



2015 West Virginia State Wildlife Action Plan

West Virginia Division of Natural Resources

September 1, 2015

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Table of Contents

Executive Summary	1
List of Acronyms	3
Chapter 1: Background	5
Chapter 2: Planning Process	9
Chapter 3: At-Risk Species and Habitats	21
Chapter 4: Stresses on Species\Habitats and Conservation Actions in Response To Stresses	234
Chapter 5: The West Virginia Landscape – An Ecoregional Perspective	248
Chapter 6: Conservation Focus Areas	282
Chapter 7: Monitoring, Adaptive Management, Research and Data Acquisition, Data Management and Plan Revision	430
References	447
Appendix 1: SGCN Species List by Taxa and Priority	455
Appendix 2: SGCN Species List by Habitat	
Terrestrial	516
Aquatic	606
Appendix 3: SGCN Species List by Ecoregion	649
Appendix 4: SGCN Species List by Conservation Focus Area	780
Appendix 5: West Virginia SWAP Partner Workshop Notes, June 23-24, 2015	1095
Appendix 6: Roadmap to Required Elements in This Plan	1102
Appendix 7: Significant Changes from the 2005 SWAP to the 2015 SWAP	1103

Executive Summary

The 2015 West Virginia State Wildlife Action Plan (SWAP) is a response to Congress's challenge for all states to provide a comprehensive wildlife conservation strategy, but more importantly, it is a road map for the West Virginia Division of Natural Resources (WVDNR) and its many partners and collaborators to proactively conserve the full array of West Virginia's biological diversity.

The citizens of West Virginia enjoy a state rich in natural resources, including an incredible diversity of landscapes, plants, and animals on both public and private lands. The people of this state have a long history of attachment to and concern for fish and wildlife resources. This plan identifies over 600 animal and 400 plant "Species of Greatest Conservation Need" (SGCN) in the state that, as the name implies, need a little more help from us all if we are to avoid their disappearance from the landscape. They, along with many more common species, thrive or fail primarily on the basis of suitable habitat availability and quality. Stresses to the overall ecosystem and to SGCN's in particular include habitat loss, habitat degradation, disease, competition, and predation. Furthermore, these stresses occur at multiple geographic scales and over different time frames presenting a complex challenge to comprehensive planning for conservation actions that address those stresses. This plan responds to that challenge by moving beyond the regulatory environment. It presents a more collaborative and voluntary approach which engages the full array of stakeholders including public and private landowners, agencies, non-governmental organizations, education and research institutions, and the general public. The 2015 SWAP has the following 10 year goals:

- ✓ Halt the decline of at-risk species and thus avoid the need for federal listing as threatened or endangered
- ✓ Assist with the recovery of federally listed species
- ✓ Keep the common species common
- ✓ Conserve the full array of habitat types and biological diversity in the state

The 2015 SWAP was developed with technical and strategic guidance from a multi-agency and organization Advisory Team. A Core Working Group was established and included virtually all of the professional staff from the agency's Wildlife Diversity Unit and members of a West Virginia University (WVU) Natural Resource Analysis Center consulting team working under a cooperative agreement with the agency. The WVDNR staff provided data, technical analysis, and most of the content for the plan. The WVU consulting team provided technical analysis, guidance, geospatial support, and additional content for the plan while also managing the planning process for the agency. External input to the plan was substantial and provided through a variety of sources and expert assistance including The American University, West Liberty University, Marshall University, and outside consultants.

While the 2015 SWAP represents compilation, analysis, management, and communication of large and complex volumes of data, information and relationships, its concept is straightforward.

- ✓ Identify, locate, and describe Species of Greatest Conservation Need.
- ✓ Identify, locate, and describe terrestrial and aquatic habitats.
- ✓ Understand habitat/species relationships.
- ✓ Evaluate stresses to species and habitats at multiple geographic scales.
- ✓ Formulate conservation actions to reduce stresses at multiple geographic scales.

- ✓ Develop Conservation Focus Areas (CFAs) where stresses and conservation actions are geographically linked.
- ✓ Develop a plan to monitor performance, continue research, and adapt management techniques to improve results.

The 2015 SWAP recognized over 600 animal species as SGCN, but the 319 Priority 1 species are the primary focus for conservation activities. Included in the SGCN list are Amphibians, Birds, Butterflies and Moths, Cave Invertebrates, Crayfish, Dragonflies and Damselflies, Fish, Snails, Mammals, Mussels, Other Invertebrates, Reptiles, and Tiger Beetles.

Science and technology played a dominant role in developing this plan. Classification and mapping of terrestrial and aquatic habitats in West Virginia incorporated data from regional mapping projects and the WVDNR's own classification and mapping efforts. Spatial analysis combined GIS databases for species occurrence with the GIS databases for habitat occurrence to help identify species/habitat relationships. A new database was built to archive and facilitate communication of these results.

Stress assessment and prioritization were conducted statewide by evaluating the geographic extent and biological impact of stresses as well as the potential for effective conservation action. That effort identified 21 major stresses on terrestrial SGCN populations and habitats and 20 major stresses on aquatic populations and habitats. Hundreds of conservation actions were formulated to respond to those stresses. Sixty-nine of these actions were considered high priority. They present a strong call for collaboration among conservation partners. They are rarely regulatory, and largely voluntary.

Several of the proposed conservation actions are potential game changers for SGCN populations. These include:

- ✓ A proposal for collaboration among members of the state's forest management community to recognize the roles that public and private forestry partners are playing to provide the desired array of forest habitats for SGCN populations,
- ✓ A proposal for collaboration between the West Virginia Division of Highways and other state and federal agencies to simultaneously protect SGCN populations and make highway construction and maintenance faster and less expensive, and
- ✓ Identifying Conservation Focus Areas to concentrate conservation actions of all partners where priority species and their habitats are most heavily concentrated

Conservation Focus Areas are a set of geographies that were identified across West Virginia where conservation resources can potentially be more efficient, effective, and provide more opportunities for leveraging successful outcomes. Stresses and associated conservation actions can occur on a statewide, regional, or local scale. Conservation Focus Areas are at a scale where more intensive investigation, collaboration, and conservation action can readily occur. Beginning this fall, conservation planning for these CFA's will engage local partners and stakeholders in an exciting effort to really "put the SWAP on the ground."

The paradigm shift envisioned in the SWAP will maintain a continuously evolving plan of action to achieve its goals. With the help of all West Virginians, the actions identified in this plan and its subsequent revisions will achieve the goals we've set for it. If we are successful, an enhanced quality of life for all our state's citizens will be the ultimate outcome.

List of Acronyms Used in this Document

AML – Abandoned Mine Lands

APHIS – Animal and Plant Health Inspection Service

ATV – All Terrain Vehicle

BCR – Bird Conservation Region

Bd -- *Batrachochytrium dendrobatidis*, chytrid fungus

BMPs – Best Management Practices

CCVI – Climate Change Vulnerability Index

CFA – Conservation Focus Area

CREP – Conservation Reserved Enhancement Program

CWA – Clean Water Act

DHHR – Department of Health and Human Resources

GIS – Geographic Information System

HUC – Hydrologic Unit Code

IUCN – International Union for Conservation of Nature

LCC – Landscape Conservation Cooperative

NEAHCS – Northeast Aquatic Habitat Classification System

NETHCS – Northeast Terrestrial Habitat Classification System

NGO – Non-Governmental Organization

NPDES – National Pollution Discharge Elimination System

NRCS – Natural Resources Conservation Service

ORBFHP – Ohio River Basin Fish Habitat Partnership

ORINWR – Ohio River Islands National Wildlife Refuge

ORSANCO – Ohio River Valley Water Sanitation Commission

PSC – Public Service Commission

RFSS – U.S. Forest Service’s Regional Forester’s Sensitive Species (RFSS) list for the Monongahela National Forest

SGCN – Species of Greatest Conservation Need

SF – State Forest

SWAP – State Wildlife Action Plan

SWG – State Wildlife Grant

TNC – The Nature Conservancy

USACOE – US Army Corp of Engineers

USDA – United State Department of Agriculture

USEPA – United States Environmental Protection Agency

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Service

USNVC – United States Navy Vegetation Classification

WMA – Wildlife Management Area

WNS – White Nose Syndrome

WVDA – West Virginia Department of Agriculture

WVDEP – West Virginia Department of Environmental Protection

WVDOF – West Virginia Division of Forestry

WVDNR – West Virginia Division of Natural Resources

WVU – West Virginia University

WVWCAP – West Virginia Wildlife Conservation Action Plan

Chapter 1: Background

1.1: Purpose and Need

1.1.1: Introduction

The fish and wildlife resources of West Virginia belong to the people of the state. Those resources are held in trust for the people by their state government. As the state's principal wildlife conservation agency, the West Virginia Division of Natural Resources (WVDNR) is charged with the responsibility of conserving all species of fish and wildlife for all the people of the state. It is no small responsibility, for our fish and wild resources include many, many more species than those with which most people are familiar. West Virginia's rich biological diversity includes thousands of plant and animal species interacting with each other and the environment. The flora and fauna of this state, along with the habitats they occupy, form West Virginia's natural heritage – a legacy that should be treasured just as much as our cultural heritage. Unfortunately, populations of many once-common species have declined because of a variety of stressors, including habitat loss, habitat degradation, diseases, and competition and predation from invasive species. While conservation actions in the past have yielded notable successes, they have not been sufficient to stem the overall tide of species decline. There is a pressing need for a comprehensive, systematic, and proactive approach to conserving the full array of West Virginia's biological diversity for the loss of any part of it is a loss to all of the state's citizens.

In the form of West Virginia's State Wildlife Action Plan (SWAP), the WVDNR has the responsibility of preparing that proactive approach to conservation. The 10-year goals of the West Virginia SWAP are to:

- (1) Halt the decline of at-risk species and thus avoid the need for federal listing as threatened or endangered; and
- (2) Assist with the recovery of federally listed species; and
- (3) Keep the common species common; and
- (4) Conserve the full array of habitat types and biological diversity in the state.

Natural habitat in West Virginia, and the biological diversity it supports, includes lands under both public and private ownership. West Virginians have a strong tradition of support for the state's 1.7 million acres of public lands. Private lands, however, comprise more than 88% of the state's 15.5 million acre total land area. The citizens and the fish and wildlife resources of the state can benefit from the strong conservation tradition and sound stewardship of both public and private landowners. The West Virginia SWAP seeks to continue this tradition, while at the same time creating new opportunities for collaboration between individual and corporate landowners, communities, private and governmental organizations, and others for conserving West Virginia's biological diversity. The West Virginia SWAP is focused principally on such collaborative conservation. As stewards for the next generation, it is everyone's responsibility to ensure the treasures that were handed to us by nature and our ancestors are still here for future generations of West Virginians to enjoy.

1.1.2: Conservation Funding

For more than 50 years, state fish and wildlife agencies have benefited from funds provided by the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) and the Federal Aid in Sport Fisheries

Restoration Act (Dingell-Johnson, Wallop-Breaux). These monies are collected through a federal excise tax on hunting and fishing equipment. In conjunction with revenues collected through the sale of hunting and fishing licenses and habitat stamps, these funds have provided consistent support for the conservation and management of wildlife species and game fish. These monies have been critical to the establishment of the Division of Natural Resources' long-term conservation planning and have led to significant conservation results in West Virginia. Species such as White-tailed Deer, Wild Turkey, Black Bear, Canada Geese, Brook Trout and Walleye, which were in low numbers in the early 1900s, have shown dramatic rebounds.

In West Virginia, game species make up less than 5% of all animal species. While many of the state's nongame species have received substantial benefits from habitat conservation and restoration directed at game species, their needs have not been fully met. Conservation efforts for these species have in large part been opportunistic and crisis-driven, limited by a lack of funding and by a lack of strategic approaches to species and habitat conservation. Today, with more than 1,300 species in the United States listed on the Federal Endangered and Threatened species list, and many more species in decline, the need has never been greater for a complementary source of funding to support the conservation, protection, and restoration of the full array of species, especially those not covered under traditional funding strategies. The West Virginia SWAP takes measures that aid in the recovery of declining species and ensure that common native species remain common.

A coalition including more than 6,000 organizations representing wildlife enthusiasts such as birdwatchers, hunters, anglers, and others was organized in the mid 1990's and is one of the largest grassroots coalitions of its kind in the nation's history. This coalition, known as Teaming with Wildlife, was created in part to demonstrate support for federal wildlife conservation funding that can be used to address the needs of declining fish and wildlife. In response to the Teaming with Wildlife Coalition, Congress established the Wildlife Conservation and Restoration and the State Wildlife Grants programs in 2001.

As a requirement for receiving funding through these two new programs, Congress required each state to develop a State Wildlife Action Plan. West Virginia's first SWAP was developed in 2005 and covered a ten year period. The SWAP developed in West Virginia and in every other state provides an essential foundation for the future of wildlife conservation and a stimulus to engage the states, federal agencies, and other conservation partners to strategically think about their individual and coordinated roles in prioritizing and delivering conservation work. The SWAP is designed as a blueprint for conservation that all organizations and individuals can use in West Virginia, not simply a plan for the West Virginia Division of Natural Resources.

1.2: Eight Required Elements of the State Wildlife Action Plan

Congress identified eight required elements to be addressed in each state's wildlife action plan. Congress also directed that the strategies must identify and focus on "species of greatest conservation need," yet address the "full array of wildlife" and wildlife-related issues. The United States Fish and Wildlife Service and the Association of Fish and Wildlife Agencies have developed additional guidance on information needed to meet the eight elements. The strategies must provide and make use of these eight elements:

- (1) Information on the distribution and abundance of species of wildlife, including low and declining populations, as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife; and,
- (2) Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1); and,
- (3) Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats; and,
- (4) Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions; and,
- (5) Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions; and,
- (6) Descriptions of procedures to review the strategy at intervals not to exceed 10 years; and,
- (7) Plans for coordinating the development, implementation, review, and revision of the plan with federal, state, and local agencies and Indian tribes that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats.
- (8) Congress also affirmed through this legislation that broad public participation is an essential element of developing and implementing these plans.

To address both "species of greatest conservation need," and the "full array of wildlife," the West Virginia SWAP followed a stepwise approach – focusing first on identifying species in need, then on habitats associated with those species and finally on geographic areas of the state with concentrations of species and the habitats that they require. In identifying species to be addressed by the SWAP, attention was focused on at-risk species. To identify species/habitat associations, known locations of species were matched with data from habitat mapping in the state and expert opinions. High-densities of species and habitat occurrences were used to identify a series of Conservation Focus Areas (CFA's). These areas provide public agencies and private entities significant opportunities to focus their resources and energies to conserve the extensive array of biological diversity (see Chapter 2 for explanation of methods used), although conservation in the state is not to be limited solely to these areas. At multiple scales, we identified stresses, both historic and current, to species and habitats. We then identified a set of overarching conservation actions to address the stresses that can be applied in many areas of the state (Chapter 4), as well as site-specific actions for each of the Conservation Focus Areas (Chapter 6).

1.3: Value of a State Wildlife Action Plan to West Virginia

The nationwide completion of State Wildlife Action Plans was viewed as a watershed event in the history of conservation in the United States. Conservation has traditionally taken a species-by-species

approach and focused on a limited number of species. Previous conservation efforts aimed at nongame species have often focused on those species that were on the brink of extinction. However, these “emergency room” efforts at recovery are expensive and not always successful. A new proactive approach was needed that addressed the full array of wildlife, keeping common species common, while also preventing our at-risk species from declining to the point of threatened or endangered status.

State Wildlife Grant (SWG) funding has been instrumental in helping the state undertake the development and implementation of the SWAP. The development process itself has engaged new partners, strengthened existing partnerships, and significantly raised awareness about the state’s biological diversity. The resulting plan is designed to provide guidance and strategic focus to agencies, organizations, communities and individuals interested in implementing conservation.

The Wildlife Conservation and Restoration and State Wildlife Grants programs have provided new funding opportunities for conservation organizations in West Virginia. The WVDNR has made portions of these funds available to dozens of conservation organizations and universities through a cooperative grants program. Projects currently underway and already completed have increased our knowledge about the species and habitats found in West Virginia and contributed towards their conservation. Continuation of a cooperative grants program will be beneficial to implementation of the West Virginia SWAP.

State Wildlife Grant funding is a turning point in wildlife conservation funding, but it cannot possibly meet all the needs of West Virginia’s wildlife species. The actions outlined in this document suggest ways to use existing monetary resources efficiently, but new funding sources and new partnerships must also be explored. The responsibility for implementation of this plan rests with all West Virginians. To that end, one of the greatest strengths of the West Virginia SWAP has been the diverse collaboration that has resulted from this planning process. In the future, that collaboration will expand to include an even greater number of stakeholders as they assist with development and implementation of operational plans for each of the 21 Conservation Focus Areas identified in the West Virginia SWAP.

Chapter 2: Planning Process

2.1: Review of 2005 Plan

As was the case in many other states, West Virginia's first State Wildlife Action Plan (SWAP), produced in 2005, was a massive effort intended to compile information on the status, distribution, and conservation needs of hundreds of fish and wildlife species about which little was known at the time. In contrast to the research and management efforts that have restored populations of game species, populations of nongame species have historically not received adequate attention nor resources necessary for conservation planning. Despite its good intentions, the internal and external conventional wisdom regarding the 2005 West Virginia Wildlife Conservation Action Plan (WVWCAP), subtitled "*It's About Habitat*", was long on identification of species but short on real conservation actions. Given that so much critical conservation information was unavailable at that time, the 2005 WVWCAP simply couldn't accomplish what it set out to do. What it did accomplish was to identify and catalyze many of the research, survey, and mapping actions that would be necessary for development of a more effective conservation plan. Those actions included:

- More extensive species distribution and abundance surveys,
- Better mapping of terrestrial and aquatic habitats, and
- A more sophisticated understanding of the regional context for species and habitat conservation.

Over the past decade, those actions have produced a more data-rich environment for revision of the West Virginia SWAP. While it undoubtedly builds on and benefits from the 2005 WVWCAP, the 2015 revision is a brand new and much more sophisticated effort. It is designed to yield more opportunities for conservation action by more partners operating with more spatially explicit information at their fingertips.

2.2: Advisory Team for the 2015 SWAP Revision

To help guide the WVDNR in developing the 2015 SWAP, an Advisory Team was formed comprised of representatives from some of the West Virginia's most experienced conservation partners. The Advisory Team has provided valuable strategic and technical guidance and review of agency and organizational plans and priorities which informed the 2015 SWAP. The Team also reviewed portions of the draft plan itself. In addition to the WVDNR personnel, the Advisory Team included:

- The Nature Conservancy,
- West Virginia Outdoor Heritage Conservation Fund,
- West Virginia Land Trust,
- West Virginia Division of Forestry,
- United States Forest Service,
- United States Fish and Wildlife Service,
- The Conservation Fund's Freshwater Institute, and
- Coalition of West Virginia Land Trusts.

2.3: The WVDNR Team for the 2015 SWAP Revision

The WVDNR assembled a Core Working Group for the 2015 SWAP revision that included virtually all of the professional staff from the agency's Wildlife Diversity Unit and members of a West Virginia University (WVU) consulting team working under a cooperative agreement with the agency. The WVDNR staff provided data, technical analysis, and most of the content for the plan. The WVU consulting team provided technical analysis, guidance, and additional content for the plan and managed the planning process for the agency. The members of the Core Working Group for the plan included:

WVDNR Staff

- Barb Sargent
- Brian Streets
- Craig Stihler
- Dan Cincotta
- Dave Thorne
- Jack Wallace
- Janet Clayton
- Jeff Hajenga
- Jim Fregonara
- Jim Vanderhorst
- Kieran O'Malley
- Mike Everhart
- Paul Harmon
- Randy Tucker
- Rich Bailey
- Ricky Doyle
- Scott Warner
- Sue Olcott
- Walt Kordek
- Whitney Bailey

WVU Consulting Team

- Paul Kinder
- Rodney Bartgis
- Steve Brown

2.4: External Inputs to Plan Revision

2.4.1 External Inputs to Species List

There was substantial input from external experts into the selection of the 2015 Species of Greatest Conservation Need (SGCN) and habitats of greatest conservation concern. The 2005 SGCN list was reviewed by internal and external experts, state ranks were updated, and species were added to or subtracted from the 2015 list based on the most current data. External lists consulted included:

- The Northeast’s Regional Species of Greatest Conservation Need list,
- West Virginia Partners in Flight,
- Appalachian Mountains Joint Venture,
- Canaan Valley National Wildlife Refuge’s Comprehensive Conservation Plan,
- Ohio River Islands National Wildlife Refuge’s Comprehensive Conservation Plan,
- The Nature Conservancy,
- WV Division of Forestry’s Forest Resource Assessment and Forest Resource Strategy, and
- U.S. Forest Service’s Regional Forester’s Sensitive Species (RFSS) list for the Monongahela National Forest.

Nineteen experts on fish and wildlife species in West Virginia reviewed the list of candidate species, and the draft SGCN list was also provided several times for review to the Advisory Team, which itself represents multiple external entities. External expert review on particular taxa groups was provided by:

- The American University (Cave invertebrates),
- West Liberty University (Crayfish), and
- Marshall University (Amphibians and Reptiles).

2.4.2: Other External Input

External inputs from multiple sources were incorporated into the SWAP planning process. Specific planning components that benefitted from external inputs included:

- habitat mapping and classification,
- stress assessment/conservation action identification, and
- identification of Conservation Focus Areas.

The external inputs that contributed to these critical components of the SWAP planning process included:

- the Northeast Terrestrial Habitat Classification System produced by NatureServe (Gawler 2008),
- the Northeast Habitat Map produced by The Nature Conservancy (Ferree and Anderson 2013),
- the Northeast Aquatic Habitat Classification System produced by The Nature Conservancy,
- GIS analyses for Assessing Future Energy Development Across the Appalachians, produced by The Nature Conservancy and the Appalachian LCC,
- projections of population change and development potential from multiple sources,
- conservation priority analyses conducted by The Conservation Fund’s Freshwater Institute,
- ecoregional conservation priority analyses conducted by The Nature Conservancy, and
- protected lands assessments developed by The Nature Conservancy

Public input to all components of the SWAP was sought during the 45 day public review period from June 15 – July 30, 2015. During this period the WVDNR hosted three public open houses conducted across the state on June 15-16, 2015. The draft SWAP was provided for external review to many individuals and organizations who could act as partners and cooperators for plan implementation, including the following:

- Canaan Valley Institute,
- Brooks Bird Club,
- Oglebay Institute,
- Oglebay Zoo,
- Marshall University,
- The Conservation Fund’s Freshwater Institute United States Fish and Wildlife Service West Virginia Field Office,
- United States Forest Service, George Washington and Jefferson National Forests,
- United States Forest Service, Monongahela National Forest,
- United States Natural Resource Conservation Service,
- West Virginia Conservation Agency,
- West Virginia Cooperative Fish and Wildlife Research Unit,
- West Virginia Council Trout Unlimited,
- West Virginia Division of Environmental Protection,
- West Virginia Division of Forestry,
- West Virginia Division of Highways,
- West Virginia Entomological Society,
- West Virginia Master Naturalist Program Steering Committee,
- West Virginia Outdoor Heritage Conservation Fund, and
- West Virginia University.

The draft SWAP was made available to the public during the comment period through the WVDNR’s website. Additional external input was secured through an extensive array of public input opportunities during 2014 and 2015, culminating in a two-day partner workshop held July23-24, 2015. A complete list of all public and partner outreach efforts for the 2015 West Virginia SWAP is as follows.

SWAP PUBLIC AND PARTNER OUTREACH EFFORTS

Date	Location	Organization/Meeting
9/27/2014	Lewis County	WV National Hunting and Fishing Day Celebration
10/4/2014	Marion County	Tygart Lake Bird Banding
10/10/2014	DNR Web site	SWAP Announcements
10/22/2014	Elkins	Coalition of WV Land Trusts
10/28/2014	Kanawha County	WVDOF - 70 state and independent foresters
11/15/2014	Randolph County	Project Wet/WILD
11/15/2014	WV Focus Magazine	Article on climate change and the WV SWAP
3/16/2015	Fairmont	Sectional Meeting
3/16/2015	Flatwoods	Sectional Meeting
3/16/2015	Harrisville	Sectional Meeting
3/16/2015	Martinsburg	Sectional Meeting
3/16/2015	Milton	Sectional Meeting
3/17/2015	Fayetteville	Sectional Meeting
3/17/2015	Glen Dale	Sectional Meeting
3/17/2015	Logan	Sectional Meeting

3/17/2015	Moorefield	Sectional Meeting
3/17/2015	Parkersburg	Sectional Meeting
3/17/2015	Elkins	Sectional Meeting
3/16/2015	Charleston	Brooks Bird Club Meeting
3/26/2015	Martinsburg	DEP/WVCA Watershed Group Gathering
4/23/2015	Canaan Valley State Park	US Forest Service
4/25/2015	Shepherdstown	Master Naturalist Class
5/1/2015	Morgantown	WVU School of Forestry - Wildlife/Coop Unit
5/15/2015	Morgantown	NRCS Meeting
6/4/2015	Statewide	WAJR Radio Interview
6/8/2015	Statewide	Press Release
6/10/2015	Statewide	Facebook
6/10/2015	Statewide	Letter of Invitation to SWAP Workshop from DNR Chief
6/13/2015	Elkins	Master Naturalist Conference
6/15/2015	Charleston	Open House
6/15/2015	Morgantown	Open House
6/16/2015	Martinsburg	Open House
6/23/2015	Statewide	Email Reminders - From DNR Chief
7/22/2015	Elkins	Coalition of WV Land Trusts
7/23-24/2015	Elkins	SWAP Partners Workshop

The intensive two-day partner workshop conducted July 23-24, 2015 was focused on ways that the SWAP could align with the priorities of implementation partners. The ideas generated during the workshop will contribute significantly to SWAP implementation, especially during the Conservation Focus Area planning and implementation processes described in subsequent sections of this document.

2.5: Species of Greatest Conservation Need – Selection and Prioritization

2.5.1: Introduction

West Virginia's 2005 WWCAP prioritized 128 species as SGCN out of a list of 574 species that was compiled from international, national, state, and private conservation organizations. In the 2015 revision, a comprehensive species list was again compiled from many of the same sources, but assembled and prioritized according to a more standardized process. The review process identified 661 animal species as SGCN but 319 Priority 1 species are the primary focus for conservation activities.

The SGCN list was compiled in three stages: data gathering, rank verification and updating, and prioritization. As a result, some species from the 2005 list were removed, and others were added. These steps are described below.

2.5.2: Data Gathering

The SGCN list was assembled based on a variety of characteristics. Lists were first assembled from the following sources:

- West Virginia 2005 Wildlife Conservation Action Plan,
- West Virginia Division of Natural Resources’ Natural Heritage Program,
- United States Fish and Wildlife Service,
- The World Conservation Union (IUCN list),
- Northeast State Fish and Wildlife Technical Committee,
- West Virginia Division of Natural Resources’ Bird Atlas Project,
- National Audubon Society,
- Monongahela National Forest,
- Jefferson and George Washington National Forests,
- Pre-publication draft of the West Virginia Landsnail Atlas,
- Cave Invertebrate data provided by Dr. David Culver, and
- Northeast Partners in Amphibian and Reptile Conservation.

Species were organized by taxonomic group into the following categories:

- Amphibians
- Birds
- Butterflies and Moths
- Cave Invertebrates
- Crayfish
- Dragonflies and Damselflies
- Fish
- Snails
- Mammals
- Mussels
- Other Invertebrates
- Reptiles
- Tiger Beetles

2.5.3: Rank Verification and Updating

In preparing for the 2015 revision, it was recognized that many taxa were in need of a review and re-ranking at the state level. The review and re-ranking was performed as follows:

Taxa	Review and Re-ranking dates
Birds	Fall 2014
Fish	Fall 2014
Amphibians	Fall 2014
Reptiles	Fall 2014

Crayfish	Spring 2015
Mussels	Winter 2013 to Fall 2014
Butterflies and Moths	Fall 2014
Dragonflies and Damselflies	Fall 2014
Snails	Spring 2015
Cave Invertebrates	Spring 2015

2.5.3: Prioritization

The list was then revised according to standardized criteria. Species were automatically included in the SGCN list if they fell into one of the following categories:

- G1-G3 or Threatened on IUCN Red list,
- Federally listed threatened or endangered,
- Regional SGCN,
- State ranked S1-S3,
- On WVDNR's tracked species list, or
- Disjunct or otherwise genetically unique populations.

A species was also included in the SGCN list if it was an S4 and S5 species, if West Virginia was responsible for a significant portion of the population (10%) or species range (25%), and if any one of the three following criteria was met:

- It is listed by a regional or taxa working group as a species of concern,
- There is a recent threat or downward population trend not yet captured in S ranking, or
- It received a Climate Change Vulnerability Index (CCVI) score of extremely or highly vulnerable.

Species that did not meet any of the above criteria could still be included and species meeting the above criteria could be excluded with a reasonable and defensible explanation. This list was reviewed by the WVDNR's Core Working Group. Some species that qualify according to the criteria were removed for various reasons. For example, the Pink Papershell (*Potamilus ohioensis*) has been down-ranked from an S1 to S2 because their occurrence increased 10-25% over the last 15 years, and WVDNR staff biologists agree that the species is doing well without need for intervention. In the end, this process produced a list of 661 SGCN.

A prioritization methodology was then applied to focus conservation efforts. The SGCN were assigned either Priority 1 or Priority 2 status, based on an assessment of conservation urgency and opportunities for conservation action. The SGCN species that were assigned Priority 1 status included:

- All G1-G3 species,
- All S1 species,
- All species with a CCVI score of 1 or 2, and
- All species that experts think should be priorities for conservation work in the next decade (survey, monitoring, propagation, habitat creation/restoration, research, etc., taking CCVI into account.)

The resulting priority list was then reviewed by the SWAP Core Working Group. A number of species that qualified for Priority 1 status according to these criteria were subsequently removed for various reasons. For example, the Cheat Minnow (*Pararhinichthys bowersi*) is ranked S1S2, G1G2Q, but is considered a hybrid and is thus not a priority species for conservation. A number of species that fall outside the numeric criteria were included because it was the judgement of WVDNR biologists that the state or global rank did not adequately capture current species conservation needs, such as the Black-bellied Salamander (*Desmognathus quadramaculatus*) which depends on habitat that is likely to be affected by climate change, and the Ruffed Grouse (*Bonasa umbellus*) which has experienced large population declines.

In the 2005 WVWCAP, all invertebrates were included on the SGCN species list by default because there was insufficient data to prioritize them, and all were in need of more survey to improve distribution data. There is now sufficient data for mussels, tiger beetles, butterflies, moths, gastropods, and cave invertebrates, such that they have been prioritized in the 2015 revision. Very little is still known about other invertebrates such as spiders, stoneflies, mayflies, and beetles which are still in need of surveys and research.

The prioritization process resulted in a list of 319 Priority 1 species and 342 Priority 2 species. All pertinent information about these species was then entered into a dedicated Microsoft Access database (SWAPMASTER) built especially for developing and implementing the West Virginia SWAP. The SWAPMASTER database is described in more detail in Section 2.12.

Individuals and groups who contributed to or reviewed the SGCN list for the 2015 SWAP revision included:

- Appalachian Mountains Joint Venture: birds
- Barbara Sargent (WVDNR): plants, mammals, reptiles, amphibians
- Brian Streets (WVDNR): plants
- Craig Stihler (WVDNR): mammals, reptiles, amphibians, cave invertebrates, snails, tiger beetles
- Dan Cincotta (WVDNR): fishes
- Dan Dourson: landsnails
- David Culver (The American University): cave invertebrates
- David Thorne (WVDNR): fishes
- Donna Ford-Werntz (WVU): plants
- Elizabeth Byers (WVDEP): plants
- Janet Clayton (WVDNR): mussels, freshwater snails
- Jayme Waldron (Marshall University): reptiles, amphibians
- Jeff Hajenga (WVDNR): cave invertebrates, mammals, reptiles, amphibians
- Jim Vanderhorst (WVDNR): plants
- Joe Greathouse (Columbus Zoo): amphibians
- Kathryn Perez (University of Alabama): landsnails
- Kieran O'Malley (WVDNR): reptiles, amphibians, mammals
- Paul Harmon (WVDNR): plants
- Paul Johnson (Alabama Dept. of Conservation & Natural Resources): freshwater snails
- Petra Wood (WVU): birds

- Richard Bailey (WVDNR): birds
- Robert Acciavatti (USFS-retired): tiger beetles
- Rodney Bartgis (TNC-retired): plants
- Susan Olcott (WVDNR): butterflies, dragonflies, damselflies, mammals
- Susan Studlar (WVU): plants
- Thomas Pauley (Marshall University-retired): reptiles, amphibians
- Tim Pearce (Carnegie Museum of Natural History): landsnails
- Virginia Department of Game & Inland Fisheries: birds
- Zachary Loughman (West Liberty University): crayfishes

2.6 Plants

The West Virginia SWAP is a wildlife plan. The federal funding that flows from its approval may not be spent to plan for or manage plants *per se*. Plants, however, are a fundamental component of habitat for SGCN. Rare plants, in particular, are often associated with SGCN habitats and can indirectly benefit from the planning and management efforts that are associated with the West Virginia SWAP. For this reason, plants are included in most sections of the SWAP. The “SGCN” plants, as it were, were selected and prioritized using a very similar process to that described for animal SGCN in Section 2.5. A total of 482 plant species were selected as SGCN and divided into 121 Priority 1 and 361 Priority 2 species.

2.7: Habitat Classification and Mapping

2.7.1: Terrestrial Habitats

Classification and mapping of terrestrial habitats in West Virginia incorporated data from the Northeast Terrestrial Habitat Classification System (NETHCS)(Gawler 2008), the Northeast Habitat Map (Ferree and Anderson 2013) and data from the WVDNR’s own classification and mapping efforts. The WVDNR staff and WVU consultants used ESRI ArcGIS Spatial Analyst tools and map algebra to extract, reclassify, and combine data from the Northeast Habitat Map and other sources. Similar habitat types were combined across ecoregion boundaries [e.g., Allegheny-Cumberland Dry Oak Forest and Woodland + Central Appalachian Dry Oak-Pine Forest = Dry Oak (-Pine) Forests]. For floodplain and riparian areas, data from The Nature Conservancy’s Active River Layer (Smith et al. 2008) were used as they were deemed to be the best available statewide GIS floodplain model despite mapping the above-ground river floodplains in karst. Any “natural” vegetation class in the floodplain was reclassified to floodplain vegetation, leaving the developed and agriculture classes as they were. There were only a few wetlands that did not fall in the floodplain and riparian zones. These included some Laurentian-Acadian and Piedmont types that were renamed “unknown.” Shale barrens and spruce habitats were mapped based on layers that WVDNR had previously developed through plot sampling, rare plant location mapping, and photo interpretation. Calcareous Glades, which were greatly over-mapped by NETHCS, were combined with the new Northeastern Interior Calcareous Oak Forest ecological system, and large areas with mostly acidic bedrock were reclassified to “previous calcareous.” The resulting mapping and classification dataset, consisting of 20 habitat types across the state, was used for subsequent terrestrial habitat analyses in the 2015 SWAP revision.

2.7.2: Aquatic Habitats

Classification and mapping of aquatic habitats in West Virginia incorporated data from the Northeast Aquatic Habitat Classification System (NEAHCS) (Olivero and Anderson 2008) with only slight modification by WVDNR to incorporate a few additional aquatic habitat types deemed necessary to classify the state's aquatic habitats. The resulting mapping and classification dataset was used for subsequent terrestrial habitat analyses in the 2015 SWAP revision.

2.8: Species/Habitat Associations

Effective management of SGCN must also address critical habitats for these species. Likewise, effective planning for that management must incorporate these species/habitat associations. For the West Virginia SWAP, the WVDNR staff and WVU consultants combined spatial databases for species occurrence with the spatial databases for habitat occurrence that were described in Section 2.7 above to produce an analysis of the habitat types where SGCN have been recorded in the past. Mapping resolution issues associated with both species and habitat data meant that this analysis could only serve as a starting point for species experts to further validate and refine the species/habitat associations. For all 661 animal SGCN and all 482 plant SGCN, the WVDNR's species and community experts edited the preliminary spatial analysis, first eliminating resolution-induced association errors and then attributing the remaining habitats as either Primary Habitats or Secondary Habitats. Primary Habitats were defined as those in which a species would be expected to occur. Secondary Habitats were defined as those in which the species might occur or habitats it may use if the primary habitat was nearby. These associations were then added to the SWAPMASTER database.

2.9: Stress Identification and Prioritization

Conservation planning for SGCN and habitats must address threats or stresses to both species and habitats. It is the position of the WVDNR that most activities that can negatively affect species and habitats should be viewed more as stresses than as threats. The distinction is more than semantic. Many influences tend to cause negative effects on habitats that at any one time are local, partial, and incremental. They tend to be more chronic than acute. They may be viewed more accurately as stresses than as threats. That is not to diminish their importance, but rather to guide our thinking to more appropriate measures to reduce or mitigate their effects.

In its identification and prioritization of stresses, the West Virginia SWAP adopted the IUCN hierarchical threat classification system recommended by the Northeast Fish and Wildlife Diversity Technical Committee of the Northeast Association of Fish and Wildlife Agencies in its Northeast Lexicon. The term "threats" has in most cases, been replaced with the term "stresses" in the West Virginia SWAP, for the reasons described above.

Utilizing the IUCN classification system, which recognizes 43 potential stress categories, nine Wildlife Diversity experts from WVDNR collaboratively identified the stresses that exist for each habitat type for terrestrial species and for each HUC-8 watershed for aquatic species within the state's four ecoregions. In doing so, they incorporated many sources of information including the energy development probability models developed by the Appalachian LCC, climate change vulnerability assessments, NETHCS, NEAHCS, permit data from the West Virginia Division of Environmental Protection (WVDEP) and their own experience. The WVDNR experts then individually assessed those recognized stresses for

impact on habitat for SGCN, considering the array of risk factors recommended in the Northeast Lexicon. Their individual impact scores were tallied for each stress by habitat, HUC-8, and ecoregion. The highest scoring stresses with the greatest degree of consensus among the WVDNR experts, 21 terrestrial stresses and 20 aquatic stresses, were prioritized for subsequent development of conservation actions. Additional stresses that were identified as non-place-based, i.e., direct stresses on SGCN populations themselves, such as White Nose Syndrome in bats, were described, along with appropriate conservation actions, in SGCN taxa descriptions (Section 3.2). Results of the stress identification and prioritization process were imported into the SWAPMASTER database.

2.10: Conservation Action Identification and Prioritization

Identification and prioritization of conservation actions to address priority stresses followed a process similar to the one described for stresses in Section 2.9 above. Potential actions to respond to stresses were first identified by WVDNR Wildlife Diversity experts, and then prioritized. The identification step produced well over 600 potential conservation actions to address priority threats. The WVU consultants consolidated similar actions to reduce that number to about 150 potential actions; about half of these were judged to be statewide in scope and the other half were ecoregional or local. These actions are identified in the West Virginia SWAP. The statewide conservation actions were then subjected to another prioritization process with the WVDNR experts, the Advisory Team, and the WVDNR Administration. They selected the highest priority actions that would be more prominently featured in the SWAP Executive Summary. The final conservation actions that were identified to respond to priority stresses were imported into the SWAPMASTER database.

2.11: Conservation Focus Area Identification and Planning

Although many of the conservation actions that are prioritized in the West Virginia SWAP are statewide in scope, concentrations of SGCN and their habitats exist in many areas of the state. To achieve the goals of the West Virginia SWAP, it was necessary to plan, and manage, at a finer scale. As one step in that direction, the WVDNR mapped the SGCN concentrations from its spatial databases of species occurrence and combined this information with additional expert input from the agency's Wildlife Diversity biologists. The WVU consultants assisted in this effort by bringing other spatial datasets, such as landscape integrity, to the analysis and then helping the agency delineate the boundaries of the resulting areas of concentration. Even when not appropriate, HUC-12 watersheds were used for that delineation. While it is the WVDNR's intent to fulfill its statutory conservation mandate across the entire state, the 21 Conservation Focus Areas (CFA's) that have emerged from this analysis are intended, as their name implies, to be areas of more concentrated conservation focus. In the aggregate, the CFA's cover roughly half the state. They vary in size, land ownership, land use, habitat extent, stresses, potential conservation actions, and potential partners (both public and private). The CFAs identification and treatment in the West Virginia SWAP are at the strategic level. Subsequent to United States Fish and Wildlife Service approval of the West Virginia SWAP, the WVDNR and its WVU consultants are committed to planning and adaptive management at the individual CFA level. The agency believes that working at that scale, with more local partners, is the component of the SWAP process that can most effectively deliver on its full promise.

2.12: SWAPMASTER Database

Most of the data compiled or generated during the planning process for the West Virginia SWAP were incorporated into the SWAPMASTER Microsoft Access database built specifically for the plan and its subsequent implementation. The SWAPMASTER database was used to generate virtually every table included in the body of this plan and its appendices. After the plan is finalized and approved, it is the WVDNR's intention to make the database available to plan partners and the public. The SWAPMASTER database will be updated regularly with information from other WVDNR databases, as well as with information about plan implementation.

Chapter 3: At-Risk Species and Habitats

3.1: Introduction

Using the selection process described in Section 2.5, a total of 1,143 animal and plant species have been identified as Species in Greatest Need of Conservation (SGCN) in the 2015 West Virginia SWAP. A complete list of those species and the priority assigned to each is provided in Appendix 1. Given the number of SGCN's addressed in this plan, it is impractical to discuss in detail the ecological requirements, distribution and status of every species, as well as the stresses and appropriate conservation actions for each. Looking at assemblages of species by taxonomic group and the habitats in which they occur allows the WVDNR to address broad patterns and trends across many species. While the agency's Wildlife Diversity Program tracks this information for individual species, program experts have compiled it for analysis and discussion in this plan in these aggregated syntheses.

3.2: Species in Greatest Need of Conservation

Taxonomic groups, such as birds, amphibians, and plants, respond to their environment in markedly different ways but often share within their own group characteristics that define how they can interact with their environment. For example, fish and mussels are both aquatic but adult fish are highly mobile and can move in response to changes within their aquatic environment but adult mussels are not mobile and cannot respond the same way. Similarly, adult butterflies and moths may be winged insects like adult dragonflies and damselflies, but the larvae of the latter are tied to aquatic habitat conditions while larvae of the former are not. In this section, broad patterns of species distribution and status in West Virginia are described, along with a high level view of recent work in the State on each group and associated conservation issues. Cave invertebrates span many taxonomic groups but since they share many common adaptations for their highly unusual habitat, are treated herein as a single taxonomic group. Also, the taxonomic groupings are not all at the same taxonomic level, such as order or class, but are at the level experts felt appropriate for the purposes of this plan.

Within each taxonomic group that follows, species are divided into species groupings based on similar habitat use, life history characteristics, and other traits that experts felt were appropriate for describing at a somewhat finer scale the conservation issues associated with those species.

3.2.1: Taxa Descriptions

3.2.1.1: Amphibians

Description

Amphibians in West Virginia (class Amphibia) belong to two major groups: toads and frogs (order Anura) and salamanders (order Urodeles). Both groups are found statewide and require an aquatic or moist environment for successful reproduction.

Eleven frog species and three toad species occur in West Virginia. While toads and frogs both have a squat appearance, toads have dry warty skin which is easily distinguishable from the smooth glandular skin of frogs. Breeding occurs in the spring and early summer when males use vocalizations to attract mates. Externally fertilized gelatinous egg masses are laid in streams, ponds, ditches, or other water bodies. The eggs develop into a larval (tadpole) stage which lasts for a few weeks for most species. American bullfrogs (*Lithobates catesbiana*) however may remain larvae for up to two years. Adult frogs may be aquatic or semi-aquatic while adult toads are terrestrial.

Thirty-four salamander species occur in West Virginia. Salamanders have smooth glandular skin which enables cutaneous respiration in many species. Most salamanders breed in spring and early summer. Some terrestrial species require aquatic habitats for breeding and undergo annual mass migrations from terrestrial habitats to aquatic breeding locations. Many terrestrial species use moist forested or rocky habitats for breeding. The female deposits eggs either in small clusters or in large gelatinous masses in appropriate habitat. Because of their moist scaleless bodies, many salamanders occur in aquatic or semi-aquatic habitats such as rivers, creeks, and springs or in moist forested areas.

Distribution

Although common amphibians occur throughout the state, for many SGCN species, West Virginia is at the edge of their ranges or West Virginia and/or adjacent states may share limited endemic species. Habitat availability, environmental conditions, and geographic barriers such as rivers and mountains restrict or delineate many SGCN species' distribution.

The area comprising the Central and Southern Appalachian Mountains is the global center of endemism for salamanders in the family Plethodontidae. Many Appalachian endemics have fairly restricted ranges, and their future existence is wholly or substantially dependent upon the condition of their habitats and populations in West Virginia. Central and Southern Appalachian Mountain endemics include: Black-bellied Salamander (*Desmognathus quadramaculatus*), Black Mountain Salamander (*D. welteri*), Kentucky Spring Salamander (*Gyrinophilus porphyriticus duryi*), Green Salamander (*Aneides aeneus*), and Cumberland Plateau Salamander (*Plethodon kentucki*). Central Appalachian Mountain endemics include: Valley and Ridge Salamander (*P. hoffmani*), Cow Knob Salamander (*P. punctatus*), Shenandoah Mountain Salamander (*P. virginia*), and Wehrle's Salamander (*Plethodon wehrlei*). Two salamanders are endemic to West Virginia, West Virginia Spring Salamander (*G. subterraneus*) and Cheat Mountain Salamander (*P. netting*).

Species Groupings

Toads and Frogs

The preferred habitat for most of these species, floodplains along major rivers, is also the preferred location for human activities related to agriculture, floodplain development, and forest management activities. Habitat loss/degradation, disease, introduced species, and pollution are threats to this group.

Acris blanchardi (Blanchard's Cricket Frog)
Acris crepitans (Northern Cricket Frog)
Anaxyrus fowleri (Fowler's Toad)
Lithobates pipiens (*Rana pipiens*) (Northern Leopard Frog)
Pseudacris brachyphona (Mountain Chorus Frog)
Pseudacris feriarum (Upland Chorus Frog)
Scaphiopus holbrookii (Eastern Spadefoot)

Aquatic Salamanders

This group includes stream-dwelling and riparian species. Threats include impacts to water quality, habitat fragmentation, disease, and acid deposition.

Ambystoma barbouri (Streamside Salamander)
Ambystoma texanum (Smallmouth Salamander)
Cryptobranchus alleganiensis alleganiensis (Eastern Hellbender)
Desmognathus fuscus (Northern Dusky Salamander)
Desmognathus monticola (Seal Salamander)
Desmognathus ochrophaeus (Allegheny Mountain Dusky Salamander)
Desmognathus quadramaculatus (Black-bellied Salamander)
Desmognathus welteri (Black Mountain Salamander)
Eurycea bislineata (Northern Two-lined Salamander)
Eurycea lucifuga (Cave Salamander)
Gyrinophilus porphyriticus duryi (Kentucky Spring Salamander)
Gyrinophilus porphyriticus porphyriticus (Northern Spring Salamander)
Gyrinophilus subterraneus (West Virginia Spring Salamander)
Necturus maculosus maculosus (Mudpuppy)
Pseudotriton montanus diastictus (Midland Mud Salamander)
Pseudotriton ruber ruber (Northern) Red Salamander

Terrestrial Salamanders

This group includes the woodland and "mole" salamanders. Some species occur across the state in specific habitats such as sandstone outcrops. Geographic barriers have restricted other species to localized areas such as isolated ridgetops. Threats include habitat fragmentation and climate change.

Ambystoma jeffersonianum (Jefferson Salamander)
Ambystoma opacum (Marbled Salamander)
Aneides aeneus (Green Salamander)
Eurycea longicauda (Longtail Salamander)
Plethodon cylindraceus (White-spotted Slimy Salamander)
Plethodon glutinosus (Slimy Salamander)
Plethodon hoffmani (Valley and Ridge Salamander)

Plethodon kentucki (Cumberland Plateau Salamander)
Plethodon nettingi (Cheat Mountain Salamander)
Plethodon punctatus (Cow Knob (White Spotted) Salamander)
Plethodon virginia (Shenandoah Mountain Salamander)
Plethodon wehrlei (Wehrle's Salamander)

Conservation Issues

Amphibians have complex life histories and unique physiologies that expose them to stresses that affect population viability. Toads, frogs, and many salamanders use lotic, lentic, and ephemeral water bodies for breeding. Terrestrial salamanders have specific moisture, humidity, and temperature requirements that affect their distribution across the landscape. Central Appalachian forest endemics are lungless and breathe through their skin and mouth lining. They are particularly at risk if their habitat becomes drier. Climate change, pollution (industrial, agricultural, urban, etc.), disease, introduced species, and habitat loss and modification impact amphibian populations. These effects can occur rapidly through mass die-offs or gradually by affecting reproduction and thereby inhibiting recruitment.

Climate change is predicted to increase the frequency of such climate stresses as extreme drought and flood events. Droughts that occur during the breeding season, when most amphibians require aquatic habitats, can truncate or completely eliminate all reproductive effort for the year. Flood events alter, if not eliminate, foraging habitat, cover, and breeding substrate. The effects of climate change can be mitigated by maintaining or restoring habitat integrity in all amphibian life zones.

Pollution in the form of industrial, agricultural, and urban effluent affects aquatic and terrestrial amphibians. Because the skin of many species supports cutaneous respiration, water pollutants can more easily impact the health of these species compared to those without permeable skin. Acid precipitation results in low pH and subsequent heavy metal deposition. Low pH and increased aluminum negatively affect invertebrate diversity (a primary food resource) and impair amphibian larval development. Eventually, pH can become too low to sustain amphibian life. Water temperature, breeding substrate, and larval development are impaired when agricultural chemicals, sediment, and nutrients enter aquatic systems. Storm water and urban waste water introduce endocrine disrupting chemicals, alter stream chemistry, and exacerbate high water conditions. Conservation actions include monitoring water quality, National Pollutant Discharge Elimination System (NPDES) enforcement, and community outreach programs that emphasize appropriate hazardous waste disposal and water conservation practices.

Modifying habitat or introducing incompatible land uses stresses amphibian populations making them vulnerable to disease. Amphibians are vulnerable to ectotherm-specific diseases such as chytrid fungus (*Batrachochytrium dendrobatidis* or Bd) and ranavirus. Depending on the species affected, these pathogens can cause mass die-offs or target larval and juvenile stage amphibians. Both diseases are present in West Virginia. Another variation of chytrid fungus, *Batrachochytrium salamandrivorans* (Bsal), specifically affects salamanders. It is present in Europe and surveillance in North America is ongoing. Conservation actions for these pathogens include 1) surveillance to assess disease prevalence, 2) developing bio-security protocols for biologists and the public, and 3) outreach programs to create public awareness of these diseases and, 4) maintaining intact habitat.

Introduced species can include native or non-native species. Introducing fish to fishless water bodies exposes amphibian populations to predation they are not adapted to. Bullfrogs are efficient predators

and disease vectors and are often introduced to ponds and opportunistically colonize when seasonal ponds are converted to permanent water bodies. They appear to have some resistance to chytrid fungus and can serve as disease vectors. Other species may not be predatory but, when introduced, may compete with native populations for habitat resources. Conservation actions include maintaining habitat integrity, maintaining natural populations, and discouraging the introduction of species not present in native habitat.

Fragmenting or otherwise degrading habitat exposes amphibian populations to other environmental stresses which act in concert to threaten population viability. Fragmentation manifests itself differently according to the species affected but can include draining wetlands, converting seasonal wetlands to permanent water bodies, and logging intact forests. Off-road motorized vehicle recreation has severely degraded seasonal pools and wetlands important for many amphibians statewide.

Fragmentation and loss of forest cover is a primary concern for the Appalachian endemic salamanders. The largest and most extensive populations tend to occur in areas with extensive forest cover. Maintaining an extensive forest canopy is important to maintaining suitable within forest microclimates. Roads and utility corridors fragment forest salamander populations and changes in forest floor structure, especially downed woody debris and leaf litter accumulation, can substantially reduce salamander populations. Poor culvert placement and road drainage fragments salamander populations in headwater streams. Loss or reductions of woody debris and leaf litter can also reduce populations of salamanders in headwater streams. Some endemic forest salamanders are also displaced by more widespread salamanders following changes in forest structure and increased fragmentation.

Amphibians can best respond to external stressors when their habitat is intact and functioning. Maintaining ecosystem integrity ensures amphibian life zones are also present and functioning. Conservation actions must focus on preserving core areas of intact habitat, restoring areas of impaired habitat, and re-establishing populations in appropriate locations.

SGCN Summary

West Virginia's list for SGCN includes 35 amphibian species, with 18 considered Priority 1. The West Virginia Spring Salamander is listed as a G1 S1 species, the Shenandoah Mountain Salamander and the Cheat Mountain Salamander are listed as G2 S2, and the Cow Knob Salamander and Green Salamander are listed as G3 S2 and G3 S3 respectively. The Cheat Mountain Salamander is currently federally listed as threatened. In 2015 the United States Fish and Wildlife Service (USFWS) received a petition to list the Green Salamander, Cow Knob Salamander, Eastern Hellbender, and West Virginia Spring Salamander. The USFWS announced a "substantial finding" for the Green Salamander, triggering a status review.

3.2.1.2: Birds

Description

Owing to its diverse physiography and climate, West Virginia hosts over 170 breeding bird species in habitats ranging from Dry Oak (-Pine) Forests of the Ohio River floodplain and foothills to high elevation boreal Red Spruce and Northern Hardwood forests in the Allegheny Highlands. Extensive grasslands can be found in the Eastern Panhandle, Greenbrier Valley, South Branch Valley, and in recent years, increasingly in the Cumberland Mountains. An additional 60+ species occur in the state only in winter and do not remain to breed. Birds occupy many niches within these habitats based on many factors, from vegetative structure to foraging strategy to needs related to breeding microhabitat.

Distribution

The distribution and abundance of many bird species in West Virginia is changing as habitats and mortality risks change here and elsewhere. The most pronounced changes have been in response to large-scale land use changes. By 1920, the original extensive forest cover of West Virginia was substantially reduced by farming and large-scale timber harvesting. This led to a major expansion of the extent of grassland and open upland habitat in the State, and an increase in the abundance of grassland birds. A period of farmland abandonment beginning in the early twentieth century and the recovery of forests from large-scale timber harvesting led to a significant loss of grassland habitats concomitant with widespread increases in the abundance of early successional species. By the end of the twentieth century, forest growth had reduced the extent of early successional habitats from the peak. Overall, bird populations of grassland and early successional species have followed this general habitat trend, as well as having increased substantially with human landuse change and then declining as landuse statewide changed again. It is less clear if forest birds as a group have proportionately benefited, as the negative impacts of forest fragmentation in recent decades appear to have offset the potential gain expected from the increase in forest cover.

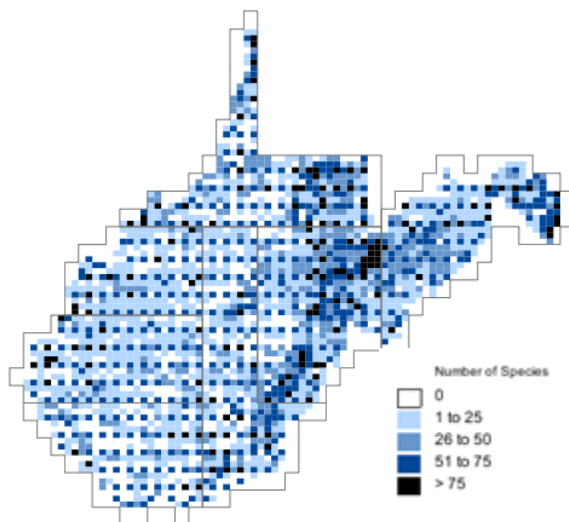
Other changes are anthropogenic and range from urban and suburban development in the Eastern Panhandle and Teays Valley to ongoing energy development in the form of coal, gas, and wind. Forest patches are increasingly fragmented statewide, and associated risks to birds that rely on forest interior habitats have increased. With very few exceptions, grasslands in West Virginia have always been a product of human and natural disturbance. In recent years, new grasslands have been created as coal mines are reclaimed. Elsewhere, changes in farming practices have affected some bird species. For example, clean farming practices have almost certainly negatively impacted Loggerhead Shrike (*Lanius ludovicianus*), while changes in hay harvesting practices are contributing to long-term declines for Eastern Meadowlark (*Sturnella magna*).

The initial West Virginia Wildlife Conservation Action Plan (WVWCAP) tasked staff with answering basic questions regarding SGCN species. True distribution and abundance of many species remained unknown. In 2014, West Virginia Division of Natural Resources (WVDNR) staff and volunteers completed the last of six years of fieldwork on the 2nd West Virginia Breeding Bird Atlas. Data from this project will serve as a primary tool for guiding conservation and management decisions related to birds for the next 20 years. Over 100,000 individual observations were submitted, and these data will enable the creation of accurate distribution maps for each of over 170 species known to breed in the state. In addition to distribution data, staff and volunteers also conducted abundance sampling in over 700 atlas blocks. The resulting density models will serve to identify focal areas for conservation for up to 80 species. These

will be particularly useful for still-ubiquitous but declining species such as Wood Thrush (*Hylocichla mustelina*) and Cerulean Warbler (*Setophaga cerulea*).

Additionally, WVDNR staff targeted survey efforts towards specific species that might otherwise be missed using atlas protocols. Two examples include Loggerhead Shrike (*Lanius ludovicianus*) and Swainson's Warbler (*Limnothlypis swainsonii*). Each species was subject to an intensive two-year survey that targeted specific habitats. The resulting data were highly informative in multiple respects. Swainson's Warbler is more widely-distributed than was known, and Loggerhead Shrike is now confirmed to be exceptionally scarce and in urgent need of conservation action.

Bird species richness by atlas block surveyed, 2009-2014



Species Groupings

As an initial step in the planning process, we revised the SGCN list for birds. These changes reflect insights gained and data collected during the first plan period, 2005-2015 (Bailey 2015). Species have been added while others have been removed. In some cases, as with Bewick's Wren (*Thryomanes bewickii*), it is because we now consider the species extirpated. Others continue to recover, as has been the case with Bald Eagle (*Haliaeetus leucocephalus*). Revisions to state ranks were informed by available data from multiple sources using NatureServe's methodology. In general, each ranking incorporated the following:

- Distribution and abundance data from the recently-completed 2nd West Virginia Breeding Bird Atlas,
- Breeding Bird Survey data assessed at multiple time scales (where applicable),
- Partners in Flight global population estimates and state population responsibility,
- Bird Conservation Region (BCR) priorities (Appalachian Mountains Joint Venture),
- Inclusion on the regional SGCN list, and
- Global rank.

Rank revisions were reviewed by both WVDNR and BCR staff on a case-by-case basis. Below is the revised list of state SGCN bird species, grouped by guild/general habitat preference, which will guide agency work until the next plan revision.

Aerial Insectivores

These species, while varying in specific habitat preferences, share a common foraging strategy of capturing insect prey while in flight. Many bird species that employ this strategy have been declining across the United States, with steepest negative trends in the northeast and in species that migrate long distances (Nebel *et al.* 2010). Species listed here have all been shown to either occur only locally, or to be in decline (Bailey 2015; Sauer *et al.* 2014). Threats include loss of nesting/breeding habitat, loss of wintering habitat and possible decline in insect diversity and abundance.

Antrostomus carolinensis (Chuck-will's-widow)
Antrostomus vociferus (Eastern Whip-poor-will)
Chaetura pelagica (Chimney Swift)
Chordeiles minor (Common Nighthawk)
Petrochelidon pyrrhonota (Cliff Swallow)
Riparia riparia (Bank Swallow)

Early Successional Forest

Early successional forest habitats in West Virginia are highly ephemeral and dependent on disturbance, either natural or anthropogenic. While specific causes of the rarity or declines of the species listed below can be complex, the availability and quality of their required habitats remains a critical component. Threats include loss of breeding and wintering habitat from multiple causes, hybridization, predation and other causes of mortality, and low productivity.

Asio otus (Long-eared Owl)
Bonasa umbellus (Ruffed Grouse)
Coccyzus erythrophthalmus (Black-billed Cuckoo)
Icteria virens (Yellow-breasted Chat)
Setophaga discolor (Prairie Warbler)
Vermivora chrysoptera (Golden-winged Warbler)
Vermivora cyanoptera (Blue-winged Warbler)

Park-like and Riparian

The species listed below, while differing in their specific habitat needs, share a general affinity for park-like open forest settings or proximity to water. Red-headed Woodpecker (*Melanerpes erythrocephalus*) and Prothonotary Warbler (*Protonotaria citrea*) appear stable in population but occur locally, while both Summer Tanager (*Piranga rubra*) and Rusty Blackbird (*Euphagus carolinus*) are in decline (Greenberg and Droege 1999; Sauer *et al.* 2014). Threats include habitat loss and change from diverse sources.

Euphagus carolinus (Rusty Blackbird)
Melanerpes erythrocephalus (Red-headed Woodpecker)
Piranga rubra (Summer Tanager)
Protonotaria citrea (Prothonotary Warbler)

Forest Interior

West Virginia has a high to very high global population responsibility for a number of species on the list below. In the case of the Cerulean Warbler, no other state hosts more breeding birds, at an estimated 35.8% of the total global population (Partners in Flight Science Committee 2013). Threats include habitat fragmentation and alteration from energy development and other sources, habitat loss on wintering grounds, mortality from predation, and brood parasitism by the Brown-headed Cowbird (*Molothrus*

ater). Forest fragmentation and loss of forest interior habitat has become particularly problematic in West Virginia in the last few decades. In one study, there was a 12.7% loss of forest interior in a 10-county area of Kentucky and West Virginia for the period 1992-2006, largely due to surface coal mining (Wickham *et al.* 2013).

Aquila chrysaetos (Golden Eagle)
Buteo platypterus (Broad-winged Hawk)
Cardellina canadensis (Canada Warbler)
Catharus fuscescens (Veery)
Certhia familiaris (Brown Creeper)
Empidonax minimus (Least Flycatcher)
Geothlypis formosa (Kentucky Warbler)
Helmitheros vermivorum (Worm-eating Warbler)
Hylocichla mustelina (Wood Thrush)
Limnothlypis swainsonii (Swainson's Warbler)
Parkesia motacilla (Louisiana Waterthrush)
Setophaga caerulescens (Black-throated Blue Warbler)
Setophaga cerulea (Cerulean Warbler)
Setophaga fusca (Blackburnian Warbler)

Grasslands and Old Field

While long-term declines in grassland bird populations have generally stabilized nationally, negative trends continue for a number of species in West Virginia. For other species, habitat loss in some areas has been offset by newly-created habitats elsewhere (Bailey 2015). General threats include habitat loss from development and farmland abandonment, changes in agricultural practices, timing of hay harvest, exposure to pesticides, and, locally, conversion of grasslands to row crops. (North American Bird Conservation Initiative 2014; Sauer *et al.* 2014).

Ammodramus henslowii (Henslow's Sparrow)
Ammodramus savannarum (Grasshopper Sparrow)
Asio flammeus (Short-eared Owl)
Colinus virginianus (Northern Bobwhite)
Dolichonyx oryzivorus (Bobolink)
Eremophila alpestris (Horned Lark)
Falco sparverius (American Kestrel)
Lanius ludovicianus (Loggerhead Shrike)
Lanius ludovicianus migrans (Migrant Loggerhead Shrike)
Pooecetes gramineus (Vesper Sparrow)
Spiza americana (Dickcissel)
Spizella pallida (Clay-colored Sparrow)
Spizella pusilla (Field Sparrow)
Sturnella magna (Eastern Meadowlark)
Tyto alba (Barn Owl)

High Elevation Forests and Wetlands

West Virginia's high elevation forests and wetlands are greatly changed from their historical extent. While the high-elevation Red Spruce Forest is currently increasing owing to natural succession and restoration efforts, its long-term prospects remain in doubt as effects from climate change are

documented. All of the species on this list are restricted in varying degrees to high elevation habitats. Some species are increasing, while others are extremely rare and localized. Threats to these species include changes in vegetation community composition and structure and habitat loss on wintering grounds (Bailey 2015, Byers *et al.* 2010, Byers and Norris 2011).

Accipiter gentilis (Northern Goshawk)
Aegolius acadicus (Northern Saw-whet Owl)
Carduelis pinus (Pine Siskin)
Catharus ustulatus (Swainson's Thrush)
Contopus cooperi (Olive-sided Flycatcher)
Empidonax alnorum (Alder Flycatcher)
Empidonax flaviventris (Yellow-bellied Flycatcher)
Loxia curvirostra (Red Crossbill)
Seiurus noveboracensis (Northern Waterthrush)
Sphyrapicus varius (Yellow-bellied Sapsucker)
Vermivora ruficapilla (Nashville Warbler)

Wetlands, Waterways and Waterbodies

Wetlands, waterbodies and rivers comprise a relatively small percentage of the West Virginia landscape. Consequently, the state population responsibility for all species on this list is quite low. A number of species on this list are uncommon and only occur locally in suitable habitat. A number of species are in decline, while others are increasing (Bailey 2015). Protecting available habitat is critical to maintaining species presence in West Virginia. Threats include habitat loss and alteration, climate change, change in farming practices, and development.

Actitis macularius (Spotted Sandpiper)
Anas rubripes (American Black Duck)
Ardea herodias (Great Blue Heron)
Bartramia longicauda (Upland Sandpiper)
Botaurus lentiginosus (American Bittern)
Butorides virescens (Green Heron)
Circus cyaneus (Northern Harrier)
Gallinago delicata (Wilson's Snipe)
Haliaeetus leucocephalus (Bald Eagle)
Ixobrychus exilis (Least Bittern)
Lophodytes cucullatus (Hooded Merganser)
Mergus merganser (Common Merganser)
Pandion haliaetus (Osprey)
Podilymbus podiceps (Pied-billed Grebe)
Porzana carolina (Sora)
Rallus limicola (Virginia Rail)
Scolopax minor (American Woodcock)

Other

The Peregrine Falcon (*Falco peregrinus*) was successfully reintroduced into West Virginia after having been extirpated by shooting and pesticide contamination. Originally it nested on cliffs, often in mountainous regions. However, it currently nests in West Virginia near water, including on man-made

structures and in urban settings. It remains unclear what its habitat usage over the long-term will be in West Virginia.

Falco peregrinus (Peregrine Falcon)

Conservation issues

The 2005 WVWCAP called for continued monitoring of rare or threatened species. These range from Bald Eagle and Peregrine Falcon to Olive-sided Flycatcher and Golden-winged Warbler. In some cases, as with Bald Eagle, monitoring of nest sites for productivity has confirmed that the species continues to recover at a robust pace. Other species, such as the Golden-winged Warbler, continue to decline (Bailey 2015, Sauer *et al.* 2014). These declines have led to multi-state partnerships guiding research and management.

General habitat threats across all taxa have been assessed by WVDNR staff and others. Distilled from this, there are a number of conservation concerns of particular importance to birds. These include climate change, ongoing habitat fragmentation, habitat alteration and loss related to energy and urban development, changes in farming and agricultural practices, and quality and quantity of available early successional habitats. Specific conservation actions will be developed to address these threats.

With this State Wildlife Action Plan (SWAP) revision, focus for many (but not all) species will shift away from better understanding of distribution and abundance to specific conservation and management actions. These actions will vary based on needs of individual species, but will in many cases have common threads. These threads include improved and expanded private landowner outreach and education, creating and strengthening partnerships between Non-Governmental Organizations (NGO's) and agencies in-state, greater presence and participation in regional and international partnerships and conservation efforts, and increasing capacity and partnerships between staff within WVDNR itself.

SGCN Summary

West Virginia's SGCN list for birds includes 75 species, with 39 listed as Priority 1. Of the listed priority species, those associated with forest interior, early successional and grassland habitats will receive the greatest attention. The USFWS was petitioned to list the Golden-winged Warbler and in 2011, announced a "substantial finding", triggering a status review.

3.2.1.3: Butterflies and Moths

Description

West Virginia hosts approximately 134 species of butterflies. Because of recent taxonomic work the number of known species of butterflies is in a state of flux for the azures (*Celastrina* spp.) and crescents (*Phyciodes* spp.). The majority of butterflies (116) are resident species; the remaining 18 occur in the state annually or periodically, but do not over-winter successfully and must recolonize. West Virginia is home to approximately 2000 species of moths. The vast majority of these species are thought to be residents, with some 20-30 species occurring annually or periodically in the state as vagrants or colonizers.

Distribution

Butterflies and moths are found across the state and distribution is primarily based on larval host plant distribution and climate. Because deciduous forests are West Virginia's most common dominant habitat, the vast majority of native species utilize forest habitats to some extent, and species of lepidoptera that utilize common forest species as larval hosts are found virtually statewide. Other species are much more specialized with regard to larval host and/or climate, and therefore are found in more limited areas. Regions in West Virginia that host a disproportionate number of these more limited species include Shale Barrens in the eastern part of the state, High Elevation Northern Hardwood/Red Spruce and wetland ecosystems in the mountains, and southern coal field forests.

Species Groupings

Shale Barrens/Eastern Oak-Pine

These species occur primarily in the Eastern Panhandle and the eastern Allegheny mountains shaly habits (including pine-oak rocky woodlands, shale barrens, and dry calcareous forest, glades and woodland habitats). Threats include Gypsy Moth (*Lymantria dispar*) insecticide control, habitat loss/degradation from development, invasive species, and deer herbivory. Gypsy Moth control measures have already decimated most of these species to the point that some may be extirpated from the state.

Acronicta dolli (Doll's Merolonche)
Calephelis borealis (Northern Metalmark)
Callophrys irus (Frosted Elfin)
Catocala dulciola (Sweet Underwing)
Catocala herodias gerhardi (Pine Barrens Underwing)
Chaetagnaea cerata (Waxed Sallow)
Erynnis lucilius (Columbine Duskywing)
Erynnis martialis (Mottled Duskywing)
Euchloe olympia (Olympia Marble)
Glaucopsyche lygdamus lygdamus (Silvery Blue)
Hesperia metea (Cobweb Skipper)
Phyciodes cocyta selene (Northern Crescent)
Pyrgus centaureae wyandot (Appalachian Grizzled Skipper)
Satyrium edwardsii (Edward's Hairstreak)
Satyrium favonus ontario (Northern Oak Hairstreak)
Zale calycanthata (Double-banded Zale)

High Elevation

These species occur above ~2000 feet. Much of this habitat is protected on federal or state lands, but is threatened by climate change. Other threats include invasive species, development, and deer herbivory.

Appalachian Wetlands and/or Red Spruce

Aplectoides condita (a noctuid moth)
Boloria selene myrina (Silver-bordered Fritillary)
Brachionycha borealis (Boreal Fan Moth)
Cerastis salicarum (Willow Dart)
Eilema bicolor (Bicolor Moth)
Euchlaena effecta (Effective Euchlaena Moth)
Euphydryas phaeton (Baltimore Checkerspot)
Euphyes bimacla (Two-spotted Skipper)
Euphyes conspicua (Black Dash)
Lithophane oriunda (Immigrant Pinion Moth)
Lophocampa maculata (Spotted Tussock Moth)
Lycaena epixanthe (Bog Copper)
Melanchra assimilis (Black Arches)
Pseudohermonassa tenicula (Morrison's Sooty Dart)
Speyeria atlantis (Atlantis Fritillary)
Syngrapha rectangular (Salt and Pepper Looper)

Heathlands

Colias interior (Pink-edged Sulphur)

Northern Hardwood

Celastrina lucia (Northern Azure)
Celastrina neglectamajor (Appalachian Azure)
Chlosyne harrisii (Harris's Checkerspot)
Papilio appalachiensis (Appalachian Tiger Swallowtail)
Pieris virginiensis (West Virginia White)
Polygonia faunus smythi (Green Comma)
Polygonia progne (Gray Comma)

Southern Coalfields

These species are threatened by mineral extraction, specifically mountaintop coal mining and associated valley fills.

Autochton cellus (Golden-banded Skipper)
Phyciodes cocyta diminutor (Summer Crescent)
Speyeria diana (Diana Fritillary)

Wet Meadows/Edges

These species require dry to wet fields with a diversity of forbs including docks, campion, lambsquarters, and bluestems. Habitats are often lost to succession or development.

Atrytonopsis hianna (Dusted Skipper)

Hadena ectypa (Starry Campion Moth)
Lycaena hyllus (Bronze Copper)
Staphylus hayhurstii (Hayhurst's Scallopwing)

Mixed Mesophytic/Oak with Openings

Although their habitat is common in West Virginia, these species are some of the most challenging to document because they are naturally rare and/or spend most of the time high in tree canopies. Surveys are required to update records.

Calycopis cecrops (Red-banded Hairstreak)
Celastrina nigra (Dusky Azure)
Celastrina serotina (Cherry Gall Azure)
Cyllopsis gemma (Gemmed Satyr)
Erora laeta (Early Hairstreak)
Euchlaena milnei (Milne's Euchlaena Moth)
Parrhasius m-album (White-m Hairstreak)
Satyrium caryaevorus (Hickory Hairstreak)

Conservation Issues

Butterflies of the families Hesperidae and Lycaenidae occur in large numbers on regional and state SGCN lists. Many of these are small-bodied, relatively weak fliers with very specific host plant requirements or other narrow ecological specializations such as association with specific vegetation communities. In addition, the larvae of many species of Lycaenidae participate in symbiotic relationships with ants, so that both the larval host plant and suitable ant partners must be available in order for the species to thrive. Current threats to members of West Virginia's lepidoptera community fall into four primary categories: habitat loss from multiple sources (succession, development, and energy extraction), invasive plant species, continued pesticide use for Gypsy Moth control, and excessive deer browsing of native vegetation. Other threats include plant pathogens that effect larval host plants (Beech Canker Fungus (*Nectria ditissima*) may cause beech declines and declines in the already rare Early Hairstreak), exotic insects that impact host species or adults directly (e.g., Chinese mantids are voracious predators on butterflies at nectar plants), and management of utility rights-of-way (i.e., chemical vs. mechanical trimming).

Similar to other taxa, loss of early successional habitat associated with the abandonment and subsequent forest succession of agricultural land has had both negative and positive effects on the state's lepidoptera species. Regal Fritillary, predominantly a prairie species, is in all likelihood extirpated from the state due to loss of large areas of grassland habitat and altered agricultural practices such as early hay harvesting; the last known colony was extirpated when a power plant was constructed on the site. Subsequent forest regeneration has provided habitat for forest species such as Eastern Tiger Swallowtail, Northern Pearly-eye (*Lethe anhedon*), and the increasingly common Carolina Satyr. Conversion of agricultural areas to housing in the eastern panhandle has likely continued negative impacts on this area's lepidopteran community including Hayhurst's Scallopwing and Bronze Copper. Conversion of forest land to others uses in other areas of the state has also likely had negative impacts: mountaintop mining in the southern coalfields impacts both ridgetops and valleys (Diana Fritillary, Golden-banded Skipper) and second home construction in certain areas in the mountain counties, such as Canaan Valley, destroys larval host plants (Harris's Checkerspot, Hoary Elfin).

Although some exotic plant species are being used by generalist lepidopteran species for host plants (ex. Northern Pearly-eye using Japanese Stilt Grass (*Microstegium vinimeium*)), the majority of interactions tend to be negative. Garlic Mustard (*Allaria officinalis*), an invasive European species, has already had significant negative impacts on the West Virginia White in other parts of its range. This species uses native cresses as its larval host plant, but will readily lay eggs on Garlic Mustard which is toxic to its larva. This butterfly's occurrence has diminished in West Virginia in more western and eastern portions of its range where Garlic Mustard is common; it is still commonly encountered in the mountain counties. Native forbs that are used as larval host plants are imperiled by infestations of Japanese Stilt Grass, Japanese Knotweed (*Fallopia japonica*), Autumn Olive (*Elaeagnus umbellata*), Multiflora Rose (*Rosa multiflora*), Spotted Knapweed (*Centaurea maculosa*), Purple Loosestrife (*Lythrum salicaria*), and others. When isolated lepidopteran colonies are invaded by one or more of these species, the larval host plant can be overwhelmed and eliminated, and the colony may "wink out."

The decline of at least eight Shale Barren lepidopteran species can be tied directly to the use of the broad spectrum persistent insecticide Dimilin for Gypsy Moth control in the 1990s. Most areas of the state within the Gypsy Moth's range have developed fungal *Entomophaga maimaiga* presence, all but eliminating the need for other control measures except for specifically defined circumstances. Some Shale Barren species have not been recorded in West Virginia for at least ten years. These species are

susceptible to early spring insecticide use based on their life histories and include Olympia Marble, Columbine Duskywing, Hickory Hairstreak, Mottled Duskywing, Sweet Underwing, and Pine Barrens Underwing. Grizzled Skipper, Cobweb Skipper, and Silvery Blue have declined significantly; only one known colony (out of 11 historic records) of Grizzled Skipper persists in the state.

Excessive herbivory by White-Tailed Deer (*Odocoileus virginianus*) is a challenge for a variety of taxa throughout the eastern United States. Forest understories, edges and openings have been especially impacted. Lepidoptera are impacted by deer through loss of populations of larval host plants, consumption of eggs and larvae by deer while eating foliage, loss of nectar flowers, and alteration of forest structure through loss of ground cover and understory. Declines in several species, including Mottled Duskywing, Frosted Elfin, Appalachian Azure, Dusky Azure, and Baltimore Checkerspot, can be directly tied to deer herbivory in various portions of their ranges. Early flying species are especially vulnerable because there are few nectar species at that time of the year and available plants are palatable to deer.

The 2005 WVWVWCAP stressed the need for surveys, inventories, and data management. These primary goals haven't changed. A West Virginia Butterfly Atlas was started in 2012 to document species occurrence, distribution, and habitat use of butterflies and selected moths (17 SGCN/RFSS species and two other moth families). As of January 2015, results to date have produced 259 county records and 340 updated historical records and increased our understanding of lepidopteran distribution in the state. Efforts have also been made to mine data from other institutions to enhance records, especially for rare species (e.g., Carnegie Museum of Natural History, Smithsonian Institute, National Museum of Natural History). Historic records for butterflies and rare moths have been examined and coordinates were generated by comparing written descriptions to maps. Coordinates have been either confirmed or generated if necessary. Most records now have accuracies of less than 0.62 miles. The large moth database from West Virginia University still needs to be examined in this manner. Research using molecular and genetic protocols has been done in West Virginia especially with new cryptic species such as Appalachian Tiger Swallowtail and Northern Azure.

In addition to surveys and inventories which are being addressed, at least in part, with the ongoing butterfly atlas, survey efforts are planned in Conservation Focus Areas (CFAs). West Virginia is a partner in a Mid-Atlantic Greater Conservation Need Butterfly Working Group. The group is submitting a grant proposal for work on Baltimore Checkerspot conservation. Other rare species will be addressed in future work.

As part of a cooperative agreement with the United States Forest Service (USFS), Monongahela National Forest, the WVDNR surveyed for rare lepidopteran species on the Forest (as part of the West Virginia Butterfly Atlas). The WVDNR and USFS are working on a monitoring plan to be implemented by USFS personnel.

New Taxa – Research

A few species have recently been split from common taxa and need additional research to determine where they occur in West Virginia and the habitats they use. The Regal Fritillary (*Speyeria idalia*) occurred in West Virginia until the late 1990s when the last known colony was destroyed by development. We hope to conduct research to determine if it can be reintroduced into West Virginia, in a manner similar to Pennsylvania's efforts. Other species include the Northern Azure, Cherry Gall Azure, Appalachian Tiger Swallowtail, and Summer Crescent. These species were included in the appropriate groupings above.

SGCN Summary

West Virginia's list of lepidopteran Species of Greatest Conservation Need has not changed significantly since 2005; it contains 41 butterfly and 17 moth species or subspecies. Most are species that occur on rare habitat (High Elevation Wetlands, Shale Barrens) or need additional research and surveys. The USFWS has been petition to list the Monarch Butterfly and is currently conducting a status review of this species.

3.2.1.4: Cave Invertebrates

Description

Cave invertebrates are highly specialized animals of caves and other subterranean habitats. Many have specializations for living in their continuously dark world, including reduced or no pigmentation, loss of eyes, and elongated legs and antennae for sensing their environment. Because their habitat is typically naturally isolated by large areas of unsuitable geology, endemism is high. Indeed, cave invertebrates as a group have the highest reported rate of endemism of any group of organisms in North America. The Central and Southern Appalachians are one of the major centers of cave species endemism in North America, being second in diversity only to the Interior Low Plateaus of Kentucky, Tennessee and Indiana. Within the Appalachians, endemism is often further broken down among watersheds and some species are known from one or only a few caves. In West Virginia, the Cheat, Greenbrier, South Branch Potomac, and other watersheds have their own endemic cave faunas. The Greenbrier Valley fauna is especially diverse. This area supports one of the six most diverse cave faunas of North America and is considered to be globally significant for its richness of cave life.

The state of West Virginia supports a diverse array of limestone caves, with approximately 4300 caves documented. These caves are distributed in 19 counties with the largest number occurring in Greenbrier County. Some of these are very short, small passages, barely passable by an average size person. These are often labeled “for reference only” or FRO. However, many caves consist of vast systems of beautiful passages, many miles in length, with deep pits, large streams, and high domes. West Virginia has 110 caves with over a mile of passage, 11 with more than ten miles of passage, and six caves with over 20 miles of passage. Six of the 25 longest caves in the United States are in West Virginia. The longest cave in West Virginia is over 45 miles in length. Karst topography, which is produced by dissolution of underlying limestone geology, is characterized by caves, sinkholes, a lack of surface streams, and large springs.

The abundance and variety of caves in West Virginia has created a wide variety of habitats for invertebrates to use. Current data from approximately 300 sites in West Virginia has produced a total of 115 species of invertebrates classified as cave endemics (91 are SGCN). Cave endemics are only found within caves and are typically unable to survive outside of their subterranean habitat. These cave invertebrates are contained in five phyla and 40 genera. West Virginia’s cave invertebrates include over 25 species that are known only from single-cave systems West Virginia has one species of isopod (Madison Cave Isopod, *Antrologna lira*) that is federally listed as threatened.

Distribution

In West Virginia, surface limestone geology is almost exclusively found only in the eastern third of the State, where it has produced thousands of caves. Any limestone cave has the potential to contain some type of cave invertebrate, and species of cave invertebrates are known from many West Virginia counties. Greenbrier County has the highest species diversity since it has the most caves, the greatest variety of cave habitats, and the most sites which have been surveyed to date. Of the 14 caves in West Virginia that have ten or more cave invertebrates documented, 11 of them are located in Greenbrier County. One cave in West Virginia (Organ Cave) has 22 species of cave invertebrates. It should be considered a highly significant site since it is one of only three caves in the United States to contain more than 20 species. Occurrences of global endemic cave invertebrates should receive additional consideration when planning conservation actions to protect cave invertebrates.

Species Groupings

Due to the variety of taxonomic groups occurring in caves, species groupings are best achieved by combining taxa based on their habitat needs within the cave environment and ignoring their taxonomic relatedness. These groupings typically have common biological needs and threats and are as follows. Note: The listing of a genus in the following species groupings may represent a single species or multiple species. The Species Groupings categories below are adapted from the Protection Strategies section of Fong *et al.* (2007).

Cave Stream Species

These are species that live within the cave stream habitat. They cannot survive outside of their aquatic habitat or survive outside of the cave. They are dependent on organic matter that is brought into the cave from an outside source. Seasonal hydrologic patterns are often very important to these species. Without a regular or seasonal input of organic matter, these species will experience changes in population number or health. Protection of these species is best accomplished by protecting the watershed. Nutrient and sediment input should remain at “normal” levels, and hydrologic pattern changes should be minimized to protect cave stream species. Water quality must also be considered as many aquatic cave species have fairly limited range of conditions which they require. Taxa that are dependent on cave streams are as follows.

Amphipods in the genus *Stygobromus* and *Gammarus*

Aquatic isopods in the genus *Caecidotea*

Aquatic flatworms in the genera *Macrotyla*, *Phagocata*, *Sphalloplana*, and *Geocentrophora*

Aquatic segmented worms in the genera *Stylodrilus* and *Trichodrilus*

Aquatic cave snails in the genus *Fontigens*

Terrestrial Riparian Species

These are species that typically inhabit the stream banks and are dependent on organic matter deposited from streams within the cave. Similar to the cave stream species, they are dependent on organic input and hydrologic patterns for much of their survival. Protection of the drainage basin will protect these species.

Mites in the genus *Rhagidia*

Spiders of the genera *Anthrobia*, *Bathyphantes*, *Nesticus*, *Phanetta*, and *Porhomma*

Pseudoscorpions in the genera *Chitrella*, *Kleptochthonius*

Springtails in the genera *Arrhopalites*, *Pseudosinella*, and *Sinella*.

Diplurans in the genus *Litocampa*

Cave millipede *Pseudotremia fulgida*

Cave Beetles in the genus *Pseudanophthalmus*

Terrestrial Transitory Organic Matter Species

These species typically reside within a few hundred yards of the entrance. They are dependent on organic matter brought in by other species (bats, woodrats, mice, Raccoons (*Procyon lotor*), cave crickets) that forage outside of the cave. Protection of cave species in this category involves protection around the cave entrance and/or protection of foraging species and the areas they use.

Mites in the genera *Rhagidia* and *Poecilophysis*

Spiders in the genera *Anthrobia*, *Bathyphantes*, *Islandia*, *Nesticus*, *Phanetta*, and *Porhomma*

Pseudoscorpions in the genus *Kleptochthonius*

Springtails in the genera *Onychiurus*, *Pseudosinella*, and *Sinella*
Millipedes in the genera *Conotylo*, *Pseudotremia*, and *Zygnopus*
Beetles in the genus *Pseudanophthalmus*
Dipteran in the genus *Spelobia*

Aquatic Epikarst Species

Organisms that live within the water-filled small crevices below the ground's surface but above the actual cave passage. Protection of these species is accomplished by protecting the surface immediately above the cave.

Aquatic amphipods in the genus *Stygobromus*, species *cooperi*, *culveri*, *emarginatus*, *franzi*, *gracilipes*, *mackini*, *nanus*, *parvus*, *pollostus*, and *redactus*
Copepods of several genera

Terrestrial Epikarst Species

These taxa live within small spaces above the actual cave passage. They are dependent on protection of the surface above the cave.

Beetles in the genus *Batriasymmodes* and *Horologion*

Aquatic Phreatic Species

These organisms are only found in the permanent groundwater below or even with the cave. Their protection requires protection of the groundwater recharge area for the species.

Aquatic isopod species *Antrolana lira*

Conservation Issues

Conservation of cave invertebrates strongly hinges upon protection of the surface habitats, the drainage basin and the groundwater. Karst topography is generally characterized by underground streams, caves, and sinkholes. The porous nature of karst makes it especially susceptible to anthropogenic impacts, especially to subterranean aquatic habitats and species. Sinkholes and sinking streams frequently act as a direct conduit to cave streams and groundwater. Karst systems typically allow inputs to flow directly, and unchanged, into the subterranean habitats.

Karst dominated landscapes in West Virginia contain rolling topography and rich soils which have made them desirable for farming and grazing. This has produced some distinct threats to cave invertebrates from organic pollution. Another significant threat to cave invertebrates is urbanization. Groundwater extraction, septic failure, clearing of forested areas, and impervious surfaces can all have impacts on cave invertebrates by changing nutrient inputs and hydrology of caves. Quarrying destroys cave invertebrate habitat directly and may have already extirpated the Rich Mountain Cave Beetle (*Pseudanophthalmus krekeleri*).

The Greenbrier Valley, especially north of Lewisburg, is currently experiencing residential development growth. This is producing direct potential threats to cave endemics. Similar development is occurring in the eastern panhandle, although cave density and species numbers are not as great. Hopefully, through proper education and planning, development will be adjusted around cave resources so that negative effects will be minimized.

Future work with cave invertebrates in West Virginia should include the following areas:

- Establish or adopt existing educational materials to be used to inform the public on land management guidelines to follow when working in karst areas.
- Establish a landowner database that keeps track of both cave entrance owners and owners of land within the caves watersheds.
- Conduct threats assessment for use in site conservation and management prioritization
- Establish programs for private landowners to assist with sinkhole cleanups, especially ones with direct links to global endemic and highly diverse sites.
- Encourage training of taxonomists to work with identification of cave invertebrates. In general, there is currently a lack of trained taxonomists. Many current taxonomists are close to retirement. Additional surveys and monitoring of known populations will be of little value if there is a lack of personnel with the skills to identify species collected.
- Conduct analysis on current datasets to determine predicted range maps for known species.

SGCN Summary

West Virginia's SGCN list for cave invertebrates includes 91 species. Seventy-five are categorized as Priority 1 due to their state and global rank, the remaining are Priority 2. West Virginia's cave invertebrates include 28 that are known only from single-cave systems. One species, the Madison Cave Isopod, is listed as federally threatened.

3.2.1.5: Crayfish

Description

West Virginia is home to 28 species of crayfish (Loughman and Welsh ____) 12 of which are listed as SGCN. Ten of the 12 SGCN are listed as Priority 1. Because of recent surveys and taxonomic work this list is at an all time high and includes six West Virginia endemics (Guyandotte River Crayfish (*Cambarus veteranus*), Elk River Crayfish (*C. elkensis*), Greenbrier River Crayfish (*C. smilax*), Teays Valley Mudbug (*C. dubius* A), Meadow River Mudbug (*C. dubius* B), and Greenbrier Cave Crayfish (*C. nerterius*). Three introduced species are also known to occur in West Virginia.

Crayfishes are important members of West Virginia's lentic and lotic ecosystems (Lawton 1979, Jezerinac *et al.* 1995, Loughman *et al.* 2009, Loughman and Welsh 2010). Within these ecological systems, crayfishes act as ecosystem engineers (Creed and Reed 2004), increasing stream benthic community complexity and providing subterranean refuges for terrestrial organisms through their burrowing behavior (Loughman and Simon 2011). Several taxa have coevolved alongside crayfishes, and are dependent on burrows created by these animals for key aspects of their life history (Taylor *et al.* 2007). Given their cosmopolitan diets, crayfishes assimilate a tremendous amount of available nutrients that are passed onto multiple levels of the foodwebs they are part of (Creed and Reed 2004; Taylor *et al.* 2007, Loughman and Simon 2011).

Economically this group of animals provides an important forage base for several game fish taxa (catfishes and basses in particular). Robust sport fish populations result in economic gain for West Virginia through license and tourism dollars. Crayfishes also are an important aspect of West Virginia's culture; many young West Virginian's first engagement with nature involved catching "crawdads" in the neighborhood stream or creek that cut through the hollow where they grew up. This initiation into nature can result in a lifelong appreciation for the natural world and the resources it provides through preservation and conservation. Crayfish conservation ensures these ecological, economic, and cultural aspects of this enigmatic group of animals continue to occur in the mountain state.

Distribution

Crayfish occur statewide in a variety of aquatic and moist terrestrial habitats from streams and creeks to caves. While some species are widespread, others have restricted ranges. Both the Big Sandy Crayfish (*Cambarus callainus*) and Guyandotte River Crayfish have observed the largest range reduction of any native epigeal (living or occurring on or near the surface of the ground) crayfish in West Virginia. Historically, the Guyandotte River Crayfish occurred in the upper Guyandotte and New River watersheds (Loughman 2013b). Subsequent examination of supposed New River specimens held at the National Museum of Natural History revealed the Guyandotte River Crayfish did not actually occur in the New River Watershed (Loughman and Welsh 2013). All historic locations were sampled in the upper Guyandotte in 2009, and are being sampled in 2015 by Loughman. In 2009, the species was collected only in Pinnacle Creek, Wyoming County. Sampling in 2015 determined that the Pinnacle Creek population is still extant and resulted in the discovery of Guyandotte River Crayfish populations in Clear Fork and Laurel Branch, Wyoming County. All other sampling at historic sites in 2015 failed to produce the crayfish. The Guyandotte River Crayfish is a West Virginia endemic whose entire global range falls within the southern coalfields in the Cumberland Mountains Ecoregion of West Virginia.

During survey efforts in 2009, what was previously referred to as the Guyandotter River Crayfish was found at two sites in the Tug Fork Watershed. Since that time, the specimens were identified as a new species, Big Sandy Crayfish, which is endemic to the Big Sandy Watershed of Kentucky, Virginia, and West Virginia (Thoma *et al.* 2014). Within West Virginia, populations have been reported from the Tug Fork River mainstem below the confluence of the Tug and Dry forks, as well as from Dry Fork. At present, Dry Fork populations appear to occur throughout the lower and mid reaches of Dry Fork downstream of War, McDowell County (Z. J. Loughman, unpublished data). No records have been documented from the Tug Fork River upstream of its confluence with Dry Fork.

West Virginia Digger Crayfish (*Fallicambarus fodiens*) populations occur in Greenbottom Wildlife Management Area (WMA) in Cabell and Mason counties, and are also found sporadically along the Kanawha River floodplain within 6.2 miles of the confluence of the Ohio and Kanawha rivers. Digger Crayfish utilize the bottomland forest, much of which has been converted to agricultural and industrial land. At present, Digger Crayfish are known from five locations statewide. White River Crayfish occur at all Digger Crayfish sites in Mason County and the Winfield Wetland in Putnam County, and also possess an S1 ranking.

Species Groupings

Epigeal Crayfish

Cambarus chasmodactylus (New River Crayfish)
Cambarus elkensis (Elk River Crayfish)
Cambarus hatfieldi (Tug Valley Crayfish)
Cambarus smilax (Greenbrier River Crayfish)
Cambarus theepiensis (Coalfields Crayfish)
Cambarus veteranus (Guyandotte River Crayfish)
Cambarus callainus (Big Sandy Crayfish)
Procambarus acutus (White River Crayfish)

Stygobitic Crayfish (Cave Dwelling)

Cambarus nerterius (Greenbrier Cave Crayfish)

Burrowing Crayfish

Cambarus dubius A (Teays Valley Mudbug)
Cambarus dubius B (Meadow River Mudbug)
Fallicambarus fodiens (Digger Crayfish)

Conservation Issues

Since the publication of Jezerinac *et al.* (1995), efforts within West Virginia to identify conservation threats, distribution records, and conservation concerns have been disjunct in nature. Key species (Elk River Crayfish and Guyandotte River Crayfish) received minimal attention since Jezerinac's effort (Jones *et al.* 2010, Jones and Eversole 2011), while the majority of taxa have remained understudied. Crayfish conservation concerns have arisen since the publication of Jezerinac *et al.* (1995) that were not of major consequence in the 1980s.

Landuse issues, stream degradation, invasive species, and habitat loss have occurred throughout the state in areas with diverse crayfish populations, the ultimate impact of which remains poorly understood within West Virginia's borders. Two aggressive invasive species, Virile Crayfish (*Orconectes*

virilis) and Rusty Crayfish (*Orconectes rusticus*), have spread throughout the state in recent years. In the Eastern Panhandle, Virile Crayfish have invaded all major watersheds in the region, taking a once diverse crayfish community and making it monotypic. The true extent and magnitude of these invasive species populations remains unknown within West Virginia. Beginning in 2007, WVDNR funded a statewide crayfish atlas project tasked with determining which species occur in West Virginia and the conservation status of all species in the state. Loughman and Welsh (2013) determined the species discussed below are worthy of conservation attention. Each species is addressed according to its priority in the SWAP.

Conservation threats for Big Sandy Crayfish include increased sedimentation, conductivity point sources, and increased nutrient loading (Loughman 2014). Digger Crayfish utilize the bottomland forest, much of which has been converted to agricultural and industrial land. Sources of imperilment for White River Crayfish mirror those of Digger Crayfish. It should be noted that introduced populations of White River Crayfish occur in the Meadow River Wetlands and sporadically throughout the Monongahela River Basin, but the species is not native to these watersheds.

No survey effort has been performed by astacologists for the Greenbrier Cave Crayfish since Jezerinac *et al.* (1995) conservation assessment in the late 1980's. Given its stygobitic nature, specific survey efforts are needed to ascertain the current status of this species in the state. At present, Greenbrier Cave Crayfish is the only crayfish in West Virginia that lacks recent data on its current conservation status. To err on the side of caution it was ranked as S1, but new data are needed to determine its actual status in the state. This species is also addressed in the Cave Invertebrate portion of this plan.

Teays Valley Mudbug is endemic to upland situations along the Kanawha River corridor of Mason, Putnam, and Cabell counties. Portions of northern Cabell and Wayne counties are impacted by development and agricultural practices, specifically in Teays Valley. Development in Teays Valley has increased dramatically over the past two decades in response to economic growth in Charleston and Huntington. Teays Valley Mudbug appears to be a seepage wetland specialist and is readily outcompeted in lowland situations in the region by the Little Brown Mudbug (*Cambarus thomai*) (Z. J. Loughman, pers. comm.). The Meadow River Mudbug is the most imperiled burrowing species of crayfish in West Virginia, and is endemic to the junction of the Allegheny Mountains and Ridge and Valley Ecoregions in Greenbrier and Monroe counties. The largest extant populations occur in the Meadow River WMA. The majority of suitable habitat for the Meadow River Burrowing Crayfish has been converted to agricultural land, and is no longer suitable for the species. Given its recent taxonomic description, very little is known about the basic biology of this West Virginia endemic (Loughman *et al.* 2015). Several interstate pipelines are proposed that would travel directly through this narrow endemic's range. The impact of these pipelines on this species remains unknown, and is an area in need of future research.

While the Elk River Crayfish and Greenbrier River Crayfish occur in regions of the Elk and Greenbrier river basins that do not experience elevated stream degradation or extractive industry, because of their small global distributions, these species were assigned state ranks of S2. Threats include potential impacts associated with the burgeoning natural gas industry in West Virginia, climate change, and potential invasion by invasive non-native species.

Though the Tug Valley Crayfish is not a West Virginia endemic, the Tug Fork River system encompasses the entire species global range, and is smaller in total square miles than both the Elk and Greenbrier basins. Furthermore, the environmental stability occurring in the latter two basins is not observed in the Tug Fork Basin. Extreme landuse practices have occurred in the region over the past century, and in

recent years have been manifested by both contour and mountaintop mining. Resultant of these activities, Tug Fork streams experience chemical alterations, elevated siltation, and channelization. The impact these activities have on this recently described species remains unknown, but warrant investigation.

Though the New River Crayfish ranges throughout the New River Watershed in West Virginia, Virginia, and North Carolina, in West Virginia, it is restricted to the Greenbrier River Basin. With the exception of lower portions of the Greenbrier River mainstem, New River Crayfish is stable throughout the majority of the watershed, and in certain situations common to abundant. So long as conditions in the Greenbrier remain as they are currently, New River Crayfish should remain stable in West Virginia. The Coalfields Crayfish's global range is limited to Kentucky and West Virginia, and within West Virginia, it is found in the Guyandotte, Twelvepole, and Lower Ohio watersheds. Stream conditions in the Guyandotte and Twelvepole basins are notoriously degraded, receiving impacts from extractive industry throughout the watersheds.

Research and Monitoring Needs

At present, roughly 60% of West Virginia's crayfish species are stable with state ranks of S4 and S5. The remaining 40% of species require future monitoring in order to determine if their ranks should be increased or decreased pending new environmental threats, as well as possible recovery of impacted habitats in which they dwell. The following outlines efforts that should occur if active crayfish conservation is a goal of future conservation planners in West Virginia. The West Virginia Crayfish Atlas (Loughman and Welsh 2013) served as a sound foundation for crayfish conservation in West Virginia and identified several gaps in the states astacological knowledge that should be addressed, as well as species in need of immediate conservation action, detailed below.

Status surveys for Greenbrier Cave Crayfish

Greenbrier Cave Crayfish, West Virginia's only cave crayfish, is the only described species of crayfish not intensively sampled during this effort Jezerinac *et al.* (1995) did an excellent job surveying the species throughout its range in the karst areas of Greenbrier and Monroe counties and these data serve as an excellent baseline to guide future efforts. The White Nose Syndrome (WNS) epidemic, that is drastically impacting several of West Virginia's important bat colonies in caves, struck right at the onset of this atlas effort, impeding our ability to survey caves for the Greenbrier Cave Crayfish. A current survey involving population size estimates and determination of population structure is needed if a complete picture of crayfish conservation is going to be acquired for West Virginia.

Monitoring and Conservation Planning for Guyandotte River Crayfish and Big Sandy Crayfish

Guyandotte River Crayfish and Big Sandy Crayfish are the most imperiled crayfish in West Virginia. Previously detailed threats run the risk of further impacting Tug Fork populations, as well as extirpating the Guyandotte populations completely. Creation and implementation of a conservation action plan specific to both taxa is needed if these species are going to survive in West Virginia. An understanding of both species annual life history is also needed should captive rearing being pursued.

Burrowing Crayfish Surveys

The one behavioral group not thoroughly surveyed during the atlas project was the burrowing crayfish. Both the *Cambarus dubius* and *Cambarus monongalensis* complexes have either undescribed West Virginia endemics or species with the majority of their global range occurring in West Virginia. Surveys for these species would focus on determining their distributions in West Virginia, as well as collecting sufficient material needed to describe species within each complex.

SGCN Summary

Twelve species of crayfish are considered SGCN. Two species, Guyandotte River Crayfish and Big Sandy Crayfish, are currently proposed for listing as endangered by the USFWS.

Species Groupings

Occurrence of odonata species is dependent on larval habitat such as aquatic environment (lotic or lentic), substrate, and temperature regime. The group is also split between high elevations (mostly northern species) and those found east or west of the mountains.

High Elevation Wetland Species (Marshes, Bogs, Ponds)

Most records occur on state or federal lands with limited occurrences on private lands. Threats to these species include climate change and development.

Aescha canadensis (Canada Darner)
Aeschna tuberculifera (Black-tipped Darner)
Aeschna verticalis (Green Striped Darner)
Cordulia shurtleffi (American Emerald)
Enallagma annexum (Northern Bluet)
Enallagma vernale (Vernal Bluet)
Epithea canis (Beaverpond Baskettail)
Lestes disjunctus (Northern Spreadwing)
Lestes inaequalis (Elegant Spreadwing)
Leucorrhinia glacialis (Crimson-ringed Whiteface)
Leucorrhinia hudsonica (Hudsonian Whiteface)
Libellula axilena (Bar-winged Skimmer)
Libellula flavida (Yellow-sided Skimmer)
Nehalennia gracilis (Sphagnum Sprite)
Rhionaeschna mutata (Spatterdock Darner)
Somatochlora elongata (Ski-tipped Emerald)
Somatochlora forcipata (Forcipate Emerald)
Sympetrum obtrusum (White-faced Meadowhawk)

High Elevation Streams and River Species

Most occurrences are reported on state or federal lands. Threats to these species include (in some areas) acid mine drainage and municipal pollutants.

Calopteryx amata (Superb Jewelwing)
Calopteryx angustipennis (Appalachian Jewelwing)
Gomphus abbreviatus (Spine-crowned Clubtail)
Gomphus aldelphus (Moustached Clubtail)
Gomphus descriptus (Harpoon Clubtail)
Gomphus fraternus (Midland Clubtail)
Gomphus lineatifrons (Splendid Clubtail)
Gomphus quadricolor (Rapids Clubtail)
Gomphus rogersi (Sable Clubtail)
Gomphus viridifrons (Green-faced Clubtail)
Lanthus parvulus (Northern Pygmy Clubtail)
Lanthus vernalis (Southern Pygmy Clubtail)
Ophiogomphus carolus (Riffle Snaketail)
Ophiogomphus mainensis fastigiatus (Maine Snaketail)
Stylurus scudderi (Zebra Clubtail)

Western/Eastern (W,E) Streams and River Species

Most of these species are found on highly altered and degraded river systems (Ohio, Kanawha, Potomac watersheds). Threats include mineral extraction (mountaintop mining, water withdrawal and degradation from horizontal drilling activities), channelization/shore manipulation, municipal/industrial pollution and others).

Dromogomphus spoliatus (Flag-tailed Spinyleg) W
Gomphus vastus (Cobra Clubtail) W,E
Helocordulia uhleri (Uhler's Sundragon) W,E
Hetaerina titia (Smokey Rubyspot) W
Macromia alleghaniensis (Allegheny River Cruiser) W,E
Macromia illinoiensis (Swift River Cruiser) W,E
Macromia taeniolata (Royal River Cruiser) W,E
Neurocordulia molesta (Smoky Shadowdragon) W
Neurocordulia obsoleta (Umber Shadowdragon) W
Neurocordulia yamaskenensis (Stygian Shadowdragon) W,E
Ophiogomphus incurvatus alleghaniensis (Appalachian Snaketail) Mercer Co
Ophiogomphus rupinsulensis (Rusty Snaketail) E
Progomphus obscurus (Common Sanddragon) W
Stylurus notatus (Elusive Clubtail) W
Stylurus plagiatus (Russet-tipped Clubtail) W,E
Stylurus spiniceps (Arrow Clubtail) W, E

Forested Seeps and Streamlet Species

These species occur statewide outside of the mountains. Threats include local impacts from timber harvesting, development, and degradation from horizontal drilling activities.

Cordulegaster erronea (Tiger Spiketail)
Cordulegaster obliqua (Arrowhead Spiketail)
Somatochlora linearis (Mocha Emerald)
Tachopteryx thoreyi (Gray Petaltail)

Well Vegetated or Marshy Pond Species

These species occur in mature ponds with well-developed shoreline and emergent vegetation. Threats include gentrification ("cleaning up" ponds) and siltation.

Celithemis fasciata (Banded Pennant)
Enallagma antennatum (Rainbow Bluet)
Enallagma vesperum (Vesper Bluet)
Lilypad Forktail (*Ischnura kellcotti*)
Lestes australis (Southern Spreadwing)
Lestes forcipatus (Sweetflag Spreadwing)
Sympetrum ambiguum (Blue-faced Meadowhawk) *Sympetrum internum* (Cherry-faced Meadowhawk)

Fishless Pond Species

Threats include the introduction of predatory fish to fishless ponds.

Anax longipes (Comet Darner)

Pond Species

While most species use “generic ponds” some species have specific requirements such as the Swamp Darner (*Epiaeschna heros*) (ponds associated with soggy wood swamps) and the Duckweed Firetail (*Telebasis byersi*) (western ponds with duckweed).

Epiaeschna heros (Swamp Darner)

Ladona deplanata (Blue Corporal)

Telebasis byersi (Duckweed Firetail)

Tamea carolina (Carolina Saddlebags)

Tamea onusta (Red Saddlebags)

Conservation Issues

Although dangers occur during the adult stage such as predation and inclement weather, primary threats to odonates occur during their larval stage. Across the northeastern United States, 18% (25 species) of odonate fauna are regionally imperiled. Peatlands, low gradient streams and seeps, high gradient headwaters, and large rivers harbor the majority of these species. In West Virginia, these habitats also harbor the majority of SGCN odonates. Species most at risk are those whose larvae inhabit flowing waters and low elevation wetlands (often found along major rivers). Of the 58% of the total lentic waters assessed by the EPA in West Virginia in 2010 (USEPA 2010), 62% were determined to be impaired. Clubtails (family Gomphidae), which as a group mostly inhabit streams and rivers, are particularly susceptible to pollutants including municipal, household, agricultural runoff, sedimentation, and mineral extraction effluents. Most need clear, clean streams with high oxygen levels. Other groups whose larvae inhabit streams and rivers include the broad-wing damselfly (family Calypterigidae), dancers (genus *Argia*, family Coenagrionidae), spiketails (family Cordulegastridae), cruisers (family Macromiidae), and shadowdragons (genus *Neurocordulia*, family Corduliidae). Although some rivers in eastern and north-central West Virginia (Cheat, Tygart, and Middle Fork among others) have made substantial recovery from unregulated logging, acid mine drainage, and unregulated municipal pollution from the 1900s, other West Virginia rivers and streams remain highly impacted. Others remain under threat from streamside development, mountaintop mining, and the booming shale gas and oil extraction industry.

Because flat land for development is at such a premium in West Virginia, areas along major rivers are often quickly developed, and the sloughs, back channels, and boggy pools that line the Ohio, Kanawha, Cacapon and other rivers are disappearing. Species that use these habitats include the Swamp Darner, Great Blue Skimmer (*Libellula vibrans*), Blue-faced Meadowhawk, spreadwings (family Lestidae), and Duckweed Firetail.

High elevation wetlands provided habitat for species that often approach or reach the southern edge of their range in West Virginia (Northern Pygmy Clubtail, Brown-striped Spiketail (*Cordulegaster bilineata*, and 12 others). Although many of these wetlands are owned and protected by federal and state agencies and/or private conservation organizations, e.g., The Nature Conservancy (TNC), others are threatened by mineral extraction or unregulated recreation, and all are threatened by effects of climate change. Species like the Spatterdock Darner can also be impacted by the introduction of fish into fishless systems.

Future efforts should concentrate on targeted surveys for rare species inhabiting specific habitats such as: Vesper Bluet and Lilypad Forktail (*Ischnura kellecotti*) at older, well vegetated ponds; the hanging

clubtails (genus *Stylurus*) on large rivers (Ohio, Monongahela, Cheat, Kanawha, New); Appalachian Snaketail at the one historic site and other streams in the same area; and Flag-tailed Spinyleg at historic sites in the southern coalfields. The atlas identified the Allegheny Mountains and Ridge and Valley Ecoregions as areas of high odonate diversity. Efforts should be made to identify specific sites of high diversity in this area and put into place mechanisms to conserve that biodiversity. Further efforts, should be put into place to improve water quality in low elevation waterways of the state. An increasing concern is potential degradation of water quality as a consequence of shale gas extraction activity.

SGCN Summary

West Virginia's SGCN list for odonates includes 69 species, with 22 considered Priority 1. Lentic dwelling species comprise a large portion of the list (45%) reflecting the imperiled nature of some of these habitats. Thirty-one species (45%) are high elevation species inhabiting lentic or lotic environments. The USFWS has been petitioned to list Appalachian Snaketail *Ophiogomphus incurvatus*.

3.2.1.7: Fish

Description

Fishes are the largest group of vertebrates, totaling over 33,000 species worldwide. Freshwater species, despite occupying only a fraction of earth's water habitats, account for an impressive 41% of this diversity. The unique freshwater fauna of North America includes 1,100 species with the Mississippi Basin (including the Ohio River Basin supporting one of the richest temperate freshwater fish faunas worldwide. Species richness of North America is highest in unglaciated southeastern United States (e.g., Tennessee and Alabama each containing over 325 freshwater taxa), with the Ohio Basin having the second most diverse fish fauna on the continent. The West Virginia freshwater ichthyofauna is composed of 23 families, 74 genera, and approximately 190 species (excluding three stocked gamefish hybrids). This fauna is largely comprised of minnows (64 species) and perches (35 species, 32 of which are darters) or about half of the state total. Moreover, when members of the sucker, catfish and sunfish families are included, approximately 75% of the state list is represented.

The West Virginia assemblage includes some primitive fishes, such as lampreys, paddlefish, and sturgeon. Lampreys include parasitic and nonparasitic species, many of which live the majority of their lives in a larval form. Some of our headwater species are Pleistocene relicts, and currently have restricted headwater ranges owing to warmer lowland climates. Coldwater relicts include the SGCN species Allegheny Pearl Dace (*Margariscus margarita*), Redside Dace (*Clinostomus elongatus*) and Checkered Sculpin (*Cottus sp. cf. cognatus*), as well as the presumed-extirpated Longnose Sucker (*Catostomus catostomus*). Eleven species have likely been extirpated from the state: Shovelnose (*Scaphirhynchus platyrhynchus*) and Lake (*Acipenser fulvescens*) sturgeons; Paddlefish (*Polyodon spathula*); Bigmouth (*Notropis dorsalis*) and Satinfish (*Cyprinella analostana*) shiners; Hornyhead Chub (*Nocomis biguttatus*); Pugnose (*Opsopoeodus emiliae*), Eastern Silvery and Mississippi Silvery (*Hybognathus nuchalis*) minnows; Longnose Sucker; Western Creek Chubsucker (*Erimyzon oblongus claviformis*); Blue Catfish (*Ictalurus furcatus*); and Buckeye Creek Cave Sculpin (*Cottus sp. cf. carolinae*), which was endemic to one cave system in the Greenbrier Valley and considered extinct. These have been lost primarily through major habitat alterations including dam construction, and various forms of pollution. The Fish Management Unit of the West Virginia Division of Natural Resources has in recent years stocked the Paddlefish, Blue Catfish, and Shovelnose Sturgeon in hopes of re-establishing these lost state fishes.

Lampreys (jawless, cartilaginous fishes), minnows, suckers, madtoms (small catfishes), sculpins, and darters are among the least understood groups of fishes within West Virginia waters. These six groups comprise 61 of the 74 SGCN fishes (see below). Minnows and suckers include a diversity of species that range from large river habitats to high elevation headwater streams. Madtoms (secretive benthic species) usually occur in large to small-sized river habitats, whereas sculpins are bottom fishes that are generally found in small high elevation rivers to cold headwater streams. Darters occur in warm large rivers to small streams and even extend into headwater habitats. The Elk and Little Kanawha River systems contain the largest diversity of all fish species in the state; 18 species of darters occur in these two waters alone, 11 of which are among the SGCN.

Although many of the SGCN fishes are undoubtedly declining and will be discussed in a forthcoming atlas of state fishes, many are still poorly understood due to a lack of information (particularly in large river habitats which are difficult to survey). Future studies on the ecology, life history, and range distributions of these poorly understood fishes are needed to conserve and manage SGCN fishes in West Virginia.

Distribution

The 2005 WVWCAP emphasized performing inventories, establishing monitoring stations of watersheds of high species richness, and conducting literature and museum searches for state records. These efforts have expanded our knowledge of state fishes considerably, as nearly 30 species have been added to the state fish list, and at least 11 species are now regarded as extirpated. In addition, the past ten years have highlighted the fact that the known ranges of many fishes have been reduced.

Fishes in West Virginia occur in three major drainages: Ohio River Basin of the Mississippi River system (usually divided into the greater Ohio River and the New River faunas due to several endemic fishes found in the upper Kanawha River or above Kanawha Falls); upper Potomac River; and, upper James River tributaries. Among these watersheds, the majority of the richness occurs in certain Ohio River drainages; the Elk and Little Kanawha River systems contain the most fish biodiversity in the state. In addition, the mainstem Ohio, Kanawha and Little Kanawha rivers support diverse large river assemblages, and the New River has ten endemic fishes (which encompasses 25% of its native fauna). Of these ten, six are among West Virginia's SGCN: *Phenacobius teretulus* (Kanawha Minnow), *Etheostoma osburni* (Candy Darter), *Percina gymnocephala* (Appalachia Darter), *Notropis scabriceps* (New River Shiner), *Cottus sp. cf. carolinae* (Bluestone Sculpin), *Cottus kanawhae* (Kanawha Sculpin). On the Atlantic slope, the Potomac and upper James River drainages support many fewer species (approximately 40 taxa). However, several forms are either endemic or restricted to these Chesapeake Bay watersheds. Checkered Sculpin is the SGCN fish endemic to the Potomac Watershed and *Etheostoma longimanum* (Longfin Darter) and *Percina notogramma* (Stripeback Darter - mountain race) are the two SGCN fishes endemic to the James River Watershed.

Species Groupings

The occurrence of fish species is dependent on lentic and/or lotic habitats, substrate, temperature regimes, and fish impediments (e.g., Kanawha Falls) in their respective Ecoregion.

Western Appalachian Plateau - Small to Large River Species of the Ohio River Basin

Found in small to large rivers of the Ohio River drainages.

Ichthyomyzon bdellium (Ohio Lamprey)
Ichthyomyzon unicuspis (Silver Lamprey)
Ichthyomyzon fossor (Northern Brook Lamprey)
Ichthyomyzon greeleyi (Mountain Brook Lamprey)
Notropis ariommus (Popeye Shiner)
Noturus stigmosus (Northern Madtom)
Cycleptus elongates (Blue Sucker)
Ameiurus melas (Black Bullhead)
Ammocrypta pellucida (Eastern Sand Darter)
Ammocrypta clara (Western Sand Darter)
Crystallaria cincotta (Diamond Darter)
Etheostoma maculatum (Spotted Darter)
Etheostoma tippecanoe (Tippecanoe Darter)
Percina macrocephala (Longhead Darter)

Western Appalachian Plateau - Small Stream Species of the Ohio River Basin

Found in warm to cold small streams of the Appalachian Plateau.

Clinostomus elongatus (Redside Dace)
Lythrurus umbratilis (Redfin Shiner)
Lepomis humilis (Orangespotted Sunfish)

Appalachian Plateau and Ridge and Valley - New River Species of the Ohio River Basin

Found in high elevation small rivers and streams; usually restricted to cool to cold streams.

Notropis scabriceps (New River Shiner)
Exoglossum laurae (Tonguetied Minnow)
Phenacobius teretulus (Kanawha Minnow)
Etheostoma osburni (Candy Darter)
Percina gymnocephala (Appalachia Darter)

Ridge and Valley - High Volume Spring Obligate Species of the New and Potomac Rivers

Found in high volume springs in Karst Regions.

Margariscus margarita (Allegheny Pearl Dace)
Cottus sp. cf. carolinae (Buckeye Creek Cave Sculpin)
Cottus sp. cf. carolinae (Bluestone Sculpin)
Cottus sp. cf. cognatus (Checkered Sculpin)
Cottus kanawhae (Kanawha Sculpin)

Ridge and Valley - Small James River Tributary Species

Found in small Chesapeake Bay streams of Monroe County.

Lythrurus ardens (Rosefin Shiner)
Etheostoma longimanum (Longfin Darter)

Percina notogramma (Stripeback Darter)

Ridge and Valley – Small to Large Streams and Small River Species of Potomac River Basin

Currently found only in the Opequon Creek and Shenandoah River drainages within West Virginia.

Cyprinella analostana (Satinfin Shiner)

Notropis amoenus (Comely Shiner)

Notropis procne (Swallowtail Shiner)

Luxilus cornutus (Common Shiner)

Etheostoma olmstedii (Tessellated Darter)

Potomac River Basin – Large River Species

Found in large stream and river habitats of the Ridge and Valley.

Moxostoma macrolepidotum (Shorthead Redhorse)

Percina peltata (Shield Darter)

Non-grouped species

Do not classify with any particular grouping or across multiple groups

Anguilla rostrata (American Eel)

Salvelinus fontinalis (Brook Trout)

Conservation Issues

Although fishes are usually not as vulnerable to extirpation or extinction as other taxa groups because they are more mobile than many of their aquatic counterparts, chronic pollution and loss of habitat eventually restricts the continued success or re-establishment of most fishes. The Clean Water Act (CWA) of the 1970s, which was passed to restore and maintain the “chemical, physical, and biological integrity” of the nation’s waters, has moderated worst-case situations by reducing pollution from point-source offenders. However, non-point pollution is far from being managed because educating landowners in alternate landuse practices, which would likely benefit both themselves and our nation’s water resources, is a slow process. Recent laws have attempted to address these issues. For example, the 2014 Farm Bill offers financial incentives to landowners who implement environmental alternatives to reverse the trend of deteriorating biological communities and waterways. In fact, the United States Environmental Protection Agency (USEPA) (2009) has recently determined that biological communities in more than half of our nation’s waterways are severely impaired. In the Eastern Highlands, where West Virginia is located, their data reveal fish assemblages in 35% of our streams are ranked in poor condition. Invertebrate populations have fared even worse, as indices suggest that up to 75% of the native taxa are missing from local streams. The main stressors identified in their study which contribute to these poor communities are elevated levels of phosphorus and nitrogen and poor or degraded riparian habitats. In West Virginia, sedimentation from mining and timbering likely limits the recovery of fish species.

Aquatic species will not rebound if current water laws are not strictly enforced and new ones relating to non-point source pollution implemented. A good example of this is the Monongahela River Watershed which has a history of acid mine drainage and poor landuse practices related to coal and/or timbering industries. Despite the advent of modern environmental laws, this severely degraded watershed has not

fully recovered. This is evident when you compare the current fish species list with its sister drainage, the Allegheny River in Pennsylvania, where nearly 40 additional fish species have been documented in recent years (Cincotta and Welsh, In Prep.). Many of the more pollution-tolerant species have returned to the Monongahela drainage since the most severe impacts were eliminated or reduced, but it is far from being fully recovered. They may never fully recover due to the lack of enforcement of current laws and the added stressors of climate change, introduction of invasive species, drilling for deep shale gas of Marcellus and Utica formations, and the discharges of high conductivity water associated with coal mining in the region. Other drainages that have also been severely impacted and have not significantly recuperated include the Big Sandy/Tug Fork and Guyandotte River basins.

The establishment of routine monitoring stations may lend early insight to species-rich areas and alert the state of potential declines. Other monitoring stations should be created in impaired waters to document the recovery of presently-impaired watersheds. The latter suggestion may be moot if water laws are weakened or ignored.

SGCN Summary

The West Virginia list of SGCN fishes includes 74 species, of which 34 are Priority 1. Many are listed because they are found in habitats that are particularly difficult to sample and additional resources are needed in this effort. Others species may be in decline or extirpated from our waters for one or more reasons discussed above. The Diamond Darter is listed as federally endangered. The USFWS has been petitioned to list the Candy Darter and American Eel.

3.2.1.8: Mammals

Description

Sixty-six native mammal species occur in West Virginia today, although the Gray Bat (*Myotis grisescens*) has not been observed in the state since 1991 and is considered an “accidental” resident of the state. Since the previous WVWCAP was written in 2005, the Seminole Bat (*Lasiurus seminolus*) has been confirmed in West Virginia and has been added to the species list. Species extirpated from the state are American Bison (*Bison bison*), Elk (*Cervus canadensis*), Gray Wolf (*Canis lupus*), and Eastern Cougar (*Felis concolor cougar*). The last recorded Bison in West Virginia was killed near Valley Head, Randolph County, in 1825. Elk were reported near the headwaters of the Tygart and Greenbrier rivers as late as 1875 and were gone by 1890. Bounties were paid on wolves in West Virginia through the late 1800s, with the last recorded wolf killed in 1900. The last report of an indigenous Eastern Cougar was of tracks observed in the 1930s. Although sightings continue, these animals may have been brought into the state and released, as was demonstrated for two cougars obtained by the WVDNR in 1976. The Beaver (*Castor canadensis*), Fisher (*Martes pennanti*), and River Otter (*Lontra canadensis*) were also eradicated, but were reintroduced in the 1930s, 1969, and 1985, respectively. The WVDNR is currently planning to reintroduce Elk into the state’s southwestern counties.

Seven non-native mammal species have taken up residence in West Virginia. These are the House Mouse (*Mus musculus*), Norway or Roof Rat (*Rattus norvegicus*), Black Rat (*Rattus rattus*), feral dog (*Canis familiaris*), Wild Boar (*Sus scrofa*), feral cat (*Felis catus*), and feral goat (*Capra aegagrus*). The Black Rat, Norway Rat, and House Mouse all came to North America with early settlers and traders. Dogs, cats and goats that wandered off or were abandoned have established feral populations in portions of the state. Wild Boar were introduced into the state in 1972. Today a population of Wild Boar exists in Boone, Logan, Raleigh and Wyoming counties.

Distribution

Mammals occur statewide and utilize a variety of habitats. Caves are used by several species of bats and Allegheny Woodrats (*Neotoma magister*), while other species such as the Southern Water Shrew (*Sorex palustris punctatus*) are semi-aquatic. Many SGCN species are found in habitats that are limited in distribution or utilize limited portions of a habitat based on specific habitat characteristics (e.g., rock outcroppings). These will be discussed under the Species Groupings below.

Species Groupings

Bats

Bats occur statewide and this group includes species which are resident year round as well as migratory species. Many bat species use caves for hibernation and Virginia Big-eared Bats (*Corynorhinus townsendii virginianus*) also rear their young in caves. Many caves in West Virginia harbor regionally and/or globally significant numbers of hibernating bats. Threats include the fungal disease White Nose Syndrome, mortalities at wind facilities, disturbance of bats in roosts, and loss of roosts.

Corynorhinus rafinesquii (Eastern Big-eared Bat = Rafinesque’s Big-eared Bat)

Corynorhinus townsendii virginianus (Virginia Big-eared Bat)

Lasiurus borealis (Eastern Red Bat)

Lasiurus cinereus (Hoary Bat)

Lasiurus seminolus (Seminole Bat)
Myotis leibii (Eastern Small-footed Bat)
Myotis lucifugus (Little Brown Bat)
Myotis septentrionalis (Northern Myotis = Northern Long-eared Bat)
Myotis sodalis (Indiana Bat)
Perimyotis subflavus (Tricolored Bat)

Talus/Boulder Field/Cliff Species (may also use caves to some extent)

These species utilize rocky habitats such as cracks and fissures in rock outcroppings or in talus areas and boulder fields. Threats include habitat disturbance, parasites (Allegheny Woodrat), and habitat fragmentation.

Neotoma magister (Allegheny Woodrat)
Spilogale putorius (Spotted Skunk)
Sorex dispar (Long-tailed Shrew)
Myotis leibii (Eastern Small-footed Bat)
Erethizon dorsatum (Porcupine)

Red Spruce/Northern Hardwood Forest Species

This group includes high elevation species associated with Red Spruce/Northern Hardwood Forests. Much of this habitat is on the Monongahela National Forest. The current extent of these forest types is much less than their historic range and efforts are underway to restore and enhance Red Spruce Forests. The vast majority of the range of the West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*), which is a Central Appalachian endemic, is found in West Virginia, and the survival of this squirrel depends on maintaining West Virginia's Red Spruce Forests. Boreal habitats in West Virginia contribute heavily to the conservation of these species in the central and southern Appalachian Mountains.

Glaucomys sabrinus fuscus (West Virginia Northern Flying Squirrel)
Microtus chrotorrhinus carolinensis (Southern Rock Vole) Central Appalachian endemic
Sorex palustris punctatus (Southern Water Shrew) Central Appalachian endemic
Lepus americanus (Snowshoe Hare)

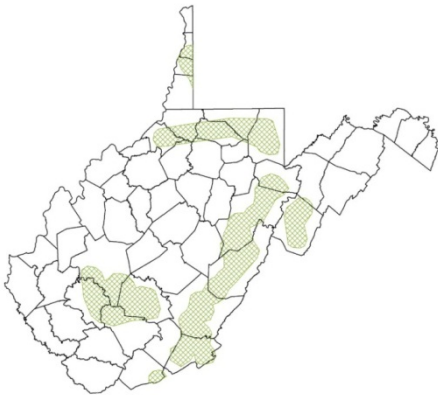
Grassland/Meadow/Scrubland Species

These species occur statewide but utilize open habitats which were never common in West Virginia. Threats include habitat degradation and loss of habitat to development. While these species are rare in West Virginia, West Virginia's contribution to the conservation of many of these species may not be large. However, populations in West Virginia at the edge of the species' range may contribute to genetic diversity.

Cryptotis parva (Least Shrew)
Microtus ochrogaster (Prairie Vole)
Ochrotomys nuttalli (Golden Mouse)
Synaptomys cooperi (Southern Bog Lemming)
Zapus hudsonius (Meadow Jumping Mouse)
Reithrodontomys humulis (Eastern Harvest Mouse)

be impacted when home owners evict bats from buildings. To minimize these impacts, in 2014 the WVDNR developed guidelines for dealing with bats in buildings. In addition, Little Brown Bats may roost in old and abandoned buildings, some of which are being demolished and replaced with newer, less bat-friendly structures.

Three SGCN bats are federally listed species. The Northern Long-eared Bat was recently listed due to the impacts of WNS. Before WNS, this was one of the most common bats in West Virginia, and it occurred in all counties. Although the population has declined due to WNS, in 2014 this was the third most commonly captured bat during mist net surveys (after the Big Brown Bat (*Eptesicus fuscus*) and Eastern Red Bat) and was still relatively common in the Northern Panhandle region. West Virginia harbors more than half of the global population of the Virginia Big-eared Bat and the largest concentration of Indiana Bats in the Mid-Atlantic area. These two listed species are less-widely distributed in the state than the Northern Long-eared Bat, and the maps below show areas where these bats are likely to occur during the active (non-hibernation) season. The fourth listed bat species in West Virginia is the Gray Bat. This species was seen during a winter bat survey in 1991, but has not been documented in the state since that time and is considered accidental at this time.



Zones of concern for "active season"
Indiana bats.



Zones of concern for "active season"
Virginia Big-eared Bats.

Talus/Boulder Field/Cliff Species

This is a suite of mammal species often associated with rock features on the landscape. These can be cliffs and large outcroppings, boulder fields, or talus areas. Rock features can be acidic or limestone, and some species will also use caves. The Eastern Small-footed Bat is included here because it uses these habitats and, unlike many other bats, is not significantly impacted by WNS and has not been documented to be impacted by the operation of wind facilities.

Threats include habitat degradation and fragmentation as rocky ridges are impacted by housing development, construction of pipelines and other rights-of-way, and the development of wind facilities. Ideally, large areas containing multiple rock features can be protected to allow meta-populations to function on the landscape. Such areas still exist in West Virginia. Forestry practices implemented near rock features should aim to maintain mast producing trees and shrubs in areas where Allegheny Woodrats occur.

Another threat is the potential impact of the raccoon roundworm (*Baylisascaris procyonis*) on Allegheny Woodrats. The eggs of the roundworm are passed in raccoon feces (raccoons often den in rocky areas), and the eggs can be transferred to Allegheny Woodrats where they can be fatal. This problem is exacerbated by artificially high raccoon populations in areas where they have access to human garbage including food materials.

Red Spruce/Northern Hardwood Forests Species

Red Spruce/Northern Hardwood Forests once covered much of the higher elevations of West Virginia. Much of this habitat was lost following large-scale logging and subsequent fires around the turn of the 20th Century. Very little old growth Red Spruce Forest remains. Although the main impacts of the timbering are a legacy of earlier logging, considerable Red Spruce (*Picea rubens*) was still being harvested in the 1980s. Much of this habitat occurs on the Monongahela National Forest, and the current management plan for the Forest includes a Red Spruce management prescription. Several organizations and agencies have contributed to Red Spruce restoration work including research into restoration measures, planting of Red Spruce seedlings, and forest management to release understory Red Spruce where there is not yet spruce in the overstory.

Climate change could impede the recovery of Red Spruce/Northern Hardwood Forests, but even if the overall range of spruce is reduced considerably from its historic distribution, there would likely be areas where spruce forest could still be expanded beyond its current range.

While most species in this group are affected mostly by habitat loss and degradation, the Snowshoe Hare may be directly impacted by climate change. Because this species has evolved to change pelage (fur) color from brown in the summer to white in the winter, a change in the timing of snow cover could lead to a “mismatch” of the hares’ coloration with the environment. If snow cover comes later and remains for a shorter period of time, white hares may become easy prey for predators.

Grassland/Meadow/Scrubland Species

The group contains species which occur from the higher elevations to the Ohio Valley, but they use open and early successional habitats. This group has not been well studied in recent years, and many of the WVDNR’s records are old. Surveys should be conducted to determine if the habitat and the species still occur at the documented sites. The main threat is probably habitat loss through succession or development, especially in the Ohio Valley and Eastern Panhandle. In some areas, species may be impacted by free-ranging pets.

SGCN Summary

West Virginia’s SGCN list for mammals includes 29 species, with 15 considered Priority 1. Nine (31%) of the mammal species on the SGCN list are bats. Three bats are federally listed (Indiana Bat (endangered), Northern Long-eared Bat (threatened), and Virginia Big-eared Bat (endangered)) and two additional bats are being reviewed for possible federal listing (Little Brown Bat and Tricolored Bat). When the 2005 WVWCAP was prepared, the West Virginia Northern Flying Squirrel was listed as federally endangered. This species has been delisted, but remains an SGCN and a Sensitive Species on the Monongahela National Forest. The Northern Long-eared Bat was federally listed since the 2005 WVWCAP was written. A recent status survey of the Eastern Small-footed Bat conducted by the USFWS determined that federal listing is not warranted at this time.

Distribution

The distribution of freshwater mussels is dependent on hosts that provide upstream dispersal of a given species. For most mussel species, occurrence and distribution in the state are generally well understood although new records continue to be discovered. State ranks were reassigned in 2014 using NatureServe's methodology. Species distributions are describe below in Species Groupings.

Species Groupings

Occurrence of mussel species is best characterized by watershed. The group is split between the Ohio River Watershed, the Potomac Watershed, and the James River Watershed. Only two of the SGCN species cross-over watershed boundaries. The Green Floater (*Lasmigona subviridis*) occurs within the Ohio and Potomac watersheds which is most likely a result of historic stream captures. Through genetic analysis King *et al.* (1999) theorized that the Potomac and other Atlantic Slope watersheds have been isolated from the Ohio Watershed populations for thousands of generations. The Creeper (*Strophitus undulatus*) cross watershed occurrence may be more related to human introductions from stocking of host fish infested with larval mussels as it is not common in the mountain headwater streams of the Ohio River Watershed.

Ohio River Watershed

Actinonaias ligamentina (Mucket)
Alasmidonta marginata (Elktoe)
Amblyma plicata (Threeridge)
Anodontoides ferussacianus (Cylindrical Papershell)
Cumberlandia monodonta (Spectaclecase)
Cyclonaias tuberculata (Purple Wartyback)
Cyprogenia stegaria (Fanshell)
Ellipsaria lineolata (Butterfly)
Elliptio crassidens (Elephant-ear)
Elliptio dilatata (Spike)
Epioblasma torulosa rangiana (Northern Riffleshell)
Epioblasma triquetra (Snuffbox)
Fusconaia ebena (Ebonyshell)
Fusconaia flava (Wabash Pigtoe)
Fusconaia subrotunda (Long-solid)
Lampsilis abrupta (Pink Mucket Pearly Mussel)
Lampsilis cardium (Plain Pocketbook)
Lampsilis fasciola (Wavy-rayed Lampmussel)
Lampsilis ovata (Pocketbook)
Lampsilis teres (Yellow Sandshell)
Lasmigona complanata (White Heelsplitter)
Lasmigona compressa (Creek Heelsplitter)
Lasmigona costata (Fluted-shell)
Lasmigona subviridis (Green Floater)
Leptodea fragilis (Fragile Papershell)
Ligumia recta (Black Sandshell)
Megalonaias nervosa (Washboard)
Obliquaria reflexa (Threehorn Wartyback)

Obovaria olivaria (Hickorynut)
Obovaria subrotunda (Round Hickorynut)
Plethobasus cyphus (Sheepnose)
Pleurobema clava (Clubshell)
Pleurobema cordatum (Ohio Pigtoe)
Pleurobema sintoxia (Round Pigtoe)
Ptychobranhus fasciolaris (Kidneyshell)
Pyganodon grandis (Giant Floater)
Quadrula cylindrica (Rabbitsfoot)
Quadrula metanevra (Monkeyface)
Quadrula pustulosa (Pimpleback)
Quadrula quadrula (Mapleleaf)
Simpsonaias ambigua (Salamander Mussel)
Strophitus undulatus (Creeper)
Toxolasma parvus (Lilliput)
Tritogonia verrucosa (Pistolgrip)
Truncilla donaciformis (Fawnsfoot)
Truncilla truncata (Deertoe)
Uniomerus tetralasmus (Pondhorn)
Villosa fabalis (Rayed Bean)
Villosa iris (Rainbow)
Villosa lienosa (Little Spectaclecase)

Potomac Watershed

Alasmidonta undulata (Triangle Floater)
Alasmidonta varicosa (Brook Floater)
Elliptio complanata (Eastern Elliptio)
Elliptio fisheriana (Northern Lance)
Lampsilis cariosa (Yellow Lampmussel)
Lampsilis radiata (Eastern Lampmussel)
Lasmigona subviridis (Green Floater)
Pyganodon cataracta (Eastern Floater)
Strophitus undulatus (Creeper)

James River Watershed

Pleurobema collina (James Spinymussel)
Strophitus undulatus (Creeper)

Conservation Issues

With over 300 species of freshwater mussels in North America, mollusks are the most imperiled group of animals in America. Of the 58% of the total lentic waters assessed by EPA in West Virginia in 2010, 62% were determined to be impaired (USEPA 2010). Although some rivers in eastern and north-central West Virginia (Monongahela Watershed among others) have made substantial improvements in water quality and sediment reductions from unregulated logging, acid mine drainage, and unregulated municipal pollution from the 1900s, other West Virginia rivers and streams remain highly impacted. Others remain under threat from streamside development, mountaintop mining, and the shale gas and oil extraction industry.

The 2005 WVWCAP listed habitat loss, water quantity and quality, and data protection as the three top conservation issues. Additional issues addressed for certain species included forest health and invasive species. Habitat continues to be lost through dredging, stream channelization, siltation, pipeline construction, and others. We have made progress in reducing these impacts through coordination and the implementation of the Mussel Survey Protocols described above, but the loss continues. Water quality continues to be an issue.

While toxic spills continue to impact mussels as evidenced by the 30 mile long mussel kill on the Ohio River in 1999, the coal slurry spill on the Tug Fork in 2000, and the complete loss of mussel populations in Dunkard Creek in 2009, the greatest general impact to our mussel resources may be chronic stressors such as elevated ammonia from wastewater discharges or chloride discharges from industrial effluents. Research in recent years shows that mussels are much more susceptible to chemicals such as ammonia and chlorides than typical aquatic organisms used to establish water quality standards (Canadian Council of Ministers of the Environment 2011, Patnode *et al.*).

Although water quantity was listed with quality in 2005, quantity was not a significant issue at the time. With the onset of the shale gas industry over the last decade, quantity has become more of an issue. In 2010 mussels were observed being stranded due to water withdrawals during drought conditions for the shale gas industry. Over the next few years West Virginia Department of Environmental Protection (WVDEP) incorporated regulations on water withdrawals. The limits set have yet to be validated as protective of aquatic life. This assessment needs to be conducted and was initiated in 2015 by the USFWS for streams containing federally endangered species. Since the 2005 WVWCAP was published, legislation was enacted that protects the release of site specific information from freedom of information requests.

Many of the actions noted in 2005 to address issues are still valid today. Coordination with our partners such as the USFWS, WVDEP, Natural Resources Conservation Service (NRCS), and others continues to be a high priority. Other actions include education of the public, industry and permit writers on the importance of mussels, riparian buffers, maintaining stream stability and minimizing direct impacts to streams (mussel habitat), reducing the spread of invasive species and others. In addition, there is a need to support legislation that creates water quality standards that are more protective of aquatic life. Would you want to drink water that our aquatic fauna could not even live in?

Populations of all freshwater mussels have been drastically reduced in our streams, some to the point of extirpation. The Tubercled Blossum (*Epioblasma torulosa torulosa*) documented in the 2005 WVWCAP is now believed to be extirpated. The reasons for this decline are many, and are all related directly to human activities. Impoundments, dams, or activities associated with these facilities create physical barriers that isolate populations and separate them from host fish, cause fluctuations in water flow that decreases nutrient and oxygen availability and alters natural temperature regimes. Entire beds have probably been destroyed by historical and ongoing commercial sand and gravel dredging within the upper Ohio River. Dredging also occurs for navigation maintenance and permanent loading and unloading facilities.

Other impacts occur from tow prop wash and chemical spills. Probably the greatest impact to freshwater mussels comes from sedimentation associated with the above activities as well as open trenching for pipeline crossings, fords, stream bank failure, land disturbances of many types (agricultural, forestry, urban, and industrial), etc. As previously mentioned, mussels feed by filtering water over their finely ciliated gills to remove microscopic food particles. This process makes them very sensitive to excessive sedimentation. Excessive sedimentation not only impacts their feeding but

reduces suitable habitat and may cause death due to smothering (Anderson and Kreeger 2010, Box and Mossa 1999).

The exotic Zebra Mussel (*Dreissena polymorpha*) continues to threaten mussel populations within the Ohio and Kanawha rivers. In 2000 a nearly 25% decline in the native mussels occurred as a result of a population explosion of Zebra Mussels. Zebra Mussels do not have a parasitic life stage and thus can produce large numbers of juveniles which, if flows are slow enough, attach to hard surfaces including native freshwater mussels. Once attached, they grow rapidly and can restrict availability of food and oxygen to the native as well as inhibit the native's ability to burrow. Since the initial infestation, Zebra Mussel densities have not reached density levels observed in 2000 and rarely survive into their second year. Zebra mussel populations are maintained by a constant influx of young produced by adults attached to barges that travel the river. Evidence does not indicate that Zebra Mussels are able to survive in our inland lakes and rivers, but education of boaters, anglers, and other stream users on cleaning equipment and movement of water containing Zebra Mussel larvae or other invasive species and pathogens should continue to keep the threat of spread to a minimum.

Future conservation efforts should include the following.

- Concentrate on targeted surveys for determining status of species considered for federal listing.
- Work should continue toward publishing the Mussels of West Virginia to provide access to data by the general public.
- The monitoring network put in place should be continued and expanded.
- Efforts should be made to identify specific sites of high diversity and put into place mechanisms to conserve that biodiversity.
- An increasing concern is potential degradation of water quality and quantity as a consequence of shale gas extraction activity. The State should be encouraged to adopt water quality standards that are more protective of aquatic life.
- Dams that are no longer supporting their designated use should be removed to restore the streams connectivity, restoring mussel habitat, mussel host movements, and thus allowing for restoration of the mussel population.
- Many other legacy impacts destroyed mussel populations, from selective species to entire streams. Restoration efforts should continue to restore these populations if water quality and habitat permits.

SGCN Summary

West Virginia's SGCN list for mussels includes 53 species, with 27 considered Priority 1. West Virginia has nine other extant federally endangered mussel species, the Pink Mucket Pearly Mussel, James Spiny mussel, Fanshell, Northern Riffleshell, Clubshell, Snuffbox, Rayed Bean, Spectaclecase, and Sheepnose. One federally endangered species, Rabbitsfoot, is currently believed to be extirpated. It was placed on the SGCN as a Priority 2 species since there is potential for restoration efforts to occur over the next 10 year period. As previously mentioned, the Green Floater is found in both the Potomac and Ohio River watersheds. These two populations are genetically significant, and West Virginia by far maintains the best population of the Ohio River Watershed form. The USFWS has been petitioned to list several mussel species. The Green Floater is one of these and several others also occur in West Virginia. All G1 to G3 species that occur in West Virginia are listed as Priority 1 species except for the Rabbitsfoot. Two G1 species occur in West Virginia (Fanshell and James Spiny mussel). West Virginia has two viable populations of the Fanshell, one on the Ohio River within the Belleville Pool and one within the Kanawha

Falls area of the Kanawha River. Restoration work with this species is ongoing. The James Spiny mussel only occurs within West Virginia and Virginia within the James River Watershed. A small population occurs in West Virginia within the Potts Creek Watershed. This population continues to be threatened by agricultural activities and more recently the location for a proposed large natural gas transmission line.

3.2.1.10: Other Invertebrates

There is no taxa description included here for this small group of invertebrate species about which little is known for West Virginia. This taxa group has been elevated as a research priority in Chapter 7.

3.2.1.11: Plants

Description

Plants comprise the Kingdom Plantae, which includes vascular plants and nonvascular plants. Vascular plants include flowering plants, conifers, and ferns and their allies. Nonvascular plants include bryophytes and green algae. West Virginia is home to over 2,300 species of vascular plants (Harmon *et al.* 2006) and over 400 species of bryophytes (Studlar *et al.* 2002, WVDNR 2015). Very little is known about the diversity of green algae in the state. The huge diversity of plants in West Virginia includes pines, oaks, maples, hickories, haws, grasses, sedges, daisies, orchids, mints, pondweeds, ferns, mosses, and much more.

Plants provide food and shelter for all wildlife, and they shape the habitats and atmosphere that all life depends on. Plants are used to classify and describe the terrestrial wildlife habitats that are used in this plan. Plants are not usually included in the definition of wildlife, but their importance to wildlife (and to humans) cannot be over-estimated.

About 75% of the documented vascular plants of West Virginia are considered native (Harmon *et al.* 2006). Native species are those that were present here prior to European settlement. The remaining 25% includes species that are adventive to West Virginia (native to North America, but moved into West Virginia after European settlement) and exotic species (species not native to North America). Almost all bryophytes known in West Virginia are considered native to the state (S. Studlar, pers. comm.).

Distribution

West Virginia is lush green. Plants dominate nearly all our terrestrial habitats and are an important component of many aquatic habitats. Hundreds of plant species are very common and occur in every county of the state, but most species are less common and have a more limited distribution. The known county distribution of West Virginia's vascular plants is presented in the Checklist and Atlas of the Vascular Flora of West Virginia (Harmon *et al.* 2006), which is available as a download from the WVDNR website (www.wvdnr.gov). Detailed spatial and tabular information on occurrences of plant SGCN is maintained by WVDNR's Natural Heritage Program in the Biotics database.

The distribution of plants in West Virginia is a complex and fascinating topic involving evolution and migration in response to geologic and human history. Plant migration (unaided by humans) is typically very slow, so modern plant distributions reflect combined conditions and events long past. Some examples illustrate the seemingly contradictory patterns of plant distribution in West Virginia. Tuliptree (*Liriodendron tulipifera*) and Jack-in-the-pulpit (*Arisaema triphyllum*), species of Mixed Mesophytic Forests, are part of an ancient Tertiary flora that once ranged across Pangaea, but now remains in two widely disjunct areas centered in the Appalachians and eastern China. Shale Barren Buckwheat (*Eriogonum allenii*) and Chestnut Lipfern (*Cheilanthes eatonii*), species of dry habitats in eastern West Virginia, have closest relatives in the arid West, suggesting a different evolutionary connection. Balsam Fir (*Abies balsamea*) and Threeleaf Goldthread (*Coptis trifolia*), species that occur in West Virginia only in some High Allegheny Wetlands, have a more abundant distribution further north; they were left behind as the species migrated north following the retreat of glaciers. In contrast, Catawba Rhododendron (*Rhododendron catawbiense*) and Mountain Silverbell (*Halesia tetraptera*) migrated into the state from the south through the gorge of the north-flowing New River. More recently, hundreds of

exotic species were introduced following European settlement; most of these are concentrated in areas that are disturbed by human activities.

The unglaciated Appalachians have a rich endemic flora. Many Southern Appalachian endemics, including Spotted Mandarin (*Disporum maculatum*), Southern Mountain Cranberry (*Vaccinium erythrocarpum*), and Cliff Saxifrage (*Saxifraga michauxii*), reach the northern limit of their range in West Virginia. A smaller number of West Virginia species, such as Kates Mountain Clover (*Trifolium virginicum*) and Shale Barren Onion (*Allium oxyphilum*), are endemic to the Central Appalachians. Plant distribution can also be described in terms of habitats. Most plants are quite specific in their habitat requirements. The co-occurrence of plants in similar habitats forms the basis for plant community ecology and vegetation classification. Dominant and common plants that characterize particular habitats are listed in the terrestrial habitat descriptions in this plan. Habitats of all plant SGCN are listed in Appendix 2. All West Virginia terrestrial habitats support some plant SGCN, but some habitats host exceptionally high diversity in relatively small areas. Habitats with particularly high numbers and concentrations of plant SGCN include Shale Barrens; High Allegheny Wetlands; River Floodplains; Dry Calcareous Oak Forests, Woodlands, and Glades; and Small Stream Riparian Habitats.

Conservation Issues

Despite the importance of plants to all wildlife and high levels of imperilment compared to most animal groups, plants have often been excluded or de-emphasized in SWAPs (Stein and Gravuer 2008). Although, currently, State Wildlife Grant (SWG) funds cannot be used for plant conservation projects, we are including plants in our SWAP to encourage their consideration when planning SWG funded wildlife conservation projects and to encourage plant conservation projects with other funding sources. We recommend that SWG funded conservation actions be designed to provide benefits and to avoid detrimental effects to native plant populations.

The role of plants in food webs has many implications for wildlife conservation. Some plant species have been identified as sole food sources for animal species, especially Lepidoptera. All animals depend on plants directly for food, or indirectly as food for their prey. Plants are, in turn, affected by herbivory and may depend on consumption or visitation by animals for seed dispersal or pollination. Most plants can tolerate some herbivory and some plants have evolved defenses such as unpalatability or toxicity. Other plants are particularly susceptible to herbivory. In recent decades, excessive herbivory by large populations of White-tailed Deer has posed a threat to many native plant species and habitats in many parts of West Virginia. Plant groups that are particularly susceptible to deer herbivory include (but are not limited to) orchids, lilies, oaks, and shrubs.

Non-native invasive species include a group of plants which threaten many wildlife and native plant populations. The WVDNR (2009) developed a list of invasive plants and threat ranks which is available on the WVDNR website (www.WVDNR.gov). In the last 30 years, a number of native trees in West Virginia have become vulnerable to an onslaught of non-native forest pests and diseases. The increased rate of invasion and spread of these pests and diseases is now at a pace probably never before experienced in temperate forests and too fast for long-lived species, like trees, to adapt to in the foreseeable future. The resulting declines in native trees are significantly affecting food availability and other habitat characteristics important for wildlife. A few of these trees, such as Balsam Fir and Butternut (*Juglans cinerea*), are currently on the State's SGCN list, but more will probably move onto the list over the coming decade as their populations decline, including Eastern Hemlock (*Tsuga canadensis*) and all native ashes (*Fraxinus* spp.). Additional non-native pests and diseases are in nearby states and

likely to soon enter West Virginia. A strategic plan and guidelines for addressing invasive species in West Virginia was recently published (Bailey 2014) and is available on the WVDNR website.

The primary threats to plant SGCN involve elimination and degradation of natural habitats. Most plant SGCN grow in relatively rare habitats or are confined to high quality or unusual examples of more common habitats. Many plant SGCN have difficulty spreading across roads and developed areas, are perennials that reproduce at an older age, have highly specialized symbiotic relationships with soil fungi, pollinators, and/or seed dispersers, or require highly specialized microhabitat features for successful germination and growth. As a result, they tend to be least vulnerable when occurring in areas of extensive suitable habitat or in patches of suitable habitat embedded in larger areas of unfragmented forest. Conservation efforts to identify and preserve these habitats will benefit both plant and animal residents of these wild communities.

Plants are particularly threatened by climate change because they have slow rates of migration. Plant SGCN occurring at high elevations near the southernmost extent of their global distribution are at particular risk. However, our state's extensive public lands, topographic complexity, and relatively intact forests at high elevations may help mitigate these threats of climate change.

SGCN Summary

West Virginia's list of SGCN includes 479 vascular plants, two mosses, and one hornwort. One hundred and twenty-one plant SGCN are considered Priority 1 and 361 are considered Priority 2.

Six species of vascular plants are listed by the USFWS as federally endangered or federally threatened: Harperella (*Ptilimnium fluviatile*), Shale Barren Rockcress (*Arabis serotina*), Northeastern Bulrush (*Scirpus ancistrochaetus*), and Running Buffalo Clover (*Trifolium stoloniferum*) are listed as endangered; Virginia Spiraea (*Spiraea virginiana*) and Small Whorled Pogonia (*Isotria medeoloides*) are listed as threatened.

Globally rare plant SGCN with a substantial portion of their known global population in West Virginia include Smoke Hole Bergamot (*Monarda fistulosa* ssp. *brevis*), Shriver's Frilly Orchid (*Platanthera shriveri*), Monongahela Barbara's-buttons (*Marshallia grandiflora*), and Canby's Mountain-lover (*Paxistima canbyi*).

The list of plant SGCN was developed by revising the most recently published list of rare, threatened, and endangered plants tracked by WVDNR (2012). Additions, deletions, and changes in taxonomy and state conservation ranks were made to reflect the most recent surveys and discoveries. The list of plant SGCN will replace the WVDNR's 2012 list and as new discoveries are made the list will be updated and posted on the WVDNR website.

3.2.1.12: Reptiles

Description

Reptiles (class Reptilia) in West Virginia belong to three primary groups: lizards, skinks, and racerunners (order Squamata, sub-order Sauria); snakes (order Squamata); and turtles (order Testudines). Although some turtles are aquatic, no reptiles are tied to aquatic habitats for reproduction, but lay their eggs or give birth in terrestrial habitats. All are covered with scales or modified scales, and except for snakes, have clawed appendages.

Four skink species, one lizard species, and one racerunner species occur in West Virginia. Lizards occur in woodlands with most species preferring dry to moist conditions or certain habitat features such as rock outcrops or large woody debris. Females may deposit their eggs in a nest they excavate or they may find suitable cover under rocks or logs.

Twenty snake species occur in West Virginia. Breeding may occur in the fall or spring (after emergence from hibernation). Nine snake species give live birth with the remaining 11 species laying eggs. Birth and hatching occur in late summer and early fall. Snakes are a diverse group with species occurring in virtually every habitat type in the state. Two species of venomous snakes occur in West Virginia: the Northern Copperhead (*Agkistrodon contortrix mokasen*) and Eastern Timber Rattlesnake (*Crotalus horridus*).

Thirteen turtle species occur in West Virginia. Although their body is covered with scales, many scales are modified to form a carapace (top shell) and a plastron (bottom shell). Twelve species are aquatic or semi-aquatic, and one species is terrestrial. All turtles lay eggs in early summer which hatch in late summer and early fall. Turtles occur in most lotic habitats.

Distribution

Reptiles occur throughout West Virginia in a broad variety of habitats including all forest types, rocky outcrops, riparian areas, and disturbed habitats. Many SGCN reptiles are at the edge of their ranges and may be limited by geographic barriers or availability of specific habitats. Only one snake (Mountain Earthsnake (*Virginia valeriae pulchra*)) is considered a Central Appalachian endemic.

Species Groupings

Terrestrial Lizards, Skinks, and Racerunners

This group includes species with limited or disjunct populations. They occur in dry to mesic woodlands. Threats include invasive species (cats), habitat degradation, and pesticide use.

Aspidoscelis sexlineata sexlineata (Eastern Six-lined Racerunner)

Scincella lateralis (Little Brown Skink)

Plestiodon anthracinus anthracinus (Northern Coal Skink)

Plestiodon laticeps (Broad-headed Skink)

Terrestrial Snakes

This group includes species that occur in specific habitats or have very distinct life histories. Threats vary according to the species but generally include habitat loss, degradation, and fragmentation, commercial exploitation, persecution, injurious/invasive species (cats), and urbanization.

Opheodrys aestivus aestivus (Rough Greensnake)
Regina septemvittata (Queen Snake)
Pituophis melanoleucus melanoleucus (Northern Pinesnake)
Virginia valeriae valeriae (Eastern Earthsnake)
Carphophis amoenus amoenus (Wormsnake)
Agkistrodon contortrix mokasen (Northern Copperhead)
Diadophis punctatus edwardsii (Northern Ring-necked Snake)
Coluber constrictor constrictor (Northern Black Racer)
Pantherophis guttatus (Red Cornsnake)
Heterodon platirhinos (Eastern Hog-nosed Snake)
Lampropeltis getula getula (Eastern Kingsnake)
Virginia valeriae pulchra (Mountain Earthsnake)
Crotalus horridus (Timber Rattlesnake)
Liochlorophis vernalis (Smooth Greensnake)
Thamnophis sauritus sauritus (Eastern Ribbonsnake)

Terrestrial Turtles

Eastern Box Turtles (*Terrapene carolina carolina*) occur across West Virginia in a variety of habitats including open woodlands, pastures, and wet meadows. Threats include habitat loss, degradation, and fragmentation, disease, and commercial exploitation.

Terrapene carolina carolina (Eastern Box Turtle)

Terrestrial/Aquatic Turtles

Species in this group are near the edge of their range in North America. In West Virginia they are restricted to the Ridge and Valley Ecoregion. Both species depend on aquatic and terrestrial habitats for part of their life history. Threats include commercial exploitation and habitat loss, degradation, and fragmentation.

Glyptemys insculpta (Wood Turtle)

Clemmys guttata (Spotted Turtle)

Aquatic Turtles

Species in this group are primarily aquatic. Specific habitat requirements relate to stream size, flow (riffles or pools), substrate, and structure. Threats include barriers to movement, channelization, pollution, and commercial exploitation.

Pseudemys rubriventris (Northern Red-bellied Cooter)

Graptemys ouachitensis ouachitensis (Ouachita Map Turtle)

Graptemys geographica (Northern Map Turtle)

Apalone mutica mutica (Midland Smooth Softshell)

Apalone spinifera spinifera (Eastern Spiny Softshell)

Pseudemys concinna concinna (River Cooter)

Conservation Issues

Reptiles have adapted to specific habitat features and many have developed unique life history characteristics. Most turtles are aquatic or semi-aquatic. Lizards occupy forested uplands and feed on insects. Most snakes are terrestrial but some occupy riparian and wetland habitats, and some are even semi-aquatic. Specialization allows species to thrive in a complex environment, but it also places them at risk when their habitat is disturbed or compromised. Threats to reptiles vary according to the species but can be categorized by the following: invasive species, disease, pollution, commercial collecting and persecution, and habitat modification.

Non-native invasive species in West Virginia include domestic and feral house cats and dogs. Small snakes and lizards are frequent prey items. Conservation actions include outreach materials for pet owners to keep pets indoors or otherwise contained. Problematic native species include Raccoons, skunks, and Opossums (*Didelphi virginiana*). When these native animals scavenge streambanks and roadsides in search of discarded food, they discover and excavate turtle nests. These animals become habituated to searching for turtle nests in addition to scavenging garbage. Conservation actions include enforcing littering laws and develop outreach material focusing on litter prevention at fishing access sites.

Modifying habitat and introducing incompatible landuses stresses reptile populations, making them vulnerable to disease. Reptile diseases that threaten West Virginia species include ranavirus, snake fungal dermatitis, and *Mycoplasma* spp. Ranavirus is a fatal ectotherm-specific disease that requires an aquatic vector. In West Virginia ranavirus has been documented in Eastern Box Turtles. Snake fungal dermatitis is an emerging disease that can be fatal. It has not been documented in West Virginia but is present in mid-Atlantic and New England states. *Mycoplasma* spp. is an upper respiratory tract disease that affects Eastern Box Turtles. In West Virginia it is present in the environment and can remain latent in individual turtles. External stress related to habitat degradation or pollution often triggers the onset. Conservation actions include developing disinfection and bio-security protocols for biologists and the public, conducting disease surveillance, and developing outreach programs to create awareness of reptile diseases.

Pollution in the form of industrial, agricultural, forestry, and urban effluent affects aquatic and terrestrial reptiles. Pesticides used to treat insects ultimately affect the prey base for lizards and many snake species. Similarly, chemicals or other effluents introduced into water bodies affects aquatic invertebrates which are prey for aquatic and riparian reptiles. When reptile species (e.g., Box Turtles) are exposed to agricultural pesticides, the stress often triggers an upper respiratory tract infection. Forestry, agriculture, and urban development activities introduce silt and sediment into streams which degrades aquatic substrates that support food resources or are used as hibernacula during dormant seasons. Conservation actions include conducting reptile population assessments, monitoring water quality, increased pesticide regulatory enforcement, NPDES enforcement, and community outreach programs that emphasize appropriate hazardous waste disposal and water conservation practices.

Commercial collecting and persecution involves removing animals from natural populations. These activities have caused local extirpations. Commercial collecting for the food market and the pet trade threatens populations of many reptile species. Common Snapping Turtles, softshell turtles, and the basking turtles are sought for international food markets. Other species including Wood Turtles, Spotted Turtles, Eastern Box Turtles, and Timber Rattlesnakes are collected for sale in the pet trade. Persecution (killing) generally targets snakes. Persecution also involves “snake hunts” where people actively search

for dens/rookeries in order to kill the snakes or collect them for wildgame food events. Increased off-road motorized recreation has increased persecution in formerly remote areas, especially for rattlesnakes. Conservation actions include enforcing existing reptile/amphibian regulations, coordinating with law enforcement in other states, developing outreach material for the public and the pet/food industry that commercial collection is prohibited in West Virginia.

Reptiles have relatively long lifespans. They may take several years to reach sexual maturity and many often have low reproductive output. Many species are slow to respond or unable to adapt to habitat modification. Populations are often restricted by geographic barriers and habitat availability. Fragmenting or otherwise modifying habitat exposes reptile populations to environmental stresses and human interactions which act in concert to threaten population viability. Fragmentation manifests itself differently according to the species affected but can include logging intact forests, road construction, dam construction, and stream channelization. Changes in farming practices, most notably increased use of machinery combined with more frequent hay harvests have reduced snake populations in farmlands.

Conservation actions include maintaining core areas of intact habitat, removing barriers to dispersal, and restoring connectivity between all reptile life zones. Outreach efforts must involve engaging with land management agencies, local planning commissions, and the public to preserve intact habitats, restore degraded habitats, and re-establish populations where appropriate.

SGCN Summary

West Virginia's list for SGCN includes 28 reptile species, with 17 considered Priority 1. The USFWS has been petitioned to list several turtles including the Northern Red-bellied Cooter, Wood Turtle and Spotted Turtle. The USFWS recently announced that it is going to initiate a status review of the Spotted Turtle.

3.2.1.13: Snails

Description

Snails belong to the phylum Mollusca, class Gastropoda. In West Virginia this group contains terrestrial snails, aquatic snails, and slugs. Three SGCN gastropods are cave-dwelling snails and were covered in the Cave Invertebrate section of this plan.

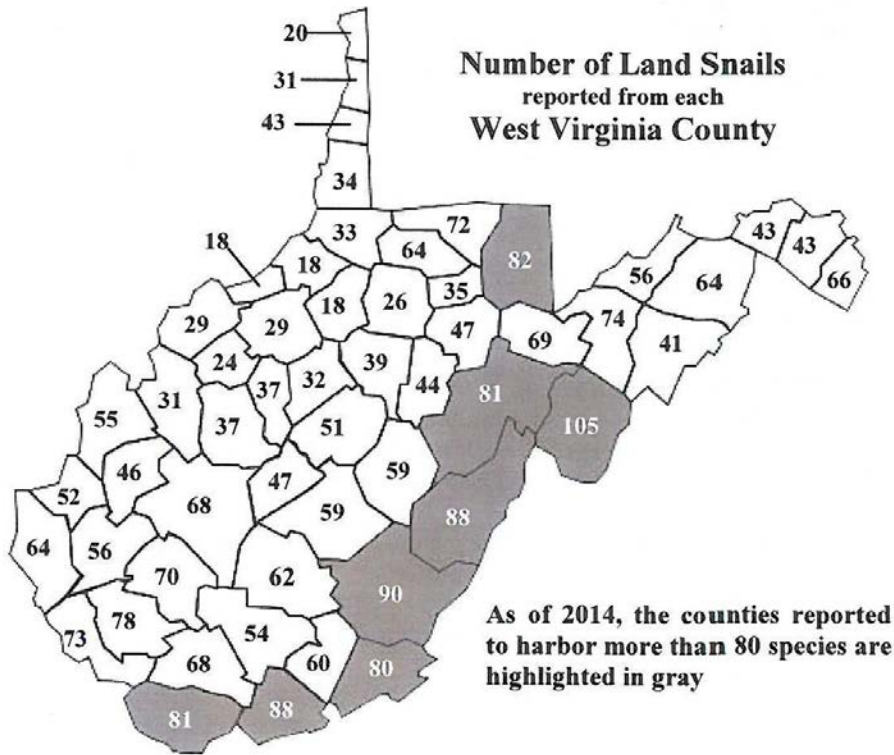
Snails are a food source for many animals and snail shells (both from live animals and empty shells) are important sources of calcium. Predators of land snails include shrews, moles and other small mammals, snakes, salamanders, and birds. Hames *et al.* (2002) documented a correlation between reduced numbers of Wood Thrushes and acid rain; the authors hypothesized that this may be connected to reduced snail populations, resulting in a reduced supply of calcium for egg production. There are also snail-eating beetles specialized to feed on land snails and even snails which feed on other snails.

Since the 2005 WWCAP, WVDNR efforts have added greatly to knowledge of snails in the state, particularly land snails. Most of these data were compiled under two projects funded through the USFWS's SWG Program. The first was a project completed by Ken Hotopp and Tim Pearce. They compiled over 10,650 existing museum records from several institutions into a database submitted to the WVDNR. The second project was a land snail atlas coordinated by the WVDNR. Dan Dourson was contracted to identify the specimens collected by the WVDNR and other partners. For this atlas, 17,130 specimens were collected and identified by Dourson. Combining these two data sources, Dourson was able to confirm 168 species of native land snails in West Virginia. Eleven gastropods possibly endemic to West Virginia have been identified. Four of these are described species and one is a described subspecies. Three additional species will be described in 2015. The remaining three species are thought to represent new species endemic to West Virginia, but additional collections and research are needed to determine their status (see list below). The Atlas resulted in five new state records and 459 new county records. During the atlas project, seven species new to science were discovered, three of which will be described and named in the Atlas publication in 2015. In addition, ten exotic snail/slug species were also documented. The distributions of aquatic snails and slugs are much less well known.

Because the last field season of the Atlas project was 2014, the new land snail data has not been incorporated into the Unit's rare species database. To assess the status of land snail species for the SGCN list, global ranks and provisional state ranks were used. State ranks will eventually be assigned following NatureServe's guidance, but for the purposes of this plan, provisional ranks were assigned based on the number, distribution, and age of the records. Because slugs are poorly represented in collections from West Virginia, only global ranks were used for these species.

Distribution

Gastropods occur statewide in a wide variety of habitats including upland habitats, aquatic habitats, and caves. Terrestrial snails are often most abundant in habitats rich in calcium. Some species are restricted to calcium rich environments, while other species occur in a wide range of habitats, but are usually more abundant at calcium-rich sites. The Ridge and Valley ecoregion along the West Virginia/Virginia border is a globally significant hot-spot of high land snail endemism with 18 species of snails and one slug endemic to the area. A list of these endemics is provided below. This is also the portion of West Virginia with the greatest number of land snail species (see figure below), and an area which warrants additional survey effort.



Number of documented species of land snail by county (from draft West Virginia Land Snail Atlas prepared by Dan Dourson, to be published 2015).

List of species endemic to the Ridge and Valley Ecoregion along the Virginia/West Virginia border. Species in bold have been documented in West Virginia (D. Dourson, pers. comm. 2015). Those species marked with an * have yet to be described.

- Anguispira clarki**
- Anguispira stihleri** *
- Glyphalinia species** (West Virginia Glyph) *(*Glyphyalinia virginica*)
- Helicodiscus diadema*
- Helicodiscus lirellus*
- Helicodiscus triodus**
- Helicodiscus villosus** *
- Mesodon aff. andrewsae** *
- Mesomphix luisant** *
- Paravitrea ceres**
- Paravitrea mira*
- Paravitrea septadens*
- Paravitrea subtilis**
- Patera* sp. (Shale Bladetooth) *
- Philomycus bisdosus*

Polygyratus virginianus
Triodopsis juxtidentis robiniae
***Triodopsis species* ***

Species Groupings

Gastropods groupings are largely based on habitats where the species are found. Some species may fall into multiple categories if they occur in a diverse array of habitat types. A few species listed as “Other Terrestrial Gastropods” have very specific habitat associations or very limited distributions in West Virginia. The largest category is that of Forest Snails. A large number of species occur in forested habitats, but for most species, specific microhabitats within the forests are not well known. Some species are usually found in the leaf litter, while others are often found under rocks and logs. Certain species are mostly restricted to calcium rich habitats; other species occur in a wide variety of forests, but occur in the greatest densities at calcium-rich sites. Still other species seek moist areas, such as seeps, within forested settings.

Snails Associated with Limestone Cliffs along Greenbrier River

Anguispira stihleri
Helicodiscus villosus
Mesomphix luisant

Snails Associated with Cliffs along Tributaries of Bluestone River

Triodopsis juxtidentis robiniae
Triodopsis sp. 1

Snails of Open Wetland Habitats

Catinella vermeta
Discus whitneyi
Nesovitrea electrina
Vertigo elatior
Vertigo milium
Vertigo ovata
Vertigo ventricosa
Vitrina angelicae

Snails of Dry Open Habitats

Inflectarius inflectus
Patera laevior
Patera pennsylvanica
Pupoides albilabris
Triodopsis fallax
Triodopsis hopetonensis
Vallonia costata
Vallonia excentrica

Vertigo elatior
Vertigo milium

Snails Found in Forest Habitats (in leaf litter or associated with logs or rocks)

Anguispira kochi
Anguispira mordax
Anguispira stihleri
Anguispira strongylodes
Carychium exiguum
Carychium nannodes
Discus catskillensis
Discus whitneyi
Euchemotrema leai
Euconulus polygyratus
Gastrocopta holzingeri
Gastrocopta procera
Gastrocopta tappaniana
Gastrodonta fonticula
Gastrodonta interna
Glyphyalinia cumberlandiana
Glyphyalinia lewisiana
Glyphyalinia picea
Glyphyalinia praecox
Glyphyalinia raderi
Glyphyalinia rimula
Glyphyalinia solida
Glyphyalinia sp 1.
Glyphyalinia virginica
Hawaiiia alachuana
Helicodiscus shimaki
Helicodiscus triodus
Hendersonia occulta
Inflectarius inflectus
Inflectarius rugeli
Lucilla scintilla
Lucilla singleyana
Mesodon aff. andrewsae
Mesodon clausus
Mesodon mitchellianus
Mesodon normalis
Mesomphix capnodes
Mesomphix perlaevis
Mesomphix rugeli
Mesomphix sp. 1
Nesovitrea electrina
Oxyloma retusum
Paravitrea bellona

Paravitrea ceres
Paravitrea pontis
Paravitrea reesei
Paravitrea seradens
Paravitrea subtilis
Philomycus virginicus
Punctum blandianum
Punctum smithi
Punctum vitreum
Stenotrema barbatum
Stenotrema edwardsi
Stenotrema macgregori
Stenotrema simile
Striatura exigua
Striatura ferrea
Striatura milium
Triodopsis anteridon
Triodopsis picea
Triodopsis platysayoides
Triodopsis rugosa
Triodopsis tennesseensis
Triodopsis vulgata
Vallonia perspectiva
Vallonia pulchella
Ventridens acerra
Ventridens arcellus
Ventridens coelaxis
Ventridens collisella
Ventridens lasmodon
Ventridens lawae
Ventridens suppressus
Ventridens theloides
Ventridens virginicus
Vertigo clappi
Vertigo elatior
Vertigo milium
Vertigo oscariana
Vertigo ovata
Vertigo parvula
Vertigo tridentata
Vertigo ventricosa
Zonitoides elliotti

Other Terrestrial Snails

Anguispira clarki

(In West Virginia, known only from a limestone outcrop on Cave Mountain, Pendleton County; taxonomic work needs to be done to confirm this as a valid species)

Triodopsis picea (Spruce Knob Threetooth Snail)

(Associated with Red Spruce/Northern Hardwood Forests)

Triodopsis platysayoides (Flat-spined Three-toothed Land Snail = Cheat Threetooth)

(Restricted to rock outcrops in Cheat Canyon, Monongahela and Preston counties)

Vertigo cristata

(In West Virginia, known only from Ice Mountain, Hampshire County)

Webbhelix multilineata

(In West Virginia, known from Cranesville Swamp, Preston County, and islands in the Ohio River)

Aquatic Snails (non-cave species)*Leptoxis dilatata**Lithasia armigera**Somatogyrus pennsylvanicus***Conservation Issues**

Threats to aquatic and terrestrial snails are related to factors that degrade or destroy their habitats. Other factors do not appear to play significant roles in impacting populations, but potentially non-native species could play a role either through direct competition or the introduction of parasites or diseases.

The Flat-spined Three-toothed Land Snail (=Cheat Three-tooth), was listed as federally threatened in 1978. This species is only found in West Virginia. Much of the species' range is now in public ownership (Cheat Canyon WMA, Coopers Rock State Forest, and Snake Hill WMA). Because of this, the WVDNR has dealt with land snail conservation issues for a number of years, and concerns for this species may provide insight into threats and conservation strategies for other terrestrial SGCN gastropods.

The Flat-spined Three-toothed Land Snail recovery plan (USFWS 1983) notes the potential impacts of concentrated foot traffic in areas open to public use. This could both impact snails directly and degrade leaf litter, a habitat feature used by the snail. Such habitat degradation was documented in the area of Coopers Rock Overlook, a popular tourist attraction located close to a parking area. In the 1990s fencing was erected to divert foot traffic away from the snail habitat at the Overlook site. Initially the fence was vandalized, and it had to be repaired in 2002 to make it effective. Since that time, the fence has been little damaged and has been effective at routing traffic away from sensitive areas. Leaf litter, which was almost absent before the fence was built (due to trampling under foot), is now abundant and utilized by the snails.

Other potential threats noted in the species' recovery plan include:

- Forest fires which could destroy leaf litter, kill trees that shade rock outcrops, and impact snails directly. Of particular concern were fire hazards such as discarded cigarettes or fires escaping from camp sites.
- The long-term impact of air pollution on lichens which could be an important food item for the snail.
- The species' recent 5-Year Review (USFWS 2007) mentioned additional concerns:
 - Rock climbing and "bouldering" events could impact snails directly and degrade or remove habitat. Because this species is usually found close to rocks, foot traffic at the base of outcrops can crush snails and degrade leaf litter. In addition, climbers may rake leaf litter away from the rocks and cut vegetation near the rocks to improve the climbing experience.
 - The Review noted that logging and associated road building were ongoing threats.

Opening the canopy can cause heating and drying of snail habitat and road construction can create sedimentation issues on steep slopes. On state lands, buffers of 150 feet around potential habitat and 200 feet around known occupied habitat have been implemented when preparing timber sales, but there is little data on the effectiveness of these buffers.

- The impact of invasive plants was another concern. Tree of Heaven (*Ailanthus altissima*) and Garlic Mustard have been observed invading the habitat of this snail in Cheat Canyon.
- The Review cites a paper by Dourson (2008) which notes that “Clearly, where the wood-rat [*Neotoma magister*] and *T. platysayoides* coexist, wood-rats furnish a nearly constant food supply to the snail, including wood-rat excrement and a host of wood-rat harvested provisions carried into the snail's location.” Decline of Allegheny Woodrat populations in areas where this snail exists could have a negative impact on food resources of the snail.
- Another concern noted, although localized in impact, is the unknown effect of toxins from treated lumber used for boardwalks and railings near the Coopers Rock Overlook.
- Hotopp (2002), raised concerns that anthropogenic changes in soil calcium levels may impact land snail populations and cites a paper documenting a decline in land snail abundance in Sweden which was correlated to a decline in calcium at the soil surface (Wäreborn 1992). Hotopp's research in mature forests in Maryland, near the West Virginia border, found a link between land snails and soil calcium. It is possible that acid precipitation could (and may have already) impact soil calcium and thus impact snails in areas where soils are poorly buffered.

Because some of the priority SGCN species have only recently been described, additional work needs to be done to explore the extent of their ranges and habitat associations. The Atlas also highlighted other possible new species that should receive attention in the future. It is likely that there are other undescribed species to be found in areas of high snail endemism and diversity, and these areas should be examined further.

There were a number of SGCN species, including some priority species, which were not encountered during the WVDNR Atlas surveys. Efforts should focus on determining if these species still occur in the state. Historic locations should be revisited, assessed for potential habitat, and surveyed. Because many of the older museum records do not have coordinates, attempts will have to be made to relocate sites based on written descriptions on museum labels. The WVDNR should attempt to acquire additional data on aquatic snails.

For SGCN gastropods, the best conservation strategy may be to determine the range and habitat needs of the species and work to insure that largely intact blocks of habitat continue to exist on the landscape. Efforts to improve water quality and the condition of the substrates in streams and rivers will benefit gastropods as well as other aquatic invertebrates.

SGCN Summary

West Virginia's SGCN list for gastropods includes 108 species, with 20 considered Priority 1. Priority species were selected based on rarity and the portion of the species' range within West Virginia. Included are 101 terrestrial snails, one slug, three aquatic snails, and three cave species (two aquatic

and one terrestrial). One land snail (Flat-spined Three-toothed Land Snail) is listed as federally threatened.

3.2.1.14: Tiger Beetles

Description

Tiger beetles are colorful and interesting beetles. Their predacious habits, as both adults and larvae, put them at the top of the insect food chain. Females lay eggs in the soil, and each species has specific soil moisture conditions critical for the survival of its eggs and larvae. Larvae burrow into the soil and maintain a hole to the soil surface where they can capture passing prey. When mature, the larvae enter a short pupation period before the adults emerge. Adults of nearly all species are diurnal, actively moving about during daylight hours. A few species remain active at night, and one species is strictly nocturnal. While on the ground, adults are very wary and quick to take flight if disturbed; however, three species which occur in West Virginia are flightless.

Distribution

Tiger beetles occur worldwide from the tropics to the boreal regions, and are represented by about 100 species across the United States. West Virginia has 20 species, known either from the state or found close enough to its borders to have a reasonable likelihood of future discovery here. Of the 20 known species, all belong to the genus *Cicindela* except for one *Megacephala* species which belongs to a primarily neotropical group. In West Virginia, tiger beetles are found statewide, but many species have specific habitat requirements and are restricted to limited areas where their habitat needs are met. Tiger beetles usually occupy open areas with little vegetative cover. Larvae occupy burrows in soils that are usually sandy in nature but may also be in clay or shale soils. Often these types of habitats are riparian, along dirt roads or near natural barrens around the state. All of these habitats are either restricted in distribution or in total area, hence the limited distribution of many species. An overview of the state's tiger beetles can be found in the "Tiger Beetles of West Virginia" by Thomas Allen and Robert Acciavatti (WVDNR 2002). Because the state has limited habitat for a number of the species, 13 species are listed as SGCN species.

Conservation Issues

A review of the conservation needs for tiger beetles indicates that initial actions for the listed species are centered on survey, inventory, and data management. Information on the distribution and status of many tiger beetles is lacking, and filling these information gaps is a necessary first step for the future conservation assessment of each species. Little new data has been acquired since the publication of "Tiger Beetles of West Virginia" in 2002. Standardized data acquisition and management both within the WVDNR Wildlife Resources Section and by all other research partners will greatly assist with these conservation assessments. Unfortunately because of the dearth of data on the distribution and status of many individual species, few specific on-the-ground conservation actions have been identified. However, because several species require sand or gravel habitats along streams and rivers, conservation of riparian zones will benefit these species.

A species of particular interest is the Splendid Tiger Beetle (*Cicindela splendida*). There have been a few recent records of Splendid Tiger Beetle in non-typical habitats. "Tiger Beetles of West Virginia" describes this beetle as a southern species near the northern edge of its range in West Virginia. Tiger beetles which appear to be the Splendid Tiger Beetle have recently been found in boreal Red Spruce Forest in three areas in West Virginia: Canaan Valley, Cheat Bridge, and along the North Fork of the

Cherry River. Additional work should be done to determine if this is the Splendid Tiger Beetle or, possibly, a new cryptic species.

SGCN Summary

West Virginia's SGCN list for tiger beetles includes 13 species, with five considered Priority 1. None are listed as federally threatened or endangered.

3.2.1.15: Additional Information About Pollinators

Pollinators are vital to the health of ecosystems through their pollination of many angiosperm species, including many that produce hard or soft mast for other wildlife species (National Resource Council 2007). In this sense they are keystone species. They are also vital to human food production, pollinating 130 crops species which produce seeds or fruit (National Resource Council 2007).

Taxa that comprise pollinators in West Virginia include bees (Apoidea), and to a much lesser extent butterflies and moths (Lepidoptera), some wasps (Vespidae), flies (Diptera), beetles (Coleoptera), and the Ruby-throated Hummingbird (*Archilochus colubris*). Bees are primary pollinators for most insect pollinated plant species because of the efficiency of their fuzzy bodies with branched hairs in carrying pollen from flower to flower. Comprehensive work on pollinators in West Virginia is lacking. Currently at least 303 species of bees are documented from the state (Discover Life 2015, McKinney 2015 - pers. comm., Williams *et al.* 2014). The number of species of other pollinators is unknown, but includes members of the families listed below (Xerces Society 2011).

Order	Family
Lepidoptera	Hesperiidae, Papilionidae, Nymphalidae, Pieridae, Lycaenidae
Hymenoptera	Vespidae – yellowjackets, hornets, potter wasps, pollen wasps, digger wasps, spider wasps
Diptera	Syrphidae, Bombyliidae, Acroceridae, Tachnidae, Muscidae
Coleoptera	Cantharidae, Cerambycidae, Buprestidae, Meloidae, Scarabaeidae, Melyridae, Cleridae, Mordellidae, Nitidulidae

Pollinators in the various taxa are found statewide depending on climate, soil type, and availability of nectar and/or pollen sources. Most pollinators are solitary, and very little is known of the natural history of most species. Some species lay eggs on vegetation, others construct some sort of chamber or nest in which to raise young. They dig nesting chambers in specific soil types, or use various plant structures, such as hollow reeds, in which to lay eggs. Social species build nests on or within structures, hollow trees, rodent burrows, or vegetation. The European honeybee (*Apis mellifera*), when raised for honey or agricultural use, by law are required to be maintained in structures with removable frames, while feral colonies use the interior of structures including hollow trees. All species that depend on nectar or pollen as a primary food source must have abundant sources for these resources over the course of their adult lives, typically late March or early April through the first killing frost.

Known threats to pollinators focus mainly on threats to bees. Declines in European honeybees from the late 1980s to mid-1990s center around exotic mites and diseases associated with Asian honeybees; this resulted in most feral colonies disappearing. Currently, Colony Collapse Disorder, theorized to be caused by anything from systemic neonicotinoid insecticides contaminating pollen and nectar, reduced immune systems due to mite infestations, to stress caused by the repeated shipping of hives from one agricultural area to the next, is decimating hives used for agriculture and honey production.

Wild bees are threatened by a number of factors. The use of herbicides with genetically modified crops (Roundup Ready) have caused significant declines of native nectar sources in some areas, contributing to the decline of area pollinators (Xerces Society 2011). Similarly, the use of crops genetically modified to resist insect herbivory have a gene for Btk, a naturally occurring insecticide, inserted into their genetic code; the resulting crop resists insects, but may also produce Btk laced pollen and nectar that can be

lethal to pollinators. As yet, this is not a major issue in West Virginia, but is an emerging threat especially in the agricultural dominated Eastern Panhandle.

Mortality to bees because of insecticide spraying on crops or ornamentals is an ongoing impact. Most mortality is likely due to bees pollinating crop fields that have been sprayed with various insecticides during flowering (Williams *et al.* 2014). Individuals or corporations that spray flowering ornamentals without regard for pollinators have caused highly visible mortality to pollinators, especially bumble bees (Xerces Society, 2015). The increased use of systemic neonicotinoid insecticides on agricultural and ornamental plants has impacted pollinator species across North America (Hopwood *et al.* 2012).

Habitat loss is also an issue. The loss of fallow fields, hedgerows, and similar areas in rural landscapes has reduced preferred nesting sites for solitary and social species. Development, degradation, and fragmentation of habitat are also serious threats. Research has documented that some bee species visit disturbed areas less than undisturbed areas, resulting in less effective pollination (Goverde *et al.* 2002). Bumble bees have a difficult time utilizing fragmented habitat; colonies suffer if nesting sites and nectar sources are not in close proximity. As in many other areas, family farms in West Virginia and throughout Appalachia have seen significant declines, with early successional habitat reverting back to forest. This process would likely favor some pollinator species, and negatively impact others.

Exotic invasive species in the form of parasites and pathogens have impacted native bee species. Evans *et al.* (2008) determined that several species of bumble bees (*Bombus* spp.) are exhibiting significant population declines due to the introduction of an exotic European fungus (*Nosema bombi*) and by parasites spread by commercial bumble bee colonies used in agriculture (*Crithidia bombi* and *Locustacarus buchneri*). It is unknown what impact these exotic species have had on West Virginia bee populations.

Climate change is a final factor discussed here that will likely impact pollinator populations. Weather patterns in Appalachia are predicted to become more extreme, and higher elevations are predicted to warm (Byers and Norris 2011). Species requiring cooler environments to survive will likely be displaced initially to higher elevations and eventually to more northern latitudes out of the state. Generally, bumble bees prefer cooler environments; bumble bee queens are among the first pollinators to emerge from hibernation in the spring. Severe storms, drought, and other extremes in the spring may impact colony establishment.

Pollinators were not treated in West Virginia's 2005 Conservation Wildlife Action Plan, except that Lepidoptera were mentioned as occasional pollinators. The state's need in regard to pollinators is to identify important taxa and to determine their status in the state through research of existing collections and state surveys. No species are listed as SGCN by West Virginia due to a lack of knowledge.

SPECIES SUMMARY BY TAXA AND PRIORITY

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	18	17
Birds	39	36
Butterflies and Moths	30	26
Cave Invertebrates	75	16
Crayfish	10	2
Dragonflies and Damselflies	25	43
Fish	37	37
Mammals	15	14
Mussels	27	33
Other Invertebrates	1	11
Plants	121	361
Reptiles	17	11
Snails	20	88
Tiger Beetles	5	8
Totals	440	703

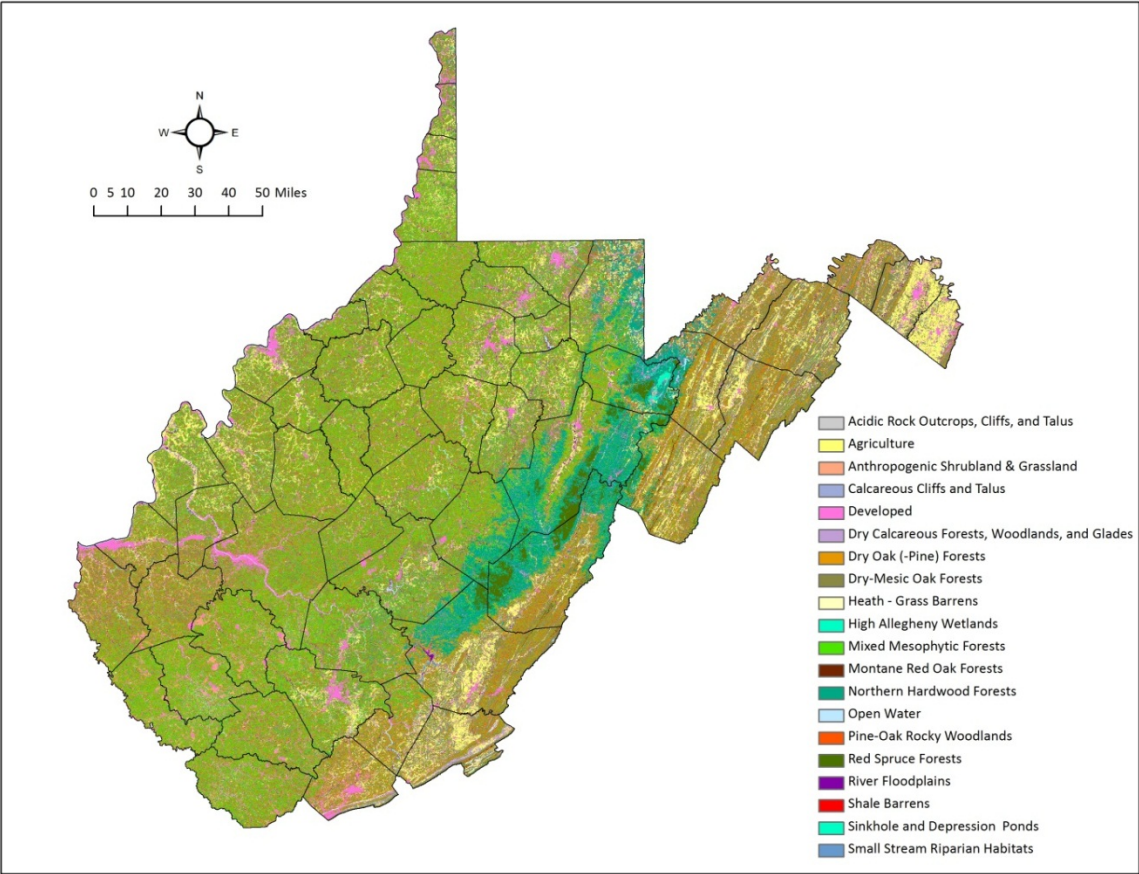
3.3: Habitats

3.3.1: Terrestrial Habitats

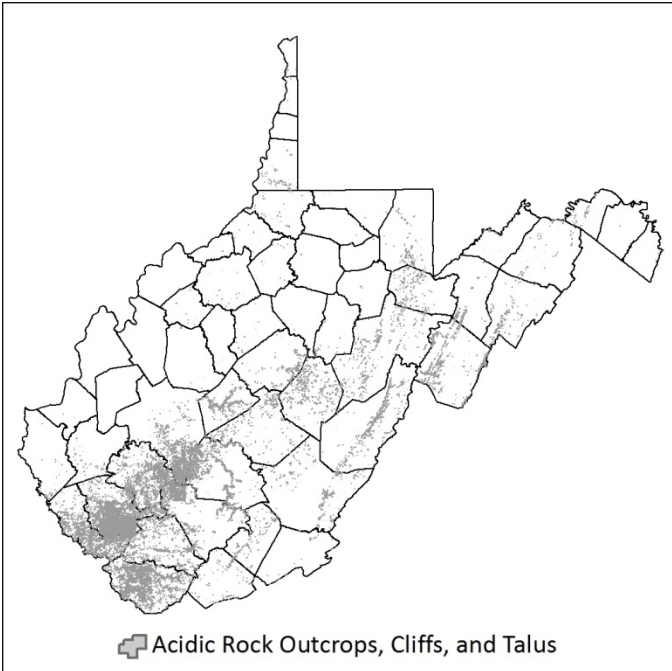
We classify and map 19 terrestrial habitats in West Virginia. These include 16 natural or semi-natural habitats that are derived from NatureServe's Ecological Systems (Comer *et al.* 2003, Gawler 2008) and three anthropogenic habitats that represent map classes of the National Land Cover Database (NLCD) (Homer *et al.* 2004). Ecological Systems are groups of Associations in the United States National Vegetation Classification (USNVC) that occur in similar environments and are influenced by similar ecological processes (Comer *et al.* 2003). For each habitat we list the corresponding Ecological Systems or NLCD map classes. For each natural habitat we provide a table of USNVC Associations that are known to occur in that habitat in West Virginia. Global and State Conservation Status Ranks (Master *et al.* 2012, Faber-Langendoen *et al.* 2012) listed for each Association are a measure of rarity and imperilment ranging from 1 (critically imperiled) to 5 (secure). Additional information on individual Ecological Systems and Associations is available on NatureServe's Explorer web application (NatureServe 2015).

Habitat mapping is based on the Northeast Habitat Map (Ferree and Anderson 2013) with revisions applied for West Virginia, including consolidation of similar Ecological Systems across Ecoregion boundaries and corrections of some known errors in the regional map. In addition to the 19 terrestrial habitats, a map class is included for Open Water. The maps provided should be considered broad-scale conceptual models for the entire state, with untested accuracy. Many errors are known and many others are likely to be found under further scrutiny, especially at finer scales.

West Virginia Terrestrial Habitat Map



3.3.1.1: Acidic Rock Outcrops, Cliffs, and Talus



Habitat area exaggerated to enhance visibility.



Acidic sandstone cliffs on North Fork Mountain.



Sandstone “rock house” along the Buckhannon River.

NatureServe Ecological Systems:

North-Central Appalachian Acidic Cliff and Talus
Cumberland Acidic Cliff and Rockhouse

Description:

Sparsely vegetated to wooded lithomorphic habitats, including rock outcrops, cliffs, talus, and boulderfields on acidic geologic formations across the state at all elevations. Rock type is mostly sandstone, but may also include other acidic lithologies. Cliff habitats often include cliff top pavement, cliff faces, and talus slopes below the cliff. Rock overhangs in the western counties formed by alluvial undercutting are often called rock houses. Some talus fields on mountain slopes and high elevation plateaus were formed from freeze/thaw action cracking the bedrock. Physiognomy is variable and includes sparsely vegetated rock faces, lichen and bryophyte dominated communities, sparse vertical shrublands, and boulderfield woodlands and forests. Boulderfield forests and woodlands occur in relatively moist topographic positions where deep rocky colluvium restricts tree growth to a few adapted species, notably Sweet Birch (*Betula lenta*), Yellow Birch (*Betula allegheniensis*), Chestnut Oak (*Quercus prinus*), and Mountain Ash (*Sorbus americana*). In open habitats tree growth is limited by drought and/or lack of rooting medium.

Similar Habitats:

Cliffs and talus on limestone are included in Limestone Cliff and Talus. Sparsely wooded sandstone glades are included in Pine - Oak Rocky Woodland.

Distribution and Abundance of Characteristic and Rare Associations:

Acidic Rock Outcrop, Cliff, and Talus habitats occupy a very small area of the state. These habitats are found across the state at all elevations, but are restricted to certain geologic formations and are concentrated in certain areas. Extensive, well-known sandstone cliffs occur in the Ridge and Valley Ecoregion on North Fork Mountain and in the Cumberland Mountains Ecoregion in the gorges of the

New and Gauley rivers. Many rivers across the state have cliff-lined valleys where they bisect resistant sandstone formations. Boulder fields, both open and wooded, are concentrated in the Ridge and Valley Ecoregion. Near level peri-glacial boulderfields are restricted to the highest elevations in the Allegheny Mountains and Ridge and Valley ecoregions. Rock houses are scattered in small drainages in the Cumberland Mountains and Western Allegheny Plateau ecoregions. Several United States National Vegetation Classification (USNVC) associations have been identified in the state but many occurrences are not yet classified.

USNVC Association Scientific Name	Code	G Rank	S Rank
Asplenium montanum Central Appalachian Sandstone Sparse Vegetation	CEGL004391	GNR	S2
Lasallia (papulosa, pensylvanica) - Dimelaena oreina - (Melanelia culbersonii) Nonvascular Vegetation	CEGL004142	G5	S3
Appalachian - Alleghenian Sandstone Dry Cliff Sparse Vegetation	CEGL006435	G4Q	S2
Umbilicaria mammulata Nonvascular Vegetation	CEGL004387	G4?	S2
Umbilicaria mammulata Nonvascular Vegetation	CEGL004387	G4?	S3
Betula lenta - Quercus prinus / Parthenocissus quinquefolia Woodland	CEGL006565	G4	S3
Umbilicaria muehlenbergii - Lasallia papulosa - (Melanelia stygia) Nonvascular Vegetation	CEGL004389	G2?	S2
Betula alleghaniensis / Sorbus americana - Acer spicatum / Polypodium appalachianum Forest	CEGL008504	G2	S2
Tilia americana - Fraxinus americana / Acer pensylvanicum - Ostrya virginiana / Parthenocissus quinquefolia - Impatiens pallida Woodland	CEGL008528	G3	S1

Places to See and Visit:

Audra State Park (Alum Cave), Coopers Rock SF, Monongahela National Forest (North Fork Mountain, Hills Creek, Dolly Sods), Gauley River National Recreation Area, New River Gorge National River (Endless Wall).

Trends:

Cliffs along the Gauley River were submerged under Summersville Lake. Natural cliffs in the Cumberland Mountains Ecoregion have been flattened and filled by mountaintop coal mining. Natural cliffs have been altered and augmented by construction of transportation corridors.

Threats:

Recreational pressure at popular overlooks and climbing areas may threaten these habitats by trampling vegetation and by disturbing wildlife.

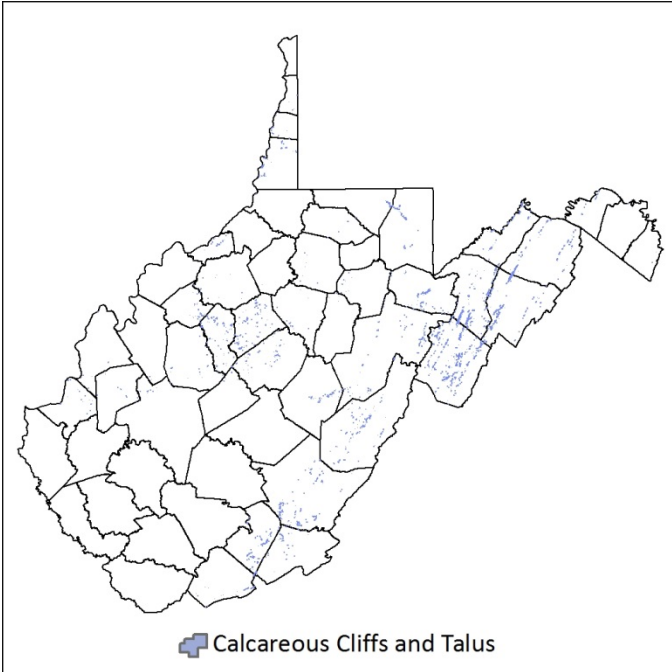
Current Projects Based on the 2005 WWCAP Priority Habitats:

The WVDNR ecologists are currently working on a statewide inventory and classification of lithomorphic habitats. Plot data has been collected from over 100 sites and will be analyzed in 2015 to develop a statewide classification.

Inventory, Management, and Research Needs:

Improve Statewide Mapping. Complete statewide classification and incorporate into the USNVC. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.2: Calcareous Cliffs and Talus



Habitat area exaggerated to enhance visibility.



Photo: Limestone cliff in the Smokehole.

NatureServe Ecological Systems:

North-Central Appalachian Circumneutral Cliff and Talus

Description:

Cliffs and talus formed from limestone, dolomite, and possibly other calcareous geologic strata. Cliffs are mostly sparsely vegetated or dominated by lichens, but may have more luxuriant growth in cooler

topographic positions and elevations. North facing cliffs sometimes support vertical woodlands dominated by Northern White Cedar (*Thuja occidentalis*). Forested limestone boulder and talus slopes below cliffs may be dominated by Northern White Cedar and/or American Basswood (*Tilia americana*).

Similar Habitats:

Cliffs and talus on acidic geologic formations are included in Acidic Rock Outcrops, Cliffs, and Talus. Sparsely wooded limestone habitats, often on cliff tops, are included in Calcareous Glades and Woodlands.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are exceedingly rare in the state. Known limestone cliffs in West Virginia are restricted to the Ridge and Valley and Allegheny Mountains ecoregions. Mapping is based on Ferree and Anderson (2013); areas of Calcareous Cliffs and Talus mapped in the Western Allegheny Plateau Ecoregion have not been substantiated by field surveys and are more likely to be acidic. Three state and globally rare USNVC associations have been identified in West Virginia, but most vegetation plots have not yet been attributed to association.

USNVC Association Scientific Name	Code	G Rank	S Rank
Cystopteris bulbifera - (Asplenium rhizophyllum) Sparse Vegetation	CEGL004394	G3G4	S2
Thuja occidentalis / Carex eburnea - Pellaea atropurpurea Woodland	CEGL002596	G2G3	S2
Tilia americana var. heterophylla - Aesculus flava - Acer saccharum / Cystopteris bulbifera - Asarum canadense Forest	CEGL006472	G3G4	S1
Undescribed lichen dominated dry limestone cliff			S2

Places to See and Visit:

Monongahela National Forest (Smokehole)

Trends:

Natural calcareous cliffs have been destroyed and altered by construction of transportation corridors and limestone quarries.

Threats:

Limestone quarrying may threaten some occurrences. Recreational pressure at popular overlooks and climbing areas may threaten these habitats by trampling vegetation and by disturbing wildlife.

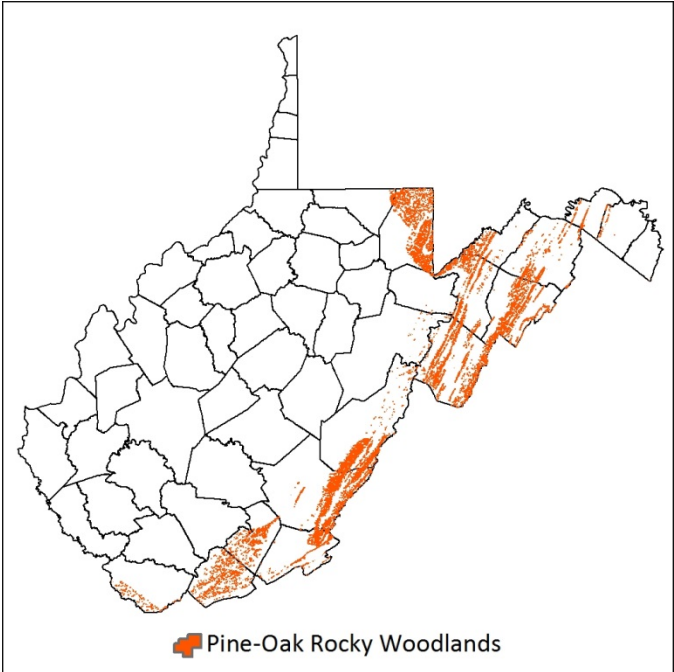
Current Projects Based on the 2005 WVWCAP Priority Habitats:

The WVDNR ecologists have been working on inventory and classification of limestone habitats, including cliffs and talus, for several years. Thirteen vegetation plots of Calcareous Cliff and Talus have been sampled and three USNVC associations have been identified in the state. The USNVC associations however need revision to accommodate data from West Virginia stands.

Inventory, Management, and Research Needs:

Improve statewide mapping. Complete statewide classification and incorporate into the USNVC. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.3: Pine - Oak Rocky Woodlands



Habitat area exaggerated to enhance visibility.



Photo: Clifftop pine at Lost River State Park.

NatureServe Ecological Systems:

- Central Appalachian Pine-Oak Rocky Woodland
- Southern Appalachian Montane Pine Forest and Woodland

Description:

Upland evergreen and mixed evergreen-deciduous woodlands and forests in hot, very dry topographic positions. Soils are usually shallow, rocky, coarse textured and highly acidic. This habitat type is confined to the eastern counties where a dry climate is produced by the rain shadow on the lee side of the Allegheny Mountains. Stands are often small patches on rocky summits, outcrops, and cliffs. Habitats include edaphic pine stands on extremely dry sites such as cliff tops, and successional pine stands which follow fire on deeper soils. Dominant pines which comprise distinct subtypes include Pitch Pine (*Pinus rigida*), Table Mountain Pine (*Pinus pungens*), Virginia Pine (*Pinus virginiana*), and Red Pine (*Pinus resinosa*). Oaks are sometimes codominant. Trees are often stunted and stand physiognomy is sometimes dwarf forest with canopy less than 16 feet tall. The understories are usually dominated by dense heath shrubs including Mountain Laurel (*Kalmia latifolia*), blueberries (*Vaccinium* spp.), and Black Huckleberry (*Gaylussacia baccata*). The herb layer is typically sparse and has low diversity. This habitat type also includes sandstone glades with high exposure of bedrock pavement with scattered, dwarfed trees, including pines and Eastern Red Cedar (*Juniperus virginiana*).

Similar Habitats:

Somewhat less dry forests in the eastern counties dominated by oaks with scattered pines, or codominated by oaks and Eastern White Pine (*Pinus strobus*), are included in Dry Oak (-Pine) Forest. Virginia Pine – oak woodlands on dry shale foothills in the eastern counties are included in Shale Barrens. Small patches in the Western Allegheny Plateau and Cumberland Mountains ecoregions that are dominated or codominated by Virginia Pine, Short Leaf Pine (*Pinus echinata*), or Eastern Red Cedar are included in Dry Oak (-Pine) Forest.

Distribution and Abundance of Characteristic and Rare Associations:

This habitat type is confined to acidic sandstone geologic formations in the eastern counties. Mapping is based on Ferree and Anderson (2013); areas of Pine - Oak Rocky Woodlands mapped in Preston and McDowell Counties have not been substantiated by field surveys and are likely to be mismapped. One USNVC Pitch Pine – Table Mountain Pine association (CEGL004996) is fairly common and occurs in hundreds of edaphic and fire patches on numerous ridge systems. Globally and state rare associations include Red Pine forests (CEGL006108) at their southernmost global range on Pike Knob and South Branch Mountain, and steeply sloping sandstone outcrop glades (CEGL004821) on North Fork Mountain. Other sandstone glades are undescribed in the USNVC, but are likely to be state and globally rare.

USNVC Association Scientific Name	Code	G Rank	S Rank
Pinus (pungens, rigida) - Quercus prinus / (Quercus ilicifolia) / Gaylussacia baccata Woodland	CEGL004996	G4	S3
Pinus resinosa / Menziesia pilosa / Polypodium appalachianum Forest	CEGL006108	G1	S1
Pinus rigida - Quercus prinus / Gaylussacia baccata / Carex pensylvanica Woodland	CEGL004821	GNR	S1
Undescribed sandstone glades			S1

Places to See and Visit:

Short Mountain WMA, Lost River State Park, Monongahela National Forest (North Fork Mountain, including Red Pine on Pike Knob), George Washington National Forest (Halfmoon Mountain), Greenland Gap (TNC).

Trends:

Pitch Pine stands expanded following fires during the logging boom in the early 1900s, but many are now decreasing in size due to human activities, lack of fire, and mesophication. Edaphic pine woodlands on dry cliffs, including all known native red pine stands, are regenerating and appear to be persistent in absence of fire.

Threats:

Native and non-native insect pests can result in mortality to pines. Many successional stands are breaking up due to mesophication (succession to moister habitat) and lack of fire.

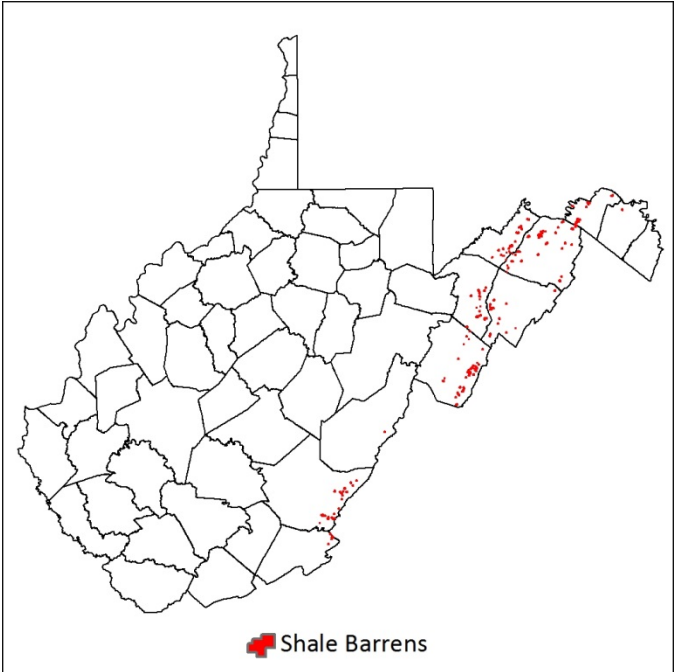
Current Projects Based on the 2005 WVWCAP Priority Habitats:

The WVDNR small grants funded research on stand dynamics and fire ecology of these habitats in 2009.

Inventory, Management, and Research Needs:

Improve Statewide Mapping. Develop state-level descriptions and make information available as part of a state vegetation classification. Research natural fire regimes and pre-settlement composition and extent. Inventory, classify, assess conservation needs, and acquire conservation land and/or conservation easements for sandstone glades.

3.3.1.4: Shale Barrens



Habitat area exaggerated to enhance visibility.



Photo: Shale Barren in the foothills of Shenandoah Mountain in Pendleton County.

NatureServe Ecological Systems:

Appalachian Shale Barrens

Description:

Small patch woodlands and openings on hot, dry topographic positions on Devonian shales in the Ridge and Valley Ecoregion and in the Greenbrier Valley of the Allegheny Mountains Ecoregion. Substrates are

usually acidic, but a smaller subset of communities occurs on calcareous shale. An open stand structure and short canopy is maintained by drought stress to trees, compounded by continual erosion of the bare shale substrate. The most common trees are Virginia Pine and Chestnut Oak, with lesser amounts of Red Oak (*Quercus rubra*), Pignut Hickory (*Carya glabra*), and Eastern Red Cedar. The herb layer is often diverse and includes a distinct assemblage of herbs called “shale barren endemics,” which occur nowhere else in the world.

Similar Habitats:

Somewhat less dry forests dominated by oaks with scattered pines, or codominated by oaks and Eastern White Pine, are included in Dry Oak (-Pine) Forest. Small patches in the Western Allegheny Plateau and Cumberland Mountains ecoregions dominated or codominated by Virginia Pine or Eastern Red Cedar are included in Dry Oak (-Pine) Forest. Very dry woodlands and forests dominated by pines on sandstone in the eastern counties are included in Pine - Oak Rocky Woodland.

Distribution and Abundance of Characteristic and Rare Associations:

Shale Barrens are confined to the Ridge and Valley Ecoregion and the Greenbrier Valley of the Allegheny Mountains Ecoregion. Shale Barrens have been intensively studied, especially sites which host the federally listed endangered Shale Barren Rockcress, but their extent is incompletely known in remote areas and on private lands. Mapping of West Virginia Shale Barrens is conservative; only known occurrences are mapped. Mapping based on ecological modeling has tended to overestimate the area, but mapping only known occurrences probably misses many occurrences. Shale Barrens in West Virginia include four globally rare associations.

USNVC Association Scientific Name	Code	G Rank	S Rank
Pinus virginiana - Quercus prinus / Packera antennariifolia - Phlox subulata Woodland	CEGL006562	G3G4	S3
Pinus virginiana - Juniperus virginiana - Quercus rubra / Solidago arguta var. harrisii - Opuntia humifusa Woodland	CEGL006288	G3	S3
Pinus virginiana - Quercus prinus / Quercus ilicifolia / (Hieracium greenii, Viola pedata) Woodland	CEGL008525	G3	S3
Juniperus virginiana - Fraxinus americana / Carex pensylvanica - Cheilanthes lanosa Wooded Herbaceous Vegetation	CEGL006037	G2	S1

Places to See and Visit:

Larinem Park (Mineral County), George Washington National Forest (Brandywine, Heavener Mountain), Slaty Mountain (TNC).

Trends:

Area of Shale Barrens may have expanded following fires during the logging boom in the early 1900s, but some are now decreasing in size due to human activities and mesophication.

Threats:

Non-native invasive plants threaten many occurrences, especially those along roads. Pesticide spraying for gypsy moth threatens rare native Lepidoptera.

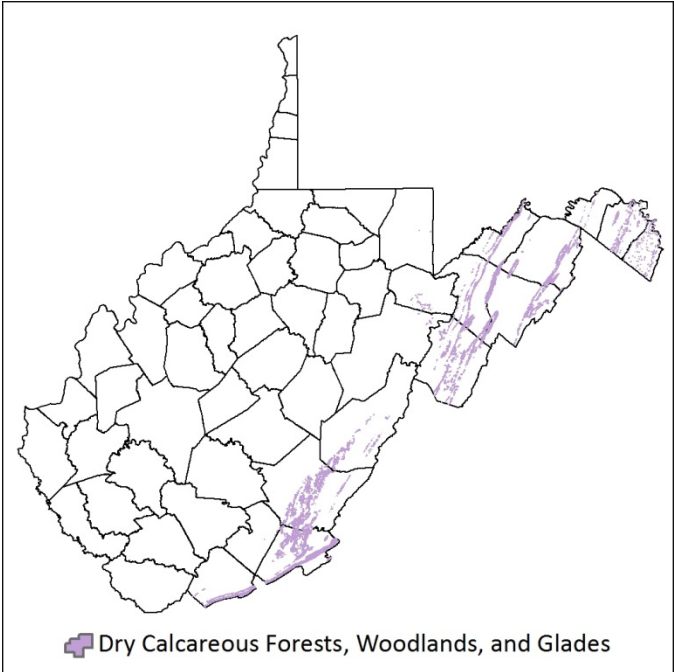
Current Projects Based on the 2005 WWCAP Priority Habitats:

In 2014, WVDNR ecologists completed a first iteration of statewide GIS mapping of Shale Barrens and shared this with TNC to incorporate as a revision to the Northeast Habitat Map.

Inventory, Management, and Research Needs:

Inventory Shale Barrens on private lands. Improve statewide mapping. Research natural fire regimes and pre-settlement composition and extent. Develop state-level description and make information available as part of a state vegetation classification.

3.3.1.5: Dry Calcareous Forests, Woodlands, and Glades



Habitat area exaggerated to enhance visibility.



Photo: Calcareous oak forest at Petersburg Gap, Grant County.



Photo: Dry calcareous woodland on Cave Mountain, Grant County.

NatureServe Ecological Systems:

Northeastern Interior Calcareous Oak Forest
 Southern Ridge and Valley / Cumberland Dry Calcareous Forest
 Central Appalachian Alkaline Glade and Woodland
 Southern Ridge and Valley Calcareous Glade and Woodland

Description:

Dry to dry-mesic calcareous forests, woodlands, and glades within the range of Chinquapin Oak (*Quercus muehlenbergii*) at low to middle elevations, most abundant in areas with drier climates in the rain shadow on the lee side of the Allegheny Mountains. They are restricted to areas where soils are influenced by calcareous geology, including limestone and dolomite. Natural vegetation of forests is dominated by oak and hickory species, including Chinquapin Oak, White Oak (*Quercus alba*), Red Oak, Bitternut Hickory (*Carya cordiformis*), and Shagbark Hickory (*Carya ovata*), with codominance by a variety of other hardwoods, including Black Maple (*Acer nigrum*), Sugar Maple (*Acer saccharum*), and White Ash (*Fraxinus americana*). Common shrubs and small trees include Paw Paw (*Asimina triloba*), Muscletree (*Carpinus caroliniana ssp. virginiana*), Redbud (*Cercis canadensis*), Dogwood (*Cornus florida*), Spicebush (*Lindera benzoin*), Hop Hornbeam (*Ostrya virginiana*), and Black Haw (*Viburnum prunifolium*). Herb layers are usually diverse, combining species with affinities for other oak-hickory forests in the region and more strict calciphiles. Open stand structure of woodland and glade habitats is maintained by drought stress to trees and in some cases by avalanches, fire, or grazing. Common woodland trees include Eastern Red Cedar, Chinquapin Oak, Red Oak, and White Ash. Some of the oldest known living trees in the eastern United States are Eastern Red Cedars found in this habitat in West Virginia. The herb layer is usually diverse and includes several globally and state rare species.

Similar Habitats:

Dry oak forests on acidic geologic formations are included in Dry Oak (-Pine) Forest. Dry-mesic oak forests on calcareous geologic formations at higher elevations in the Allegheny Mountains and on acidic geologic formations throughout the state are included in Dry-mesic Oak Forest. Dry woodlands

dominated by pines on acidic substrates in the Ridge and Valley are included in Pine - Oak Rocky Woodland and Shale Barrens.

Distribution and Abundance of Characteristic and Rare Associations:

Total original area occupied by these habitats is rather small and has decreased due to human landuse. Forests in this system can occur in large patches in the Ridge and Valley Ecoregion and in the Greenbrier Valley of the Allegheny Mountains Ecoregion, where extensive areas of calcareous bedrock are exposed, but even in these areas they may be confined to erosional landforms where geology has the strongest influence on soil chemistry. Occurrences in the Western Allegheny Plateau and Cumberland Mountains ecoregions may be small, narrow patches centered on thin, horizontal limestone beds. Due to the natural fertility of these soils, much of the area previously occupied by this system has been cleared in the past for agriculture and timber, but successional forests have reinvaded abandoned farmlands, and secondary natural forests persist, especially on steep slopes. Occurrences of woodlands and glades are concentrated in the upper Potomac River drainage, especially in the Smokehole area, with smaller areas in the Shenandoah and Greenbrier river drainages. Eight USNVC associations are recognized in West Virginia but classification of all existing vegetation plots has not been completed.

USNVC Association Scientific Name	Code	G Rank	S Rank
Acer saccharum - Quercus muehlenbergii / Cercis canadensis Forest	CEGL006017	G4?	S3
Quercus rubra - Acer saccharum / Ostrya virginiana / Cardamine concatenata Forest	CEGL008517	G4	S3
Quercus muehlenbergii - Quercus (alba, rubra) - Carya cordiformis / Viburnum prunifolium Forest	CEGL004793	G3G4	S3
Acer saccharum - Quercus muehlenbergii / Cercis canadensis Forest	CEGL006017	G4?	S2
Quercus muehlenbergii - Cercis canadensis / Packera obovata - Lithospermum canescens Woodland	CEGL006231	G3G4	S2
Thuja occidentalis / Carex eburnea - Pellaea atropurpurea Woodland	CEGL002596	G2G3	S2
Juniperus virginiana / Bouteloua curtipendula - Carex eburnea Wooded Herbaceous Vegetation	CEGL006047	G1G2	S2
Juniperus virginiana - Fraxinus americana / Carex pensylvanica - Cheilanthes lanosa Wooded Herbaceous Vegetation	CEGL006037	G2	S1

Places to See and Visit:

Shannondale Springs WMA, Greenbrier River Trail, Monongahela National Forest (Smokehole), Bluestone National Scenic River, Harpers Ferry National Historical Park.

Trends:

Pre-settlement area of these habitats was dramatically decreased due to conversion for agriculture. Tiny remnants of this habitat in Jefferson County may indicate a broader distribution in the Shenandoah Valley prior to settlement and development of nearly this entire landscape for agriculture, mining, and residential use. One well known site along the South Branch of the Potomac River was greatly diminished by a limestone quarry. Some occurrences in agricultural settings have probably been lost to invasions of pasture grasses and other non-native invasive plant species. Examples on deeper soils may be reduced from their previous area by mesophication (succession to more moist habitat) and lack of fire or grazing. Remote occurrences on steep topography are probably more stable.

Threats:

Non-native invasive plants are especially troublesome in these calcareous habitats. Timber harvest and grazing often provide disturbance which favors non-native invasive plants. Some occurrences are threatened by limestone mining and development of second homes.

Current Projects Based on the 2005 WWCAP Priority Habitats:

The WVDNR ecologists have been working on inventory and classification of limestone habitats for several years. Over 100 vegetation plots have been sampled and seven USNVC associations have been identified in the state, but the USNVC associations need revision to accommodate data from West Virginia stands. In 2014, WVDNR ecologists proposed and wrote a description for a new Northeastern Interior Calcareous Oak Forest which was added to NatureServe's classification of Ecological Systems.

Inventory, Management, and Research Needs:

Improve statewide mapping of these habitats. Acquire conservation land and/or conservation easements for Dry Calcareous Oak Forests, especially in the Greenbrier Valley where there are few occurrences protected on public land. Inventory, classify, and assess conservation needs of occurrences in the Western Allegheny Plateau and Cumberland Mountains ecoregions, where these habitats are poorly known. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.6: Dry Oak (-Pine) Forests

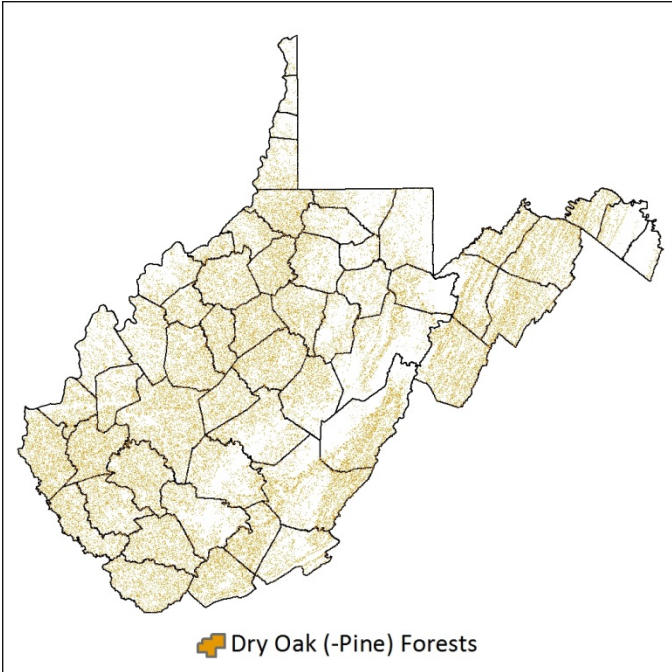


Photo: Dry oak / heath forest at Mountwood Park, Wood County.

NatureServe Ecological Systems:

Allegheny-Cumberland Dry Oak Forest and Woodland
Central Appalachian Dry Oak-Pine Forest

Description:

Upland deciduous and mixed evergreen-deciduous forests on warm, dry topographic positions and soils throughout the state, except at the highest elevations, most extensive in the Ridge and Valley Ecoregion.

Soils are typically shallow, dry, and highly acidic, with low to moderate fertility. Dominant trees include Chestnut Oak, Scarlet Oak (*Quercus coccinea*), Black Oak (*Quercus velutina*), White Oak, and Red Maple (*Acer rubrum*). Sourwood (*Oxydendrum arboreum*) is a common small tree, except in the Ridge and Valley Ecoregion, where it is absent. In the eastern counties there are large areas where Eastern White Pine is codominant with oaks. Other pines are often found scattered in mostly deciduous stands. Some small patches in the Western Allegheny Plateau and Cumberland Mountains ecoregions are dominated or codominated by Virginia Pine or Short Leaf Pine. Understories are usually dominated by heath shrubs, including Mountain Laurel, Black Huckleberry, and blueberries. Herb layers are usually sparse and have low diversity.

Similar Habitats:

Very dry forests and woodlands in the Ridge and Valley Ecoregion dominated by Virginia Pine, Pitch Pine, Table Mountain Pine, or Red Pine are included in the Pine – Oak Rocky Woodland. Dry oak forests on limestone are included in the Dry Calcareous Oak Forest.

Distribution and Abundance of Characteristic and Rare Associations:

This habitat includes several common USNVC associations which may occur as large contiguous stands (especially in the Ridge and Valley Ecoregion), as large patches (typical in the Cumberland Mountains and Allegheny Mountains ecoregions), or as numerous small patches repeated on warmer topographic positions (as in the Western Allegheny Plateau Ecoregion). Globally and/or state rare associations include a few small patch or linear pine communities in the Western Allegheny Plateau and Cumberland Mountains ecoregions and an undescribed Post Oak (*Quercus stellata*) – Eastern Red Cedar woodland in the Lower Kanawha Valley.

USNVC Association Scientific Name	Code	G Rank	S Rank
Pinus virginiana Successional Forest	CEGL002591	GNA	SNA
Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest	CEGL006271	G5	S4
Quercus prinus - (Quercus coccinea, Quercus rubra) / Kalmia latifolia / Vaccinium pallidum Forest	CEGL006299	G5	S4
Quercus prinus - Quercus (rubra, velutina) / Vaccinium angustifolium Forest	CEGL006282	G5	S3
Pinus rigida - Quercus coccinea / Vaccinium angustifolium Woodland	CEGL006557	G4Q	S1
Quercus prinus - Quercus (alba, coccinea, velutina) / Viburnum acerifolium - (Kalmia latifolia) Forest	CEGL005023	G4?	S4
Pinus strobus - Quercus alba - Quercus prinus / Vaccinium stamineum Forest	CEGL008539	G4	S4
Quercus alba - Quercus prinus - Carya glabra / Cornus florida / Vaccinium pallidum Forest	CEGL008515	G4	S3
Quercus prinus / Rhododendron catawbiense - Kalmia latifolia Forest	CEGL008524	G4	S2
Quercus prinus - Quercus rubra / Rhododendron maximum / Galax urceolata Forest	CEGL006286	G4	S3S4
Quercus prinus - Pinus virginiana - (Pinus pungens) / Schizachyrium scoparium - Dichanthelium depauperatum Woodland	CEGL008540	G3?	

Pinus virginiana - Pinus (rigida, echinata) - (Quercus prinus) / Vaccinium pallidum Forest	CEGL007119	G3	S2
Tsuga canadensis - Quercus prinus - Betula lenta Forest	CEGL006923	G3	S3
Pinus echinata - Quercus prinus – Quercus (coccinea, velutina) Forest	CEGL004761	G2G3	S1
undescribed Kanawha Valley post oak – eastern red cedar woodland			S1

Places to See and Visit:

Beech Fork Lake, Short Mountain WMA, Stumptown WMA, George Washington National Forest, Monongahela National Forest (North Fork Mountain), New River Gorge National River.

Trends:

Most of these habitats expanded following fires during the logging boom around 1900. Many stands are now decreasing in size due to human activities and gradual mesophication. However, fire and logging continues to create and maintain these habitats in many areas of the state. Prescribed fire and silvicultural treatments are increasingly used to promote oaks and pines on public land, and repeated arson, especially in the Cumberland Mountains Ecoregion, creates and maintains these habitats even on relatively mesic sites.

Threats:

Pesticide spraying for gypsy moth threatens rare native Lepidoptera. Overbrowsing by deer reduces regeneration of oak and may eliminate palatable understory species such as Orchids and Lillies. Many stands are succeeding towards more mesic habitats due to mesophication and lack of fire.

Current Projects Based on the 2005 WVWCAP Priority Habitats:

These habitats were not identified as a priority in the 2005 WVWCAP.

Inventory, Management, and Research Needs:

Complete and improve statewide classification and mapping. Develop state-level descriptions and make information available as part of a state vegetation classification. Inventory, classify, and assess conservation needs of Short Leaf Pine – oak forests and Post Oak – Eastern Red Cedar woodlands. Research natural fire regimes and pre-settlement composition and extent.

3.3.1.7: Dry-Mesic Oak Forests

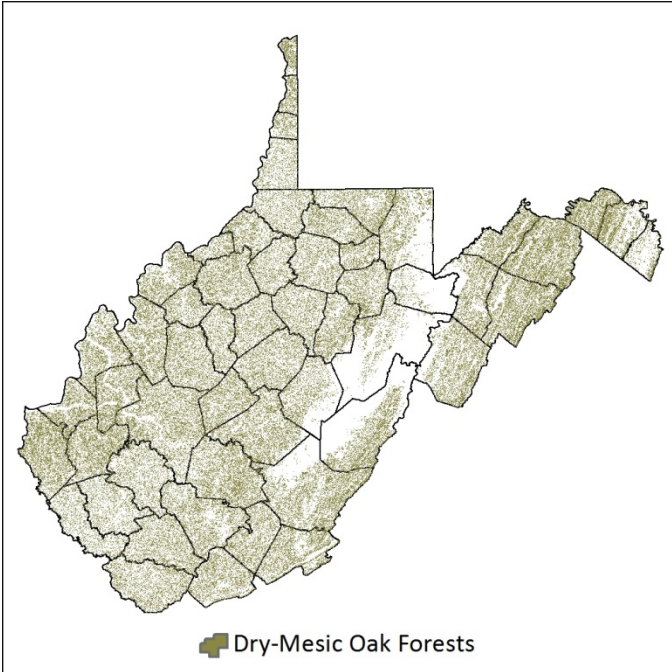


Photo: Old growth oak forest at Big Ditch Wildlife Management Area, Webster County.

NatureServe Ecological Systems:

- Northeastern Interior Dry-Mesic Oak Forest
- Southern Appalachian Oak Forest

Description:

Upland, mostly deciduous forests at lower and middle elevations throughout the state. Soils are usually somewhat less acidic and more fertile compared to the Dry Oak (-Pine) Forest, but are dryer than the

Mixed Mesophytic Forest or Northern Hardwood Forest. Most stands have a large component of oaks, including Red Oak, Chestnut Oak, White Oak, and Black Oak. A subset can be described as oak – hickory forests with a large component of hickory species including Pignut, Mockernut (*Carya alba*), and Shagbark. Other common trees include Red Maple, Sugar Maple, White Ash, Tuliptree, Black Gum (*Nyssa sylvatica*), and American Beech (*Fagus grandifolia*). Common small trees and shrubs include Sourwood, Witch Hazel (*Hamamelis virginiana*), Hop Hornbeam, Serviceberry (*Amelanchier arborea*), and Dogwood. Heath shrubs may be present but are not abundant as in the Dry Oak (-Pine) Forest. Common vines include Virginia Creeper (*Parthenocissus quinquefolia*) and Greenbrier (*Smilax rotundifolia*). The herb layer ranges from sparse to moderate and is often quite diverse.

Semi-natural forests within this map class may be dominated by Tuliptree, Black Locust (*Robinia pseudoacacia*), Red Maple, Sweet Birch, or Eastern White Pine. This map class also includes areas of pine plantations.

Similar Habitats:

Dryer oak dominated forests are included in Dry Oak (-Pine) Forests and Dry Calcareous Oak Forests. Forests dominated by stunted Red Oaks at high elevations in the Ridge and Valley Ecoregion are included in Montane Red Oak Forests.

Distribution and Abundance of Characteristic and Rare Associations:

These are the most abundant natural habitats in the state, occurring in all ecoregions and at all but the highest elevations. They often occur in large patches or form part of a matrix which covers a large proportion of the landscape. Outside their main range they may also occur in small patches or narrow zones constrained by topography and microclimate, or by fragmentation. Although these forests are common, large high-quality stands are less common. Because they are extensive and cover a broad geographic and ecological range these forests are variable and difficult to classify. Classification of USNVC associations in West Virginia is in progress and tentative. Most USNVC association descriptions will require revisions to accommodate West Virginia data and some new associations may need to be described, especially for forests in the western part of the state. Different associations are recognized based on total floristics, which reflects geography (ecoregion), soil moisture, and soil chemistry. State rare associations include a few that are constrained to particular ecoregions (e.g. Blue Ridge) or geology types (e.g. limestone or phyllite) that have limited distribution in the state.

USNVC Association Scientific Name	Code	G Rank	S Rank
Quercus prinus - Quercus rubra / Hamamelis virginiana Forest	CEGL006057	G5	S4
Quercus prinus - (Quercus rubra) - Carya spp. / Oxydendrum arboreum - Cornus florida Forest	CEGL007267	G4G5	S4
Quercus prinus - Carya ovata - Quercus rubra / Acer saccharum Forest	CEGL007268	G4?	S4
Quercus rubra - Acer saccharum - Liriodendron tulipifera Forest	CEGL006125	G4?	S4
Quercus prinus - Quercus rubra - Carya ovalis / Carex pensylvanica - (Calamagrostis porteri) Forest	CEGL008516	G3G4	S3
Quercus prinus - Quercus rubra / Vaccinium pallidum - (Rhododendron periclymenoides) Forest	CEGL008523	G3G4	S3

Quercus rubra - Carya (ovata, ovalis) - Fraxinus americana / Actaea racemosa - Hydrophyllum virginianum Forest	CEGL008518	G3G4	S3
Quercus alba - Fagus grandifolia Western Allegheny Plateau Forest	CEGL006144	GNR	S3?
Quercus alba - Quercus rubra - Quercus prinus - Acer saccharum / Linder benzoin Forest	CEGL002059	GNR	S3?
Quercus rubra - Quercus prinus - Carya ovalis / (Cercis canadensis) / Solidago (caesia, curtisii) Forest	CEGL008514	G3G4	S2
Quercus rubra - Quercus prinus - Magnolia (acuminata, fraseri) / Acer pensylvanicum Forest	CEGL004817	G4?	S2?
Unclassified red oak – hickory / hophornbeam limestone forest			S2
Liriodendron tulipifera - Quercus spp. Forest	CEGL007221	GNA	SNA
Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula Forest	CEGL008503	GNA	SNA
Robinia pseudoacacia Forest	CEGL007279	GNA	SNA
Pinus strobus Successional Forest	CEGL007944	GNA	SNA
Pinus strobus Planted Forest	CEGL007178	GNA	SNA

Places to See and Visit:

Big Ditch WMA (old growth), Elk River WMA (old growth), Kanawha State Forest, Waters Smith State Park (old growth), George Washington National Forest, Monongahela National Forest, New River Gorge National River, Murphy Preserve (TNC old growth).

Trends:

Pre-settlement extent, distribution, and condition of these forests are poorly known and controversial. These forests declined drastically in area during the logging boom around 1900, but today they have regained dominance on the landscape. Clearing and fire following the logging boom may have increased the area of oak dominance on relatively mesic, fertile soils; without disturbance, these areas may succeed to more mesic forests with less oak. However, fire and logging continues to create and maintain these habitats in many areas of the state. Prescribed fire and silvicultural treatments are increasingly used to promote oaks on public land, and repeated arson, especially in the Cumberland Mountains Ecoregion, creates and maintains these habitats even on mesic sites. Because they are located in low to middle elevations, these forests are mostly in private ownership and are increasingly fragmented.

Threats:

Repeated timber harvests result in permanent changes to forest composition, including canopy trees and understory shrubs and herbs. Energy development often permanently converts these forests to developed areas and pipelines can fragment these habitats. Overbrowsing by deer reduces regeneration of oak and may eliminate palatable understory species such as Orchids and Lillies.

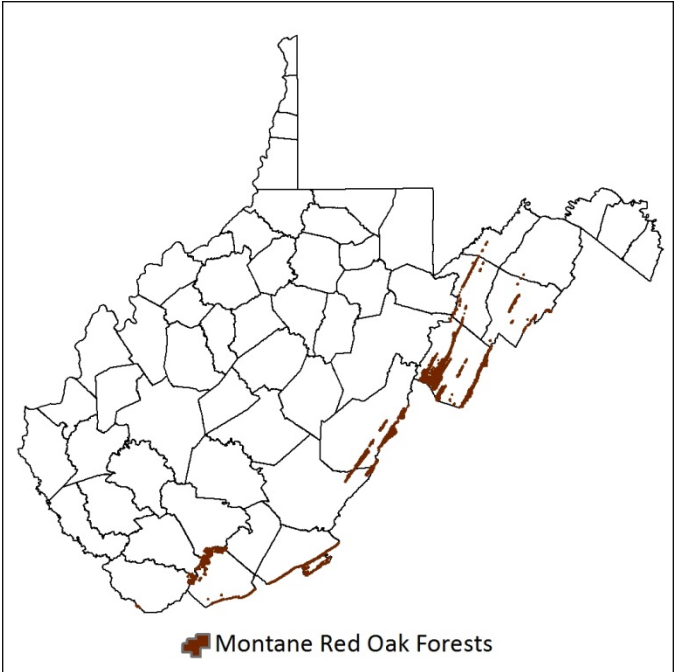
Current Projects Based on the 2005 WVCAP Priority Habitats:

These habitats were not identified as a priority in the 2005 WVCAP.

Inventory, Management, and Research Needs:

Complete statewide classification and incorporate into the USNVC. Develop state-level descriptions and make information available as part of a state vegetation classification. Identify and protect old growth and large high-quality stands. Research natural fire regimes and pre-settlement composition and extent. Research and identify indicators for sustainable levels of deer herbivory and timber harvest.

3.3.1.8: Montane Red Oak Forests



Habitat area exaggerated to enhance visibility.



Photo: Red Oak forest on North Fork Mountain, Pendleton County.

NatureServe Ecological Systems:

Central and Southern Appalachian Montane Oak Forest

Description:

Forests dominated by Red Oak at high elevations in the Ridge and Valley Ecoregion and along the border with Virginia on Allegheny Mountain in the Allegheny Mountains Ecoregion. Other oaks and hickories

are generally excluded and canopy height is stunted due to severe climate. There is usually abundant coarse woody debris and an open canopy structure due to tree damage from wind and ice storms. Associated trees include Red Maple, Sugar Maple, Black Cherry (*Prunus serotina*) and Sweet Birch. Common subcanopy trees and shrubs include Striped Maple (*Acer pensylvanicum*), Witch Hazel, and Mountain Holly (*Ilex montana*). Some stands have shrub layers dominated by heaths. Herb layers are variable, with variants dominated by combinations of grasses, forbs, and ferns.

Similar Habitats:

Red Oak forests with tall canopies at high elevations in the western Allegheny Mountains Ecoregion or at lower elevations throughout the state are included in Dry-Mesic Oak Forest. Red Oak – Sugar Maple forests on calcareous substrates at lower elevations in the Ridge and Valley Ecoregion are included in Dry Calcareous Oak Forest.

Distribution and Abundance of Characteristic and Rare Associations:

Known occurrences of these habitats are restricted to the highest ridges in the Ridge and Valley Ecoregion and in the Allegheny Mountains Ecoregion along the border with Virginia. In these environments they occur as large or continuous linear patches which dominate the ridgetops and upper slopes. Mapping is based on Ferree and Anderson (2013); areas mapped along the western border of Mercer County (and bordering counties) have not been substantiated by field surveys. Two USNVC associations have been identified in the state. The heath understory type (CEGL007300) is very rare in the state and known only in the southernmost counties near the Virginia border.

USNVC Association Scientific Name	Code	G Rank	S Rank
Quercus rubra / (Vaccinium simulatum, Rhododendron calendulaceum) / (Dennstaedtia punctilobula, Thelypteris noveboracensis) Forest	CEGL007300	G4	S1
Quercus rubra - (Quercus alba) / Ilex montana / Dennstaedtia punctilobula - Lysimachia quadrifolia Forest	CEGL008506	G3G4	S3

Places to See and Visit:

George Washington National Forest (Shenandoah Mountain), Jefferson National Forest (Peters Mountain), Monongahela National Forest (Allegheny Mountain).

Trends:

Some areas of mountain ridgetops which probably supported this habitat were cleared for grazing and today remain in pasture.

Threats:

Prescribed burning may threaten populations of rare plants and amphibians in these habitats.

Current Projects Based on the 2005 WVCAP Priority Habitats:

Twenty-three vegetation plots of this habitat were sampled as part of a statewide high elevation habitat inventory. Statewide classification of these habitats was completed in 2013.

Inventory, Management, and Research Needs:

Refine statewide mapping. Identify and sample additional stands of CEGLO07300. Develop state-level descriptions and make information available as part of a state vegetation classification. Research natural disturbance regimes and pre-settlement composition and extent.

3.3.1.9: Mixed Mesophytic Forests

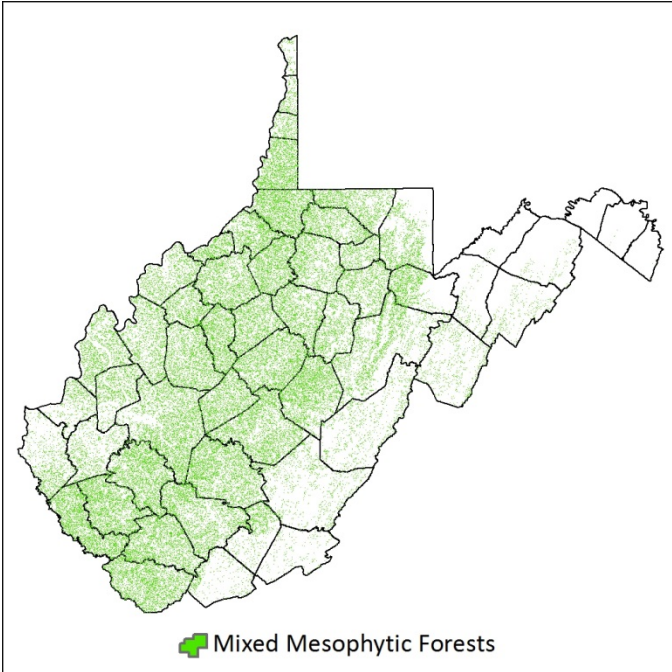


Photo: Sugar Maple – American Basswood forest at Bluestone National Scenic River, Mercer County.



Photo: Eastern Hemlock hardwood forest at Greenland Gap, Grant County.

NatureServe Ecological Systems:

South-Central Interior Mesophytic Forest
Southern and Central Appalachian Cove Forest

Description:

Upland deciduous and mixed deciduous-evergreen forests in moist (mesic) habitats at lower to middle elevations throughout the state. Common deciduous tree species in natural stands include Sugar Maple, American Basswood, American Beech, Red Maple, Tuliptree, Red Oak (*Quercus rubra*), Sweet Birch, White Ash, and Yellow Buckeye (*Aesculus flava*). Some stands may include or be dominated by Eastern Hemlock (*Tsuga canadensis*). Common shrubs include Great Rhododendron (*Rhododendron maximum*), Spicebush, Witch Hazel, and Striped Maple. The herb layers of deciduous Mixed Mesophytic Forests are often lush and diverse, characterized by a flush of spring ephemerals followed by late season dominance by Wood Nettle (*Laportea canadensis*) and ferns. In contrast, hemlock dominated Mixed Mesophytic Forests typically have low cover and diversity of herbs. Bryophytes may be abundant in all types.

Semi-natural forests within this map class may be dominated by Tuliptree, Black Walnut (*Juglans nigra*), White Ash, and/or Black Cherry. Semi-natural forests on more acidic sites (with hemlock potential) may be dominated by pines.

Similar Habitats:

Moist, deciduous and deciduous-hemlock forests at higher elevations in the Allegheny Mountains Ecoregion are included in Northern Hardwood Forests. Somewhat dryer forests dominated by oaks are included in Dry-Mesic Oak Forests.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are broadly distributed across the lower and middle elevations of the state but are most abundant in areas with more rainfall to the west of the Allegheny Front. They occur in large areas on

cool aspects of mountain flanks and gorge slopes. In the dissected landscapes of the Western Allegheny Plateau Ecoregion and low-rainfall areas of the Ridge and Valley Ecoregion patches are smaller and are confined to lower slopes and the coolest aspects. State rare associations include two (CEGL008412, CEGL007710) that have a peripheral distribution near the borders, and three hemlock or Yellow Birch dominated types (CEGL006304, CEGL008407, CEGL007861) with limited distribution.

USNVC Association Scientific Name	Code	G Rank	S Rank
Liriodendron tulipifera - Betula lenta - Tsuga canadensis / Rhododendron maximum Forest	CEGL007543	G5	S4
Acer (nigrum, saccharum) - Tilia americana / Asimina triloba / Jeffersonia diphylla - Caulophyllum thalictroides Forest	CEGL008412	G4G5	S2
Acer saccharum - Fraxinus americana - Tilia americana / Acer spicatum / Caulophyllum thalictroides Forest	CEGL005008	G4?	S3
Liriodendron tulipifera - Pinus strobus - Tsuga canadensis - Quercus (rubra, alba) / Polystichum acrostichoides Forest	CEGL006304	G4?	S2
Liriodendron tulipifera - Tilia americana var. heterophylla - Aesculus flava - Acer saccharum / (Magnolia tripetala) Forest	CEGL005222	G4?	S4
Tsuga canadensis - (Fagus grandifolia, Tilia americana var. heterophylla) / Magnolia tripetala Forest	CEGL008407	G4	S2
Tsuga canadensis - Fagus grandifolia - Acer saccharum / (Hamamelis virginiana, Kalmia latifolia) Forest	CEGL005043	G3?	S3
Betula alleghaniensis - (Tsuga canadensis) / Rhododendron maximum / (Leucothoe fontanesiana) Forest	CEGL007861	G3	S2
Tsuga canadensis - Quercus prinus - Betula lenta Forest	CEGL006923	G3	S3
Liriodendron tulipifera - Aesculus flava - (Fraxinus americana, Tilia americana) / Actaea racemosa - Laportea canadensis Forest	CEGL007710	G4	S1
Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia) Forest	CEGL006599	GNA	SNA
Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin) Forest	CEGL007220	GNA	SNA
Juglans nigra / Verbesina alternifolia Forest	CEGL007879	GNA	SNA
Pinus virginiana Successional Forest	CEGL002591	GNA	SNA
Pinus strobus Successional Forest	CEGL007944	GNA	SNA

Places to See and Visit:

Cabwaylingo State Park, Calvin Price SF, Holly River State Park, Panther SF, R. D. Bailey WMA, Bluestone National Scenic River, Gauley River National Recreation Area, New River Gorge National River.

Trends:

These habitats declined dramatically in area following the logging boom and subsequent conversion of forest lands to agriculture. In recent decades there has been an increase in these habitats relative to

dryer habitats in many areas due to gradual mesophication. However, fire and logging continue to decrease these habitats in other areas of the state. Prescribed fire and silvicultural treatments are increasingly used to promote oaks and pines on public land, and repeated arson, especially in the Cumberland Mountains Ecoregion, prevents the development of mesophytic forests. Hemlock dominated forests are currently decreasing due to infestations of Hemlock Woolly Adelgid (*Adelges tsugae*). Repeated logging of productive mesophytic forests has converted large areas into semi-natural successional forest types. In recent decades large areas in the Cumberland Mountains Ecoregion and elsewhere have been permanently lost to mountaintop mining and valley fills.

Threats:

Repeated timber harvest often converts these forests to successional monocultures of Tuliptree or Maples. The Hemlock Woolly Adelgid is a serious threat to stands dominated by Eastern Hemlock. These habitats are especially susceptible to invasions of non-native plants. Prescribed burning and arson converts these habitats to other types.

Current Projects Based on the 2005 WWCAP Priority Habitats:

These habitats were not identified as a priority in the 2005 WWCAP.

Inventory, Management, and Research Needs:

Identify old growth and other high quality stands. Sample additional plots of rare associations. Research historical and pre-historic composition and distribution. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.10: Northern Hardwood Forests

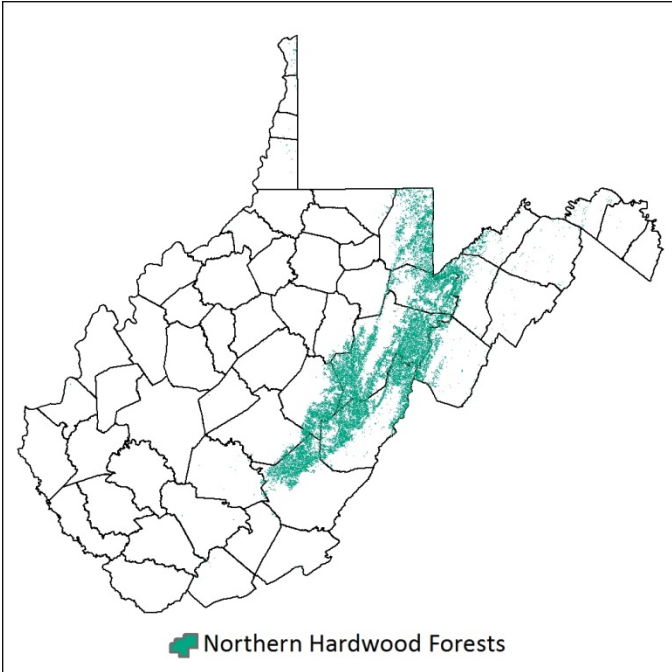


Photo: Northern hardwoods on Middle Mountain, Randolph County.

NatureServe Ecological Systems:

Appalachian (Hemlock)-Northern Hardwood Forest

Description:

Upland deciduous and mixed deciduous-evergreen forests at high elevations in the Allegheny Mountains Ecoregion. Common deciduous tree species in natural forests include Sugar Maple, Red Maple, American Beech, Yellow Birch, Sweet Birch, Black Cherry, Red Oak, Cucumber-tree (*Magnolia*

acuminata), and White Ash. Some stands may include or be dominated by Eastern Hemlock. Red Spruce (*Picea rubens*) is often present but is not abundant in the tree canopy. Common shrubs include Striped Maple and Mountain Holly. The herb layer is characterized by species adapted to short, cool growing seasons, including Intermediate Woodfern (*Dryopteris intermedia*), New York Fern (*Thelypteris noveboracensis*), Mountain Wood Sorrel (*Oxalis montana*), and Canada Mayflower (*Maianthemum canadense*). This upland forest ecosystem may include forest seeps which are too small to map as a separate wetland habitat.

Semi-natural forests within this map class often have canopy composition similar to natural forests, or may be dominated by a single species such as Black Cherry or Red Maple. The map class may also include plantations of Red Pine, Eastern White Pine, Norway Spruce (*Picea abies*), and Red Spruce.

Similar Habitats:

Somewhat dryer forests dominated by oaks are included in Dry-Mesic Oak Forests. Moist, deciduous and deciduous-hemlock forests at low and middle elevations throughout the state are included in Mixed Mesophytic Forests. Mixed deciduous-evergreen forests at high elevations with a large component of Red Spruce are included in Red Spruce Forests.

Distribution and Abundance of Characteristic and Rare Associations:

These forests are abundant at higher elevations in the Allegheny Mountains Ecoregion. Associations that are rare in West Virginia include outliers at high elevations in the Ridge and Valley Ecoregion (CEGL006109), and disjunct “southern northern hardwoods” (CEGL004973) with Yellow Buckeye in the Yew Mountains. Small areas of three forest seep associations (CEGL006193, CEGL006597, and CEGL006567) are also included.

USNVC Association Scientific Name	Code	G Rank	S Rank
Acer saccharum - Fraxinus americana - Tilia americana / Acer spicatum / Caulophyllum thalictroides Forest	CEGL005008	G4?	S3
Quercus rubra - Acer saccharum - Liriodendron tulipifera Forest	CEGL006125	G4?	S4
Tsuga canadensis - Betula alleghaniensis - Acer saccharum / Dryopteris intermedia Forest	CEGL006109	G4?	S1
Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum Forest	CEGL006206	G4?	S3
Acer saccharum - Betula alleghaniensis - Prunus serotina Forest	CEGL006045	G4	S4
Betula alleghaniensis - Quercus rubra / Acer (pennsylvanicum, spicatum) / Dryopteris intermedia - Oclema acuminata Forest	CEGL008502	G3G4	S1
Aesculus flava - Betula alleghaniensis - Acer saccharum / Acer spicatum / Caulophyllum thalictroides - Actaea podocarpa Forest	CEGL004973	G3	S1
Betula alleghaniensis var. alleghaniensis / Carex scabrata - Viola cucullata / Plagiomnium ciliare sloping linear forest seep	CEGL006597	G3	S2
Betula alleghaniensis var. alleghaniensis / Impatiens capensis - Chrysosplenium americanum - (Symplocarpus foetidus) / Rhizomnium appalachianum forest seep	CEGL006193	G3G5	S3
Symplocarpus foetidus - Impatiens capensis Herbaceous Vegetation	CEGL006567	GNR	S1

Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia) Forest	CEGL006599	GNA	SNA
Pinus strobus Planted Forest	CEGL007178	GNA	SNA
Pinus resinosa Planted Forest	CEGL007177	GNA	SNA
Picea rubens Planted Forest	CEGL004758	GNA	SNA

Places to See and Visit:

Cathedral State Park, Canaan Valley National Wildlife Refuge, Kumbrabow SF, Monongahela National Forest (Backbone Mountain, Cheat Mountain, Middle Mountain).

Trends:

Deciduous northern hardwood forests probably increased in area following the logging boom around 1900 due to the decline of Red Spruce forests. Mixed hemlock - hardwood forests have probably increased in more recent years as hemlock gains dominance in deciduous stands, but this trend may reverse if Hemlock Woolly Adelgid takes hold in the higher elevations. Both deciduous and hemlock - hardwood forests are now decreasing in area as Red Spruce regains dominance in many areas and due to human activities which affect all natural communities in the state.

Threats:

Hemlock Woolly Adelgid may threaten stands with Eastern Hemlock.

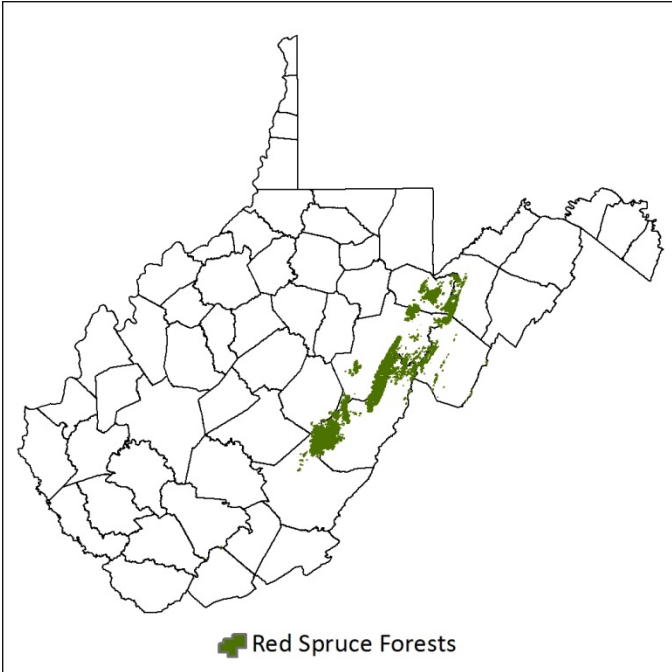
Current Projects Based on the 2005 WVWCAP Priority Habitats:

These habitats were not identified as a priority in the 2005 WVWCAP.

Inventory, Management, and Research Needs:

Identify old growth and other high quality stands. Sample additional plots of rare associations. Determine distribution and extent in the Ridge and Valley and Western Allegheny Plateau. Research historical and pre-historic composition and distribution. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.11: Red Spruce Forests



Habitat area exaggerated to enhance visibility.



Photo: Red Spruce forest on Spruce Knob, Pendleton County.

NatureServe Ecological Systems:

Central and Southern Appalachian Spruce-Fir Forest

Description:

Upland, mixed evergreen-deciduous forests and woodlands at high elevations dominated or codominated by Red Spruce). Soils are usually rocky, highly acidic, and cold. Associated trees may

include the evergreen Eastern Hemlock, and deciduous Yellow Birch, Red Maple, American Beech, Mountain Ash, and Black Cherry. Common shrubs include Mountain Holly, Great Rhododendron, Striped Maple, Southern Mountain Cranberry (*Vaccinium erythrocarpum*), and Mountain Laurel. The herb layer is characterized by species adapted to short, cool growing seasons, including Intermediate Woodfern, Mountain Woodfern (*Dryopteris campyloptera*), Mountain Wood Sorrel, Canada Mayflower, and Painted Wakerobin (*Trillium undulatum*). Mosses and liverworts often have heavy cover over the rocky ground. This upland forest ecosystem may include forest seeps which are too small to map as a separate wetland habitat.

Similar Habitats:

Upland deciduous forests and mixed hemlock – deciduous forests at high elevations that may include some Red Spruce, but where it is not dominant, are included in Northern Hardwood Forests. Wetland forests and woodlands with Red Spruce are included in High Allegheny Wetlands.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are confined to high elevations in the Allegheny Mountains Ecoregion, with small outliers at the highest elevations on North Fork Mountain (Panther and Kile Knobs) in the Ridge and Valley Ecoregion. There are five globally rare upland Red Spruce associations classified in West Virginia. These forests occur in small to large patches. Small areas of two forest seep associations (CEGL006193 and CEGL006597) are also included in this map class.

USNVC Association Scientific Name	Code	G Rank	S Rank
<i>Picea rubens</i> - <i>Tsuga canadensis</i> - <i>Fagus grandifolia</i> / <i>Dryopteris intermedia</i> Forest	CEGL006029	G3	S3
<i>Picea rubens</i> - (<i>Tsuga canadensis</i>) / <i>Rhododendron maximum</i> Forest	CEGL006152	G2G3	S2
<i>Picea rubens</i> / <i>Betula alleghaniensis</i> / <i>Bazzania trilobata</i> Forest	CEGL008501	G2	S2
<i>Picea rubens</i> / <i>Kalmia latifolia</i> - <i>Menziesia pilosa</i> Woodland	CEGL006254	G2	S1
<i>Picea rubens</i> / <i>Vaccinium erythrocarpum</i> / <i>Dryopteris campyloptera</i> Forest	CEGL007131	G2	S1
<i>Betula alleghaniensis</i> var. <i>alleghaniensis</i> / <i>Impatiens capensis</i> - <i>Chrysosplenium americanum</i> - (<i>Symplocarpus foetidus</i>) / <i>Rhizomnium appalachianum</i> forest seep	CEGL006193	G3G5	S3
<i>Betula alleghaniensis</i> var. <i>alleghaniensis</i> / <i>Carex scabrata</i> - <i>Viola cucullata</i> / <i>Plagiomnium ciliare</i> sloping linear forest seep	CEGL006597	G3	S2

Places to See and Visit:

Blackwater Falls State Park, Kumbrabow SF, Monongahela National Forest (Highlands Scenic Highway, Gaudineer Knob, Dolly Sods, Spruce Knob).

Trends:

These forests dramatically decreased in area following the logging boom around 1900. They are now increasing in area as Red Spruce regains dominance in many areas.

Threats:

Because they occur in the highest elevations which have the coldest climate in the state these habitats are most threatened by climate change. Because they receive high precipitation and are downwind from coal power plants they may be threatened by acid deposition.

Current Projects Based on the 2005 WVWCAP Priority Habitats:

The WVDNR ecologists completed statewide classification and conservation assessment of these habitats in 2010 (Byers *et al.*).

Inventory, Management, and Research Needs:

Continue working with the Central Appalachian Spruce Restoration Initiative to develop and provide information to preserve and restore Red Spruce Forests in the state.

3.3.1.12: Heath - Grass Barrens



Habitat area exaggerated to enhance visibility.



Photo: Heath barrens on Dolly Sods, Tucker County.

NatureServe Ecological Systems:

Southern Appalachian Grass and Shrub Bald

Description:

Open shrub and grassland communities at high elevations. Dominant shrubs include blueberries, Mountain Laurel, Back Huckleberry, and Black Chokeberry (*Photinia melanocarpa*). The dominant

grasses are Allegheny Flyback (*Danthonia compressa*) and Hairgrass (*Deschampsia flexuosa*). Dwarfed forms of Red Spruce or Pitch Pine and a few deciduous trees may be scattered in this type. Reindeer Lichens (*Cladonia* spp.) may have high ground cover in some areas.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are restricted to high elevations in the Allegheny Mountains Ecoregion and a few very small patches in the Ridge and Valley Ecoregion on higher peaks of North Fork Mountain (e.g. Kile Knob, Panther Knob). The largest concentration is along the Allegheny Front in the vicinity of Dolly Sods. Two USNVC associations have been identified in West Virginia.

USNVC Association Scientific Name	Code	G Rank	S Rank
Vaccinium (angustifolium, myrtilloides, pallidum) Central Appalachian Dwarf-shrubland	CEGL003958	G3G4	S2
Kalmia latifolia - Gaylussacia baccata - Vaccinium (angustifolium, pallidum) - Menziesia pilosa Shrubland	CEGL003939	G2	S2

Places to See and Visit:

Monongahela National Forest (Dolly Sods).

Trends:

Some of these habitats may have been naturally maintained by occasional wildfire and severe growing conditions, but their extent probably increased following settlement due to timber harvest, fire, and grazing. Two associations occur at Dolly Sods: the blueberry type probably requires periodic fire or other disturbance to persist, but the Mountain Laurel type is probably maintained by harsh climate and rocky soils along the Front. Many areas are slowly reverting to Red Spruce or Northern Hardwood Forests. Small patches on clifftops with scenic overlooks which are popular hiking destinations have been reduced by trampling.

Threats:

Small patches are threatened by trampling at overlooks. Fire suppression along the Allegheny Front may result in succession towards forested habitat.

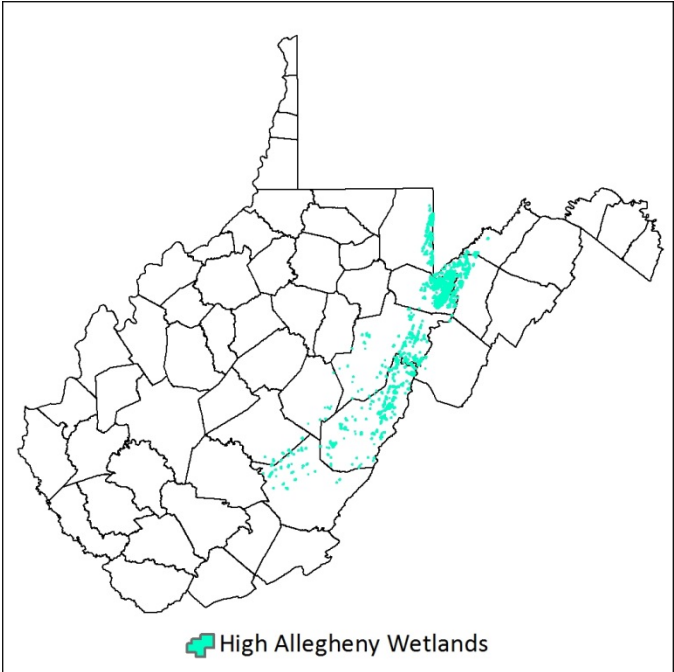
Current Projects Based on the 2005 WVWVAP Priority Habitats:

Fourteen vegetation plots of this habitat were sampled as part of a statewide high elevation habitat inventory. A new USNVC association (CEGL003939) was developed in conjunction with ecologists from the Virginia Natural Heritage Program. The entire known extent of these habitats was mapped based on aerial photo interpretation and this GIS coverage was added as a revision to the Northeast Habitat Map in 2013.

Inventory, Management, and Research Needs:

Develop state-level description and make information available as part of a state vegetation classification.

3.3.1.13: High Allegheny Wetlands



Habitat area exaggerated to enhance visibility.



Photo: Headwater wetland, First Fork of Shavers Fork, Pocahantas County.

NatureServe Ecological Systems:

High Allegheny Wetland

Description:

Wetlands in this system are drained by low-gradient, meandering, intermittent to small streams that form the headwaters of larger mountain rivers. These habitats form complex mosaics of small patch communities. Forested swamps occupy the drier margins or slightly higher “islands” in the wetland mosaic. Nutrient-poor fens with bog-like vegetation such as Cottongrass (*Eriophorum virginicum*) and *Sphagnum* mosses form the characteristic open portion of many of these wetlands. Ombrotrophic bogs, which receive all their water and nutrients from precipitation, are rare, but occur in undisturbed portions of a few of the larger wetlands. The more central, flood- or Beaver-influenced sections contain shrub swamps, sedge fens, wet meadows, and open marshes.

Forested swamps are dominated by Red Spruce, with varying cover by Red Maple, Eastern Hemlock, and Yellow Birch. Where limestone or calcareous shale influences seepage water, Balsam Fir and Black Ash (*Fraxinus nigra*) are typical canopy dominants. Shrub swamps may be dominated by Speckled Alder (*Alnus incana* ssp. *rugosa*), Bushy St. Johnswort (*Hypericum densiflorum*), Black Chokeberry, Common Winterberry (*Ilex verticillata*), and/or Velvetleaf Blueberry (*Vaccinium myrtilloides*). Herbaceous communities may be dominated by species of bulrushes (*Scirpus*, *Schoenoplectus*), burreeds (*Sparganium*), rushes (*Juncus*), sedges (*Carex*, *Dulichium*), and grasses (e.g. *Calamagrostis canadensis*, *Glyceria* spp.). Mosses, especially peat mosses (*Sphagnum* spp.) have high ground cover in most communities.

Similar Habitats:

Wetlands associated with large rivers are classified as River Floodplains. Wetlands associated with small streams at lower elevations are classified as Small Stream Riparian Habitats.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are confined to higher elevations of the Allegheny Mountains Ecoregion in Preston, Mineral, Tucker, Grant, Randolph, Pendleton, Pocahantas, Nicholas, and Greenbrier counties. Large concentrations of these habitats are found in Canaan Valley, Cranesville Swamp, Cranberry Glades, and headwaters of the Greenbrier and Shavers Fork rivers.

USNVC Association Scientific Name	Code	G Rank	S Rank
Carex lacustris Fen	CEGL002256	G4G5	S1
Carex utriculata / Sphagnum spp. Poor Fen	CEGL002257	G4G5	S1
Alnus incana Shrub Swamp	CEGL002381	GNR	S3
Larix laricina / Ilex verticillata / Symplocarpus foetidus - Osmunda cinnamomea / Sphagnum spp. Peat Woodland	CEGL002472	G4	S1
Sparganium (americanum, chlorocarpum) Marsh	CEGL004510	G3?	S2
Calamagrostis canadensis Wet Meadow	CEGL005174	G4G5	S2
Fraxinus nigra - Abies balsamea / Rhamnus alnifolia Forested Swamp	CEGL006003	G1	S1
Acer rubrum - Nyssa sylvatica / Osmunda cinnamomea / Sphagnum spp. Forested Swamp	CEGL006132	GNR	S2
Chrysosplenium americanum - Impatiens capensis / Rhizomnium appalachianum Seep	CEGL006193	G3G5	S3
Schoenoplectus tabernaemontani Marsh	CEGL006275	GNR	S2
Picea rubens - (Tsuga canadensis) / Rhododendron maximum Forest ed Swamp	CEGL006277	G2?	S1
Tsuga canadensis / Rhododendron maximum / Sphagnum spp. Forested Swamp	CEGL006279	G4?	S1
Salix sericea Shrub Swamp	CEGL006305	GNR	S2S3

Scirpus cyperinus Wet Meadow	CEGL006349	GNR	S3
Carex stricta Wet Meadow	CEGL006412	G4G5	S3
Leersia oryzoides - Sagittaria latifolia Marsh	CEGL006461	GNR	S3
Hypericum densiflorum / Rubus hispidus Shrub Swamp	CEGL006464	GNR	S3
Photinia melanocarpa - Viburnum nudum / Eriophorum virginicum / Sphagnum spp. Shrub Peatland	CEGL006545	GNR	S3
Carex canescens / Polytrichum spp. - Sphagnum spp. Poor Fen	CEGL006549	GNR	S1
Dulichium arundinaceum Fen	CEGL006552	GNR	S1
Picea rubens - Betula alleghaniensis - Tsuga canadensis / Glyceria melicaria / Sphagnum spp. Forested Swamp	CEGL006556	G3	S1
Solidago rugosa - Euthamia graminifolia Wet Meadow	CEGL006568	GNR	S3
Eriophorum virginicum - (Carex folliculata) / Sphagnum spp. - Polytrichum spp. Poor Fen	CEGL006570	G3	S1
Spiraea tomentosa / Sphagnum spp. Shrub Swamp	CEGL006571	GNR	S2
Pinus rigida - Picea rubens / Nemopanthus mucronata - Kalmia latifolia / Sphagnum spp. Peat Woodland	CEGL006587	G1G2	S1
Picea rubens / Rhododendron maximum - Kalmia latifolia / Eriophorum virginicum / Sphagnum spp. Peat Woodland	CEGL006588	G2G3	S1
(Andromeda polifolia var. glaucophylla) / Polytrichum strictum - Cladina spp. - Sphagnum spp. Bog	CEGL006589	G1	S1
Picea rubens / Carex trisperma / Sphagnum spp. - Polytrichum spp. Peat Woodland	CEGL006590	G2	S1
Abies balsamea - Picea rubens / Ilex verticillata / Sphagnum spp. Woodland Swamp	CEGL006591	G2	S1
Abies balsamea - Picea rubens / Danthonia compressa - Lycopodium spp. / Sphagnum spp. Forested Swamp	CEGL006592	G2	S1
Picea rubens / Vaccinium erythrocarpum / Sphagnum spp. - Bazzania trilobata Forested Swamp	CEGL006593	G2	S1
Populus tremuloides / Vaccinium myrtilloides / Solidago uliginosa Swamp	CEGL006594	GNR	S3
Spiraea alba Shrub Swamp	CEGL006595	GNR	S3
Vaccinium myrtilloides / Pteridium aquilinum / Polytrichum spp. Shrub Swamp	CEGL006596	GNR	S3
Tsuga canadensis - Fraxinus nigra - Betula alleghaniensis / Onoclea sensibilis Forested Swamp	CEGL007441	GNR	S1
Carex gynandra - Carex atlantica Fen	CEGL007771	G2	S1
Vaccinium oxycoccus - (Vaccinium macrocarpon) / Rhynchospora alba - Drosera rotundifolia / Sphagnum spp. Dwarf Shrub Peatland	CEGL007856	G2	S1
Carex echinata / Sphagnum spp. Poor Fen	CEGL008534	G2?	S1
Callitriche heterophylla - Glyceria striata Spring Seep	new CALLI6	GNR	S1

Trends:

These habitats were directly and indirectly affected by the logging boom of 1880-1920. Effects included sedimentation, stream channelization, and impoundment. Removal of Beaver in the early 1900s had additional negative effects on hydrology. Reintroduction of Beaver and the return of forests and their protection on public lands generally stabilized these habitats by the later 1900s.

Threats:

Because they occur in the highest elevations which have the coldest climate in the state, these habitats are most threatened by climate change. Some occurrences, especially those with soils influenced by limestone, are threatened by non-native invasive plant species.

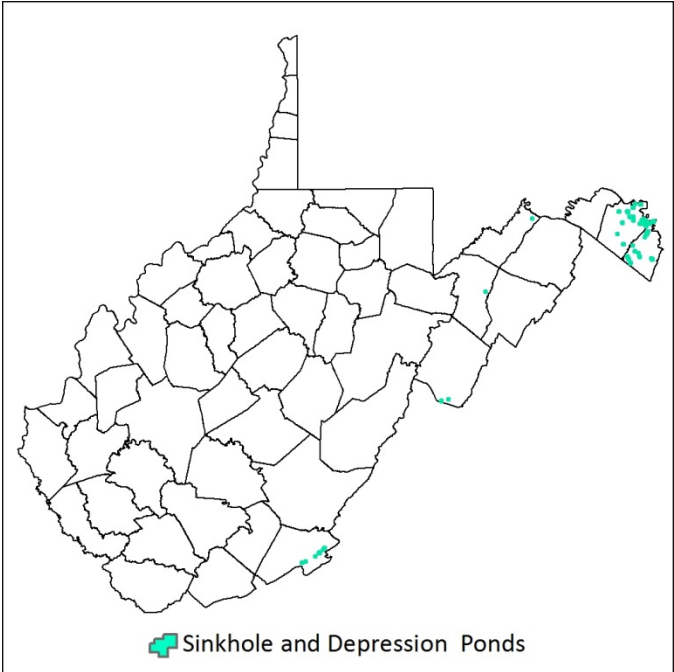
Current Projects Based on the 2005 WWCAP Priority Habitats:

The WVDNR ecologists completed a statewide classification and conservation assessment of these habitats in 2007 (Byers *et al.*). Most occurrences of USNVC associations and rare plants in these habitats have been entered in Biotics database. The WVDNR ecologists completed statewide mapping of these habitats and this GIS layer was added as a revision to the Northeast Habitat Map in 2013.

Inventory, Management, and Research Needs:

Maintain and update records on occurrences of rare and exemplary occurrences.

3.3.1.14: Sinkhole and Depression Ponds



Habitat area exaggerated to enhance visibility.



Photo: Sinkhole wetland on Harper Ridge, Berkeley County.

NatureServe Ecological Systems:

Central Interior Highlands and Appalachian Sinkhole and Depression Pond

Description:

Hydrologically isolated wetlands on sandstone-over-karst topography along ridgetops and bluffs in the Ridge & Valley Ecoregion of West Virginia. These wetlands typically lie on drainage divides. They are acidic in soil chemistry as a result of the sandstone bedrock, but they have the approximate morphology of sinkholes, reflecting the karst collapse features underlying the sandstone. They may contain forested or open wetland habitats depending on inundation levels. Common names for these habitats include swamp forests, shrub swamps, marshes, fens, and ponds.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats are confined to a few locations in the Ridge and Valley. Mapping is based on Ferree and Anderson (2013) but only a few occurrences have been verified by field surveys.

USNVC Association Scientific Name	Code	G Rank	S Rank
Glyceria acutiflora - Scirpus ancistrochaetus Sinkhole Marsh	CEGL003746	G1	S1
Quercus palustris / Carex lupulina Sinkhole Swamp	CEGL004643	G2	S1

Trends:

Most of these habitats have been altered by human encroachment.

Threats:

This rare isolated wetland type is heavily impacted by all terrain vehicle use, which has destroyed much of the former vegetation and severely threatens the remaining vegetated sites on private land. Roads and trails are adjacent to almost all of these wetlands, and invasive plants are a serious threat at some of them.

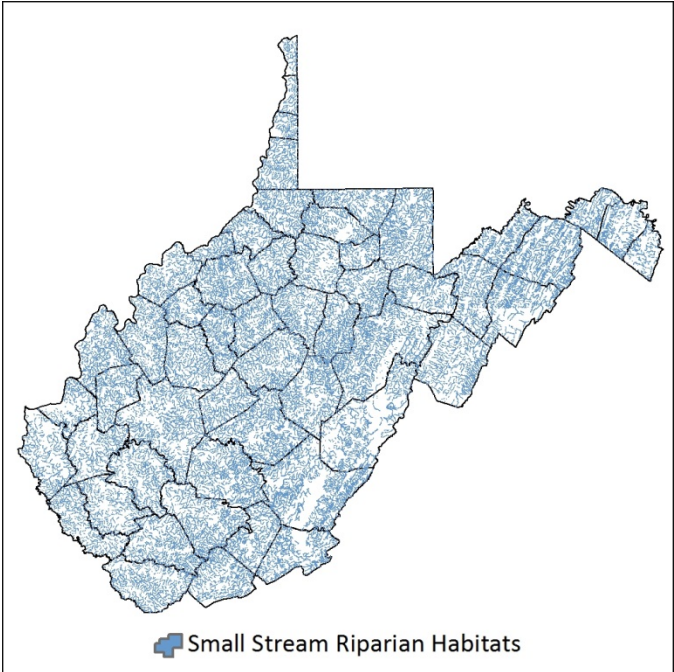
Current Projects Based on the 2005 WVWCAP Priority Habitats:

In 2014, WVDNR ecologists completed statewide classification and mapping of these habitats and a GIS layer was submitted as a revision to the Northeast Habitat Map.

Inventory, Management, and Research Needs:

Identify and survey additional occurrences. Work with landowners to protect existing occurrences.

3.3.1.15: Small Stream Riparian Habitats



Habitat area exaggerated to enhance visibility.



Photo: riparian zone along Bullskin Run, Jefferson County.

NatureServe Ecological Systems:

- Central Appalachian Stream and Riparian
- South-Central Interior Small Stream and Riparian

Description:

Natural vegetation of variable physiognomy in the floodplains of small streams, primarily at low to middle elevations. These habitats are mostly jurisdictional wetlands, but narrow riparian zones that are not wetlands may also be included. Habitats include headwater wetlands and seeps, and wetlands and riparian zones along creeks and other small streams. Beaver-influenced wetlands are common. Common names for these habitats include floodplain forests, swamp forests, riparian forests, riparian zones, forest seeps, shrub swamps, marshes, wet meadows, Beaver meadows, and Beaver ponds.

Similar Habitats:

Floodplains of larger rivers are included in River Floodplains. High elevation headwater wetlands in the Allegheny Mountains Ecoregion drained by small low-gradient streams are placed in High Allegheny Wetlands.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats occur in linear zones and small patches throughout the state. Mapping is based on TNC's Active River Area (Smith *et al.* 2008). The "base zones" for size 11 and 12 streams, excluding developed, agricultural, and anthropogenic NLCD map classes, were used to approximate the natural habitats of Small Stream Riparian Habitats.

USNVC Association Scientific Name	Code	G Rank	S Rank
Sparganium eurycarpum Rich Marsh	CEGL002026	G4G5	S2
Salix nigra Ruderal Floodplain Forest	CEGL002103	G4	SNA
Cephalanthus occidentalis Shrub Swamp	CEGL002191	G4	S3
Quercus palustris - Quercus bicolor - (Liquidambar styraciflua) / Toxicodendron radicans Forested Swamp	CEGL002432	G3G4	S2
Acer saccharinum / Toxicodendron radicans / Boehmeria cylindrica Floodplain Forest	CEGL002586	G4?	S2
Lemna spp. Ruderal Aquatic Vegetation	CEGL003059	G5	SNA
Salix nigra Ruderal Shrub Swamp	CEGL003901	G4?	SNA
Carex torta Herbaceous Rivershore	CEGL004103	G3G4	S3
Justicia americana Riverine Aquatic Bed	CEGL004286	G4G5	S3
Polygonum hydropiperoides Aquatic Bed	CEGL004290	G4?	S2
Sparganium (americanum, chlorocarpum) Marsh	CEGL004510	G3?	S2
Potamogeton spp. - Ceratophyllum spp. - Elodea spp. Aquatic Bed	CEGL004725	G4?	S2
Acer negundo Ruderal Floodplain Forest	CEGL005033	G4G5	SNA
Calamagrostis canadensis Wet Meadow	CEGL005174	G4G5	S2
Phalaris arundinacea Ruderal Wet Meadow	CEGL006044	GNA	SNA
Acer rubrum - Nyssa sylvatica / Osmunda cinnamomea / Sphagnum spp. Forested Swamp	CEGL006132	GNR	S2
Juncus balticus - (Schoenoplectus acutus, Carex lasiocarpa) - Scutellaria galericulata Rich Fen	CEGL006170	G1Q	S1
Chrysosplenium americanum - Impatiens capensis / Rhizomnium appalachianum Seep	CEGL006193	G3G5	S3
Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis Floodplain Forest	CEGL006217	G4	S2
Schoenoplectus tabernaemontani Marsh	CEGL006275	GNR	S2

<i>Tsuga canadensis</i> / <i>Rhododendron maximum</i> / <i>Sphagnum</i> spp. Forested Swamp	CEGL006279	G4?	S1
<i>Salix sericea</i> Shrub Swamp	CEGL006305	GNR	S2S3
<i>Scirpus cyperinus</i> Wet Meadow	CEGL006349	GNR	S3
<i>Carex stricta</i> Wet Meadow	CEGL006412	G4G5	S3
<i>Leersia oryzoides</i> - <i>Sagittaria latifolia</i> Marsh	CEGL006461	GNR	S3
<i>Quercus</i> (<i>rubra</i> , <i>velutina</i> , <i>alba</i>) / <i>Carpinus caroliniana</i> / <i>Maianthemum racemosum</i> Floodplain Forest	CEGL006462	G1	S1
<i>Hypericum densiflorum</i> / <i>Rubus hispidus</i> Shrub Swamp	CEGL006464	GNR	S3
<i>Platanus occidentalis</i> - <i>Aesculus flava</i> / <i>Lindera benzoin</i> / <i>Verbesina alternifolia</i> Floodplain Forest	CEGL006466	GNR	S2
<i>Verbesina alternifolia</i> - <i>Dichanthelium clandestinum</i> - <i>Solidago gigantea</i> Tall Herbaceous Rivershore	CEGL006480	GNR	S2
<i>Quercus bicolor</i> - <i>Nyssa sylvatica</i> / <i>Ilex verticillata</i> / <i>Symplocarpus foetidus</i> Forested Swamp	CEGL006497	G3G4	S1
<i>Fraxinus pennsylvanica</i> - <i>Acer saccharinum</i> - <i>Ulmus americana</i> / <i>Geum canadense</i> Forested Swamp	CEGL006548	G4	S1
<i>Dulichium arundinaceum</i> Fen	CEGL006552	GNR	S1
<i>Picea rubens</i> - <i>Betula alleghaniensis</i> - <i>Tsuga canadensis</i> / <i>Glyceria melicaria</i> / <i>Sphagnum</i> spp. Forested Swamp	CEGL006556	G3	S1
<i>Solidago rugosa</i> - <i>Euthamia graminifolia</i> Wet Meadow	CEGL006568	GNR	S3
<i>Spiraea tomentosa</i> / <i>Sphagnum</i> spp. Shrub Swamp	CEGL006571	GNR	S2
<i>Tsuga canadensis</i> - <i>Quercus rubra</i> - (<i>Betula nigra</i>) / <i>Rhododendron maximum</i> Floodplain Forest	CEGL006620	GNR	S2
<i>Pinus rigida</i> / <i>Osmunda cinnamomea</i> - <i>Carex stricta</i> / <i>Sphagnum</i> spp. Woodland Swamp	CEGL007056	G1	S1
<i>Alnus serrulata</i> - <i>Cornus amomum</i> Shrub Swamp	CEGL007062	G4	S3
<i>Platanus occidentalis</i> - <i>Acer saccharinum</i> - <i>Juglans nigra</i> / <i>Boehmeria cylindrica</i> Floodplain Forest	CEGL007334	G4	S1
<i>Quercus palustris</i> - (<i>Fraxinus nigra</i>) / <i>Cornus amomum</i> / <i>Carex bromoides</i> Forested Swamp	CEGL007399	GNR	S1
<i>Tsuga canadensis</i> - <i>Fraxinus nigra</i> - <i>Betula alleghaniensis</i> / <i>Onoclea sensibilis</i> Forested Swamp	CEGL007441	GNR	S1
<i>Peltandra virginica</i> - <i>Saururus cernuus</i> - <i>Boehmeria cylindrica</i> Aquatic Bed	CEGL007696	G3	S2
<i>Acer rubrum</i> - <i>Quercus alba</i> / <i>Osmunda cinnamomea</i> - <i>Thelypteris noveboracensis</i> Forested Swamp	CEGL007853	G2	S2
<i>Liriodendron tulipifera</i> - <i>Pinus strobus</i> - (<i>Tsuga canadensis</i>) / <i>Carpinus caroliniana</i> / <i>Amphicarpaea bracteata</i> Floodplain Forest	CEGL008405	G3	SNR
<i>Carex pellita</i> - <i>Carex stricta</i> Rich Fen	new CAPE42	GNR	S1
<i>Eleocharis palustris</i> - <i>Carex comosa</i> - <i>Leersia oryzoides</i> Marl Marsh	new ELPA3	GNR	S1
<i>Sorghastrum nutans</i> - <i>Juncus nodosus</i> Marl Wet Meadow	new SONU2	GNR	S1

Trends:

Natural riparian habitats have steadily declined in area due to human activities. These habitats were directly and indirectly affected by the logging boom of 1880-1920. Effects included sedimentation, stream channelization, and impoundment. Removal of Beaver in the early 1900s had additional negative effects on hydrology. Predating and following the logging boom, agriculture has been centered in and around riparian areas, usually eliminating natural habitats.

Threats:

Occurrences on private land are directly threatened by conversion to agriculture and developed areas. Indirect threats come from sedimentation and pollution from off-site logging, agriculture, mining and other development. These habitats are especially susceptible to invasions of non-native plant species.

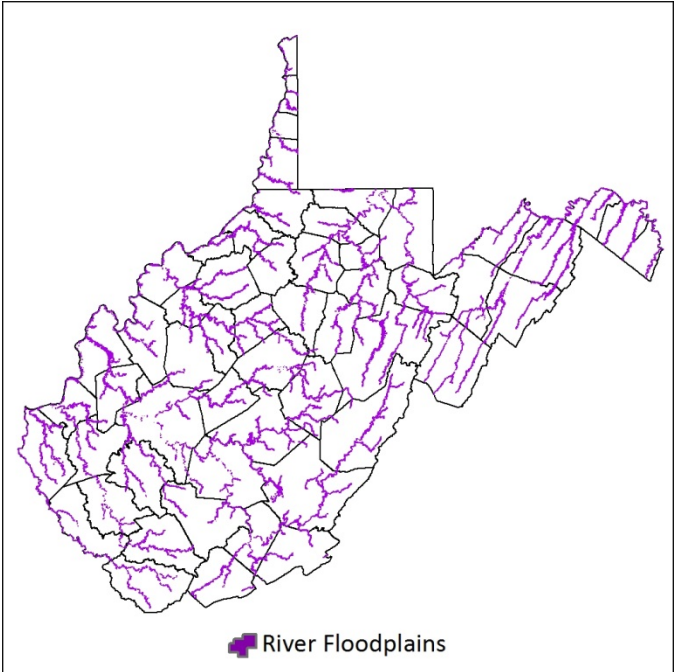
Current Projects Based on the 2005 WWCAP Priority Habitats:

The WVDNR ecologists completed a classification of these habitats in 2013.

Inventory, Management, and Research Needs:

Identify and map high quality occurrences. Incorporate new associations in the USNVC. Develop state level descriptions and make information available as part of a state vegetation classification.

3.3.1.16: River Floodplains



Habitat area exaggerated to enhance visibility.

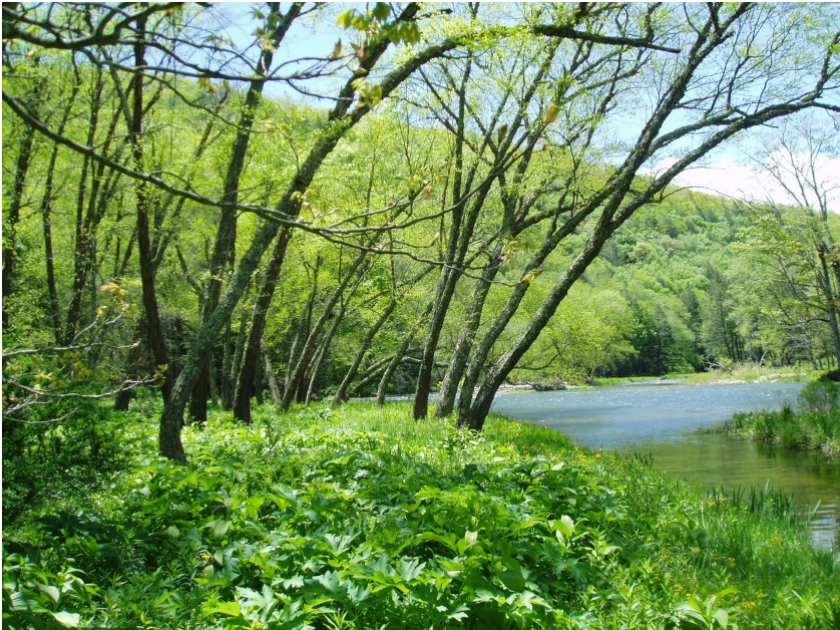


Photo: Floodplain of Greenbrier River, Pocahantas County.

NatureServe Ecological Systems:

- Central Appalachian River Floodplain
- South-Central Interior Large Floodplain

Description:

Natural vegetation in the floodplains of rivers. These habitats include jurisdictional wetlands and areas of floodplain that are not jurisdictional wetlands. Wetland habitats include forests, shrublands, and herbaceous communities that are flooded for significant periods during the growing season, have hydric soils, and support hydrophytes. Natural non-wetland floodplain vegetation is usually forested and occupies well-drained levees and other floodplain positions that are not flooded for significant periods during the growing season, but which may be flooded in the dormant season or by occasional high water events. Most floodplains include both wetland and non-wetland habitats. They often occur in complex mosaics of natural, semi-natural, and cultural vegetation. Common names for these habitats include floodplain forests, swamp forests, riparian forests, riverscours woodlands, shrub swamps, marshes, wet meadows, backwater sloughs, oxbows, rivershores, cobble bars, and riverscours prairies.

Common trees of forested floodplains at lower elevations include Sycamore (*Platanus occidentalis*), Silver Maple (*Acer saccharinum*), River Birch (*Betula nigra*), White Ash, Green Ash (*Fraxinus pennsylvanica*), Sugar Maple, Pin Oak (*Quercus palustris*), and Tuliptree. High elevation floodplain forests are often dominated by Red Spruce, Yellow Birch, and/or Eastern Hemlock. Shrub swamps of lower elevation floodplains are often dominated by Smooth Alder (*Alnus serrulata*) or Buttonbrush (*Cephalanthus occidentalis*). Riverscours prairies are usually characterized by warm-season grasses such as Big Bluestem (*Andropogon gerardii*) and Switch Grass (*Panicum virgatum*), but these are lacking in riverscours prairies at higher elevations. Herbaceous wetland floodplain communities may be dominated by species of bulrushes (*Scirpus* spp., *Schoenoplectus* spp.), burreeds (*Sparganium* spp.), rushes (*Juncus* spp.), sedges (*Carex* spp., *Dulichium* spp.), water lilies (*Nuphar* spp., *Nymphaea* spp.) and/or other species.

Similar Habitats:

Floodplains of smaller streams are included in Small Stream Riparian Habitats or, in higher elevations low-gradient headwater basins, in High Allegheny Wetlands.

Distribution and Abundance of Characteristic and Rare Associations:

These habitats occupy a very small area of the state but they are represented by a disproportionately high number of USNVC associations, many of them globally and/or state rare. Because they are along rivers, they are concentrated in the lower elevations, but they also include smaller areas along rivers at higher elevations. Thus they range from the lowest elevations in the state along the Ohio and Potomac Rivers up to 3600 feet elevation along the Shavers Fork River.

Mapping is based on TNC's Active River Area (Smith *et al.* 2008). The "base zones" for size 20 and larger rivers, excluding developed, agricultural, and anthropogenic NLCD map classes, were used to approximate the natural habitats of River Floodplains

USNVC Association Scientific Name	Code	G Rank	S Rank
Schoenoplectus tabernaemontani - Typha spp. - (Sparganium spp., Juncus spp.) Herbaceous Vegetation	CEGL002026	G4G5	S2
Betula nigra - Platanus occidentalis Forest	CEGL002086	G5	SNA
Salix nigra Forest	CEGL002103	G4	S2

Cephalanthus occidentalis / Carex spp. - Lemna spp. Southern Shrubland	CEGL002191	G4	S3
Nuphar advena - Nymphaea odorata herbaceous vegetation	CEGL002386	G4G5	S3
Quercus palustris - Quercus bicolor - (Liquidambar styraciflua) Mixed Hardwood Forest	CEGL002432	G3G4	S2
Acer saccharinum - Ulmus americana Forest	CEGL002586	G4?	S2
Platanus occidentalis - Betula nigra / Cornus amomum / (Andropogon gerardii, Chasmanthium latifolium) Woodland	CEGL003725	G3	S3
Arundinaria gigantea ssp. gigantea Shrubland	CEGL003836	G2?	S1
Platanus occidentalis - Betula nigra - Salix (caroliniana, nigra) Woodland	CEGL003896	G4G5	S1
Salix nigra Temporarily Flooded Shrubland	CEGL003901	G4?	SNA
Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica Forest	CEGL004073	G4	S2
Carex torta riverscour prairie	CEGL004103	G3G4	S3
Juncus effusus Seasonally Flooded Herbaceous Vegetation	CEGL004112	G5	SNA
Typha latifolia Southern Herbaceous Vegetation	CEGL004150	G5	SNA
Justicia americana Herbaceous Vegetation	CEGL004286	G4G5	S3
Polygonum (hydropiperoides, punctatum) - Leersia spp. Herbaceous Vegetation	CEGL004290	G4?	S2
Vallisneria americana - (Heteranthera dubia) Riverine Herbaceous Vegetation	CEGL004333	G3G4	S3
Liquidambar styraciflua - Liriodendron tulipifera / Lindera benzoin / Arisaema triphyllum Forest	CEGL004418	G4	S1
Sparganium americanum - (Sparganium erectum ssp. stoloniferum) - Epilobium leptophyllum Herbaceous Vegetation	CEGL004510	G3?	S2
Fagus grandifolia - Quercus spp. - Acer rubrum - Juglans nigra Forest	CEGL005014	G2G3	S1
Acer negundo Forest	CEGL005033	G4G5	SNA
Phalaris arundinacea Eastern Herbaceous Vegetation	CEGL006044	GNA	SNA
Acer rubrum - Nyssa sylvatica High Allegheny Plateau, Central Appalachian Forest	CEGL006132	GNR	S2
Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus) Forest	CEGL006217	G4	S2
Picea rubens - Tsuga canadensis / Rhododendron maximum / Sphagnum spp. - Bazzania trilobata forested swamp	CEGL006277	G2?	S1
Andropogon gerardii - Panicum virgatum - Baptisia australis Herbaceous Vegetation	CEGL006283	G3	S1
Scirpus cyperinus wet meadow	CEGL006349	GNR	S3
Carex stricta wet meadow	CEGL006412	G4G5	S3
Carya cordiformis - Prunus serotina / Ageratina altissima Forest	CEGL006445	G2G3	S1

Carex trichocarpa floodplain prairie	CEGL006447	G3	S1
Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia Forest	CEGL006458	G3Q	S2
Quercus (rubra, velutina, alba) / Carpinus caroliniana - (Halesia tetraptera) / Maianthemum racemosum Forest	CEGL006462	G1	S1
Leersia oryzoides - Sagittaria latifolia Herbaceous Vegetation	CEGL006461	GNR	S3
Salix nigra - Betula nigra / Schoenoplectus pungens Wooded Herbaceous Vegetation	CEGL006463	G1?	S1
Hypericum densiflorum / Juncus effusus / Sphagnum spp. shrub peatland	CEGL006464	GNR	S3
Platanus occidentalis / Aesculus flava Forest	CEGL006466	GNR	S2
Panicum virgatum - Andropogon gerardii Gravel Wash Herbaceous Vegetation	CEGL006477	G2G3	S1
Verbesina alternifolia - Elymus riparius - Solidago gigantea - (Teucrium canadense) Herbaceous Vegetation	CEGL006480	GNR	S2
Eupatorium serotinum - Polygonum (lapathifolium, punctatum, pensylvanicum) Herbaceous Vegetation	CEGL006481	GNR	S1
Eragrostis hypnoides - Ludwigia palustris - Lindernia dubia - Cyperus squarrosus Herbaceous Vegetation	CEGL006483	G3	S1
Quercus palustris - Quercus bicolor / Carex tribuloides - Carex radiata - (Carex squarrosa) Forest	CEGL006497	G3G4	S1
Dulichium arundinaceum - Carex folliculata - Juncus spp. Herbaceous Vegetation	CEGL006552	GNR	S1
Lysimachia ciliata - Apocynum cannabinum Sparse Vegetation	CEGL006554	GNR	S1
Picea rubens - Betula alleghaniensis var. alleghaniensis - Tsuga canadensis / Glyceria melicaria / Sphagnum spp. forested swamp	CEGL006556	G3	S1
Solidago rugosa - Euthamia graminifolia Herbaceous Vegetation	CEGL006568	GNR	S3
Rhododendron arborescens / Marshallia grandiflora - Triantha glutinosa - Platanthera flava var. herbiola Herbaceous Vegetation	CEGL006598	G1	S1
Tsuga canadensis - Quercus rubra - (Platanus occidentalis, Betula nigra) / Rhododendron maximum / Anemone quinquefolia Forest	CEGL006620	GNR	S2
(Betula nigra, Ilex verticillata) / Andropogon gerardii - Solidago simplex var. racemosa Herbaceous Vegetation	CEGL006623	G2	S3
Pinus virginiana - (Pinus rigida) - Nyssa sylvatica / Xanthorhiza simplicissima/ Euphorbia corollata Forest	CEGL006624	G1	S1
Alnus serrulata Saturated Appalachian-Piedmont Shrubland	CEGL007062	G4	S3
Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin) Forest	CEGL007220	GNA	SNA
Liriodendron tulipifera - Quercus spp. Forest	CEGL007221	GNA	SNA
Robinia pseudoacacia Forest	CEGL007279	GNA	SNA
Quercus palustris - (Fraxinus nigra) / Lindera benzoin / Carex bromoides Forest	CEGL007399	GNR	S1

Peltandra virginica - Saururus cernuus - Boehmeria cylindrica / Climacium americanum Herbaceous Vegetation	CEGL007696	G3	S2
Populus deltoides / Acer negundo / Boehmeria cylindrica Forest	CEGL007731	G3G5	S1
Carex gynandra - Carex atlantica / Sphagnum spp. seepage fen	CEGL007771	G2	S1
Ludwigia peploides Herbaceous Vegetation	CEGL007835	G4G5	SNA
Juglans nigra / Verbesina alternifolia Forest	CEGL007879	GNA	SNA
Liriodendron tulipifera - Pinus strobus - (Tsuga canadensis) / Carpinus caroliniana / Amphicarpaea bracteata Forest	CEGL008405	G3	S2
Juniperus virginiana var. virginiana - Pinus virginiana - Quercus stellata / Amelanchier stolonifera / Danthonia spicata – Melica mutica Woodland	CEGL008449	G1	S1
new PLOC-ACSAS	new PLOC-ACS	GNR	S1
Nuphar advena - Nymphaea odorata Aquatic Bed	CEGL002386	G4G5	S3
Nelumbo lutea Herbaceous Aquatic Bed	CEGL004323	G4?	S1
Fraxinus pennsylvanica - Acer saccharinum - Ulmus americana / Geum canadense Forested Swamp	CEGL006548	G4	S1

Places to see and visit: Shannondale Springs WMA, Monongahela National Forest (Shavers Fork and Greenbrier rivers), Harper’s Ferry National Historical Park, Gauley River National Recreation Area, New River Gorge National River, Ohio River Islands National Wildlife Refuge.

Trends:

Large areas of river floodplain have been drained or filled and developed for human uses. Other areas have been permanently flooded behind dams. Natural flood regimes have been altered by construction of dams and levees. Many areas that still flood are cleared for agriculture. Prior to settlement Large River Floodplains occupied a small area of the present state of West Virginia; today they are greatly diminished.

Threats:

Occurrences on private land are directly threatened by logging and by conversion to agriculture and developed areas. Indirect threats come from sedimentation and pollution from off-site logging, agriculture, mining and other development. These habitats are especially susceptible to invasions of non-native plant species.

Current Projects Based on the 2005 WVWCAP Priority Habitats:

The WVDNR ecologists completed a classification of these habitats in 2013.

Inventory, Management, and Research Needs:

Incorporate new associations in the USNVC. Develop state-level descriptions and make information available as part of a state vegetation classification.

3.3.1.17: Anthropogenic Shrubland and Grassland

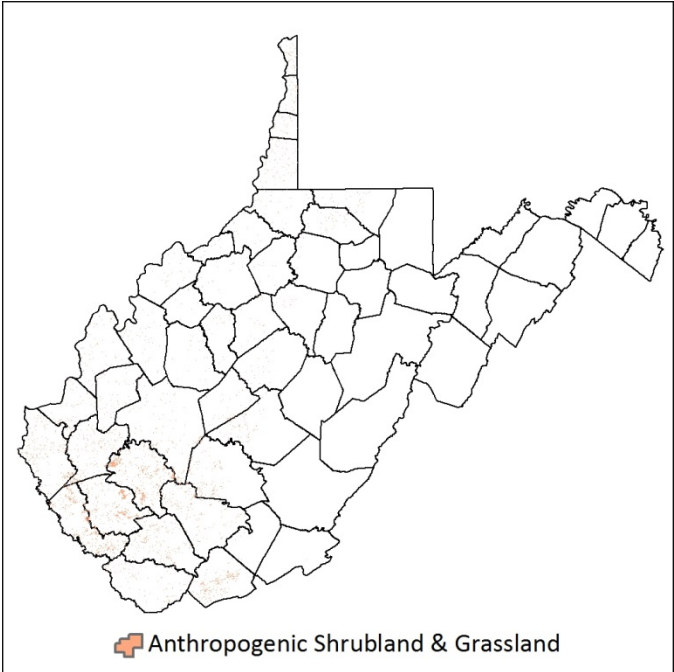


Photo: Abandoned farmland at the National Conservation Training Center in Jefferson County

National Land Cover Database:

- 52 – Scrub/Shrub
- 71 – Grassland/Herbaceous

Description:

Areas characterized by semi-natural vegetation dominated by small trees, shrubs, and herbs. These areas are not subject to intense active management, but may be utilized for grazing (Homer *et al.* 2004).

These habitats developed on land that was converted from natural habitats by humans, and then abandoned. Vegetation is highly variable and often includes a mixture of native and non-native plant species.

Similar Habitats:

More intensively managed habitats are included in Agriculture or Developed.

Distribution and Abundance:

These habitats occur in small to large patches throughout the state at all elevations. Mapping is based on Ferree and Anderson (2013), who used National Land Cover Database classes (Homer *et al.* 2004) to map these habitats. Due to anomalies in the source data, these habitats are not mapped in the same way throughout the state, with few areas mapped in the eastern part of the state.

Trends:

These habitats increased dramatically following the logging boom and widespread settlement of the state. There was probably a second increase following the abandonment of farms in the later 1900s. Recently there has been a decrease in many areas as grasslands and shrublands succeed to forests. However, significant areas have been and continue to be created by surface mining and reclamation, especially in the Cumberland Mountains Ecoregion.

Threats:

These ephemeral habitats are threatened by succession to forested habitats.

3.3.1.18: Agriculture

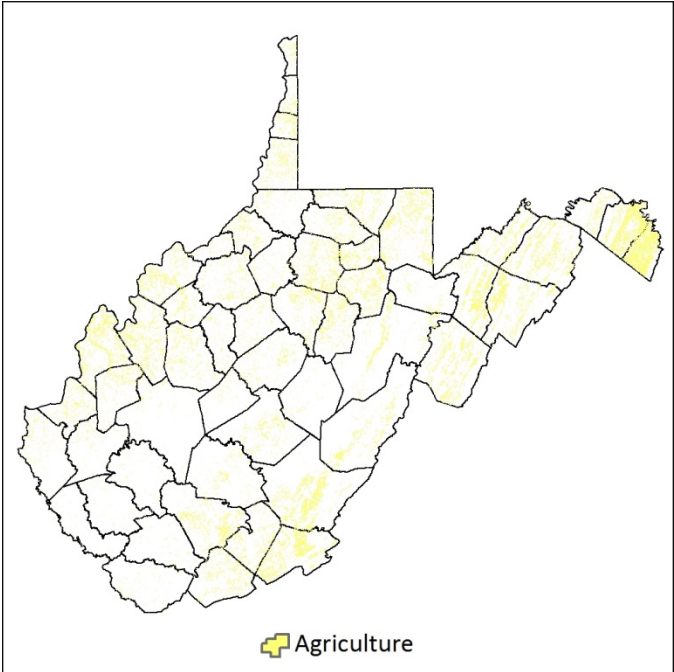


Photo: Cornfield at Harpers Ferry National Historical Park in Jefferson County

National Land Cover Database:

- 81 - Pasture/Hay
- 82 - Cultivated Crops

Description:

Areas with planted herbaceous vegetation that is intensely managed for food, feed, or fiber (Homer *et al.* 2004). Common crops include hay, corn, and soybeans.

Similar Habitats:

Less intensely managed farmland that may be utilized for grazing is included in Anthropogenic Shrubland and Grassland.

Distribution and Abundance:

Agriculture is centered in valley bottoms. It is most extensive in the Greenbrier and Potomac valleys and is mostly absent in high elevations and areas with rugged topography. Mapping is based on Ferree and Anderson (2013), who used National Land Cover Database classes (Homer *et al.* 2004) to map these habitats.

Trends:

These habitats greatly increased following widespread human settlement of the state. In recent decades there has been a decrease in these habitats as farms were abandoned or converted for residential and industrial development.

Threats:

The primary threat to these habitats is development by humans for other purposes.

3.3.1.19: Developed

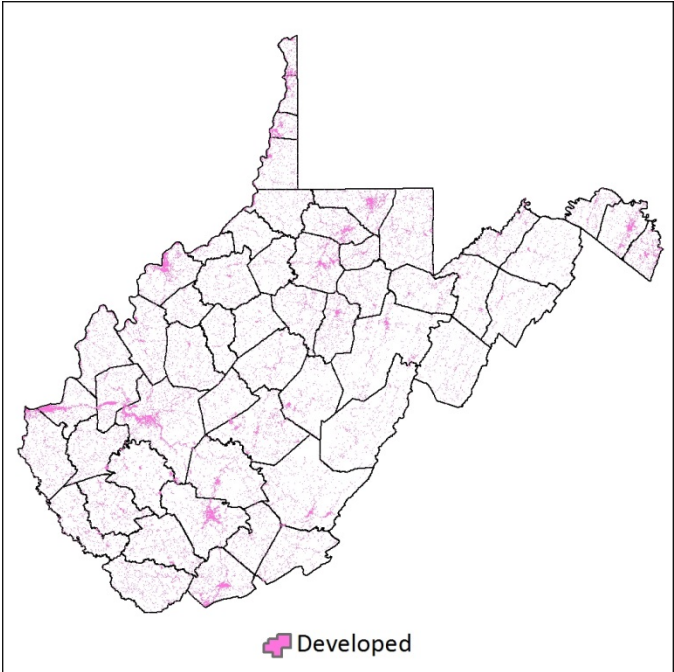


Photo: Developed Area at the National Conservation Training Site, Jefferson County

National Land Cover Database:

- 21 - Developed, Open Space
- 22 - Developed, Low Intensity
- 23 - Developed, Medium Intensity
- 24 - Developed, High Intensity
- 31 - Barren Land

Description:

Areas characterized by a high percentage of constructed materials (Homer *et al.* 2004) which are used for human residence and activity. Vegetation may cover significant area but is not usually natural. Developed areas range from cities to rural homesteads.

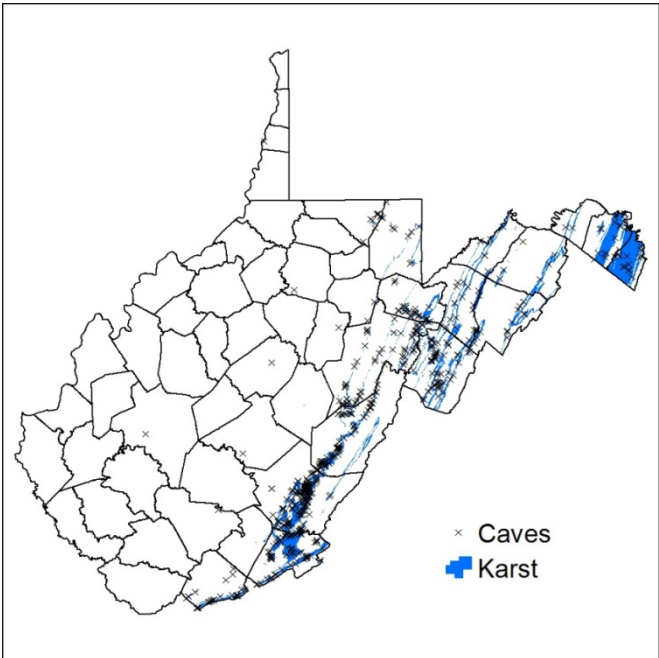
Distribution and Abundance:

Developed areas are concentrated in valley bottoms at lower elevations, but small areas occur throughout the state. Mapping is based on Ferree and Anderson (2013), who used National Land Cover Database classes (Homer *et al.* 2004) to map these habitats.

Trends:

Developed areas have increased steadily since the 1700s.

3.3.1.20: Subterranean Habitats





Description:

West Virginia's subterranean habitats include a spectacular assemblage of natural caves and underground passages mostly associated with karst topography. Karst is a distinctive topography characterized by sinkholes, caves, and springs, which is created by the dissolution of carbonate rock, primarily limestone and dolomite. When these soluble rocks dissolve they form fissures which carry water underground, leading to further dissolution and erosion which, over time, creates interconnected

caves and underground streams. In addition there is aquatic habitat known as epikarst. Here organisms live within the small water- filled crevices in the limestone below the ground's surface, but above the cave passage. Springs of calcium-enriched water form where streams emerge from underground.

There are also a few subterranean habitats in West Virginia that are not associated with karst. These include a few natural caves in sandstone and shale and a large number of manmade mines and tunnels. Shallow subterranean habitats are also formed under talus and boulderfields.

Caves are characterized by darkness, high humidity, and constant temperature around 50-54° F. Cave entrances are ecotones with terrestrial habitat where light and weather fluctuates daily and seasonally, but in the deep zone of caves there is complete darkness and climate stability. In contrast to terrestrial habitats, there are no primary producers (plants) in the deep zone of caves; all food sources must be imported from the surface. An important subset of subterranean habitats is aquatic; this includes underground streams and rivers, still pools, epikarst, and springs. Although caves might seem to be self-contained ecosystems, they are connected to above ground terrestrial and aquatic habitats through water and air passages and through food webs.

Caves are important habitat for wildlife, including bats that move in and out, and a diverse group of vertebrate and invertebrate animals that have evolved specialized adaptations to permanent underground living. Common traits exhibited by permanent cave dwellers (troglobites) include blindness (or complete loss of eyes) and reduced pigmentation. West Virginia SGCN that depend on cave habitats include eight bats, a fish, two salamanders, a crayfish, and 91 cave invertebrates. There are other SGCN that often use caves (e.g., Allegheny Woodrat), but are not solely dependent on caves for their survival. Manmade subterranean habitats may be used by mobile animals such as bats, but lack the less mobile, more specialized life forms that evolved in isolated natural caves.

Distribution:

Small caves and manmade subterranean habitats occur in all counties of the state, but biologically important limestone caves are concentrated in areas with extensive limestone bedrock at or near the surface in the Allegheny Mountains and Ridge and Valley Ecoregions. Caves in the Allegheny Mountains Ecoregion associated with Greenbrier Limestone account for a large proportion of caves in the state (Davies 1958); the largest concentration of these caves is in the Greenbrier Valley. Caves in the Ridge and Valley Ecoregion are associated with several limestone formations, including the Conococheague, Elbrook, and Tonoloway, the Helderburg Group, and others. A recent summary of West Virginia's karst features (WVASS 2014) lists 3748 known caves in the state. Counties with the highest number of caves include (in decreasing order) Greenbrier, Pocahontas, Randolph, Monroe, Pendleton, Berkeley, Tucker, and Mercer, each with over 100 known caves.

Mapping of karst is approximated using statewide mapping of limestone and dolomite formations (Caldwell et al. 1968), but some areas with extensive limestone, such as the Shenandoah Valley in Jefferson County, have relatively few caves. Cave locations and maps have been published for numerous caves (e.g. Davies 1958). Cave locations presented here are based on WVDNR records; they include many of the most biologically important caves in the state, but not all known caves are mapped.

Places to See and Visit:

Four commercial caves offer tours: Lost World Caverns, Organ Cave, Seneca Cave, and Smoke Hole Caverns.

Conservation Issues:

The threats to SGCN species that use caves are varied, and potential impacts differ depending on the species and how it uses the cave. Most species found in caves are adapted to fairly specific environmental conditions, and changes in cave temperature and relative humidity or nutrient input can impact species or whole communities.

Several species of bats use caves as hibernation sites. Because bats must survive the winters on limited fat reserves accumulated in late summer and fall, disturbance of bats during hibernation can cause them to use up fat stores prematurely. Several important bat hibernacula in West Virginia are officially closed to human visitation early fall through late spring to protect hibernating endangered bats. Gates and fences have been constructed at some of these sites to better restrict human traffic during critical periods. In the wake of the fungal disease known as White Nose Syndrome (WNS), the small number of surviving bats of species that were common just a few years ago should be not be disturbed during hibernation, and cavers are encouraged to schedule trips into caves when bats are not present. Cavers and cave researchers are also asked to clean and disinfect gear between cave trips to help minimize the spread of the fungus that causes WNS or other potential pathogens. Virginia Big-eared Bats also use caves during the summer. In the spring, females gather to form maternity colonies to rear their young; males may form “bachelor” colonies, although the location of most males during the summer is not known. Summer colonies of Virginia Big-eared Bats are sensitive to disturbance, and human visitation to these caves should be avoided during late spring through early fall. Both hibernating concentrations of bats and summer colonies require specific ranges of temperature and humidity. While blocking a cave entrance directly impacts the bats’ access to the sites and should be avoided, modification of entrances can alter air flow and affect cave temperature and relative humidity. Cave gates should be designed using “bat-friendly” designs which allow bats to enter and exit the cave freely and which do not greatly affect air flow and condition within the cave. In addition, suitable roosting habitat should be provided around cave entrances to be used by bats during the fall swarming period and in the spring.

Allegheny Woodrats often use caves where they find shelter during the day and exit the cave to forage in the evening. These animals are probably less sensitive to temperature and relative humidity than bats, but do require access to the cave. Bat-friendly gates will provide access for woodrats as well. Because woodrats rely on stores of mast to survive the winter, where appropriate, mast producing trees should be retained or encouraged near cave entrances in areas where Allegheny Woodrats occur.

West Virginia is home to several rare cave invertebrate species, some found nowhere else. Cave invertebrates inhabit subterranean terrestrial, aquatic, and riparian habitats. These species require nutrient inputs from the surface. Some species specialize in organic inputs actively brought into the cave by other species (e.g., bats and woodrats); others use organic matter (e.g., leaves, wood) which enters the cave through an entrance, while other species specialize on matter carried into the cave by flowing or dripping water. Land use practices above cave passages and around cave entrances can alter nutrient inputs into the caves. Activities such as clearing trees around a cave entrance or physically closing a cave entrance may limit nutrient inputs, while improper disposal of human waste above a cave could overload a cave system with nutrients and disrupt the cave community. Many of the karst areas

of WV contain rolling topography and rich soils which have made them desirable for farming and grazing. This has produced some distinct threats to cave invertebrates from organic pollution. Another source of concern is the potential input of contaminants from practices inappropriate in karst regions. These include diverting storm run-off into karst features, dumping trash in sinkholes, and application of pesticides where they can get flushed into a cave. The source of some of these inputs may be large distances from the cave itself, requiring a landscape level analysis to identify possible threats. Urbanization, especially in the Greenbrier Valley north of Lewisburg, is producing potential threats to cave endemics. Similar development is occurring in the Eastern Panhandle, but the cave density and species numbers are not a great in this portion of the state. Groundwater extraction, septic failure, clearing of forested areas, and increased areas of impervious surfaces as a result of urbanization can all have impact cave invertebrates by changing the nutrient inputs and hydrology of caves.

STATEWIDE TERRESTRIAL HABITAT TYPE EXTENT

HABITAT TYPE	ACRES	PERCENT OF WV LAND AREA
Acidic Rock Outcrops, Cliffs, and Talus	89,783	0.59%
Agriculture	1,435,287	9.36%
Anthropogenic Shrubland & Grassland	159,128	1.04%
Calcareous Cliffs and Talus	9,208	0.06%
Developed	1,138,906	7.43%
Dry Calcareous Forests, Woodlands, and Glades	71,523	0.47%
Dry-Mesic Oak Forests	4,989,621	32.53%
Dry Oak (-Pine) Forests	2,470,980	16.11%
Heath-Grass Barrens	2,817	0.02%
High Allegheny Wetlands	20,935	0.14%
Mixed Mesophytic Forests	2,945,997	19.21%
Montane Red Oak Forests	21,140	0.14%
Northern Hardwood Forests	994,851	6.49%
Pine-Oak Rocky Woodlands	76,399	0.50%
Red Spruce Forests	177,969	1.16%
River Floodplains	120,210	0.78%
Shale Barrens	1,793	0.01%
Sinkhole and Depression Ponds	149	0.00%
Small Stream Riparian Habitats	494,276	3.22%
Unresolved	116,730	0.76%
Totals	15,337,700	100.00%

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Acidic Rock Outcrops, Cliffs, and Talus

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Birds		1
Mammals	4	
Plants	42	1
Reptiles	1	2
Snails	1	
Tiger Beetles		1
Totals	49	5

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Agriculture

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	3	
Birds	1	5
Butterflies and Moths		2
Mammals	2	5
Reptiles	7	2
Snails		1
Tiger Beetles	1	3
Totals	14	18

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Anthropogenic Shrubland & Grassland

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Birds	19	8
Butterflies and Moths	7	4
Mammals	6	1
Reptiles	3	6
Snails	3	2
Tiger Beetles	1	
Totals	40	21

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Calcareous Cliffs and Talus

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Butterflies and Moths		3
Mammals	2	1
Plants	18	3
Reptiles	1	3
Snails	13	5
Totals	35	15

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Caves and Karst

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	3	2
Cave Invertebrates	91	
Mammals	6	5
Snails	4	1
Totals	104	8

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Developed

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Birds	5	
Mammals	1	3
Reptiles	8	1
Snails	13	1
Tiger Beetles	3	2
Totals	31	7

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Dry Calcareous Forests, Woodlands, and Glades

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Butterflies and Moths	1	5
Mammals		8
Plants	55	2
Snails	12	3
Totals	69	18

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Dry Oak (-Pine) Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Birds	1	9
Butterflies and Moths	7	3
Mammals	13	2
Plants	44	1
Reptiles	6	5
Snails	28	18
Tiger Beetles		3
Totals	100	42

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Dry-Mesic Oak Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	8	3
Birds	10	12
Butterflies and Moths	4	2
Mammals	15	4
Plants	45	3
Reptiles	8	7
Snails	53	12
Tiger Beetles	1	4
Totals	144	47

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Heath-Grass Barrens

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Birds		1
Butterflies and Moths	2	1
Mammals	1	1
Plants	11	
Reptiles	1	1
Totals	15	4

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: High Allegheny Wetlands

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Birds	7	5
Butterflies and Moths	15	2
Crayfish	1	1
Dragonflies and Damselflies	18	
Mammals	2	6
Plants	143	1
Reptiles	1	
Snails	2	2
Totals	189	17

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Mixed Mesophytic Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	10	7
Birds	4	20
Butterflies and Moths	12	4
Mammals	13	5
Plants	41	2
Reptiles	6	3
Snails	50	16
Tiger Beetles	1	3
Totals	137	60

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Montane Red Oak Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	3	1
Mammals	4	1
Plants	14	
Reptiles	3	1
Snails	2	2
Totals	26	5

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Northern Hardwood Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	7	3
Birds	7	18
Butterflies and Moths	14	3
Mammals	10	7
Plants	17	2
Reptiles	2	1
Snails	9	2
Totals	66	36

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Pine-Oak Rocky Woodlands

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Butterflies and Moths	5	5
Mammals	5	3
Plants	38	
Reptiles	3	4
Snails	1	
Totals	52	12

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Red Spruce Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		4
Birds	7	5
Butterflies and Moths	6	2
Mammals	5	2
Plants	10	2
Snails	3	2
Tiger Beetles		1
Totals	31	18

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: River Floodplains

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	12	2
Birds	8	11
Butterflies and Moths	4	3
Crayfish	1	
Dragonflies and Damselflies	14	
Mammals	9	4
Plants	165	1
Reptiles	12	2
Snails	12	5
Tiger Beetles	8	1
Totals	245	29

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Shale Barrens

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Butterflies and Moths	11	2
Plants	32	3
Reptiles	3	1
Tiger Beetles		1
Totals	46	7

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Sinkhole and Depression Ponds

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Mammals		7
Plants	3	
Snails	2	1
Totals	6	8

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Small Lentic Water Bodies

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	4	16
Birds	5	5
Dragonflies and Damselflies	14	
Mammals	1	
Reptiles		8
Snails	3	
Totals	27	29

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Small Stream Riparian Habitats

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	2	14
Birds	2	4
Butterflies and Moths	6	6
Crayfish	1	
Dragonflies and Damselflies	24	
Mammals	10	6
Plants	121	1
Reptiles	9	3
Snails	6	13
Tiger Beetles	2	2
Totals	183	49

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

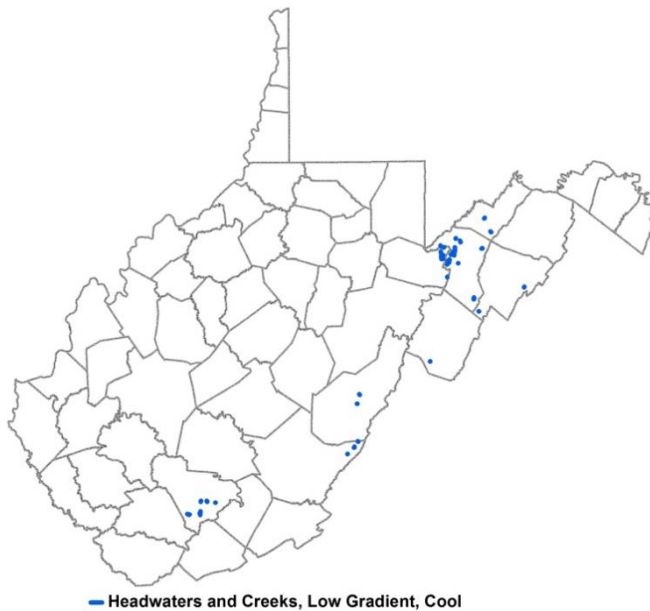
3.3.2: Aquatic Habitats

Eighteen aquatic habitat types were classified and mapped for West Virginia. These are GIS-derived types based on a simplification for West Virginia of the Northeast Aquatic Habitat Classification System (NEAHCS) (Anderson *et al.* 2013). Stream size is considered the most influential effect on determining biological assemblages at the reach scale and is divided into four primary classes: headwaters and creeks, small rivers, medium rivers, and large rivers. Stream slope, or gradient, affects aquatic communities at the reach scale due to its influence on stream bed morphology, water velocity, and sediment dynamics. Three relative classes (low, moderate, or high) of gradient are used to define West Virginia's streams. Water temperature in streams is a key physiological characteristic determining where different stream organisms may persist. Temperature affects seasonal migrations, growth rates, body condition, and fecundity of biota. Three temperature classes (cold, cool, warm) based on continuously recorded data and modeled environmental variables were used to determine biological constraints on stream communities in this model. The maps as represented are based on the regional model and have received only minimal field-checking against local conditions. Contact the WVDNR Aquatic Community Assessment and Restoration Program for more specific information about these different habitat types and where they may occur.

Analysis was performed for a buffered riparian zone (328 feet from each bank, 656 feet total) to determine riparian land cover and condition within each of the 18 habitat types as represented in the chart at the end of each habitat description. Land cover was determined from the 2011 National Land Cover Dataset (Homer *et al.* 2015) and is represented by the numerical category and description along the X-axis. The Y-axis is the percentage of that Land Cover type occurring adjacent to reaches classified as a particular aquatic habitat type. The "Open Water" category is generally over-represented due to spatial inaccuracies in the NLCD (30 meter grid) and NEACHS (NHD+ polyline) datasets.

A full list of all SGCN can be found in Appendix 2 for each classified habitat type.

3.3.2.1: Headwaters and Creeks, Low Gradient, Cool Temperature



Beaver Creek near Davis, Tucker County

Description:

These are relatively short reaches of cool, slow-moving, headwaters and creeks of moderate to high elevation in flat valley settings interspersed within larger reaches of more moderate gradients. The headwaters and creeks are defined by watersheds less than 38.6 mi² in size. The cool slow-moving waters of less than 0.5 % slope may exhibit moderate turbidity and be somewhat poorly oxygenated. Instream habitats are dominated by glide-pool and ripple-dune systems with runs interspersed by pools and a few short or no distinct riffles. Aquatic vegetation and large woody debris are common, adding to habitat stability and complexity. Bed materials are predominantly sands, silt, and smaller gravel. These low-gradient stream reaches may have high sinuosity but are usually only slightly entrenched with adjacent floodplain and riparian wetland ecosystems. Cool water temperatures in these streams means the fish community contains a higher proportion of cool and warm water species relative to coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 ft. These stream types can be found in the Allegheny Mountains, Ridge and Valley, and Northern Cumberland Mountains ecoregions of the state.

Similar Habitat Types:

Headwaters and creeks also occur at higher elevations and on higher slopes, but these tend to have coarser substrates and faster water. This cool low gradient stream type typically flows into low gradient cool rivers.

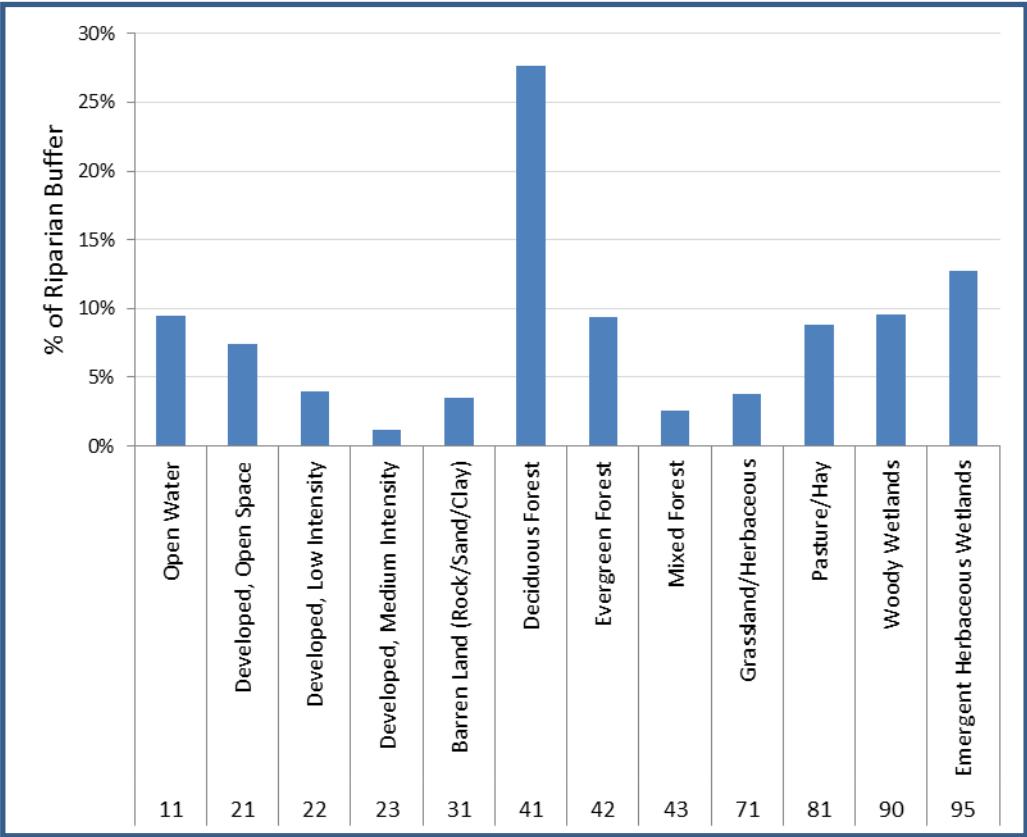
Places to Visit This Habitat:

Little Blackwater River in Canaan Valley National Wildlife Refuge, Mill Run in Canaan Valley State Park

Notable Species Found in This Habitat in West Virginia:

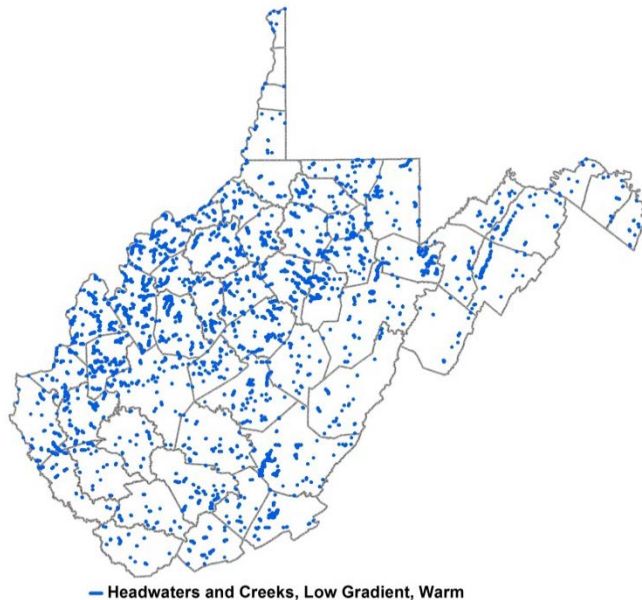
Fishes: Redside Dace, Tonguetied Minnow, Candy Darter, Common Shiner, Rosefin Shiner, Redfin Shiner, New River Shiner, and Kanawha Minnow.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Forcipate Emerald, Hudsonian Whiteface.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwaters and creeks of low gradient and cool temperatures in West Virginia.

3.3.2.2: Headwaters and Creeks, Low Gradient, Warm Temperature



Slab Creek near Berea, Ritchie County.

Description:

These are warm, slow-moving, headwaters and creeks of low-elevation flat, often marshy settings. These small streams of the state occur in the lower elevations on flats or very gentle slopes in watersheds less than 38.6 mi² in size. The warm slow-moving waters of less than 0.5 % slope are sediment-laden and susceptible to turbidity with the smallest of precipitation events and may be somewhat poorly oxygenated. Instream habitats are dominated by glide-pool and ripple-dune features with runs interspersed by pools and a few short or no distinct riffles. Aquatic vegetation and large woody debris are common and add to habitat stability and complexity. Bed materials are predominantly sands, silt, and only isolated amounts of gravel. Some examples are associated with wetland complexes and these segments may be dominated by silt, organic muck and debris, marl deposits, and woody or leafy materials. These low-gradient streams may have high sinuosity, but are usually only slightly to moderately entrenched with adjacent floodplain and riparian wetland ecosystems. Warm water temperatures in these streams means the fish community will contain a higher proportion of warmwater species relative to coolwater species, and are unlikely to support any resident coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain less than 3.86 mi², and have an average bankfull width of 16.4 feet or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of 32.8 feet. Streams of this type are well-represented across the Western Allegheny Plateau, but can be readily found across all ecoregions of the state.

Similar Habitat Types:

Headwaters and creeks also occur at higher elevations and on higher slopes, but these tend to have coarser substrates, faster, and cooler water. Warm low gradient streams typically flow into low gradient warm rivers.

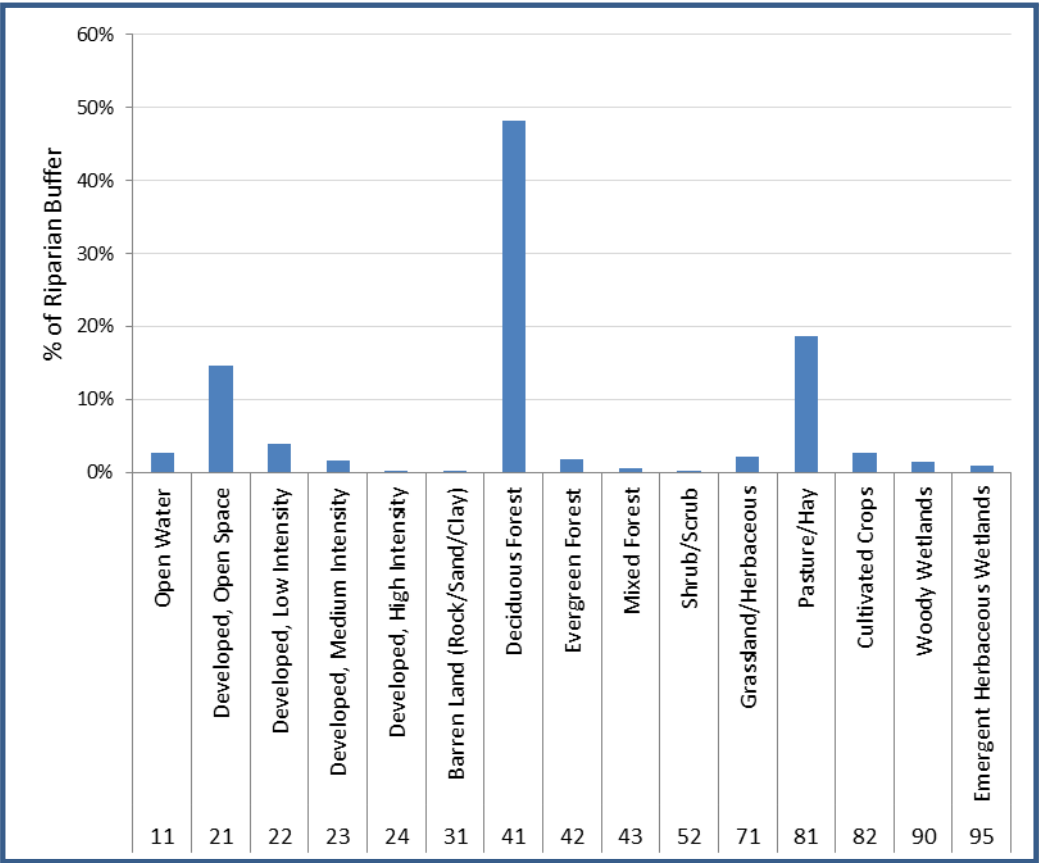
Places to Visit This Habitat:

Kiah Creek in East Lynn Lake Wildlife Management Area, Meadow River in Meadow River Wildlife Management Area, Oldtown Creek in McClintic Wildlife Management Area and Saltlick Creek in Braxton County.

Notable Species Found in This Habitat in West Virginia:

Fishes: Redfin Shiner, Orangespotted Sunfish, Black Bullhead.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Round Hickorynut, Clubshell, Mudpuppy, New River Crayfish, Coalfields Crayfish, Green-striped Darner.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwaters and creeks of low gradient and warm temperatures in West Virginia.

3.3.2.3: Headwaters and Creeks, Moderate Gradient, Cold Temperature



Gandy Creek near Osceola, Randolph County.

Description:

These are cold, fast-moving, headwaters and creeks of hills and gentle slopes. These small streams of northern regions or high elevations occur on hills and slopes at moderate to high elevations in watersheds of less than 38.6 mi² in size. They have cold, moderately fast-moving waters of 0.5 to less than 2.0 % slope with good oxygenation. Instream habitats are dominated by good riffle-pool development with low sinuosity, moderate entrenchment, and moderately narrow valleys. Substrates are predominantly angular cobbles and gravels, and sand with occasional small patches of boulders. Large woody debris is often an important part of the habitat complex, forming pools and adding nutrients to the channel. Permanent cold water temperatures in these streams means coldwater fish species, such as Brook Trout, likely represent the highest relative abundance of the fish community. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. These stream types are most prevalent in the Allegheny Mountains and Ridge and Valley ecoregions of the state.

Similar Habitat Types:

These moderate gradient streams are transitional types and often exhibit some characteristics of both the higher and lower gradient streams. This cold moderate gradient stream type typically flows into moderate or low gradient cool rivers in areas of less topography.

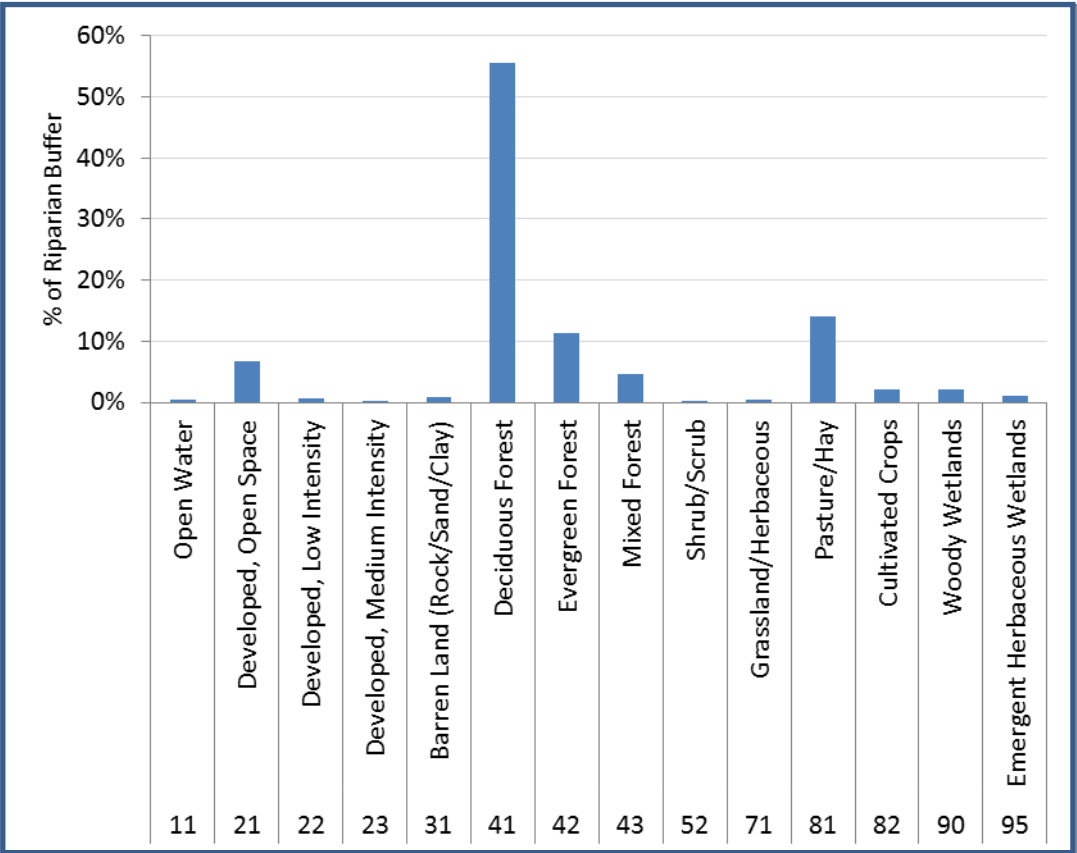
Places to Visit This Habitat:

Numerous streams within the Monongahela National Forest including: First Fork, Little River East Fork Greenbrier River, Shavers Fork, and Knapp Creek.

Notable Species Found in This Habitat in West Virginia:

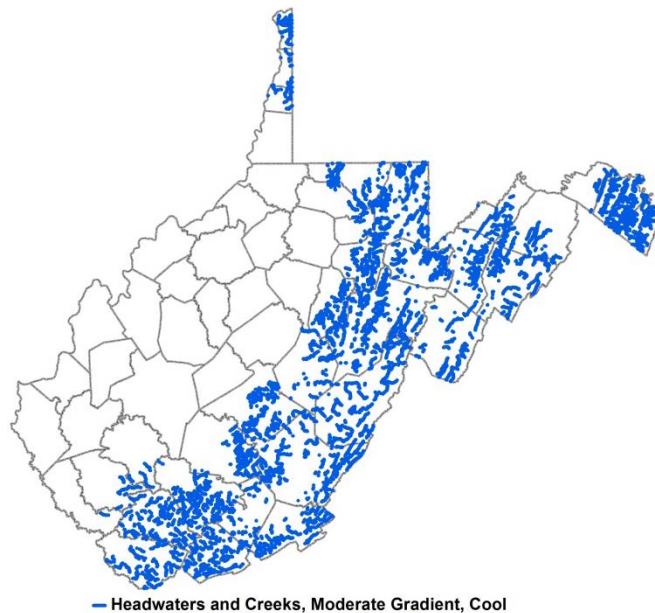
Fishes: Checkered Sculpin, Brook Trout, New River Shiner, Candy Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Greenbrier Crayfish, New River Crayfish, Forcipate Emerald, White-faced Meadowhawk.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011)of headwaters and creeks of moderate gradient and cold temperatures in West Virginia.

3.3.2.4: Headwaters and Creeks, Moderate Gradient, Cool Temperature



Little River, Monongahela National Forest, Pocahontas County.

Description:

These are cool, moderately fast-moving, headwaters and creeks of low elevation hills and gentle slopes. These small streams occur on hills and slopes at low to moderate elevations in watersheds of less than 38.6 mi² in size. They have cool moderately fast-moving waters with good oxygenation. Instream habitats are dominated by good riffle-pool development with low sinuosity, moderate entrenchment, and moderately narrow valleys. Substrates are predominantly dominated by cobble, gravel, and sand with occasional small patches of boulders. Large woody debris is often an important component of the habitat, adding complexity and nutrients to the channel. Cool water temperatures in these streams means the fish community will likely consist of a higher relative proportion of cool and warm water species versus those obligate to colder water. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. These stream types can be found statewide, but are most prevalent in the Allegheny Mountains and Ridge and Valley ecoregions of the state.

Similar Habitat Types:

These moderate gradient streams are transitional types and often exhibit some characteristics of both the higher and lower gradient streams. Similarly cool streams are transitional between cold and warm systems and may include biota found in both colder and warmer types. This cool moderate gradient stream type typically flows into moderate or low gradient cool and warm rivers in areas of less topography.

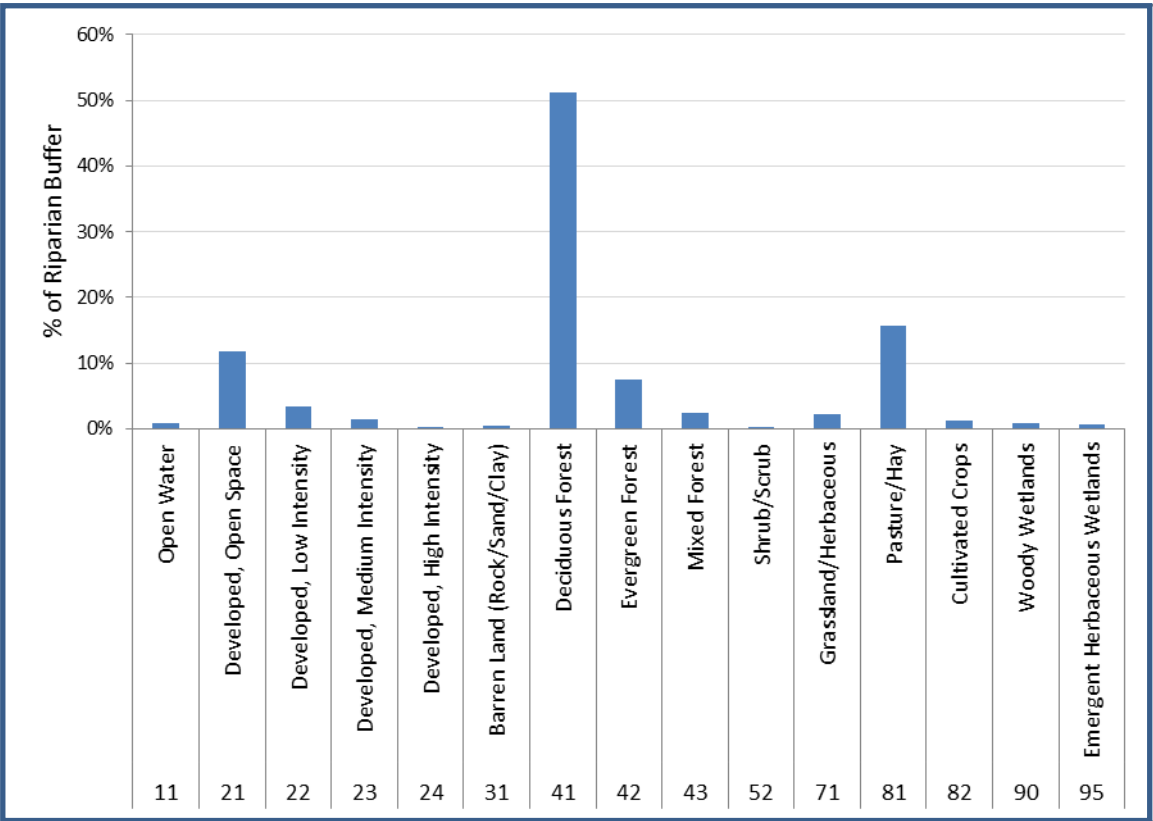
Places to Visit This Habitat:

Camp Creek in Camp Creek State Forest, Potts Creek in Jefferson National Forest, Cranberry River in Monongahela National Forest and Meadow Branch in Sleepy Creek Wildlife Management Area.

Notable Species Found in This Habitat in West Virginia:

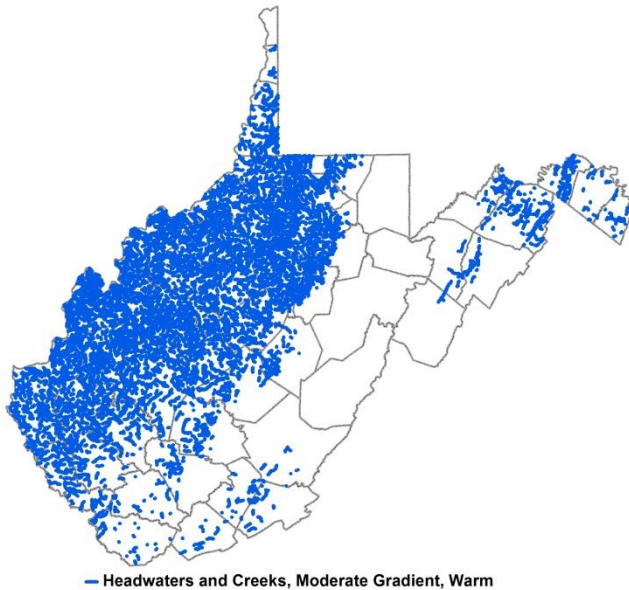
Fishes: Brook Trout, Checkered Sculpin, Common Shiner, Redside Dace, New River Shiner, Candy Darter, and Tonguetied Minnow.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: James Spiny mussel, Green Floater, Elktoe, Eastern Hellbender, Big Sandy Crayfish, Greenbrier Crayfish, New River Crayfish, White-faced Meadowhawk, Harpoon Clubtail, Wood Turtle, and Spotted Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwaters and creeks of moderate gradient and cool temperatures in West Virginia.

3.3.2.5: Headwaters and Creeks, Moderate Gradient, Warm Temperature



Dents Run near Morgantown,
Monongalia County

Description:

These are warm, moderately fast-moving, headwaters and creeks of low-elevation hills and gentle slopes. This small stream type occurs on hills and slopes at low to moderate elevations in watersheds of less than 38.6 mi² in size. They have warm, moderately fast-moving waters with good oxygenation. Instream habitats are dominated by riffle-pool features with low sinuosity, moderate entrenchment, and moderately narrow valleys. Substrates are predominantly dominated by cobble, gravel, and sand with occasional small patches of boulders. Large woody debris is often an important component of the habitat, adding complexity and nutrients to the channel. Warm water temperatures in these streams means the fish community will consist of a higher relative proportion of warmwater species to coolwater fish species. These systems are unlikely to support any resident coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. These stream types are most prevalent in the Western Allegheny Plateau Ecoregion, but are represented in the Ridge and Valley and Northern Cumberland ecoregions of the state. Warm headwaters and creeks are uncommon in the Allegheny Mountains Ecoregion.

Similar Habitat Types:

These moderate gradient streams are transitional types and often exhibit some characteristics of both the higher and lower gradient streams. This warm moderate gradient stream type typically flows into moderate or low gradient warm rivers in areas of less topography.

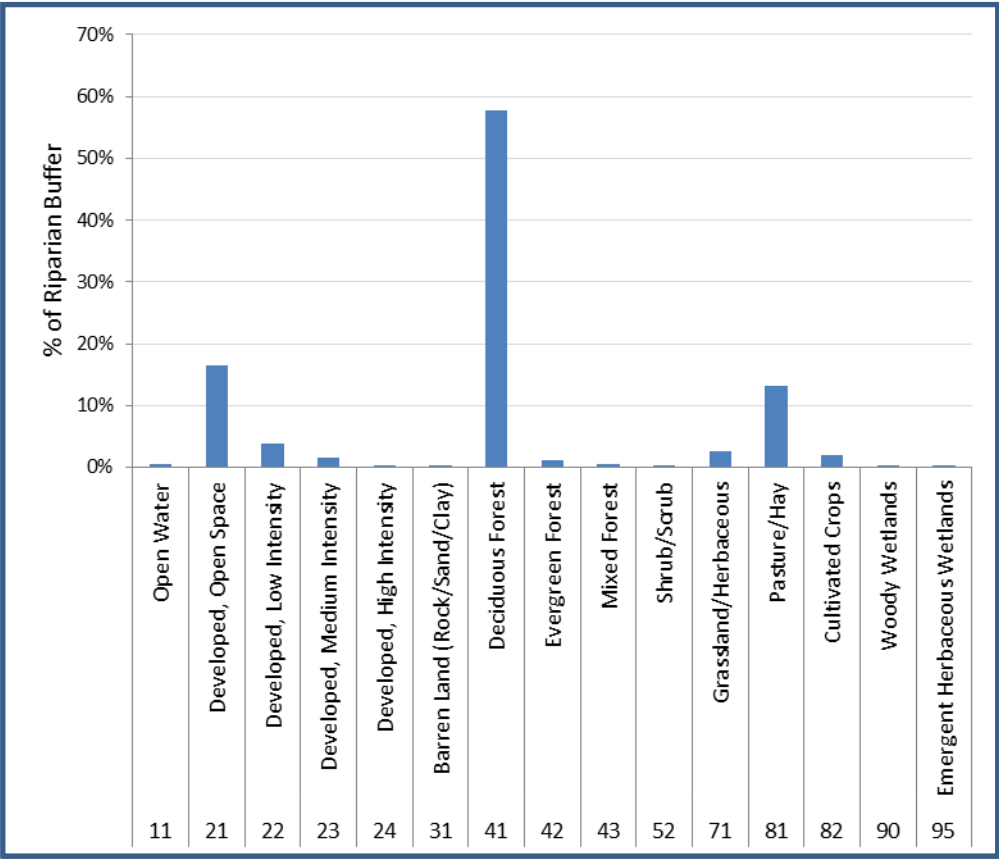
Places to Visit This Habitat:

Pipstem Creek in Bluestone Lake WMA, Pringle Fork in Stonecoal Lake WMA; Panther Creek in Panther State Forest; Millers Fork in Beech Fork Lake WMA.

Notable Species Found in This Habitat in West Virginia:

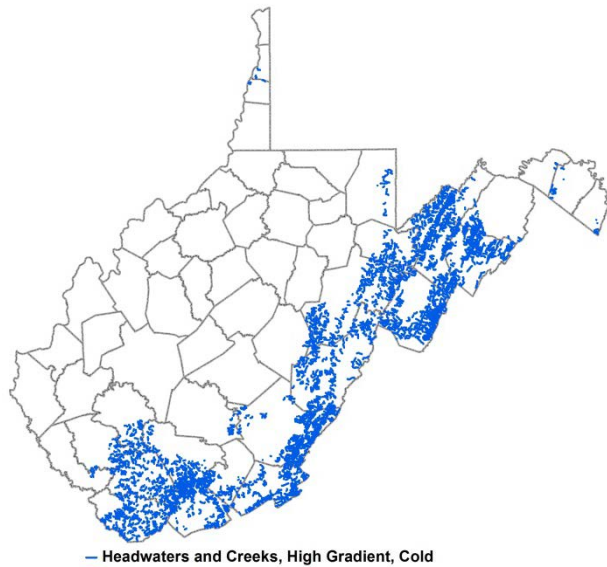
Fishes: Redfin Shiner, Orangespotted Sunfish, Black Bullhead, Common Shiner, Tessellated Darter, Swallowtail Shiner.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Round Hickorynut, Clubshell, Wavyrayed Lampmussel, Mudpuppy, Eastern Hellbender, Coalfields Crayfish, Tug Valley Crayfish, Flag-tailed Spinyleg, Wood Turtle, Spotted Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwater streams with moderate gradient and warm temperatures in West Virginia.

3.3.2.6: Headwaters and Creeks, High Gradient, Cold Temperature



Odey Run, Monongahela National Forest, Pocahontas County

Description:

These are cold, fast-moving, headwaters and creeks of steeper slopes at moderate to high elevations. These small streams of northern regions or high elevations are defined by watersheds less than 38.6 mi² in size. The cold fast-moving waters have high clarity and are well oxygenated. Instream habitats are dominated by riffles and cascade and step-pool systems. Channels are usually narrowly confined, high gradient, and surrounded by upland forests. Bed materials often consist of bedrock, boulders, cobbles, and coarse gravel and may include incorporated large woody debris. The predominant source of consumable energy to the stream is terrestrial leaf litter or organic matter (allochthonous inputs). Permanent cold water temperatures in these streams means coldwater fish species such as Brook Trout likely represent the highest relative abundance of the fish community. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. This stream type can be found across the state in all ecoregions.

Similar Habitat Types:

Headwaters and creeks also occur at lower elevations but these tend to be warmer, flatter, and slower. Cold high gradient streams typically flow into moderate gradient cool rivers.

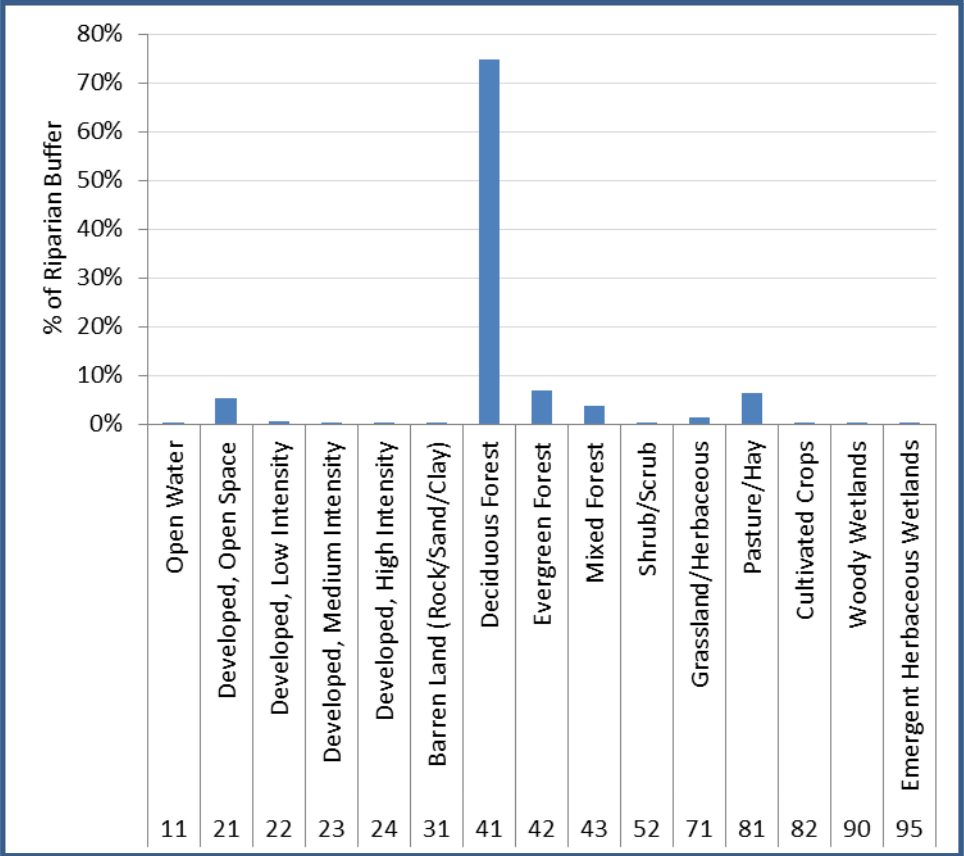
Places to Visit This Habitat:

Red Creek in Dolly Sods Wilderness Area, Waites Run in George Washington National Forest, Tea Creek in Monongahela National Forest

Notable Species Found in This Habitat in West Virginia:

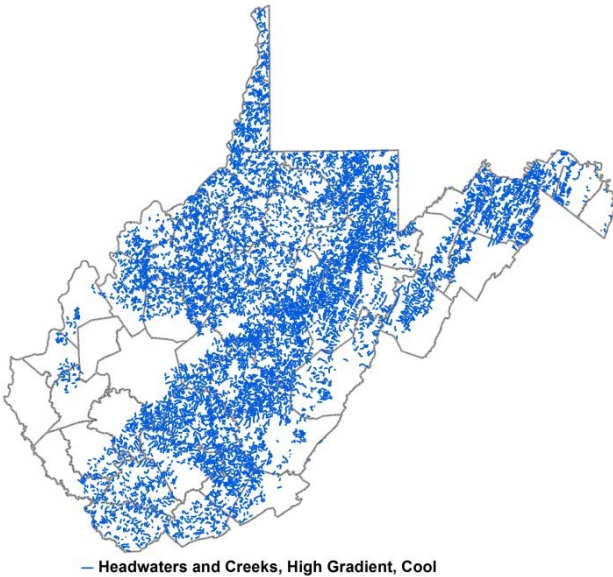
Fishes: American Eel, Checkered Sculpin, Longfin Darter, Tonguetied Minnow, Common Shiner, Allegheny Pearl Dace, Brook Trout.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: James Spiny mussel, Elk River Crayfish, New River Crayfish, American Emerald, Tiger Spiketail, Wood Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwater streams of high gradient and cold temperatures in West Virginia.

3.3.2.7: Headwaters and Creeks, High Gradient, Cool Temperature



Seneca Creek near Onego, Pendleton County.

Description:

These are cool, fast-moving, headwaters and creeks of steeper slopes. These small streams occur on steep slopes at moderate to high elevations in watersheds of less than 38.6 mi² in size. They have cool fast-moving waters of high clarity and good oxygenation. High gradient instream habitats are dominated by riffle and cascade and step-pool features. Channels are typically narrowly confined, high-gradient, and surrounded by upland forests. Bed materials often consist of bedrock, boulders, cobbles, and coarse gravel and may include incorporated large woody debris. The predominant source of consumable energy to these streams is terrestrial leaf litter or organic matter (allochthonous inputs). Cool water temperatures in these streams means the fish community will have higher species richness, consisting of a higher relative proportion of cool and warm water species compared to coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. These stream types are common statewide, but less prevalent in the southern portion of the Western Allegheny Plateau Ecoregion of the state.

Similar Habitat Types:

Headwaters and creeks may also occur at lower elevations but these tend to be warmer, flatter, and slower. Other than occasional isolated reaches high gradient streams are rare in areas of less topography. These cool, high gradient stream types typically flow into moderate or low gradient cool and warm rivers in areas of less topography.

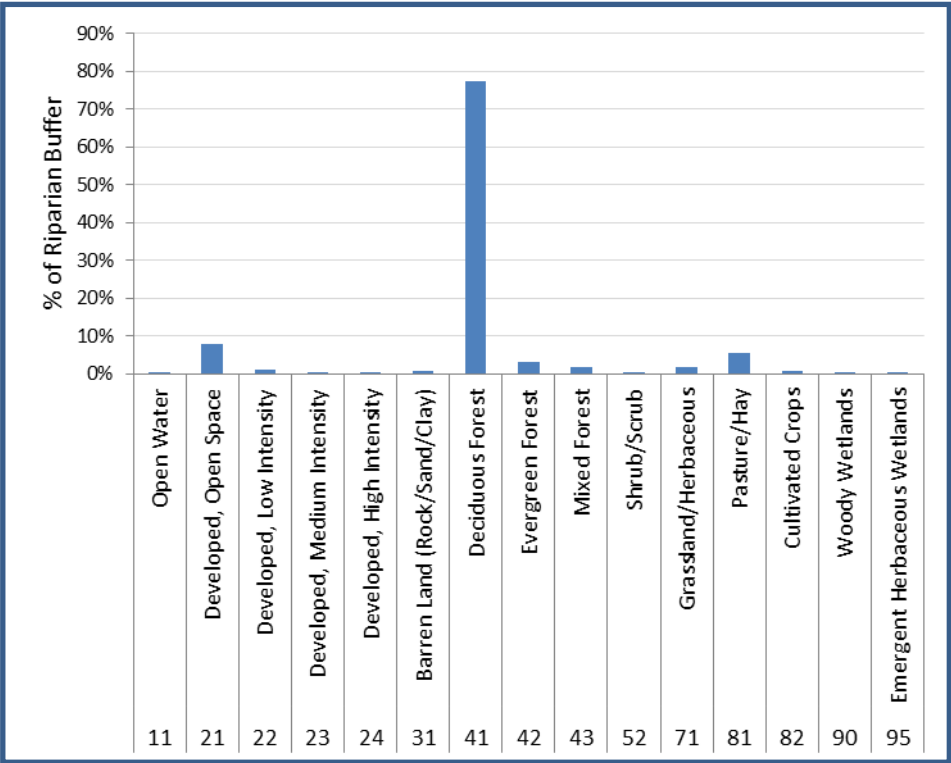
Places to Visit This Habitat:

Seneca Creek in Monongahela National Forest, Meadow Creek in New River Gorge National River, Scott Run in Coopers Rock State Forest, and Hawk Run in George Washington National Forest.

Notable Species Found in This Habitat in West Virginia:

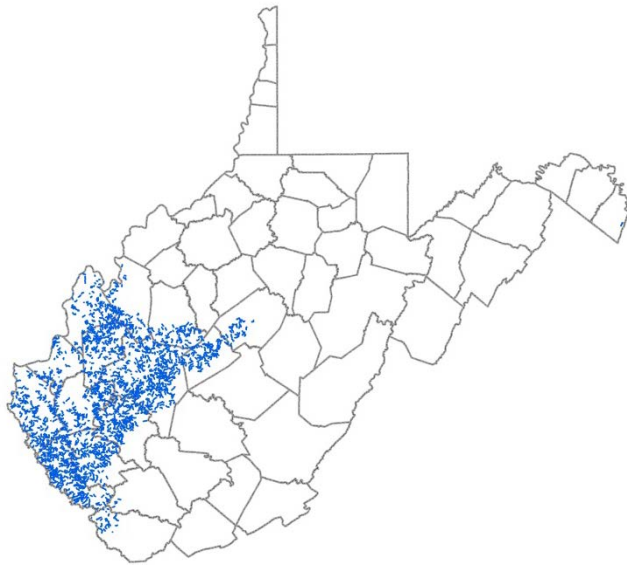
Fishes: Brook Trout, New River Shiner, Redside Dace, Tonguetied Minnow, Candy Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Eastern Hellbender, Elk River Crayfish, Coalfields Crayfish, Gray Petaltail, Green-faced Clubtail, Northern Pygmy Clubtail, Wood Turtle, Common Ribbonsnake.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of headwater streams of high gradient and cool temperatures in West Virginia.

3.3.2.8: Headwaters and Creeks, High Gradient, Warm Temperature



— Headwaters and Creeks, High Gradient, Warm



Tommy Creek near Amigo, Raleigh County.

Description:

These are warm, fast-moving, headwaters and creeks of steeper slopes at low elevation. These small streams occur on steep slopes at low to moderate elevations in watersheds less than 38.6 mi² in size. The warm fast-moving water has high clarity and is generally well oxygenated. High gradient instream habitats are dominated by riffle and cascade and step-pool features. Channels are usually narrowly confined, high gradient, and surrounded by upland forests. Bed materials often consist of bedrock, boulders, cobbles, and coarse gravel, and the predominant source of consumable energy to the stream is terrestrial leaf litter or organic matter (allochthonous inputs). Large woody debris may also be incorporated into the stream substrate, adding complexity and nutrients to the channel. Warm water temperatures in these streams means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 3.86 mi², and have an average bankfull width of 16.4 feet or less, or 2) creeks that include larger streams with watersheds up to 38.6 mi² and have an average bankfull width of up to 32.8 feet. These stream types can be found in the Allegheny Mountains, Ridge and Valley, and Northern Cumberland Mountains ecoregions of the state.

Similar Habitat Types:

Headwaters and creeks may also occur on more moderate and gentle slopes and in settings with cooler to much cooler water temperatures. This warm high gradient stream type typically flows into moderate or low gradient warm rivers in areas of less topography.

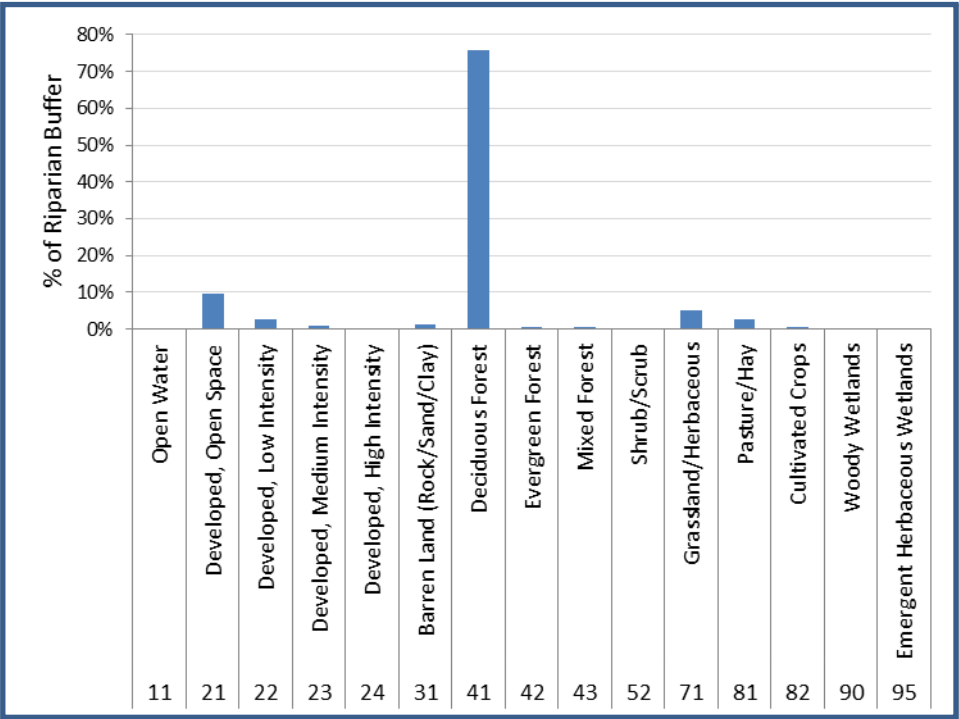
Places to Visit This Habitat:

Long Branch in Cabwaylingo State Park, Davis Creek in Kanawha State Forest, and Toms Branch in Laurel Lake WMA.

Notable Species Found in This Habitat in West Virginia:

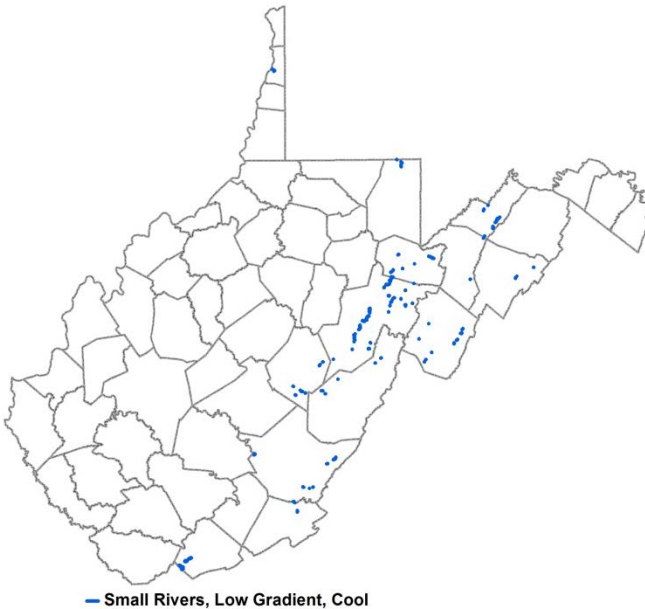
Fishes: Tessellated Darter.

Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: Mudpuppy, Tug Valley Crayfish, Coalfields Crayfish.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011)of headwater streams of high gradient and warm temperatures in West Virginia.

3.3.2.9: Small Rivers, Low Gradient, Cool Temperature



Blackwater River, Canaan Valley National Wildlife Refuge, Tucker County. Photo by T. Kiser/
Wikimedia Commons

Description:

These are short reaches of cool, slow-moving, small rivers of moderate to high elevation in flat valley settings interspersed within larger reaches of more moderate gradients. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The slow-moving waters may exhibit high turbidity and be somewhat poorly oxygenated. Instream habitats are dominated by runs interspersed by pools and a few short or no distinct riffles. Aquatic vegetation and large woody debris are common, adding to channel stability and complexity. Bed materials are predominantly sands, silt, and smaller gravel. These low-gradient rivers may have moderate to high sinuosity and channels usually have unconfined access to the adjacent floodplain within broad valleys. They are typically surrounded by floodplain forests, wetlands, or eroded sand or clay banks or fine sediment bars. The predominant source of consumable energy is generated from within the stream channel (autochthonous inputs). Cool water temperatures in these rivers means the fish community contains a higher proportion of cool and warm water species relative to coldwater species. There will be less available habitat with cold enough temperatures to support coldwater species throughout the year. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type can be found in the Allegheny Mountains and Ridge and Valley ecoregions of the state.

Similar Habitat Types:

Small rivers occur all across the state. Those with cooler water temperatures tend to be in steeper topography with coarser substrates and faster water. Small rivers with warmer temperatures occur in the lower elevations of the state in areas of less topography. This cool low gradient river type typically flows into low gradient cool or warm medium rivers.

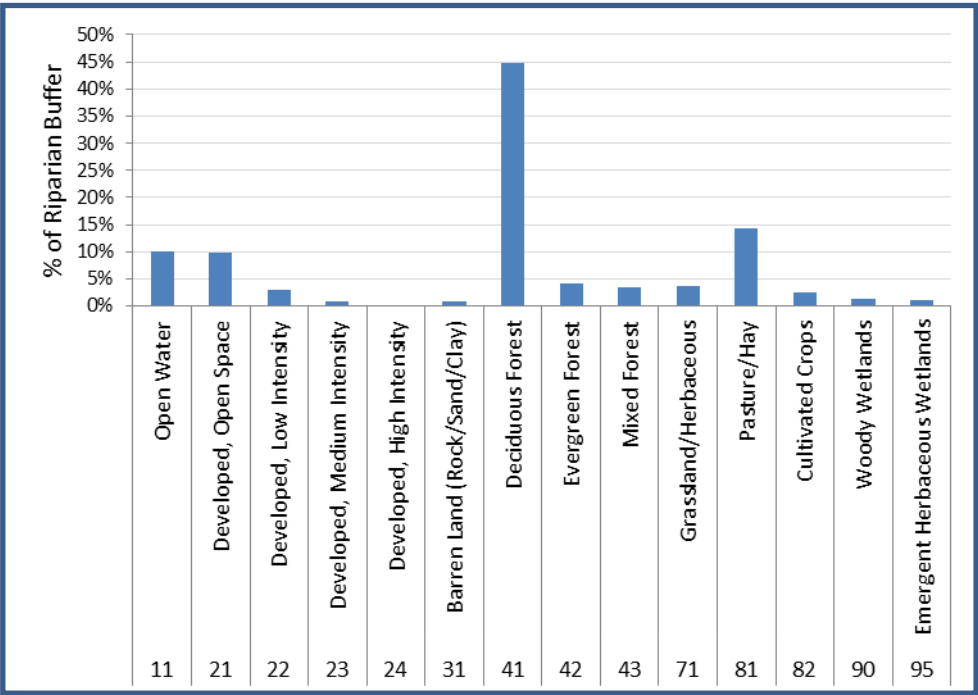
Places to Visit This Habitat:

Blackwater River in Canaan Valley National Wildlife Refuge, Tygart Valley River in Huttonsville State Farm WMA, Bluestone River, Mercer County and Patterson Creek, Mineral County.

Notable Species Found in This Habitat in West Virginia:

Fishes: Common Shiner, Satinfish Shiner, Tessellated Darter, Swallowtail Shiner, Candy Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Yellow Lampmussel, Brook Floater, Eastern Hellbender, Swift River Cruiser, Hudsonian Whiteface.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of low gradient and cool temperatures in West Virginia.

3.3.2.10: Small Rivers, Low Gradient, Warm Temperature



Oldtown Creek, McClintic Wildlife Management Area, Mason County.

Description:

These are warm, slow-moving, small rivers at low elevations in flat valley settings throughout the state. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The slow-moving waters may exhibit high turbidity and be somewhat poorly oxygenated. Instream habitats are dominated by runs interspersed by pools and a few short or no distinct riffles. Bed materials are predominantly sands, silt, and smaller gravel. Aquatic vegetation and large woody debris are common adding to channel stability and complexity. These low-gradient rivers may have moderate to high sinuosity and channels usually have unconfined access to the adjacent floodplain within broad valleys. They are typically surrounded by floodplain forests, wetlands, or eroded sand or clay banks or fine sediment bars. The predominant source of consumable energy is generated from within the stream channel (autochthonous inputs). Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type can be found in any of the ecoregions of the state, but predominantly occur in the lowlands of the Western Allegheny Plateau Ecoregion.

Similar Habitat Types:

Small rivers occur all across the state. Those with cooler water temperatures tend to be in steeper topography with coarser substrates and faster water. This warm low gradient river type typically flows into low gradient warm medium rivers.

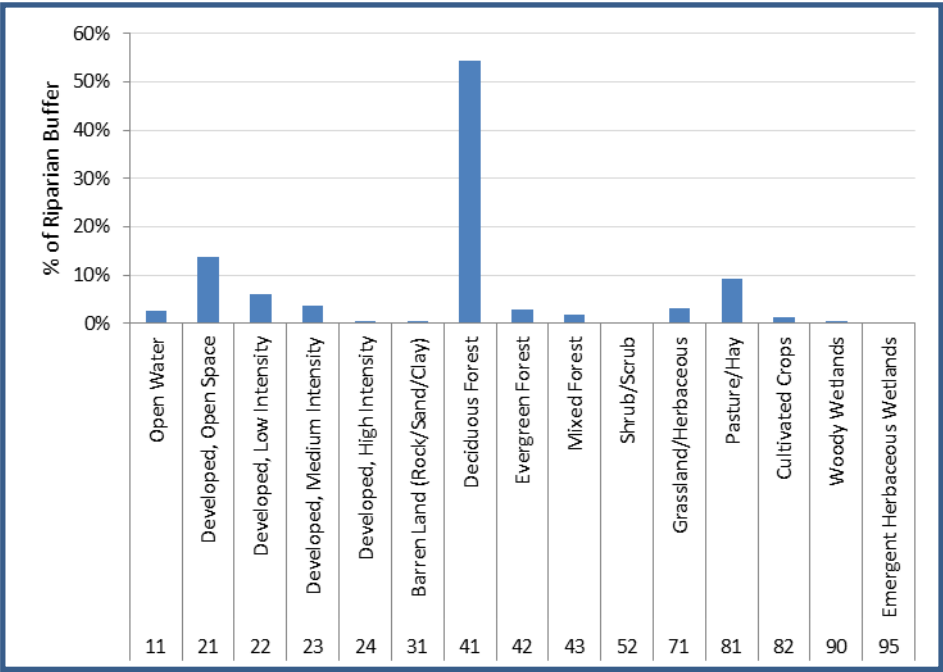
Places to Visit This Habitat:

West Fork Twelvepole Creek in Cabwaylingo State Forest, Goose Creek in Hughes River WMA, Little Kanawha River in Burnsville Lake WMA and Oldtown Creek in McClintic WMA.

Notable Species Found in This Habitat in West Virginia:

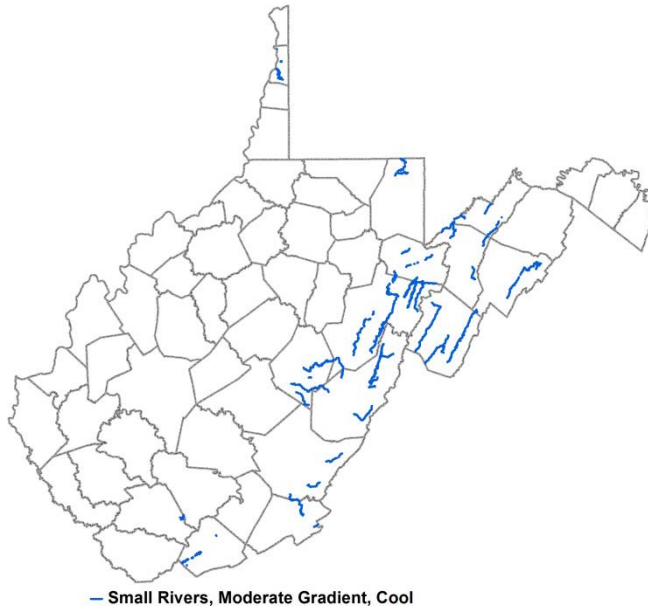
Fishes: Redfin Shiner, Eastern Sand Darter, New River Shiner, Common Shiner, Longhead Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Round Hickorynut, Snuffbox, Round Pigtoe, Longsolid, Salamander Mussel, Mudpuppy, Eastern Hellbender, Coalfields Crayfish, Swift River Cruiser, Common Sanddragon, Wood Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of low gradient and warm temperatures in West Virginia.

3.3.2.11: Small Rivers, Moderate Gradient, Cool Temperature



Elk River Catch and Release Area, Randolph County.

Description:

These are cool, moderately fast-moving, small rivers at moderate to high elevations in constrained valley settings in areas of high topography within the state. Anglers will quickly recognize these as among the most popular stocked trout fishing streams in West Virginia. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The moderately fast-moving waters are dominated by a well-defined pattern of alternating pools, riffles, and runs. Substrate is a well-homogenized mix of gravels, cobbles and boulders, with occasional large woody debris providing additional habitat complexity for fish and macroinvertebrates. Small rivers of this type often have high clarity and are well oxygenated. These moderate gradient rivers exhibit moderate to low sinuosity within moderately narrow valleys and adjacent riverside upland communities. The predominant source of consumable energy is generated from within the stream channel (autochthonous inputs). Cool water temperatures in these rivers means the fish community will support few permanent coldwater species and will consist of a higher relative proportion of cool and warm water species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type are predominantly found in the Allegheny Mountains and Ridge and Valley ecoregions with a few scattered representative reaches found in other areas of the state.

Similar Habitat Types:

Small rivers occur all across the state. Those with warmer water temperatures tend to occur at lower elevations and in flatter topography with finer substrates and slower water. This cool moderate gradient river type typically flows into moderate or low gradient warm medium rivers.

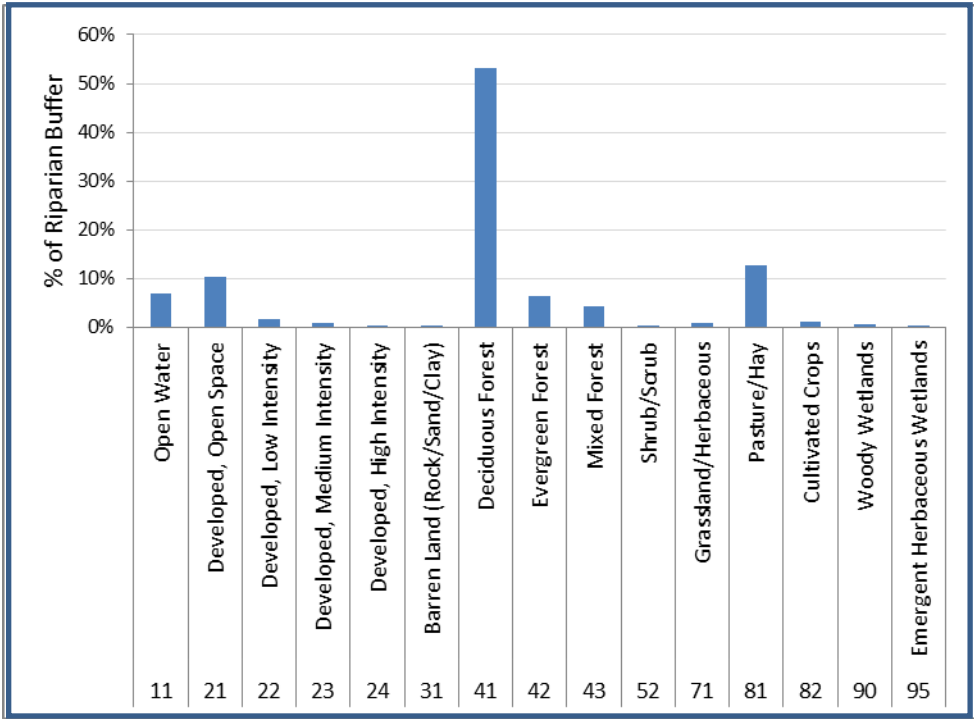
Places to Visit This Habitat:

Cranberry River in the Cranberry Backcountry Monongahela National Forest, West Fork Greenbrier River, and Shavers Fork in the Monongahela National Forest, and Elk River Catch and Release Area, Randolph County.

Notable Species Found in This Habitat in West Virginia:

Fishes: Common Shiner, New River Shiner, Candy Darter, Brook Trout, Tonguetied minnow, Kanawha Minnow.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Yellow Lampmussel, Brook Floater, Green Floater, Triangle Floater, Elktoe, Eastern Hellbender, New River Crayfish, Elk River Crayfish, Greenbrier Crayfish, Superb Jewelwing, American Emerald, Wood Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of moderate gradient and cool temperatures in West Virginia.

3.3.2.12: Small Rivers, Moderate Gradient, Warm Temperature



North River, Short Mountain Wildlife Management Area, Hampshire County.

Description:

These are warm, moderately fast-moving, small rivers at low to moderate elevations in a constrained valley setting. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The moderately fast-moving waters are dominated by a well-defined pattern of alternating pools, riffles, and runs. Substrate is a well-homogenized mix of gravels, cobbles and boulders, with occasional large woody debris providing additional habitat complexity for fish and macroinvertebrates. Small rivers of this type often have high clarity and are well oxygenated. These moderate gradient rivers exhibit moderate to low sinuosity within moderately narrow valleys and adjacent riverside upland communities. The predominant source of consumable energy is generated from within the stream channel (autochthonous inputs). Warm water temperatures in these rivers means the fish community consist of a higher relative proportion of warmwater species compared to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type are found in all but the highest, most mountainous areas of the state. Many occur in the Northern Cumberlands, Western Allegheny Mountains and eastern Ridge and Valley ecoregions with many scattered shorter reaches found in the Western Allegheny Plateau.

Similar Habitat Types:

Small rivers occur all across the state. These moderate gradient rivers are transitional types and often exhibit some characteristics of both the higher and lower gradient rivers. Those with cooler water temperatures tend to occur at higher elevations and in steeper topography with coarser substrates. This warm moderate gradient river type typically flows into moderate or low gradient warm medium or large rivers in areas of less topography.

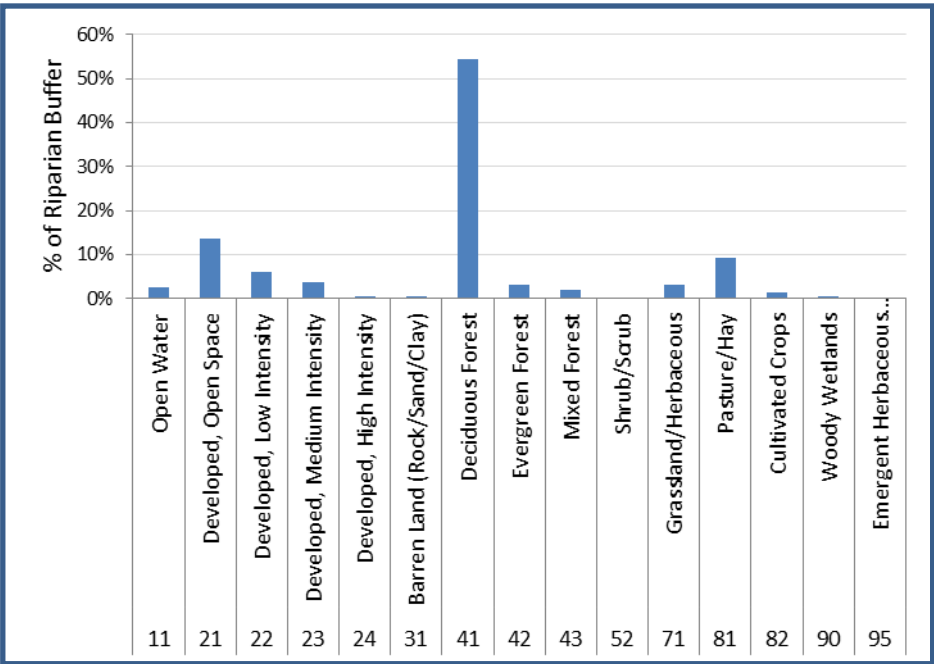
Places to Visit This Habitat:

Cherry River in Monongahela National Forest, North River in Short Mountain WMA, West Virginia Fork Fish Creek in Cecil H. Underwood WMA and Sleepy Creek, Morgan County.

Notable Species Found in This Habitat in West Virginia:

Fishes: Common Shiner, Candy Darter, Redfin Shiner, Orangespotted Sunfish, New River Shiner, Black Bullhead, Eastern Sand Darter, Rosefin Shiner.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Round Hickorynut, Yellow Lampmussel, Longsolid, Round Pigtoe, Snuffbox, Eastern Hellbender, Elk River Crayfish, Big Sandy Crayfish, New River Crayfish, Swift River Cruiser, Rapids Clubtail, Wood Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of moderate gradient and warm temperatures in West Virginia.

3.3.2.13: Small Rivers, High Gradient, Cool Temperature



Blackwater River Canyon, Blackwater Falls State Park, Tucker County. Photo by T. Kiser/Wikimedia Commons

Description:

These are cool, fast-moving, small rivers of moderate elevations in very constrained valley settings. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The rapidly-moving waters are dominated by a complex of deep runs and cascades and step-pool features. Substrate is dominated by large boulders embedded in cobble and larger gravels, with little finer materials or large woody debris. These river types often have high clarity and are very well oxygenated. This high gradient river type exhibits low sinuosity within very narrow valleys and adjacent well-forested slopes. The predominant source of consumable energy is generated from upstream reaches within the stream channel (variable allochthonous and autochthonous inputs). Cool water temperatures in these rivers means the fish community consist of a higher relative proportion of cool and warm water species compared to coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type are found only in a few of the deepest river valleys of the Allegheny Mountains Ecoregion.

Similar Habitat Types:

Small rivers occur all across the state. These high gradient rivers are rare transitional types between highland plateaus and lowland river valleys. Those with cooler water temperatures tend to occur at higher elevations and in steeper topography with much coarser substrates. This cool high gradient river type typically is a subsection of moderate gradient cool small rivers. They flow into moderate gradient cool or warm medium rivers in areas of reduced topography.

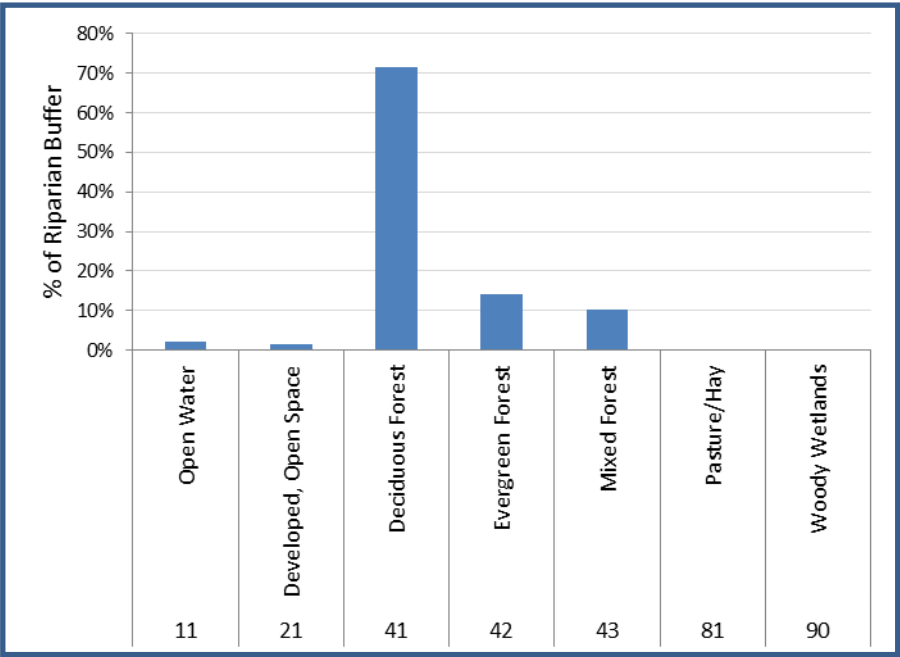
Places to Visit This Habitat:

Blackwater River in Blackwater Falls State Park, Shavers Fork River and Williams River in Monongahela National Forest.

Notable Species Found in This Habitat in West Virginia:

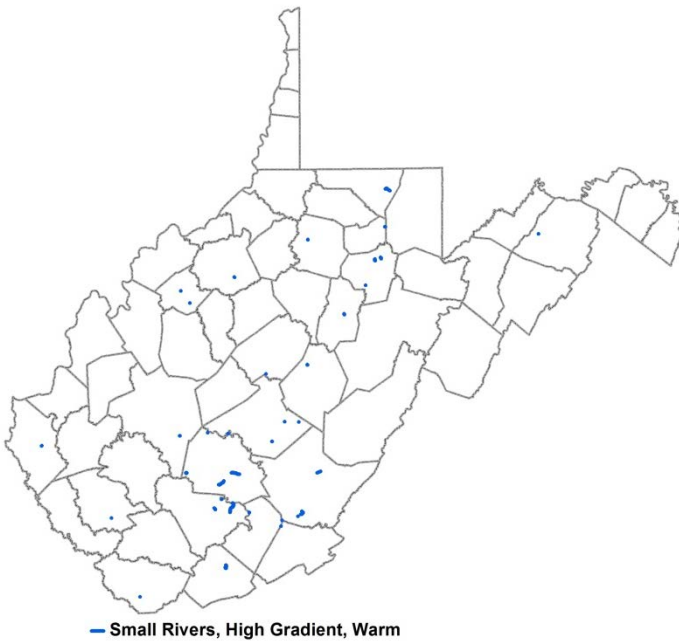
Fishes: There are no records for Species of Greatest Conservation Need from this type of habitat. The rare nature of the habitat and difficulty of sampling have created a data gap in these small rivers. Common fish species are expected to include Rock Bass *Ambloplites rupestris*, White Sucker *Catostomus commersonii*, Mottled Sculpin *Cottus bairdii*, Fantail Darter *Etheostoma flabellare*, Northern Hog Sucker *Hypentelium nigricans*, River Chub *Nocomis micropogon*, Silver Shiner *Notropis photogenis*, Stonecat *Noturus flavus*, and Longnose Dace *Rhinichthys cataractae*.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Mussels: Creeper (*Strophitus undulatus*) occurs upstream of Davis. The rare nature of the habitat and difficulty of sampling have created a data gap in these small rivers.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of high gradient and cool temperatures in West Virginia.

3.3.2.14: Small Rivers, High Gradient, Warm Temperature



Deckers Creek near Morgantown, Monongalia County.

Description:

These are relatively short reaches of warm, fast-moving, small rivers at low to moderate elevations in constrained valley settings. These small rivers are defined by watersheds less than 200 mi² in size and average bankfull width of 65.6 feet. The rapidly-moving waters are dominated by a complex of deep runs and cascades and step-pool features. Substrate is dominated by large boulders embedded in cobble and larger gravels, with little finer materials. These river types often have high clarity and are very well oxygenated. These high gradient reaches exhibits low sinuosity within very narrow valleys and adjacent well-forested slopes. The predominant source of consumable energy is generated from upstream reaches within the stream channel (variable allochthonous and autochthonous inputs). Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Small rivers of this type are uncommon, occurring along the transitional zone on the western flank of the Allegheny Highlands Ecoregion and in the rivers draining to the New River Gorge.

Similar Habitat Types:

Small rivers occur all across the state. Those with cooler water temperatures tend to occur at higher elevations and more northern areas. This warm high gradient river type is usually a relatively short reach interspersed within longer reaches of more moderate gradient. They typically flow into low gradient warm medium or large rivers.

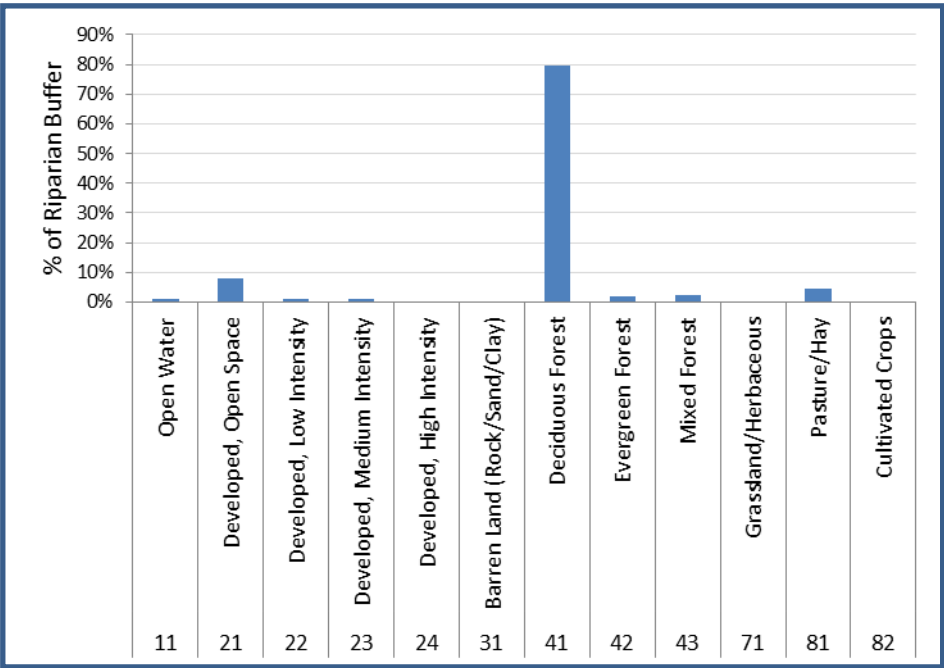
Places to Visit This Habitat:

Manns Creek in Babcock State Park, Brush Creek in Brush Creek Preserve, Teter Creek in Pleasant Creek WMA, and Dunloup Creek in New River Gorge National River.

Notable Species Found in This Habitat in West Virginia:

Fishes: There are no records for Species of Greatest Conservation Need from this type of habitat. The rare nature of the habitat and difficulty of sampling have created a data gap in these small rivers. Common fish species are expected to include Rock Bass, Northern Hog Sucker, River Chub, Silver Shiner, Rosyface Shiner *Notropis rubellus*, Longnose Dace.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Superb Jewelwing, Rusty Snaketail, Uhler’s Sundragon.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of small rivers of high gradient and warm temperatures in West Virginia.

3.3.2.15: Medium Rivers, Low Gradient, Warm Temperature



Guyandotte River near Bruno, Logan County.

Description:

These are warm, slow-moving, mid-sized rivers at low to moderate elevations in broad valley settings. These medium rivers are defined by watersheds less than 1000 mi² in size and average bankfull width of 115 feet. The slowly-moving waters are expected to be more unconfined with higher sinuosity, broader floodplain valleys, more riparian wetlands, and relatively high width: depth ratios. Instream habitats are characterized by a well-homogenized mix of short riffles, runs, and long, deep pools. Emergent aquatic vegetation is common and provides additional habitat. Substrate is predominantly silts, sands, and gravels occasionally interspersed with well-developed cobble point bars. These low-gradient river types often have low clarity and are moderately oxygenated. Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Medium rivers of this type are common, and well-known to anglers, swimmers, and casual paddlers. They occur across the state in all ecoregions.

Similar Habitat Types:

Medium rivers occur all across the state. Those with higher gradient are more prevalent in the Allegheny Highlands and Ridge and Valley ecoregions. They typically flow into larger warm rivers.

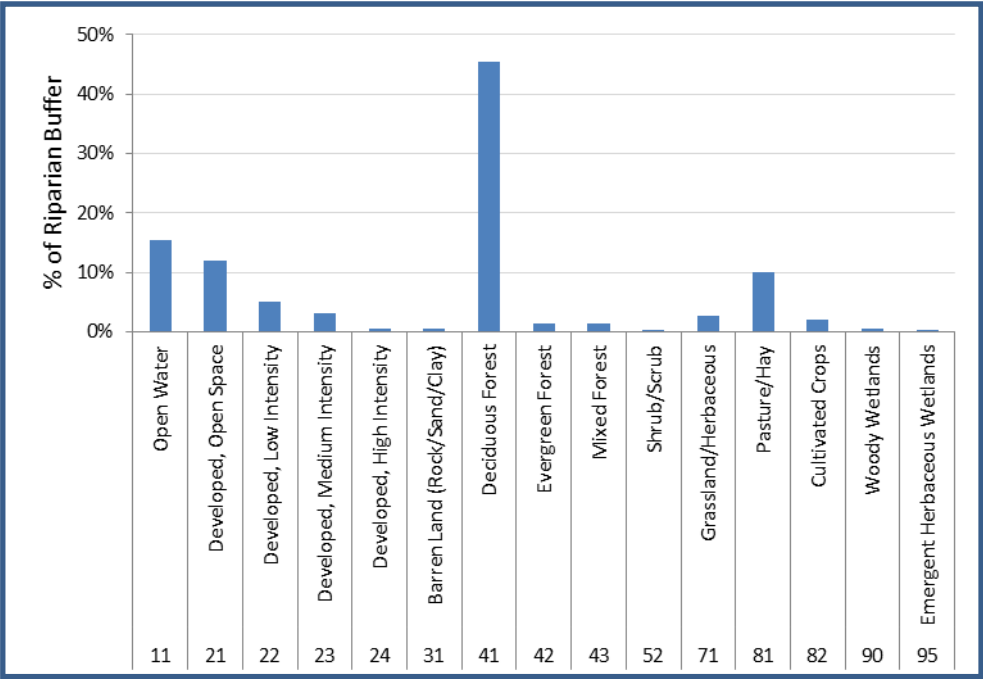
Places to Visit This Habitat:

Elk River, Braxton and Clay counties; Guyandotte River in Chief Logan State Park, Coal River in Coal River Water Trail, Greenbrier River, and Greenbrier River Trail.

Notable Species Found in This Habitat in West Virginia:

Fishes: Common Shiner, Tippecanoe Darter, Popeye Shiner, Eastern Sand Darter, Black Bullhead, Longhead Darter, Spotted Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Longsolid, Wavyrayed Lampmussel, Black Sandshell, Elephantear, Clubshell, Round Hickorynut, Mudpuppy, Spinycheek Crayfish, New River Crayfish, Coalfields Crayfish, Swift River Cruiser *Macromia illinoiensis*, Common Sanddragon *Progomphus obscurus*, Wood Turtle *Glyptemys insculpta*.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of medium rivers of low gradient and warm temperatures in West Virginia.

3.3.2.16: Medium Rivers, Moderate Gradient, Warm Temperature



Cacapon River near Capon Springs, Hampshire County.

Description:

These are warm, moderately fast-moving, mid-sized rivers at moderate elevations, or in small reaches at lower elevations, in constricted valley settings. The medium rivers are defined by watersheds less than 1000 mi² in size and average bankfull width of 115 feet. The moderately fast-moving waters are expected to be more confined with lower sinuosity, narrower floodplain valleys, more forested upland slopes, and relatively moderate width: depth ratios. Instream habitats are characterized by a well-homogenized mix of deep riffles, runs, and long, deep pools. Emergent aquatic vegetation is common and provides additional habitat. Substrate in moderate gradient rivers is predominantly gravel, cobble, and boulders over bedrock outcrops. These moderate-gradient river types are of high clarity and are well oxygenated. Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected across acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. Medium rivers of this type are common, and well-known to anglers, swimmers, and casual paddlers. They occur largely in the steeper topography of the state in the Allegheny Highlands and Ridge and Valley ecoregions, but can occur in short reaches within the Northern Cumberlands and Western Allegheny Plateau ecoregions interspersed within longer low gradient reaches.

Similar Habitat Types:

Medium rivers occur all across the state. Those with lower gradient are more prevalent in the lower elevations of less topographically. They typically flow into larger warm rivers.

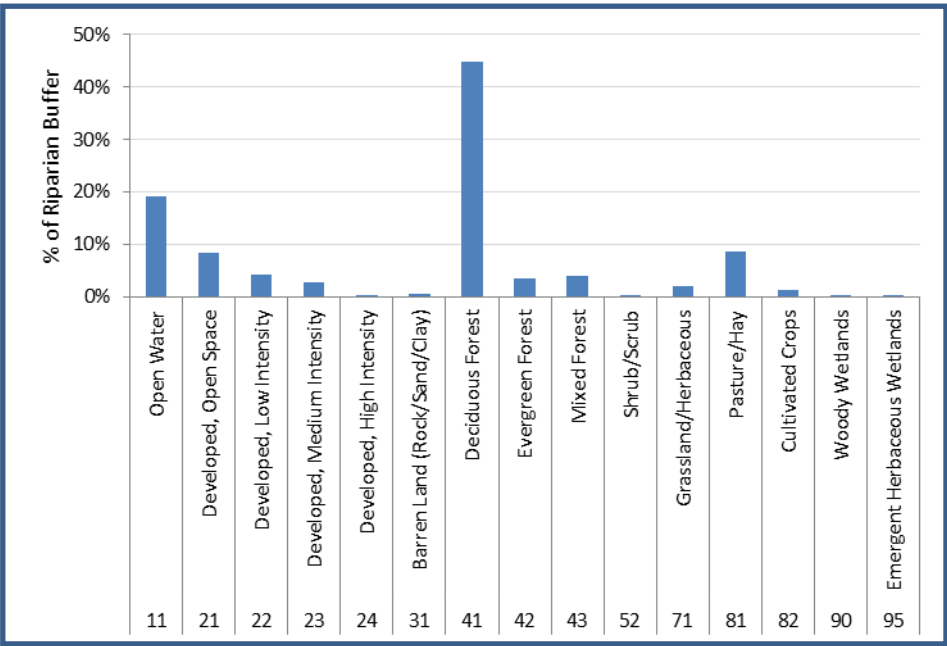
Places to Visit This Habitat:

North Fork South Branch Potomac River in Monongahela National Forest. Meadow River in Gauley River National Recreation Area, Wheeling Creek, Ohio County and Cacapon River, Hampshire County.

Notable Species Found in This Habitat in West Virginia:

Fishes: Common Shiner, New River Shiner, Candy Darter, Popeye Shiner, American Eel, Eastern Sand Darter, Longhead Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Wavyrayed Lampmussel, Yellow Lampmussel, Green Floater, Longsolid, Brook Floater, Black Sandshell, Mudpuppy, New River Crayfish, Elk River Crayfish, Green-faced Clubtail, Wood Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of medium rivers of moderate gradient and warm temperatures in West Virginia.

3.3.2.17: Large Rivers, Low Gradient, Warm Temperature



Little Kanawha River near Newark, Wirt County.

Description:

These are warm, slow-moving, large rivers at low elevations in broad flat valleys. The very large and deep rivers drain watersheds greater than 1000 mi² in size and have an average bankfull width of 246 feet or greater. The slower moving low gradient waters are expected to be more unconfined with higher sinuosity, broader floodplain valleys, more riparian wetlands, and relatively high width: depth ratios. Instream habitats are characterized by long, deep pools interspersed with occasional riffle areas typically associated with islands and sand or gravel bars. Emergent aquatic vegetation is common and provides additional shallow-water habitat. Large woody debris along steep incised banks adds to the channel complexity as well, providing deepwater refugia for many species. Substrate in large, low gradient rivers can vary, but will be predominantly silts and sands in pools with some gravel and cobble around islands and point bars. Clarity and oxygenation varies across ecoregions, but continuous large and small tributary inputs contribute clear and oxygenated water. Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. The biological community in large rivers is relatively stable as is water quality due to landscape accumulation of minerals and nutrients to buffer extreme local conditions. Large rivers of this type are common in all areas of the state and well-known to recreational users, and include the navigational dam-controlled rivers. They occur largely in the lowlands draining the margins of the state, except for the New River of this group, which is older than the Appalachian Mountains and bisects the state in largely the same channel it has for millennia.

Similar Habitat Types:

Large rivers traverse the majority of the state. Those with more moderate gradient are rare and found as small reaches in transitional zones of greater topography within the lower gradient reaches. Large rivers typically have a number of medium river tributary systems draining into them.

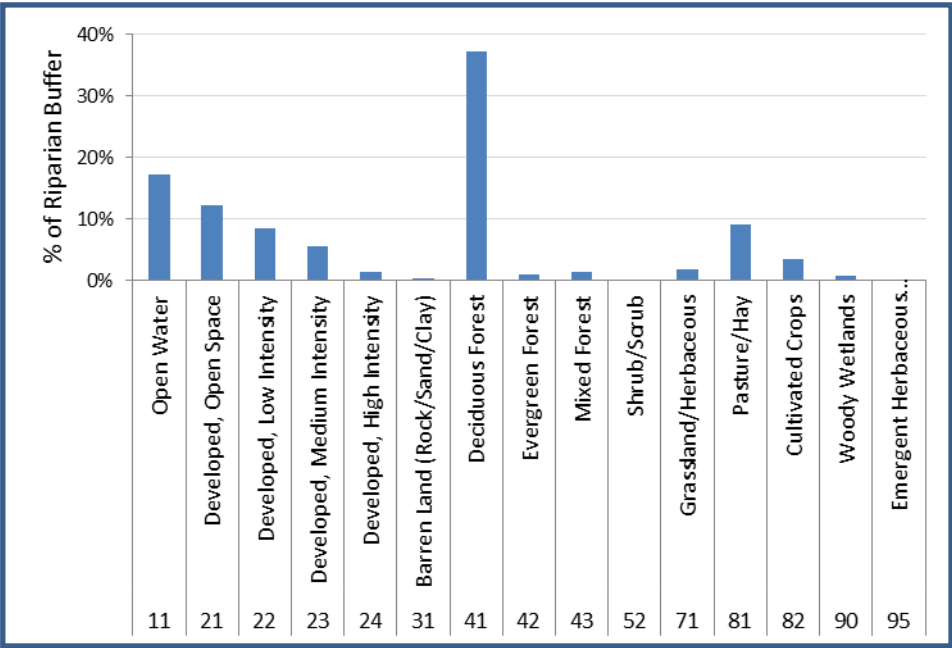
Places to Visit This Habitat:

Ohio River; Shenandoah River, Jefferson County; South Branch Potomac River, Hampshire County; Little Kanawha River, Wirt and Wood Counties; Greenbrier River, Summers County.

Notable Species Found in This Habitat in West Virginia:

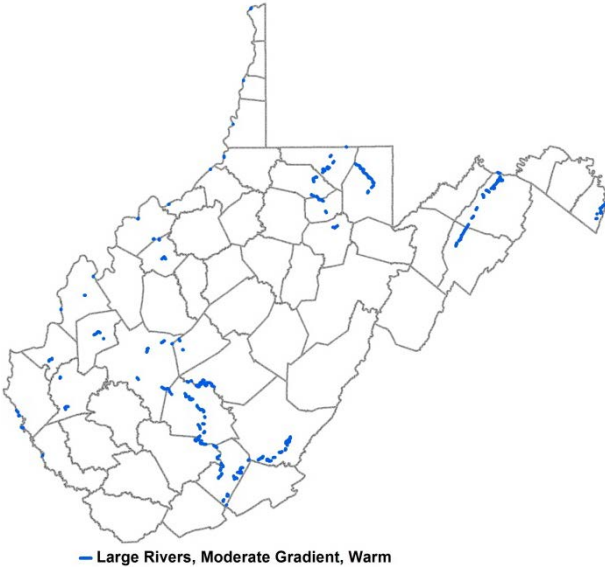
Fishes: Black Bullhead, Tippecanoe Darter, Eastern Sand Darter, Popeye Shiner, Longhead Darter, Diamond darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Black Sandshell, Elephantear, Longsolid *Fusconaia subrotunda*, , Mudpuppy, New River Crayfish, Smoky Shadowdragon, Swift River Cruiser, Green-faced Clubtail, Northern Red-bellied Cooter, Northern Map Turtle.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of large rivers of low gradient and warm temperatures in West Virginia.

3.3.2.18: Large Rivers, Moderate Gradient, Warm Temperature



Tygart Valley River at Valley Falls State Park, Marion County. Photo by B M Powell/Wikimedia Commons

Description:

These are relatively short reaches of warm, moderately fast-moving, large rivers at low elevations. The very large and deep rivers drain watersheds greater than 1000 mi² in size and have an average bankfull width of 246 feet or greater. These moderately fast-moving waters of moderate gradient are expected to be more confined with lower sinuosity, more constrained valleys segments, more forested upland slopes, and relatively moderate width: depth ratios. Instream habitats are characterized by a mix of deep riffles, runs, and short deep pools. Emergent aquatic vegetation is common in riffles and runs and provides additional habitat. Substrate in moderate gradient rivers is predominantly gravel, cobble, and boulders over bedrock outcrops. These moderate gradient reaches generally have good clarity and are well oxygenated. Warm water temperatures in these rivers means the fish community contains a higher proportion of warm water species relative to coolwater species. These systems are unlikely to support any resident coldwater species. The biological community in large rivers is relatively stable as is water quality due to landscape accumulation of minerals and nutrients to buffer extreme local conditions. These moderate gradient reaches of large rivers are uncommon in the state, but provide scenic diversity in riverine habitats where found. They occur where the lower gradient rivers cross hard outcrops of bedrock in areas of changing topography.

Similar Habitat Types:

Large rivers traverse the majority of the state. Those with higher gradient are much more common throughout the lowlands of less topography draining the margins of the state. Large rivers typically have a number of medium river tributary systems draining into them.

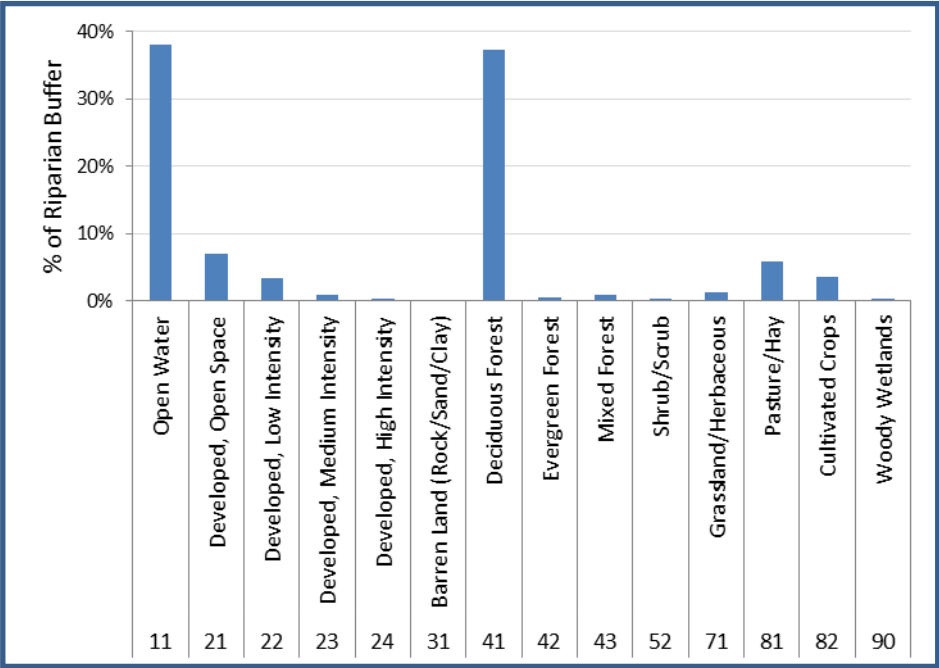
Places to Visit This Habitat:

Tygart Valley River in Valley Falls State Park, New River in New River Gorge National River, Shenandoah River in Harpers Ferry National Historical Park and Elk River in Coonskin Park near Charleston.

Notable Species Found in This Habitat in West Virginia:

Fishes: Eastern Sand Darter, Tippecanoe Darter, Popeye Shiner, Western Sand Darter, Shorthead Redhorse, Longhead Darter, Diamond Darter.

Mussels, Crayfish, Other Invertebrates, Amphibians, and Reptiles: Purple wartyback, Wavyrayed Lampmussel, Black Sandshell, Longsolid, Elephantear, New River Crayfish, Swift River Cruiser.



656 feet (328 ft. each bank) Riparian Land Cover (NLCD 2011) of large rivers of moderate gradient and warm temperatures in West Virginia.

STATEWIDE AQUATIC HABITAT EXTENT

HABITAT TYPE	MILES	PERCENT OF WV STREAM MILES
Headwater Creek,Low Gradient,Cool	19	0.06%
Headwater Creek,Low Gradient, Warm	968	2.96%
Headwater Creek,Moderate Gradient,Cold	67	0.20%
Headwater Creek,Moderate Gradient,Cool	3,364	10.30%
Headwater Creek,Moderate Gradient,Warm	7,244	22.17%
Headwater Creek,High Gradient,Cold	3,547	10.86%
Headwater Creek,High Gradient,Cool	10,610	32.48%
Headwater Creek,High Gradient,Warm	2,108	6.45%
Small River,Low Gradient,Cool	54	0.17%
Small River,Low Gradient, Warm	746	2.28%
Small River,Moderate Gradient,Cool	552	1.69%
Small River,Moderate Gradient,Warm	980	3.00%
Small River,High Gradient,Cool	8	0.03%
Small River,High Gradient,Warm	23	0.07%
Medium River, Low Gradient,Warm	825	2.53%
Medium River,Moderate Gradient,Warm	539	1.65%
Medium River,High Gradient,Warm	4	0.01%
Large River,Low Gradient,Warm	851	2.61%
Large River,Moderate Gradient,Warm	160	0.49%
Totals	32,670	100.00%

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Embayment,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Mussels	1	5
Totals	1	5

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek,High Gradient,Cold

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	4	1
Dragonflies and Damselflies	4	7
Fish	1	3
Mussels		4
Other Invertebrates	5	
Reptiles	2	
Totals	16	15

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek,High Gradient,Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	5	1
Crayfish	2	1
Dragonflies and Damselflies	9	14
Fish	1	1
Other Invertebrates	7	
Reptiles		1
Totals	24	18

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek,High Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Crayfish		1
Fish		1
Other Invertebrates	2	
Totals	2	3

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek, Low Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Crayfish	1	
Dragonflies and Damselflies	10	4
Fish		10
Mussels	1	19
Other Invertebrates	1	
Plants	1	
Reptiles	1	
Totals	15	34

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek, Low Gradient, Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	2	
Dragonflies and Damselflies		1
Fish		1
Other Invertebrates	3	
Totals	5	2

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek, Moderate Gradient, Cold

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	4	
Dragonflies and Damselflies	4	4
Fish		2
Other Invertebrates	5	
Totals	13	6

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek, Moderate Gradient, Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	7	1
Crayfish	3	2
Dragonflies and Damselflies	17	10
Fish	10	8
Mussels	4	6
Other Invertebrates	7	
Plants	1	
Reptiles		1
Totals	49	28

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	2
Crayfish	3	
Dragonflies and Damselflies	13	6
Fish	5	11
Mussels	7	11
Other Invertebrates	3	
Reptiles	2	
Totals	34	30

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Large River,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	2
Crayfish		1
Dragonflies and Damselflies	7	4
Fish	26	15
Mussels	45	9
Plants	1	1
Reptiles	5	
Snails	3	
Totals	88	32

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Large River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Dragonflies and Damselflies	2	1
Fish	4	9
Mussels	2	32
Other Invertebrates	1	
Plants		1
Snails	1	
Totals	10	44

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Lentic,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Mussels	2	1
Totals	2	1

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Medium River, Low Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		2
Dragonflies and Damselflies	1	4
Fish	22	11
Mussels	30	15
Other Invertebrates	1	
Reptiles	1	1
Snails	1	
Totals	56	33

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Medium River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Dragonflies and Damselflies	9	5
Fish	1	7
Mussels	13	26
Other Invertebrates	3	
Reptiles	1	
Snails	1	
Totals	28	39

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Small River, Low Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Dragonflies and Damselflies	1	3
Fish	1	13
Mussels	15	23
Reptiles	1	
Snails	1	
Totals	19	40

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Small River,Low Gradient,Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Dragonflies and Damselflies		1
Fish		3
Mussels		4
Reptiles	1	1
Totals	1	9

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Small River, Moderate Gradient, Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	5	1
Crayfish	1	1
Dragonflies and Damselflies	9	6
Fish	7	3
Mussels	4	6
Other Invertebrates	2	
Totals	28	17

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

SPECIES SUMMARY BY AQUATIC HABITAT TYPE

HABITAT TYPE: Small River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		2
Crayfish		4
Dragonflies and Damselflies		6
Fish	2	11
Mussels	14	24
Reptiles		1
Snails	1	
Totals	17	48

¹ PRIMARY HABITAT: Species expected to be found in this habitat type

² SECONDARY HABITAT: Species sometimes found in this habitat type

Chapter 4: Stresses on Species\Habitats and Conservation Actions in Response to Stresses

4.1: Stresses on Species and Habitats

Stresses exerted on Species of Greatest Conservation Need (SGCN) populations and habitats from a number of sources can reduce species populations either directly, by disease, or indirectly, by affecting the quality or quantity of available habitat. In considering how stresses are affecting SGCN habitats, scale is an important parameter. Some stresses are local, some are regional, and some occur statewide. The scale at which the stress is impacting habitats must be considered when developing potential actions to reduce the effects of the stress.

With these considerations in mind, the West Virginia Division of Natural Resources (WVDNR) assessed an extensive array of stresses for their presence and impact on SGCN populations. External analyses contributed substantially to this assessment, including the energy development probability models developed by The Nature Conservancy (TNC) and the Appalachian Landscape Conservation Cooperative (LCC), climate change vulnerability assessments, Northeast Terrestrial Habitat Classification System (NETHCS), Northeast Aquatic Habitat Classification System (NEAHCS), and permit data from the West Virginia Division of Environmental Protection (WVDEP).

In developing this component of the State Wildlife Action Plans (SWAP), the USFWS has encouraged states to use a standard threat classification system developed by the International Union for the Conservation of Nature (IUCN). This approach will facilitate the integration of SWAPs into regional plans. The WVDNR followed this guidance for the West Virginia SWAP. The IUCN classification system used 43 categories of stress as follows.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
1.1	Housing and Urban Area	Human cities, towns, and settlements including non-housing development typically integrated with housing	urban areas, suburbs, villages, ranchettes, vacation homes, shopping areas, offices, schools, hospitals, birds flying into windows, land reclamation or expanding human habitation that causes habitat degradation in riverine areas, etc.
1.2	Commercial and Industrial Areas	Factories and other commercial centers	military bases, factories, stand-alone shopping centers, office parks, power plants, train yards, ship yards, airports, landfills, etc.
1.3	Tourism and Recreational Areas	Tourism and recreation sites with a substantial footprint	ski areas, golf courses, resorts, county parks, campgrounds, etc.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
2.1	Annual and Perennial Non-timber crops	Crops planted for food, fodder, fiber, fuel, or other uses	agricultural crops.
2.2	Wood and Pulp Plantations	Stands of trees planted for timber or fiber outside of natural forests, often with non-native species	pine silviculture, Christmas tree farms, etc.
2.3	Livestock Farming and Ranching	Domestic terrestrial animals raised in one location on farmed or non-local resources (farming); also domestic or semi-domesticated animals allowed to roam in the wild and supported by natural habitats (ranching)	cattle feed lots, chicken farms, dairy farms, cattle ranching, etc.
2.4	Marine and Freshwater Aquaculture	Aquatic animals raised in one location on farmed or non-local resources; also hatchery fish allowed to roam in the wild	shrimp or fin fish aquaculture, fish ponds on farms, hatchery salmon, etc.
3.1	Oil and Gas Drilling	Exploring for, developing, and producing petroleum and other liquid hydrocarbons	oil wells, hydraulic fracking, etc.
3.2	Mining and Quarrying	Exploring for, developing, and producing minerals and rocks	coal strip mines, alluvial gold panning, gold mines, rock quarries, sand/salt mines, dredging outside of shipping lanes, etc.
3.3	Renewable Energy	Exploring, developing, and producing renewable energy	geothermal power production, solar farms, wind farms (including birds flying into windmills), etc.
4.1	Roads and Railroads	Surface transport on roadways and dedicated tracks	highways, secondary roads, primitive roads, logging roads, bridges & causeways, road kill, fencing associated with roads, freight/passenger/mining railroads, etc.
4.2	Utility and Service Lines	Transport of energy & resources	electrical & phone wires, aqueducts, oil & gas pipelines
4.3	Shipping Lanes	Transport on and in freshwater and ocean waterways	dredging, canals, shipping lanes, ships running into fish and wildlife, wakes from cargo ships,

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES etc.
4.4	Flight Paths	Air and space transport	flight paths, jets impacting birds, etc.
5.1	Collecting Terrestrial Animals	Collecting terrestrial wild animals or animal products for commercial, research or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch	
5.2	Gathering Terrestrial Plants	Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, subsistence, research or cultural purposes, or for control reasons	
5.3	Logging and Wood Harvesting	Harvesting trees and other woody vegetation for timber, fiber, or fuel	
5.4	Collecting Aquatic Resources	Collecting aquatic wild animals or plants for commercial, research, or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch	
6.1	Recreational Activities	People spending time in nature or traveling in vehicles outside of established transport corridors, usually for recreational reasons	off-road vehicles, motorboats, motorcycles, jet-skis, snowmobiles, mountain bikes, hikers, cross-country skiers, birdwatchers, camping, caving, rock-climbing, etc.
6.2	War, Civil Unrest and Military Exercises	Actions by formal or paramilitary forces without a permanent footprint	armed conflict, mine fields, tanks & other military vehicles, training exercises & ranges, defoliation, munitions testing, etc.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
6.3	Work and Other Activities	People spending time in or traveling in natural environments for reasons other than recreation or military activities	law enforcement, drug smugglers, illegal immigrants, species research, vandalism, etc.
7.1	Fire and Fire suppression	Suppression or increase in fire frequency and/or intensity outside of its natural range of variation	
7.2	Dams and Water Management/Use	Changing water flow patterns from their natural range of variation either deliberately or as a result of other activities	
7.3	Other Ecosystem Modifications	Other actions that convert or degrade habitat in service of managing natural systems to improve human welfare	land reclamation projects, abandonment of managed lands, rip-rap along shoreline, mowing grass, tree thinning in parks, beach construction, removal of snags from streams, etc.
8.1	Invasive Non-native/Alien Species/Diseases	Harmful plants, animals, pathogens and other microbes not originally found within the ecosystem(s) in question and directly or indirectly introduced and spread into it by human activities	
8.2	Problematic Native Species/Diseases	Harmful plants, animals, or pathogens and other microbes that are originally found within the ecosystem(s) in question, but have become "out-of-balance" or "released" directly or indirectly due to human activities	
8.3	Introduced Genetic Material	Human altered or transported organisms or genes	pesticide resistant crops, hatchery salmon, restoration projects using non-local seed stock, genetically modified insects for biocontrol, genetically modified trees, genetically

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
			modified salmon, etc.
8.4	Problematic Species/Diseases of Unknown Origin	Harmful plants, animals, or pathogens and other microbes of unknown origin. It is not known if they were deliberately or accidentally introduced or if they were originally found within the ecosystem(s) in question.	
8.5	Viral/Prion-induced Diseases	Viruses are infectious agents that replicate only inside the living cells of an organism. Prions are infectious agents that do not contain nucleic acids.	
8.6	Diseases of Unknown Cause	Occasionally plants and animals are impacted by diseases of unknown origin and often it may take many years to identify the pathogen responsible.	
9.1	Domestic and Urban Waste Water	Water-borne sewage and non-point runoff from housing and urban areas that include nutrients, toxic chemicals and/or sediments	
9.2	Industrial and Military Effluents	Water-borne pollutants from industrial and military sources including mining, energy production, and other resource extraction that include nutrients, toxic chemicals and/or sediments	

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
9.3	Agricultural and Forestry Effluents	Water-borne pollutants from agricultural, silvicultural, and aquaculture systems that include nutrients, toxic chemicals and/or sediments	
9.4	Garbage and Solid Waste	Rubbish and other solid materials including those that entangle wildlife	municipal waste, litter from cars, flotsam & jetsam from recreational boats, waste that entangles wildlife, construction debris, etc.
9.5	Air-Bourne Pollutants	Atmospheric pollutants from point and nonpoint sources	acid rain, smog, ozone, etc.
9.6	Excess Energy	Inputs of heat, sound, or light that disturb wildlife or ecosystems	lamps attracting insects, lights disorienting wildlife, heated water from power plants, damaging atmospheric radiation resulting from ozone holes, noise from highways or airplanes, etc.
10.1	Volcanos	Volcanic events	eruptions, emissions of volcanic gasses, etc.
10.2	Earthquake/Tsunamis	Earthquakes and associated events	earthquakes, etc.
10.3	Avalanches/Landslides	Avalanches or landslides	avalanches, landslides, mudslides, etc.
11.1	Habitat Shifting or Alteration	Major changes in habitat composition and location	the habitat effects of climate change.
11.2	Droughts	Periods in which rainfall falls below the normal range of variation	severe lack of rain, loss of surface water sources, etc.
11.3	Temperature Extremes	Periods in which temperatures exceed or go below the normal range of variation	heat waves, cold spells, water temperature changes, etc.
11.4	Storms and Flooding	Extreme precipitation and/or wind events	thunderstorms, tropical storms, hurricanes, cyclones, tornados, hailstorms, ice storms or blizzards, dust storms, etc.

4.2: Results of the Stress Assessment

The stress assessment for the West Virginia SWAP was conducted by WVDNR biologists and ecologists using the IUCN classification system. Terrestrial stresses were assessed at the habitat level within ecoregion, thus combining a habitat perspective with a geographic one. Because the impacts of aquatic stresses are rarely limited to a specific habitat, i.e., they tend to ripple downstream, they were assessed at the Hydrologic Unit Code (HUC)-8 watershed level within ecoregion. The assessment results were then analyzed and prioritized at multiple scales, from local to statewide. Throughout the remainder of the West Virginia SWAP, those results are presented at a scale appropriate to the section in which they are discussed.

In this section, we summarize the results of the stress assessment and prioritization at a broad scale. The prioritized stresses presented here affect multiple habitats in multiple areas of the state. Many have statewide impact. All have more than local or regional impact. For this reason, the WVDNR considers them to be major stresses in the context of this plan. Factors considered in the prioritization of these extensive, major stresses were:

- Geographic extent of the stress,
- Expert consensus that they have high impact on SGCN populations and habitats, and
- Potential for effective action.

4.2.1: Major Stresses on Terrestrial SGCN Populations and Habitats

The following 21 stresses, in order of priority, are all considered by the WVDNR to be major stresses on terrestrial SGCN populations and habitats:

- Invasive Non-native/Alien Species/Diseases
- Roads and Railroads
- Utility and Service Lines
- Housing and Urban Area
- Recreational Activities
- Mining and Quarrying
- Problematic Native Species/Diseases
- Logging and Wood Harvesting
- Collecting Terrestrial Animals
- Commercial and Industrial Areas
- Agricultural and Forestry Effluents
- Livestock Farming and Ranching
- Oil and Gas Drilling
- Tourism and Recreational Areas
- Fire and Fire suppression
- Renewable Energy
- Annual and Perennial Non-timber crops
- Dams and Water Management/Use
- Other Ecosystem Modifications
- Industrial and Military Effluents

- Habitat Shifting or Alteration

4.2.2: Major Stresses on Aquatic SGCN Populations and Habitats

The following 20 stresses, in order of priority, are all considered by the WVDNR to be major stresses on aquatic SGCN populations and habitats:

- Industrial and Military Effluents
- Storms and Flooding
- Invasive Non-native/Alien Species/Diseases
- Roads and Railroads
- Domestic and Urban Waste Water
- Dams and Water Management/Use
- Agricultural and Forestry Effluents
- Droughts
- Mining and Quarrying
- Utility and Service Lines
- Recreational Activities
- Logging and Wood Harvesting
- Other Ecosystem Modifications
- Collecting Aquatic Resources
- Shipping Lanes
- Livestock Farming and Ranching
- Temperature Extremes
- Tourism and Recreational Areas
- Air-Bourne Pollutants
- Problematic Native Species/Diseases

4.3: Conservation Actions

4.3.1: SWAP Perspective on Conservation Actions

For the West Virginia SWAP, the real purpose of the stress assessment and prioritization is to identify conservation actions that can reduce the impacts from stresses on SGCN populations and habitats. In most cases, the stresses themselves are completely legal activities of individuals, corporations, and public agencies engaged in pursuit of their recreational, economic or mission-related interests. It is rarely a practical option to advocate eliminating those activities because of their impact on species and habitats. The more realistic approach is to identify collaborative opportunities for conservation partners to reduce the impacts from stresses across the landscape. The majority of conservation actions presented in the West Virginia SWAP are of that type, i.e., rarely regulatory, largely voluntary, and almost universally collaborative.

4.3.2: Conservation Actions to Address the Impacts of Major Stresses

Following the process described in Section 2.10, conservation actions were identified and prioritized by WVDNR biologists to address each of the major stresses listed in Sections 4.2.1 and 4.2.2. Because (1) IUCN stress categories often obscure the actual impact of the stresses, e.g., stream sedimentation, (2) there is overlap in terrestrial and aquatic stress categories and (3) many conservation actions address multiple stresses, conservation actions presented in this section have been grouped for clarity of communication. In the WVDNR's SWAPMASTER database, each action remains linked to the IUCN stress to which it responds.

4.3.2.1: Conservation Actions that Address Impacts from Species and Diseases that Affect SGCN Populations and Habitats

- Collaborate with others to implement control and management strategies of the "West Virginia Invasive Species Strategic Plan and Voluntary Guidelines" (WVDNR 2014) for building capacity, setting priorities, and sharing expertise.
- Partner with others to strengthen state law relating to the private stocking of gamefish in public waters.
- Partner with others to seek passage of state legislation that would regulate transport of aquatic species between waterbodies.
- Evaluate and, where feasible, modify WVDNR fish stocking policies to reduce harmful effects of stocking non-native species over populations of SGCN species.
- Increase collaborative efforts to inform sportsmen and other publics about the harmful effects of invasive species and diseases and the role that recreational users can play to reduce those effects.
- Consider SGCN populations and habitats in formulating deer harvest strategies.
- Collaborate with others to inform the public about stresses placed on SGCN populations and habitats by some native species and actions that can be taken to reduce those stresses.
- Collaborate with others to inform the public about problematic native diseases.
- Coordinate efforts among government agencies to modify practices that introduce invasive species and encourage use of native ecotypes.
- Collaboratively establish protocols to limit spread of pathogens to unaffected areas and implement disinfection protocols at public access sites and other public lands.
- Collaboratively pursue adequate funding for West Virginia Department of Agriculture (WVDA), Animal and Plant Health Inspection Service (APHIS), and other federal programs for identifying, prioritizing, and addressing non-native forest pests and invasive plants.

4.3.2.2: Conservation Actions that Address Impacts of Water Pollution from Industrial and Municipal Sources

- Coordinate efforts among government agencies and private entities to prevent or reduce discharge of harmful industrial effluents into high-quality aquatic habitats with significant populations of aquatic SGCN.
- Partner with others to seek and enforce more effective water quality laws/procedures relating to transportation, treatment, discharge, and spills of harmful industrial effluents.
- Support regulatory changes that improve separation of stormwater and sewage treatment facilities.
- Partner with others to seek incorporation of mussel standards into water quality regulations.

- Coordinate with Department of Health and Human Resources (DHHR) and WVDEP to improve wastewater standards and/or enforcement.
- Partner with others to increase public awareness of impacts from harmful industrial effluents to aquatic habitats and species, especially SGCN, and to encourage reductions in discharge of those effluents.
- In cooperation with West Virginia Department of Homeland Security, establish a hazardous waste response protocol appropriate for protecting critical SGCN populations.
- Coordinate efforts among government agencies and private entities to encourage development and deployment of improved sewage treatment and stormwater retention facilities statewide.

4.3.2.3: Conservation Actions that Address Impacts from Roads and Railroads

- Coordinate efforts among government agencies and private entities to elevate conservation of SGCN and their habitat throughout planning and permitting processes for new construction and repair of existing roads and railroads.
- Coordinate efforts among government agencies to develop a pre-planning and pre-mitigation program to enhance conservation of fish and wildlife habitats and reduce costly highway construction delays.
- Modify mowing regimes and implement roadside vegetation plantings that benefit SGCN but are resistant to deer herbivory.
- Improve interagency coordination for planning, site selection and project design, with special emphasis on early coordination/mitigation planning of individual projects.
- Coordinate efforts among government agencies to improve construction and maintenance standards for bridges, culverts, and other transportation infrastructure with the goal of ensuring aquatic passage and protecting aquatic life and their habitats.

4.3.2.4: Conservation Actions that Address Impacts of Storms and Flooding

- Collaborate with others to ensure that in-stream modifications incorporate natural channel design principles.
- Coordinate efforts among government agencies to improve design requirements for stream and streambank modifications implemented in response to floods and other watershed events.
- Coordinate efforts among government agencies and private entities to ensure that all stream modifications are properly designed, permitted and implemented.
- Coordinate efforts among government agencies and private entities to elevate consideration of SGCN populations and habitats during the permitting process for in-stream and near-stream activities.
- Restore and increase floodplain wetland habitats to reduce sediment runoff, hold stormwater and reduce downstream flooding spikes.

4.3.2.5: Conservation Actions that Address Impacts from Energy Production, Transmission and Consumption

- Coordinate efforts of government agencies and private entities to develop and Implement operational guidelines for wind energy facilities that reduce bird and bat mortality, minimize forest fragmentation, minimize impacts to SGCN habitats (e.g., rock outcrops), and reduce impacts to ridgeline invertebrates.

- All Stream Activity Applications received by the WVDNR should be reviewed for potential impact to high-value aquatic habitats for SGCN.
- Increase coordination among government agencies and private entities to develop industry and Public Service Commission (PSC) protocols encouraging the creation of pipeline corridors which can be utilized by multiple companies and are cited to minimize impacts to SGCN species.
- Collaborate with others to develop gas and oil drilling guidelines that reduce impacts on SGCN populations and habitats.
- Coordinate with government agencies to improve mine reclamation and abandoned mine lands (AML) restoration to reduce impacts on SGCN populations and habitats.
- Continue to support reductions in pollutants contributing to acid deposition.
- Collaborate with others to increase public awareness of the beneficial role that soft edges play in maintained forest openings, such as pipelines and utility corridors.
- Coordinate efforts among government agencies and private entities to reduce aquatic impacts from construction and maintenance of stream crossing infrastructure for utility and service lines.
- Collaborate with others to develop a more detailed assessment of climate change vulnerability for SGCN with specific management recommendations for the most vulnerable SGCN.

4.3.2.6: Conservation Actions that Address Impacts of Recreational Activities

- Collaborate with public land owners to increase effective law enforcement of recreational vehicle use on public lands.
- Collaborate with recreational user groups to encourage responsible use of trails near streams and rivers.
- Collaborate with others to increase public awareness of the potential impacts of all-terrain vehicles (ATV) and other motorized recreation, including habitat degradation, introduction and spread of invasives, and disturbance of species, and develop responsible use guidelines for responsible recreation.
- Collaborate with managers of public and private recreational facilities to implement management practices that enhance SGCN habitat.

4.3.2.7: Conservation Actions that Address Impacts of Commercial and Residential Development

- Collaborate with others to enhance landowner incentives and funding for participating in land conservation.
- Incorporate guidance on appropriate voluntary conservation measures in farmland protection easements to benefit SGCN species and habitats.

4.3.2.8: Conservation Actions that Address Impacts of Agriculture and Forest Management

- Partner with government agencies and corporate timberland owners to develop an integrated forest management model that enhances habitat availability for SGCN across multiple seral stages in multiple areas of the state.
- Coordinate efforts among government agencies and private entities to increase implementation of Farm Bill-related conservation practices, such as stream fencing with the goal of reducing harmful impacts from certain agricultural activities.
- Expand Appalachian Fire Network ability to identify appropriate contexts for prescribed fire in West Virginia, developing appropriate prescribed fire and fire suppression management

prescriptions, and developing and coordinating resources for appropriate prescribed fire and fire suppression activities.

- Collaborate with others to increase implementation of Best Management Practices (BMPs) during forestry operations.
- Promote partnerships among federal and state agencies to increase public awareness of impacts from certain harmful agricultural and forestry practices to SGCN populations and habitats and to encourage reductions or modifications of those practices.
- Collaboratively enhance forest stewardship outreach for informing consulting foresters and landowners on timber harvest practices that benefit SGCN forest species.
- Collaborate with others to increase public awareness of the beneficial role that headwater forests, wetlands, groundwater, and forested riparia play in maintaining adequate base flows, moderating storm flows, and moderating water temperatures in streams and rivers.
- Collaborate with others to increase public awareness of aquatic SGCN, the effects that land management can have on aquatic SGCN habitats and the availability of incentives for habitat conservation.
- Coordinate efforts among government agencies and private entities to promote riparian conservation/restoration initiatives such as Conservation Reserved Enhancement Programs (CREP).
- Collaboratively increase efforts to inform the public about the effects of non-point source pollution on aquatic and karst species, on their habitats and on groundwater.
- Collaborate with the West Virginia Division of Forestry (WVDOP) to promote inclusion of shade strips in forestry operations.
- Collaborate with the WVDOP to elevate protection of habitat for SGCN during regulated forestry operations.

4.3.2.9: Conservation Actions that Address Impacts to Water Quantity

- Partner with others to seek regulatory solutions that manage water use to maintain adequate flow for all aquatic species, with increased emphasis on SGCN.
- Coordinate efforts among government agencies and private entities to reduce or eliminate interbasin transfer of water resources.

4.3.2.10: Conservation Actions that Address Impacts from Pesticide Application

- Collaboratively develop and disseminate management guidelines and associated general outreach to private landowners for reducing the effects of pesticides on SGCN insects, reptiles and amphibians.
- Improve interagency coordination and pre-planning to minimize impacts of forest pest suppression programs on SGCN populations and sensitive habitats.
- Coordinate with government agencies to consolidate and make available the most recent information on pesticide impacts to SGCN in West Virginia.

4.3.2.11: Conservation Actions that Address Impacts from Take of SGCN

- Partner with others to strengthen state laws relating to take of SGCN.
- Collaborate with others to increase public awareness of the detrimental effects from unregulated harvest and transport of SGCN.

- Coordinate with public agencies and private entities to increase effective enforcement of existing laws and regulations relating to take of SGCN.

4.3.2.12: Conservation Actions to Address Communication and Information Needs

- Collaborate with government agencies and private entities to provide publicly accessible information about concentrations of SGCN populations and habitats to better facilitate conservation.
- Collaborate with others to increase public awareness of habitat requirements of SGCN.
- Partner with others to develop and disseminate information about appropriate conservation practices to benefit SGCN populations and habitats.

4.3.2.13: Conservation Actions to Address Climate Change

Climate change is an issue of substantial concern to wildlife biologists with several recent assessments reviewing the potential impacts of climate change on animals, plants, and forest communities in the region (Butler et al. 2015, Byers and Norris 2011, Staudinger et al. 2015). Chapter 3 of this plan highlights climate change as a concern for many specific groups, including cool and cold water fish, plants, terrestrial salamanders, high elevation amphibians, birds, mammals, butterflies and moths, and wetland amphibians, birds, butterflies, moths, dragonflies and damselflies. Section 4.2 of this plan identified several major statewide stresses associated with climate change: Habitat Shifting or Alteration for terrestrial SGCN populations and habitats and Drought, Storms and Flooding, and Temperature Extremes for aquatic SGCN populations and habitats.

Even within taxonomic and habitat groupings, species will respond to climate changes differently based on individual sensitivities to temperature, moisture, seasonal triggers, and other climate related effects. While species specific conservation actions eventually may be warranted in some cases, anticipating how any one species, let a large number of species, may respond across the suite of modeled climate change scenarios is very difficult. Instead of a species-specific approach, the WV SWAP broadly addresses climate change concerns by 1) statewide actions to reduce additional stresses on habitats and species, 2) more geographically focused actions in Conservation Focus Areas (CFAs), and 3) additional vulnerability assessments for select species.

- 1) Because climate change can have widespread impacts across multiple habitats and species groups, climate change effects act in tandem with other stresses. For example, fragmentation of aquatic and terrestrial habitats may prevent species shifts in response to changing conditions, invasive species and pests may spread higher in elevation, and food sources already reduced by development activities may become even more scarce. Addressing these and other stresses to species and habitats are also important statewide conservation actions for decreasing their vulnerability to climate change and are found throughout SWAP section 4.3.2. Such statewide conservation actions include enhanced planning of transportation projects to reduce and offset fragmentation, providing additional statewide incentives for private land conservation, and implementing components of the state invasive species plan.
- 2) Opportunities for appropriate conservation actions vary among CFAs based on their particular set of species, habitats, land uses, stresses, and other features (see Chapter 6). These may focus on reducing specific stresses (such as cooperating with the gas industry in

- infrastructure planning to reduce fragmentation in the Little Kanawha and Middle Island Creek CFA) or restoring and expanding highly vulnerable habitat types (such as continuing spruce/high elevation forest restoration in the High Alleghenies CFA). Maintaining landscapes with characteristics conducive to supporting functioning ecological systems which may be more resilient to the effects of major perturbations such as climate change, and maintaining connectivity within and between landscapes, are seen as efficient approaches to potentially maintain broad suites of species. Recent analyses have indicated that the high level of geophysical complexity (variability) and high degree of integrity (intactness) of natural cover in the Central Appalachians, including West Virginia, support landscapes of continental-scale importance for these values (Anderson and Ferree 2010, Anderson et al. 2012, Anderson et al. 2014) and also support landscapes of continental-scale importance for maintaining local and regional connectivity (Anderson et al, 2015.) This SWAP identifies CFAs where such values are especially high and opportunities for conservation action are deemed most promising. The importance of this perspective in addressing climate change within these CFAs is highlighted by a Conservation Action to “Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.”
- 3) A prior vulnerability assessment highlighted that a number of plants and animals in West Virginia are vulnerable to the potential negative effects of climate change while other species may not be vulnerable or may even respond positively (Byers and Norris 2011). Vulnerability assessments of additional species are warranted to better understand how they may respond to climate change or the interactions between climate change and other stresses (see 4.3.2.5).

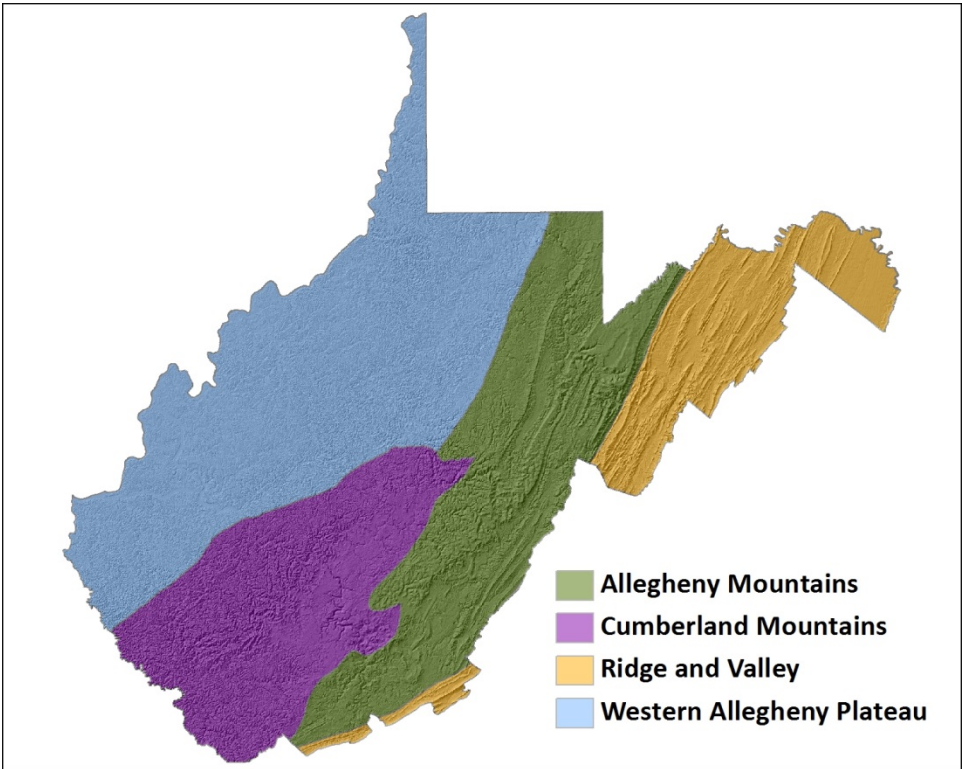
Chapter 5: The West Virginia Landscape – An Ecoregional Perspective

5.1: Introduction

In Chapter 3, we presented a clear picture of West Virginia’s diversity of animal and plant species and the habitats with which they are associated. In Chapter 4, we discussed the stresses that are being placed on species and habitats in the state and introduced the concept of scale by proposing some broad-scale conservation actions to address stresses. In this chapter, we further explore the issue of scale for conservation planning by viewing the state at the ecoregional level.

The physical and ecological variations that exist across the West Virginia landscape defy characterization at a statewide scale. The lowest elevation in the state, on the Potomac River, lies at 240 feet above sea level. The highest point, Spruce Knob, reaches an elevation of 4,861 feet. To understand West Virginia, one must understand the role that elevation plays in determining habitat characteristics and natural communities. Viewing the state from an ecoregional perspective is a good way of understanding its physical and ecological diversity.

For the West Virginia State Wildlife Action Plan (SWAP), the West Virginia Division of Natural Resources (WVDNR) adopted a modified version of Bailey’s ecoregions at the Section level (Bailey et al. 1994) which divides the state into four ecoregions based on geology, physiography, climate, hydrology, vegetation, soils, and terrestrial and aquatic animals. The four ecoregions adopted for use in the SWAP are the Allegheny Mountains, Cumberland Mountains, Ridge and Valley, and Western Allegheny Plateau.

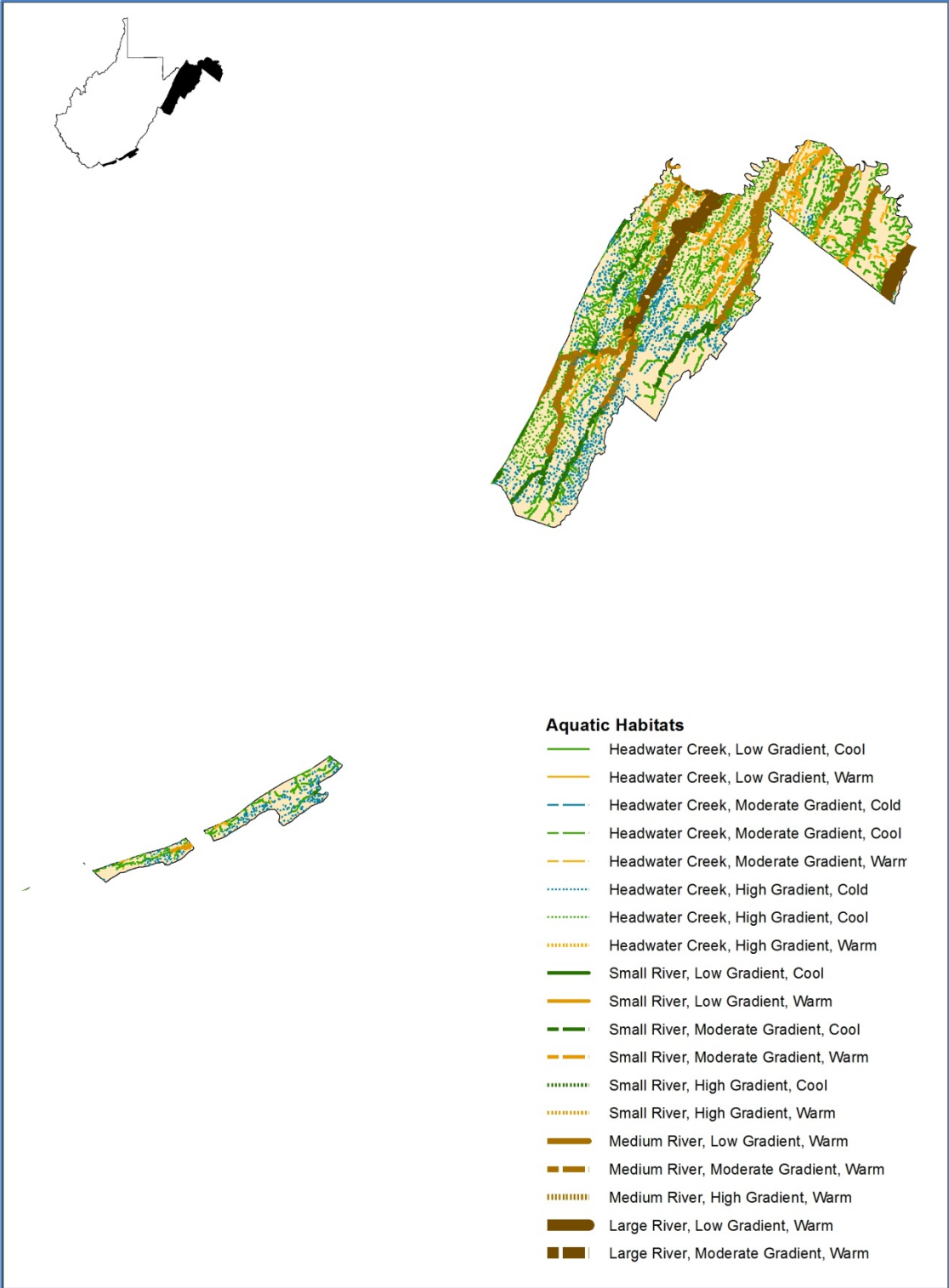


5.2: The Ridge and Valley Ecoregion

Terrestrial Habitats – Ridge and Valley Ecoregion



Aquatic Habitats – Ridge and Valley Ecoregion



5.2.1: Description

The Ridge and Valley Ecoregion comprises about 14% of the state's area and includes Bailey *et al.*'s (1994) Northern Ridge and Valley and a small area of the Northern Blue Ridge Mountains in Jefferson County. It has the lowest elevation in the state (Harpers Ferry), but also has the highest range in elevation, with some peaks exceeding 4,000 feet. The climate varies with elevation, but is relatively dry due to the rain shadow effect of the Allegheny Mountains to the west. Geology is comprised of folded and faulted layers of sedimentary rock, mostly sandstones and shales, which form acidic soils, but there are also significant outcrops of limestone and dolomite which form higher pH soils and caves. The crystalline rocks of the Blue Ridge Mountains are older than the sedimentary rocks found in the rest of West Virginia.

The Ridge and Valley Ecoregion has a great variety of terrestrial habitats which reflect its dramatic and contrasting geologic and climatic patterns. Most of the highest ridges support Montane Red Oak Forests, but there are a few patches of Red Spruce Forests and Northern Hardwoods Forests. Drier habitats including Dry Oak (-Pine) Forests; Pine – Oak Rocky Woodlands; Shale Barrens; and Dry Calcareous Oak Forests, Woodlands, and Glades occur in higher concentrations in this ecoregion than in any other in the state. The ecoregion is noteworthy for a large number of Central and Southern Appalachian endemic plants and animals, especially very localized cave endemics and Central Appalachian endemic plants, snails, and salamanders of Dry Oak and Montane Red Oak Forests, Woodlands, Shale Barrens, and Cedar Glades. Small Stream Riparian habitats in Jefferson and Berkeley counties include specialized marl marshes which occur nowhere else in the state and host a high diversity of rare plants.

The northern portion of the Ridge and Valley Ecoregion of West Virginia drains to the Chesapeake Bay via the Potomac River. The southern portions of Monroe and Mercer counties drain to the Chesapeake Bay via the James River as well as to the Ohio River via the New/Kanawha rivers. Aquatic habitats vary widely, from high-volume cold springs to ephemeral reaches of small rivers that disappear during dry seasons to mountain cascades to large rivers of wide agricultural valleys. The high density of quality springs can be attributed largely to two sources: the folded, porous geology gathering variable seasonal precipitation and feeding it to underground reservoirs that outcrop occasionally at downstream portals and the karst nature found in pockets throughout the ecoregion's valley floors that provide avenues for groundwater to reach the surface in springs and stream channels. While species that are obligate to the coldwater springs exist, endemism in these habitats in West Virginia is not common.

The New River (the oldest river in North America) bisects West Virginia's southern portion of the Ridge and Valley ecoregion where it comes into the state from Virginia. Its age and form contribute to high endemism of aquatic species in the streams draining to it. A small portion of this ecoregion is West Virginia's only portion of the headwaters of the James River Basin, the montane reaches of Potts and Cove creeks, which are home to some aquatic species more common to the Piedmont and lower elevations to the east.

Valley bottoms in this ecoregion have a long history of conversion of natural habitats for agriculture, which is more prevalent here than elsewhere in the state. There is high residential density and substantial population growth in the easternmost counties and substantial vacation home development locally throughout the ecoregion. Tourism is economically important. Coal mining and natural gas development are rare, but there are permitted (but to date, unbuilt) and proposed wind energy projects on some ridges. A large proportion of lands in this ecoregion are in private ownership, with large corporate ownerships being rare. Remaining private tracts over 1,000 acres are typically owned for non-

industrial timber, recreation (especially hunting), and future development. There are also extensive public lands, mostly on the ridges.

Conservation opportunities are substantial. Extensive and widespread public land ownership provides multiple opportunities for habitat protection and restoration. Mineral ownership is rarely separated from surface ownership, enabling land conservation through conservation easements. There is an active but small land trust community in many portions of the ecoregion and all counties but one have farmland protection programs. There is substantial landowner interest in land conservation, which greatly exceeds the limited resources and incentives available. In the Potomac basin, there is a well-developed network of watershed and local conservation non-profits. There are substantial existing and developing programs to maintain and improve water quality, especially as part of the Chesapeake Bay Watershed Agreement (2014) (http://www.chesapeakebay.net/documents/FINAL_Ches_Bay_Watershed_Agreement.withsignatures-HIres.pdf).

5.2.2: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this ecoregion. See Appendix 3 for a complete list of species recorded by the WVDNR within the boundaries of each ecoregion.

SPECIES SUMMARY BY TAXA AND PRIORITY

ECOREGION = Ridge and Valley

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	11	17
Birds	33	24
Butterflies and Moths	19	16
Cave Invertebrates	28	11
Crayfish		1
Dragonflies and Damselflies	13	26
Fish	15	6
Mammals	6	7
Mussels	10	7
Plants	49	161
Reptiles	12	9
Snails	3	37
Tiger Beetles	2	1
Totals	201	323

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Ridge and Valley

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	4,499	0.21%	5.01%
Anthropogenic Shrubland & Grassland	774	0.04%	0.49%
Calcareous Cliffs and Talus	4,997	0.24%	54.27%
Developed	129,105	6.16%	11.34%
Dry Calcareous Forests, Woodlands, and Glad	52,334	2.50%	73.17%
Dry Oak (-Pine) Forests	345,951	16.51%	14.00%
Dry-Mesic Oak Forests	878,396	41.91%	17.60%
Heath-Grass Barrens	7	0.00%	0.24%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	55,398	2.64%	1.88%
Montane Red Oak Forests	12,416	0.59%	58.73%
Northern Hardwood Forests	16,933	0.81%	1.70%
Pine-Oak Rocky Woodlands	27,295	1.30%	35.73%
Red Spruce Forests	893	0.04%	0.50%
River Floodplains	20,182	0.96%	16.79%
Shale Barrens	1,460	0.07%	81.43%
Sinkhole and Depression Ponds	149	0.01%	100.00%
Small Stream Riparian Habitats	75,631	3.61%	15.30%
Unresolved	66,951	3.19%	57.36%
Totals	1,693,371		

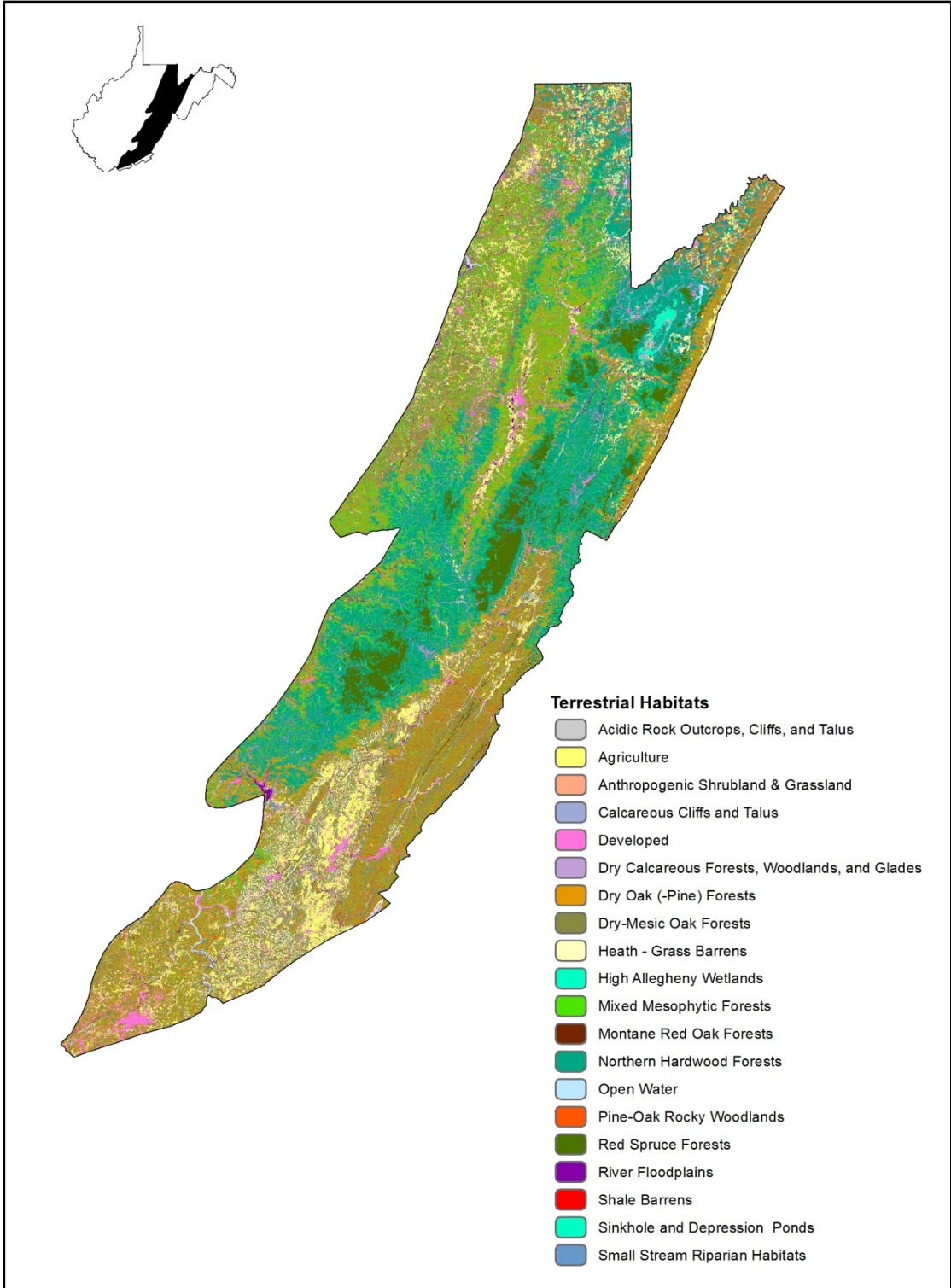
AQUATIC HABITAT SUMMARY

ECOREGION = Ridge and Valley

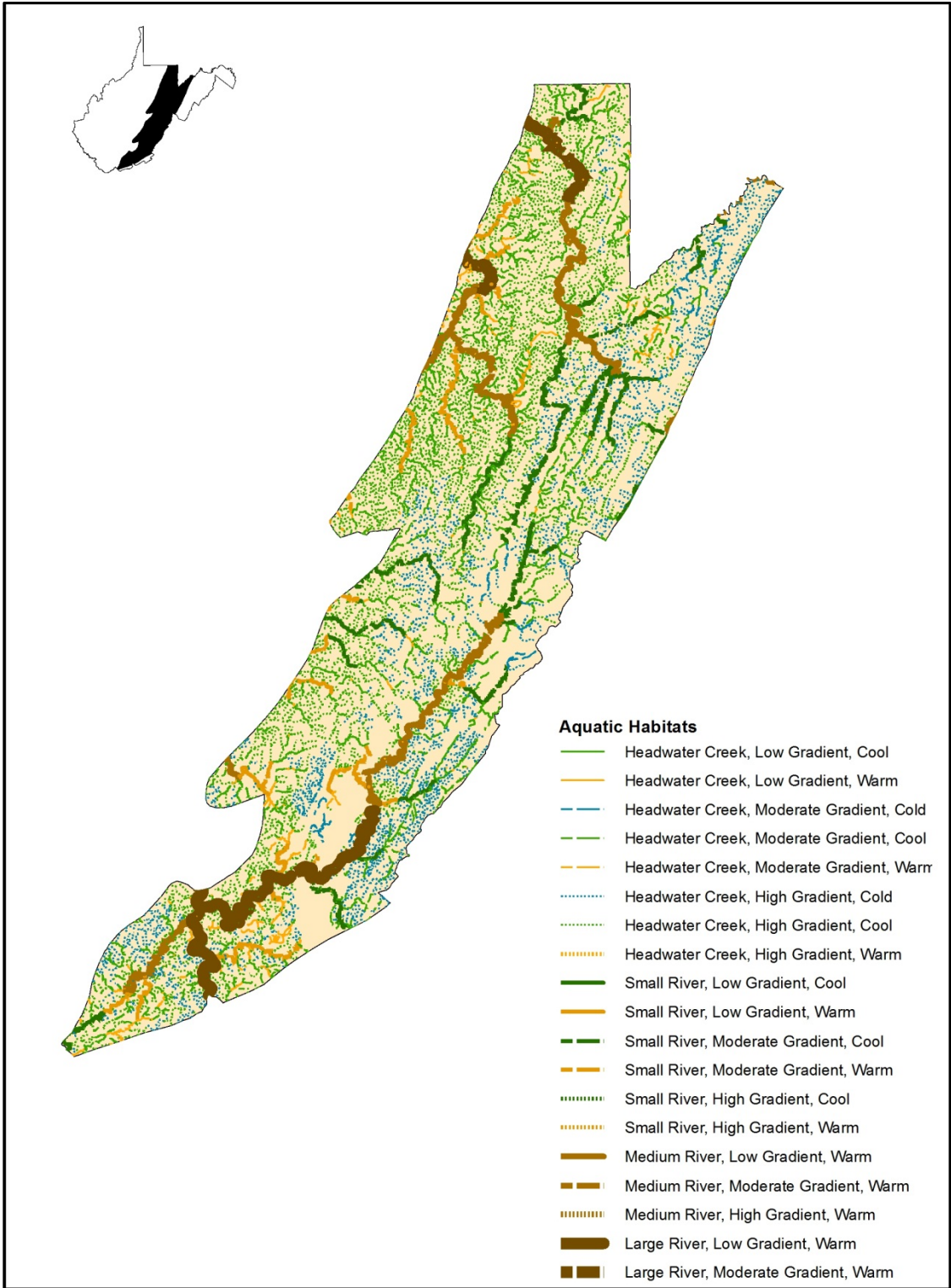
HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	3	0.07%	16.23%
Headwater Creek,Low Gradient, Warm	34	0.76%	3.50%
Headwater Creek,Moderate Gradient,Cool	874	19.50%	25.97%
Headwater Creek,Moderate Gradient,Warm	368	8.22%	5.08%
Headwater Creek,High Gradient,Cold	1,117	24.93%	31.48%
Headwater Creek,High Gradient,Cool	1,390	31.04%	13.10%
Headwater Creek,High Gradient,Warm	2	0.04%	0.08%
Small River,Low Gradient,Cool	10	0.22%	18.17%
Small River,Low Gradient, Warm	27	0.60%	3.59%
Small River,Moderate Gradient,Cool	137	3.07%	24.91%
Small River,Moderate Gradient,Warm	112	2.51%	11.47%
Small River,High Gradient,Warm	0	0.00%	0.12%
Medium River, Low Gradient,Warm	108	2.40%	13.04%
Medium River,Moderate Gradient,Warm	165	3.69%	30.71%
Large River,Low Gradient,Warm	101	2.25%	11.86%
Large River,Moderate Gradient,Warm	32	0.70%	19.78%
Totals	4,480		

5.3: The Allegheny Mountains Ecoregion

Terrestrial Habitats – Allegheny Mountains Ecoregion



Aquatic Habitats - Allegheny Mountains Ecoregion



5.3.1: Description

The Allegheny Mountains Ecoregion comprises approximately 25% of the state's area. It includes the highest elevations in the state representing one of the highest contiguous land masses in eastern North America. It receives the highest rainfall, and has the coldest temperatures and shortest growing seasons in the state. Geology is comprised of gently tilted layers of sedimentary rock, mostly sandstones and shales which form acidic soils, but also significant outcrops of limestone which form higher pH soils and caves. The eastern flank of the Allegheny Mountains forms the Eastern Continental Divide; waters to the west of the divide drain to the Ohio River, those to the east drain into the Chesapeake Bay via the Potomac River. The Cheat, Youghiogheny, and Tygart Valley rivers flowing north form the majority of the Monongahela River; the Greenbrier and Bluestone rivers flow into the New River in the southern part of the state. The headwaters of the Gauley, Elk, and Little Kanawha rivers also originate in the Allegheny Mountains, draining to the southwest and west. In the far eastern portion of the ecoregion is origin of the headwaters of the North and South Branches of the Potomac River.

Because of its present climate and the history of migrations following the ice ages, the vegetation and fauna resembles those of areas further north and many Species of Greatest Conservation Need (SGCN) in this ecoregion are near the southern extent of their global range. This ecoregion includes a large majority of Red Spruce Forests and Northern Hardwoods Forests in the state and all of the High Allegheny Wetlands. At lower elevations in the Greenbrier Valley there are some drier terrestrial habitats including Shale Barrens and Dry Calcareous Forests, Woodlands, and Glades, and below ground is one of highest concentrations of caves in the world. The ecoregion is especially noteworthy for the large number of Central and Southern Appalachian endemic plants and animals it supports. This includes montane species shared with the Southern Blue Ridge Mountains, shale barren and other xeric endemics of the Central Appalachians, and a globally significant concentration of very localized cave endemics. While most of these endemics are relatively common and secure at the present time, many are also SGCN.

The majority of West Virginia's coldwater aquatic habitats are found in the Allegheny Mountains Ecoregion, originating on the high mountain ridges flowing steeply and quickly down into the warmer river valleys. Many cascades and waterfalls form natural impediments to upstream migration, leaving many of the highest stream reaches with low species richness and diminished genetic diversity. The karst region of the southern Greenbrier Valley is an aquatic enigma: devoid of surface water features, but a tremendous source of cold, rich waters driving local subterranean endemism and productivity. The New River defies categorization by ecoregion, as it bisects across the southern part of the state, crossing through all ecoregions and contained by none. It is oldest river in North America, predating the formation of the Appalachian Mountains. The New River basin is home to ten endemic fishes, of which only six are found in West Virginia, due to downstream biogeographic barriers. While the southern part of the ecoregion has consistently good water quality with relatively high alkalinity and productivity, streams of the northern portion of the Allegheny Mountains in West Virginia have been subject to ongoing acidification from historic mining practices in high sulfur coal seams and acidic deposition. Many stream reaches have been dead for decades, and only recently has technology advanced to the point where restoration, or at least improvement, has become possible in some of the more degraded areas.

Human population densities are relatively low over large portions of this ecoregion and there is a high proportion of public land, primarily in the mountainous portions. Public lands include most of the Monongahela National Forest, the entire Canaan Valley National Wildlife Refuge, and several West

Virginia State Parks, Forests, and Wildlife Management Areas. Agriculture and development are concentrated in the lower elevations, including the Tygart and Greenbrier valleys. The northern and western parts of the ecoregion include some of the most important timber producing areas in West Virginia. Coal mining and natural gas development also occur in the northern and western portions. Several large wind energy facilities also occur on higher mountains. There are large corporate ownerships (with some properties covering tens of thousands of acres) in the northern and western portions of the ecoregion and are held primarily for timber and energy. Otherwise, forested private tracts over 1,000 acres are typically owned for non-industrial timber and recreation (especially hunting). Recreation and tourism are important, including several major resorts.

Conservation opportunities are substantial. Extensive and widespread public land ownership provides multiple opportunities for habitat protection and restoration. There are already a few established, active multi-party habitat restoration initiatives centered around public lands. Corporate lands with intensive natural resource management provide opportunities for early succession forest habitat. Mineral ownership is generally separated from surface ownership in the northern and western portions, limiting private land conservation. Mineral rights are generally not separated from surface ownership in the southern and eastern portions, enabling land conservation through conservation easements. There is a small land trust community in those portions of the ecoregion and some counties have farmland protection programs. There is substantial landowner interest in land conservation in the Greenbrier Valley, where it exceeds the limited resources and incentives available. Locally, there are active watershed groups. There are some existing and developing programs to maintain and improve water quality, especially with a focus on addressing acid mine run-off in the northern part of the ecoregion.

5.3.2: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this ecoregion. See Appendix 3 for a complete list of species recorded by the WVDNR within the boundaries of each ecoregion.

SPECIES SUMMARY BY TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	12	16
Birds	38	31
Butterflies and Moths	18	22
Cave Invertebrates	43	15
Crayfish	3	2
Dragonflies and Damselflies	22	34
Fish	12	3
Mammals	9	8
Mussels	7	11
Plants	65	178
Reptiles	8	10
Snails	10	39
Tiger Beetles	3	
Totals	250	369

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Allegheny Mountains

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	12,287	0.31%	13.68%
Anthropogenic Shrubland & Grassland	10,007	0.25%	6.29%
Calcareous Cliffs and Talus	3,052	0.08%	33.14%
Developed	225,550	5.71%	19.80%
Dry Calcareous Forests, Woodlands, and Glades	19,189	0.49%	26.83%
Dry Oak (-Pine) Forests	521,476	13.20%	21.10%
Dry-Mesic Oak Forests	906,046	22.94%	18.16%
Heath-Grass Barrens	2,810	0.07%	99.76%
High Allegheny Wetlands	20,894	0.53%	99.80%
Mixed Mesophytic Forests	436,945	11.06%	14.83%
Montane Red Oak Forests	7,130	0.18%	33.73%
Northern Hardwood Forests	967,945	24.51%	97.30%
Pine-Oak Rocky Woodlands	48,192	1.22%	63.08%
Red Spruce Forests	177,050	4.48%	99.48%
River Floodplains	35,319	0.89%	29.38%
Shale Barrens	333	0.01%	18.57%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	149,257	3.78%	30.20%
Unresolved	48,358	1.22%	41.43%
Totals	3,591,837		

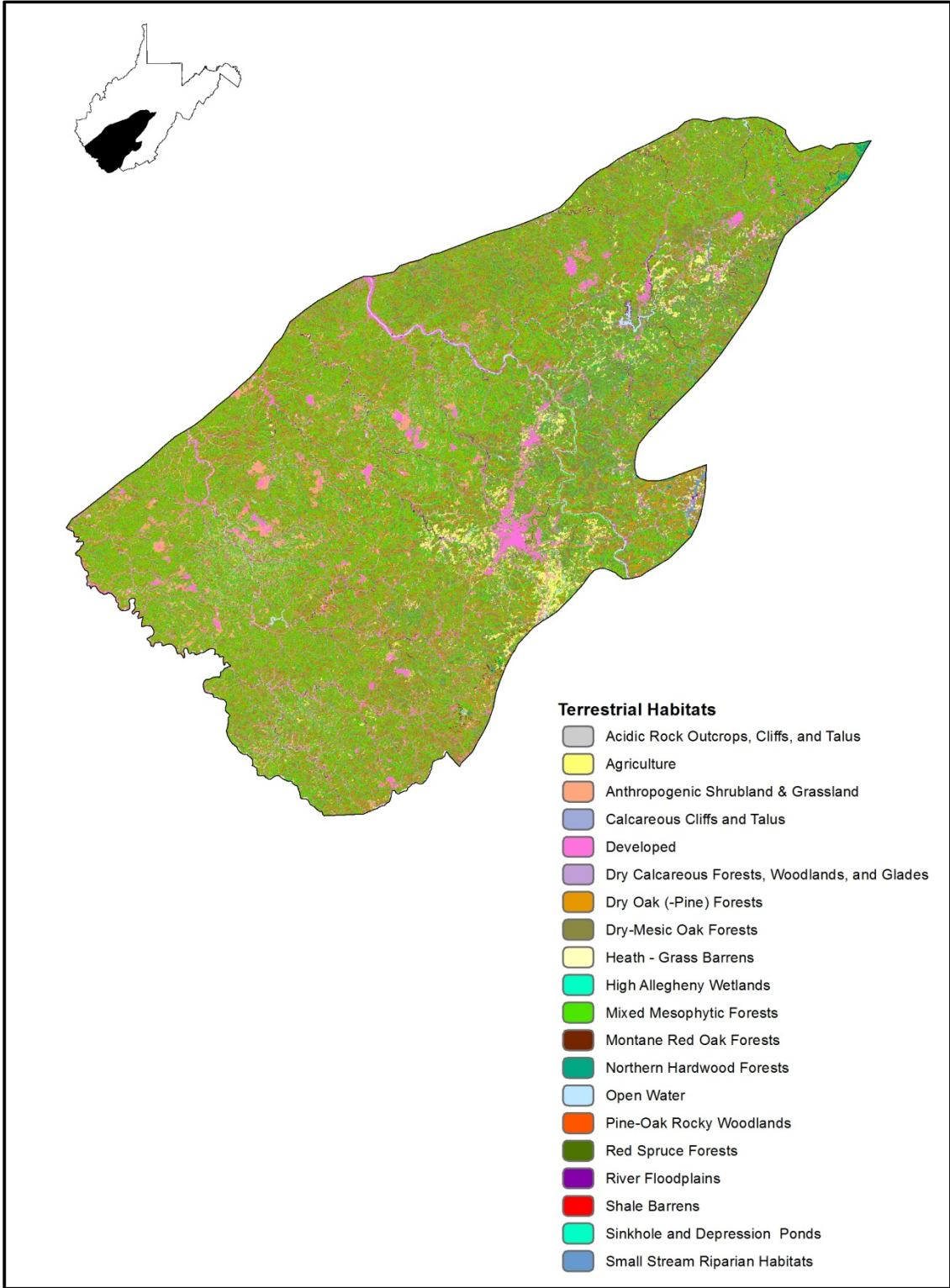
AQUATIC HABITAT SUMMARY

ECOREGION = Allegheny Mountains

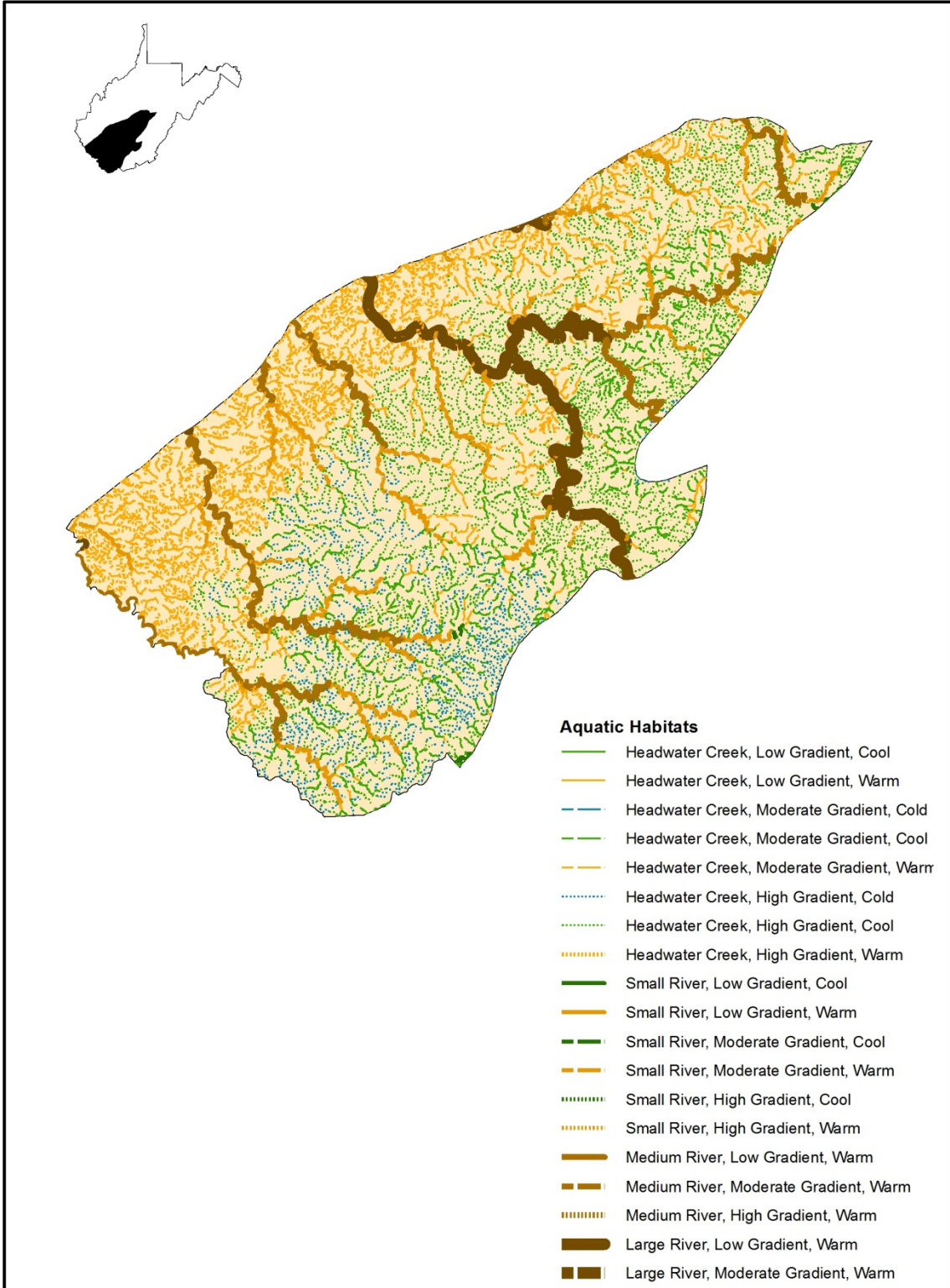
HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	12	0.15%	62.59%
Headwater Creek,Low Gradient, Warm	182	2.31%	18.80%
Headwater Creek,Moderate Gradient,Cold	67	0.85%	100.00%
Headwater Creek,Moderate Gradient,Cool	1,501	19.08%	44.61%
Headwater Creek,Moderate Gradient,Warm	115	1.47%	1.59%
Headwater Creek,High Gradient,Cold	1,677	21.31%	47.26%
Headwater Creek,High Gradient,Cool	3,222	40.95%	30.37%
Small River,Low Gradient,Cool	41	0.52%	75.51%
Small River,Low Gradient, Warm	72	0.92%	9.66%
Small River,Moderate Gradient,Cool	379	4.81%	68.59%
Small River,Moderate Gradient,Warm	179	2.28%	18.27%
Small River,High Gradient,Cool	8	0.11%	100.00%
Small River,High Gradient,Warm	8	0.10%	33.21%
Medium River, Low Gradient,Warm	108	1.37%	13.10%
Medium River,Moderate Gradient,Warm	168	2.13%	31.17%
Medium River,High Gradient,Warm	1	0.01%	11.66%
Large River,Low Gradient,Warm	83	1.06%	9.80%
Large River,Moderate Gradient,Warm	45	0.57%	28.35%
Totals	7,867		

5.4: The Cumberland Mountains Ecoregion

Terrestrial Habitats – Cumberland Mountains Ecoregion



Aquatic Habitats - Cumberland Mountains Ecoregion



5.4.1: Description

The Cumberland Mountains Ecoregion comprises about 22% of the state's area. Climate is uniformly warm and moist, with microclimatic differences related to slope position and aspect. The landscape is a highly dissected plateau of narrow valleys and low mountains with steep slopes and narrow ridges or, in some places, nearly flat plateaus cut by deep gorges. Geology is comprised of nearly level layers of sedimentary rocks, mostly sandstones and shales, but also extensive coal seams. Soils are mostly acidic, but some localized neutral soils were formed by influence of shallow calcareous deposits.

Terrestrial habitat patterns in the Cumberland Mountains Ecoregion reflect its low mountainous topography, with patches of three dominant forest habitats, Mixed Mesophytic Forests, Dry-Mesic Oak Forests and Dry Oak (- Pine) Forests, corresponding to slope position and aspect. Floodplain habitats along the New and Gauley rivers (preserved within National Parks) include globally rare floodplain forest and riverscours prairie associations which host numerous rare plant species. The New River has long been recognized as a north-south migration corridor, which may have increased importance for wildlife in lieu of climate change.

The New River is unusual because it flows north, cutting across the Appalachian Mountains, and is regarded to be one of the oldest rivers in the world. The New River bisects the Northern Cumberland Mountains ecoregion into north and south sections. The smaller northern section drains predominantly into the New River via the Gauley Basin. Rivers south of the New drain westward to the Ohio via the Tug/Big Sandy and Guyandotte River basins and to the Kanawha via the Coal River Basin. The extreme northern and northwestern areas of the ecoregion drain to the Kanawha River via the Elk River Basin. The aquatic fauna of the Cumberland Mountains Ecoregion varies greatly, from the species-rich waters of the Elk, Kanawha, Guyandotte, and Tug Fork rivers to the much less speciose areas of the Gauley and New rivers upstream of Kanawha Falls. Kanawha Falls is a significant biogeographic feature to stream fish distribution. During the inundation of the Kanawha (Teays River) Valley by Lake Tight multiple times during the Pleistocene glaciation, fishes became well-distributed within the areas covered by the lake, but many failed to advance upstream beyond the current location of Kanawha Falls. There are ten species above the falls which are not found downstream and are considered endemic to the New River. Six of these species are found within West Virginia's portion of the basin.

Human population patterns and dynamics in the ecoregion reflect the geography and economy of coal mining, with a secondary influence of tourism centered on the New and Gauley Rivers. Over most of the ecoregion population is declining and agriculture is rare. A significant portion of the land is in large to very large corporate tracts held for timber and minerals. This is a major timber producing part of the state and there is some gas production. Deep mining occurs in many areas, although it was more prevalent in the past. Extensive mountaintop removal/valley fill coal mining in the ecoregion has directly affected terrestrial and aquatic habitats by removing forests and soils and burying and polluting streams. Aquatic diversity south of the New River was arguably higher prior to the influence of industrial coal mining in the region, perhaps rivaling the Elk River or even the Clinch of the Tennessee basin to the immediate south. Some water quality parameters remain relatively good despite the presence of coal because of the high alkalinity and low sulfur content of the coal-bearing shales there. Impacts on the aquatic fauna are largely sediment-related; more recently, impacts from loss of available headwater habitat through valley fill practices have reduced refuge habitat for many small-stream species while exposing harmful heavy metals to surface waters.

Public land ownership provides some opportunities for habitat protection and restoration, especially along and near the river gorges. Corporate lands with intensive natural resource management provide

opportunities for early succession forest habitat. Mineral ownership is generally separated from surface ownership, limiting private land conservation. However, the large size of corporate ownerships can potentially enable agreements that could restore habitats, especially aquatic ones, at a significant scale. There are some existing and developing programs to maintain and improve water quality through mitigation, abandoned mine land remediation, and addressing residential wastewater.

5.4.2: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this ecoregion. See Appendix 3 for a complete list of species recorded by the WVDNR within the boundaries of each ecoregion.

SPECIES SUMMARY BY TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	11	16
Birds	25	15
Butterflies and Moths	8	7
Cave Invertebrates	1	
Crayfish	4	1
Dragonflies and Damselflies	11	19
Fish	15	18
Mammals	8	3
Mussels	19	23
Plants	39	104
Reptiles	10	9
Snails	2	19
Tiger Beetles	1	1
Totals	154	235

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Cumberland Mountains

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	69,762	2.06%	77.70%
Anthropogenic Shrubland & Grassland	87,469	2.59%	54.97%
Calcareous Cliffs and Talus	75	0.00%	0.82%
Developed	249,690	7.39%	21.92%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	580,340	17.18%	23.49%
Dry-Mesic Oak Forests	1,112,554	32.93%	22.30%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	41	0.00%	0.20%
Mixed Mesophytic Forests	1,030,420	30.50%	34.98%
Montane Red Oak Forests	1,593	0.05%	7.54%
Northern Hardwood Forests	5,876	0.17%	0.59%
Pine-Oak Rocky Woodlands	824	0.02%	1.08%
Red Spruce Forests	27	0.00%	0.01%
River Floodplains	17,826	0.53%	14.83%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	105,760	3.13%	21.40%
Unresolved	952	0.03%	0.82%
Totals	3,263,211		

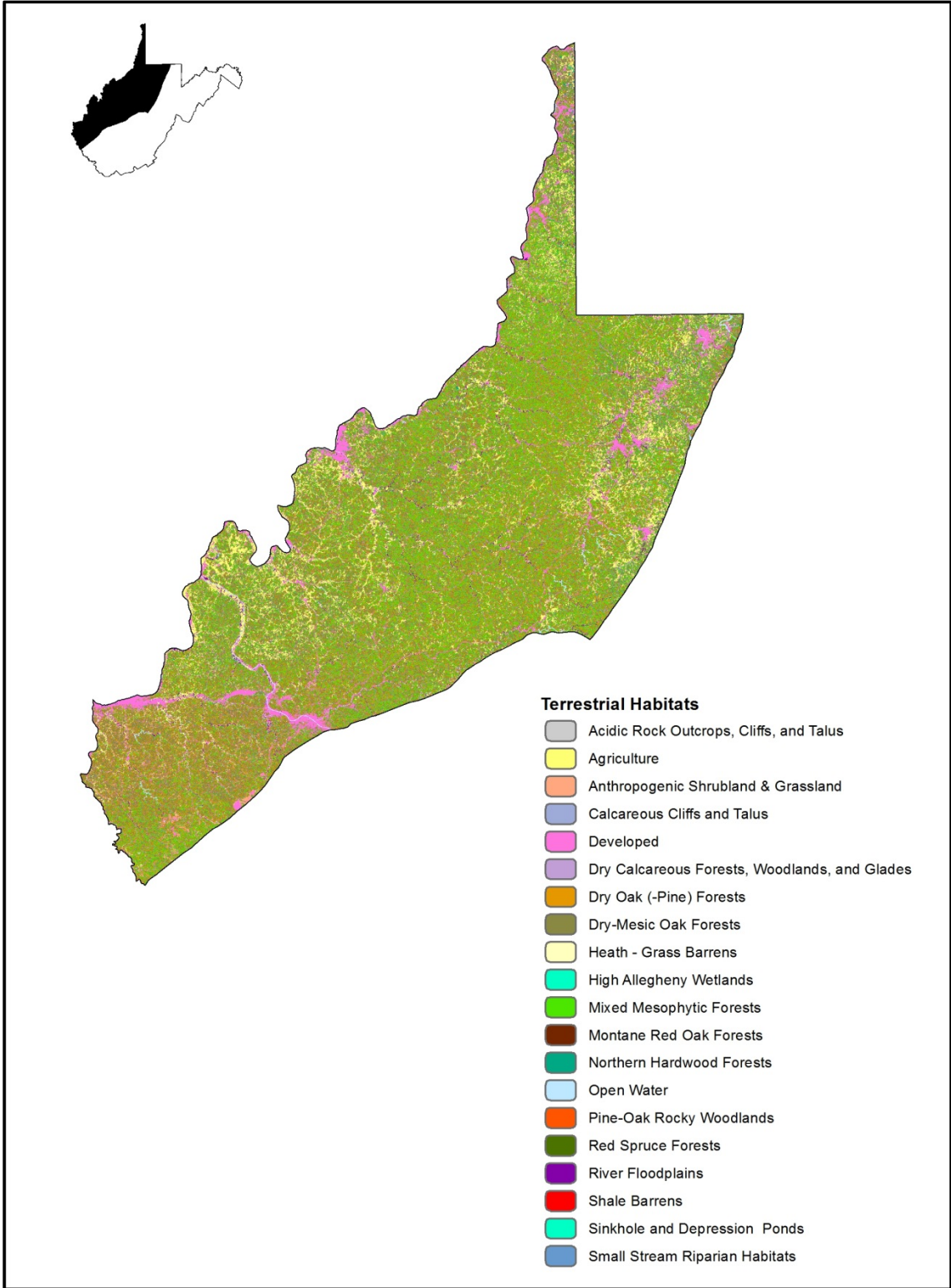
AQUATIC HABITAT SUMMARY

ECOREGION = Cumberland Mountains

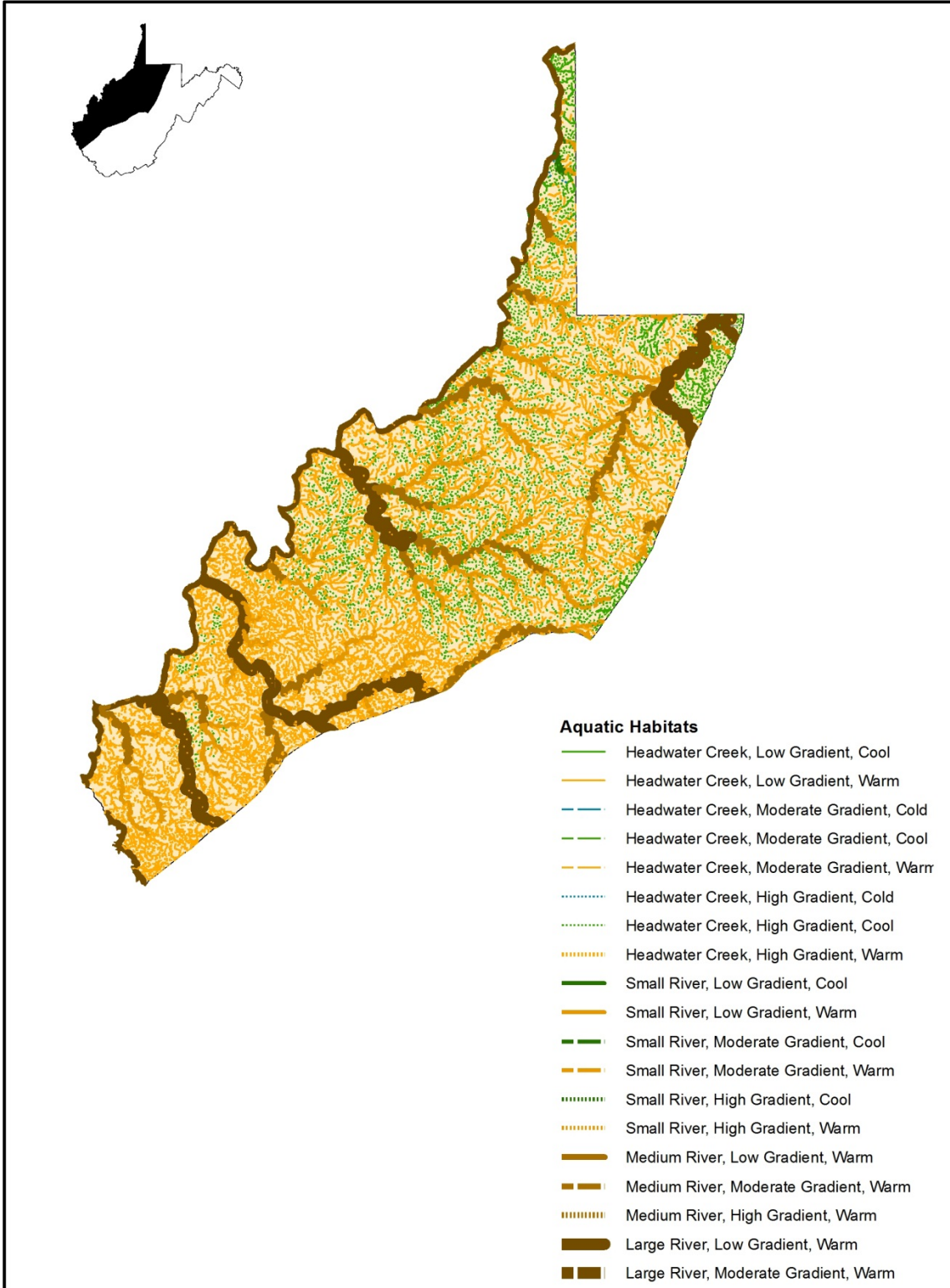
HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	4	0.06%	21.18%
Headwater Creek,Low Gradient, Warm	115	1.63%	11.92%
Headwater Creek,Moderate Gradient,Coo	756	10.68%	22.49%
Headwater Creek,Moderate Gradient,War	1,115	15.75%	15.40%
Headwater Creek,High Gradient,Cold	748	10.56%	21.08%
Headwater Creek,High Gradient,Cool	2,552	36.05%	24.05%
Headwater Creek,High Gradient,Warm	861	12.16%	40.82%
Small River,Low Gradient,Cool	2	0.04%	4.63%
Small River,Low Gradient, Warm	73	1.03%	9.72%
Small River,Moderate Gradient,Cool	22	0.31%	4.01%
Small River,Moderate Gradient,Warm	343	4.84%	34.98%
Small River,High Gradient,Warm	13	0.19%	56.24%
Medium River, Low Gradient,Warm	179	2.53%	21.71%
Medium River,Moderate Gradient,Warm	150	2.11%	27.76%
Medium River,High Gradient,Warm	3	0.05%	77.97%
Large River,Low Gradient,Warm	97	1.37%	11.43%
Large River,Moderate Gradient,Warm	45	0.64%	28.42%
Totals	7,079		

5.5: The Western Allegheny Plateau Ecoregion

Terrestrial Habitats – Western Allegheny Plateau Ecoregion



Aquatic Habitats – Western Allegheny Plateau Ecoregion



5.5.1: Description

The Western Allegheny Plateau Ecoregion comprises about 39% of the state's area and ranges from the foothills of the Allegheny Mountains west to the Ohio River and includes the entire Northern Panhandle. It has the lowest mean elevation of any ecoregion in the state and the lowest range in elevation. Climate is rather uniformly warm and moist, but with a small latitudinal temperature gradient and slightly dryer areas in the far west and far north. The landscape is a highly dissected plateau of low hills. Geology is comprised of nearly level layers of sedimentary rocks, mostly sandstones and shales. Soils are mostly acidic, but some very localized neutral soils were formed by influence of shallow calcareous deposits.

Terrestrial habitat patterns in the Western Allegheny Plateau reflect its low, hilly topography, with tessellated zones and small patches of three forest habitats, Mixed Mesophytic Forest, Dry-Mesic Oak Forest and Dry Oak (- Pine) Forests, corresponding to slope position and aspect. Most floodplains and flooding regimes have been highly modified by human activities, but small remnants of natural River Floodplains and Small Riparian Habitats persist, mostly where they are too wet for economic exploitation.

The Western Allegheny Plateau of West Virginia drains entirely to the Ohio River via many river outlets. Northern areas drain to the Monongahela River and directly to the Ohio by smaller creek basins. The western portion of the state is drained mostly by Middle Island Creek, Little Kanawha River, Kanawha River, Guyandotte River, Twelvepole Creek, and Big Sandy River. All modified-channel, navigable lock and dam-controlled rivers occur in this ecoregion: the Ohio, Monongahela, Kanawha (with the exception of the Marmet and London pools), and Big Sandy rivers.

The highest diversity of fishes and mussels in West Virginia occur in the Western Allegheny Plateau due to the influence of the ancient Teays River system and subsequent flooding of what we now regard as the Kanawha and Teays valleys by glacial Lake Tight which formed as Pleistocene glaciers advanced southward about two million years ago. Water quality is generally good throughout the ecoregion, with high alkalinity and productivity. The exception is the Monongahela River basin. Due to historic coal mining practices in high sulfur coal seams, many streams in the northeastern part of the Western Allegheny Plateau have been subjected to ongoing acidification from unmitigated mine drainage. Some streams have seen restoration from mining impacts in recent generations, and the effort continues to expand, but more commonly than not, the aquatic diversity and productivity never return to historic levels. Riparian and upland areas consist of a considerable proportion of colloidal materials, resulting in elevated turbidity at all flow levels and increased risk of sedimentation with the least amount of ground disturbance.

There is a long history of human settlement and abundant evidence of pre-historical human occupation. Today this ecoregion has the highest population of any in the state and includes the state's seven most populous cities. Population centers are scattered throughout the ecoregion in river valleys. Agriculture is widely scattered, but also is most significant in the river valleys. Surface mining has been widespread, but deep mining is prevalent and increasing in the northern half of the ecoregion. Coal mining in the eastern part of this ecoregion has had a huge negative impact on aquatic habitats due to acid mine drainage. Historically, oil and traditional gas development were important. In the last decade there has been a boom in shale gas exploration and development in the northern part of the ecoregion, leading to rapidly changing land use and demographic patterns, even in rural areas. Locally, there are some large corporate ownerships. Other private forestlands are mostly held for timber and mineral production, or recreation (especially hunting).

Corporate lands with intensive natural resource management provide opportunities for early succession forest habitat. Mineral ownership is generally separated from surface ownership, limiting private land conservation. There are some existing and developing programs, including local watershed groups, to maintain and improve water quality through mitigation, abandoned mine land remediation, and addressing residential wastewater. The development of the shale gas industry is still “young enough” that pre-development planning by the industry could avoid and minimize many potential impacts on wildlife and wildlife habitat. Several major academic/research institutions occur in the ecoregion, with Marshall and West Virginia universities being the largest.

5.5.2: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this ecoregion. See Appendix 3 for a complete list of species recorded by the WVDNR within the boundaries of each ecoregion.

SPECIES SUMMARY BY TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	9	16
Birds	31	24
Butterflies and Moths	12	7
Cave Invertebrates	1	3
Crayfish	3	1
Dragonflies and Damselflies	13	26
Fish	18	25
Mammals	5	7
Mussels	22	28
Plants	17	82
Reptiles	13	10
Snails	2	29
Tiger Beetles	1	3
Totals	147	261

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Western Allegheny Plateau

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	3,236	0.05%	3.60%
Anthropogenic Shrubland & Grassland	60,878	1.03%	38.26%
Calcareous Cliffs and Talus	1,084	0.02%	11.77%
Developed	534,561	9.04%	46.94%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	1,023,212	17.30%	41.41%
Dry-Mesic Oak Forests	2,092,625	35.38%	41.94%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	1,423,234	24.06%	48.31%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	4,096	0.07%	0.41%
Pine-Oak Rocky Woodlands	88	0.00%	0.11%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	46,883	0.79%	39.00%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	163,629	2.77%	33.10%
Unresolved	469	0.01%	0.40%
Totals	5,353,994		

AQUATIC HABITAT SUMMARY

ECOREGION = Western Allegheny Plateau

HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	636	4.81%	65.78%
Headwater Creek,Moderate Gradient,Coo	233	1.76%	6.93%
Headwater Creek,Moderate Gradient,War	5,645	42.63%	77.93%
Headwater Creek,High Gradient,Cold	6	0.05%	0.17%
Headwater Creek,High Gradient,Cool	3,446	26.02%	32.48%
Headwater Creek,High Gradient,Warm	1,246	9.41%	59.10%
Small River,Low Gradient,Cool	1	0.01%	1.69%
Small River,Low Gradient, Warm	575	4.34%	77.03%
Small River,Moderate Gradient,Cool	14	0.10%	2.49%
Small River,Moderate Gradient,Warm	346	2.61%	35.28%
Small River,High Gradient,Warm	2	0.02%	10.43%
Medium River, Low Gradient,Warm	430	3.25%	52.15%
Medium River,Moderate Gradient,Warm	56	0.42%	10.36%
Medium River,High Gradient,Warm	0	0.00%	10.37%
Large River,Low Gradient,Warm	569	4.30%	66.90%
Large River,Moderate Gradient,Warm	37	0.28%	23.45%
Totals	13,244		

5.6: Stresses at the Ecoregional Scale

Stresses on species and habitats were extensively discussed in Chapter 4. Several of those stresses are so closely associated with specific ecoregions in West Virginia that they are worthy of mention at this scale. Specific conservation actions are not presented here as the WVDNR believes that the appropriate actions for these stresses are identified at the broad scale in Chapter 4 or at the finer scale of Conservation Focus Areas presented in Chapter 6. Ecoregional stresses are presented here for context and in transition from broad-scale actions (Chapter 4) to fine-scale actions (Chapter 6).

5.6.1: Energy Development

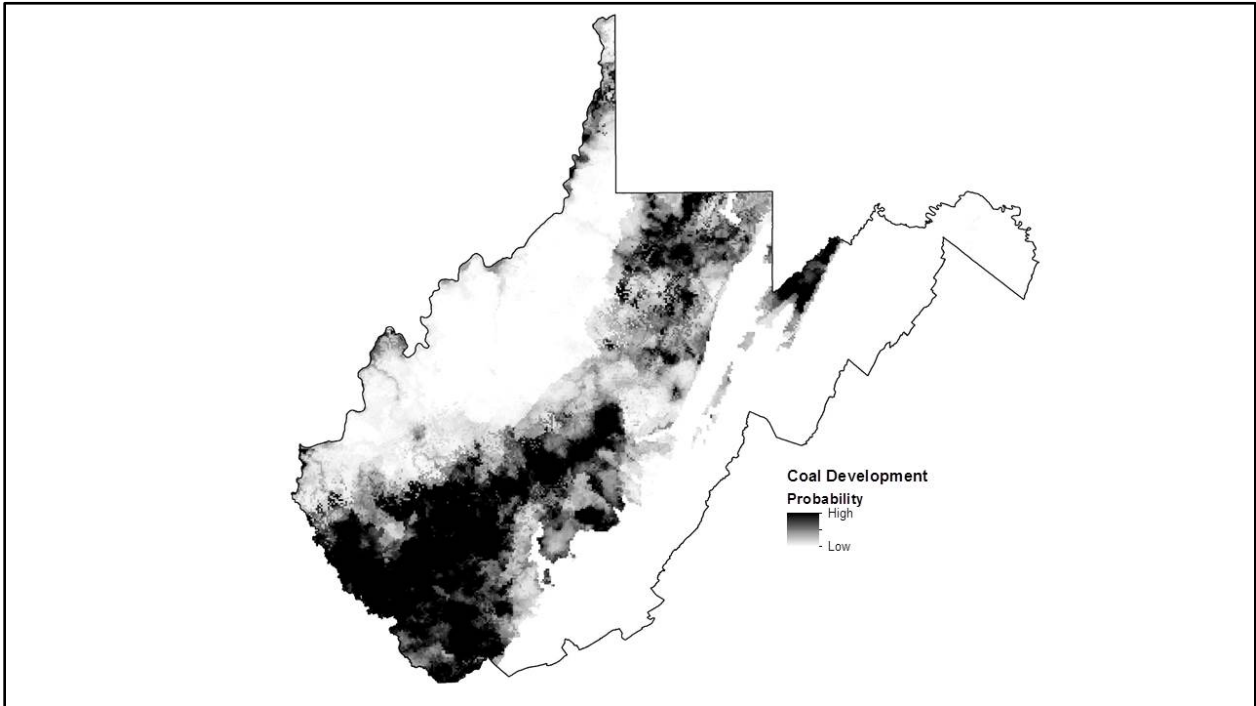
Energy development has long been, and continues to be, a dominant industry in West Virginia. Looking forward, the probability of further energy development varies geographically across and with industry segments, i.e., coal vs. shale gas vs. windpower. Energy development probabilities were modeled for The Appalachian Landscape Conservation Cooperative by The Nature Conservancy specifically for use by states preparing their SWAPs. Predictive mapping generated by these models is included here.

Future coal development follows the historic patterns in West Virginia. In the Cumberland Mountains, the most economically valuable seams have largely been mined and annual coal production has peaked. However, there will continue to be significant surface mining and some deep mining. With the widespread adoption of technology to address sulfur pollution at power plants, mining is likely to increase in the Western Allegheny Plateau in northern West Virginia's higher sulfur coal seams, especially through deep mining.

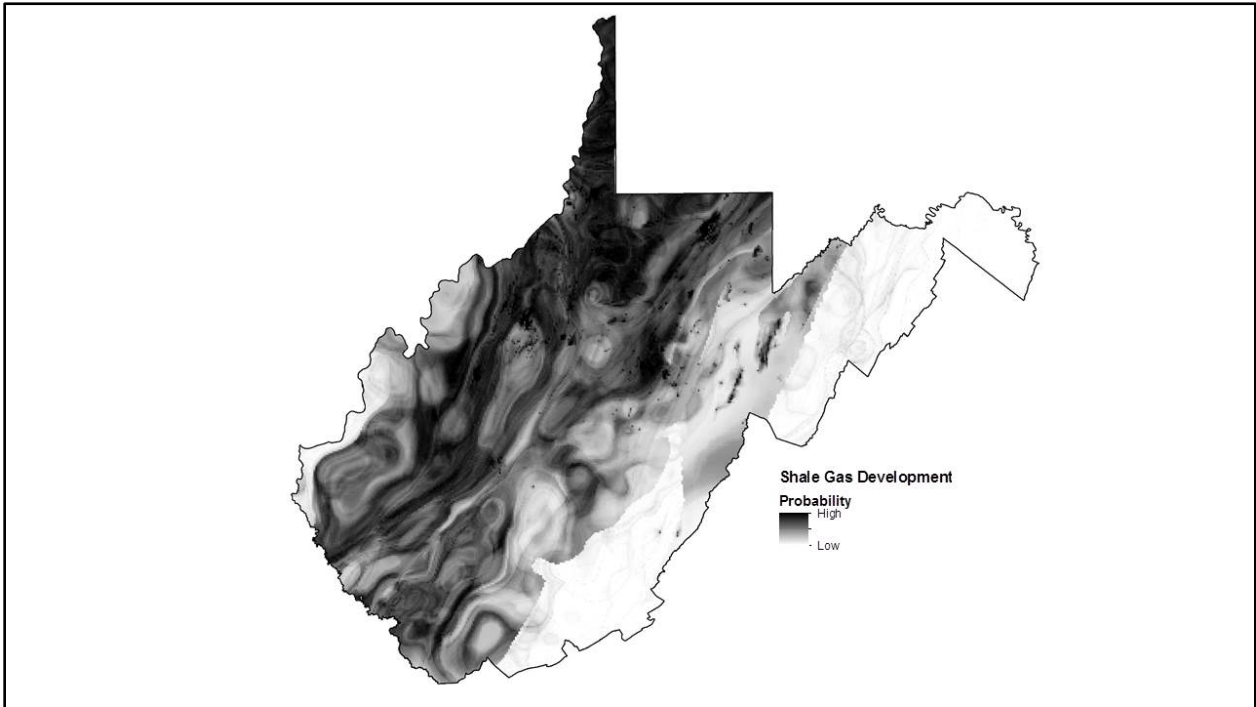
Shale gas development is increasing most rapidly in the Western Allegheny Plateau, especially in the northwestern portion of the State. There may be some shale development in the Cumberland Mountains and northern Allegheny Mountains as well.

Industrial wind energy development is most likely in the High Allegheny Mountains but may also occur in portions of the Cumberland Mountains and Ridge and Valley. (Note that the wind energy development model includes current infrastructure availability as a component, which may underestimate the likelihood of wind energy development in the Allegheny Mountains where there currently is less infrastructure in place.)

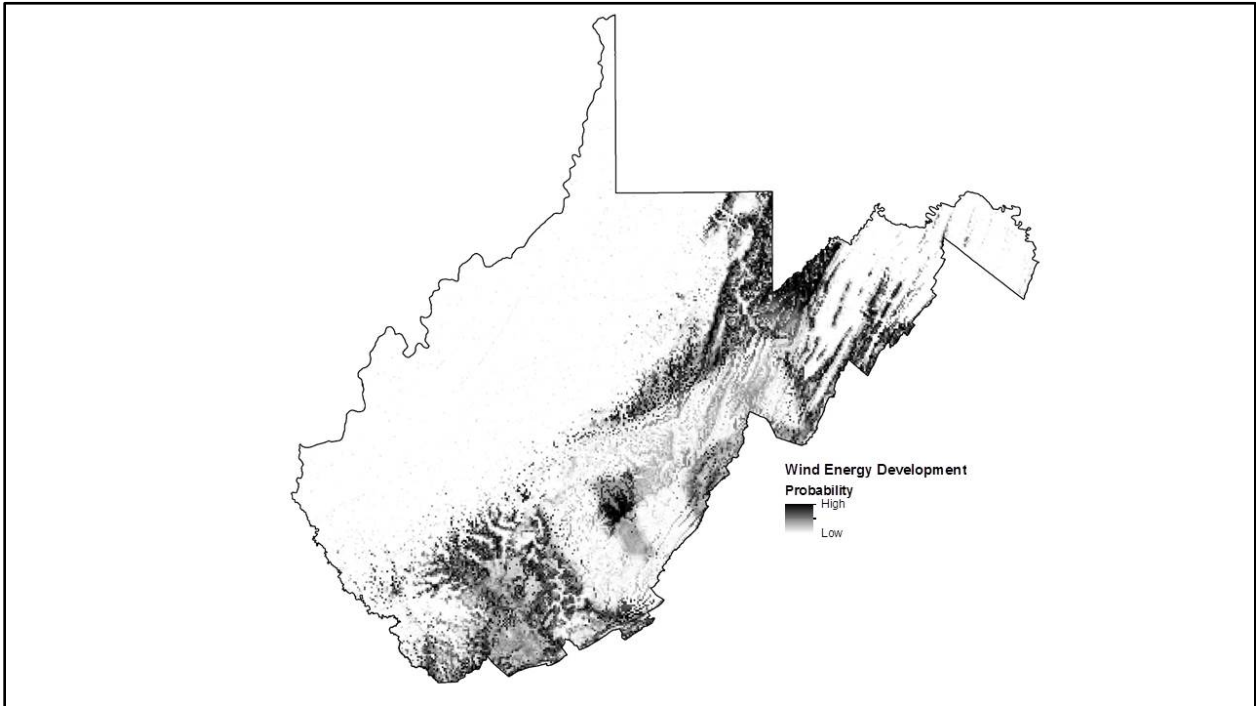
Future Coal Development Probability in West Virginia



Future Shale Gas Development Probability in West Virginia



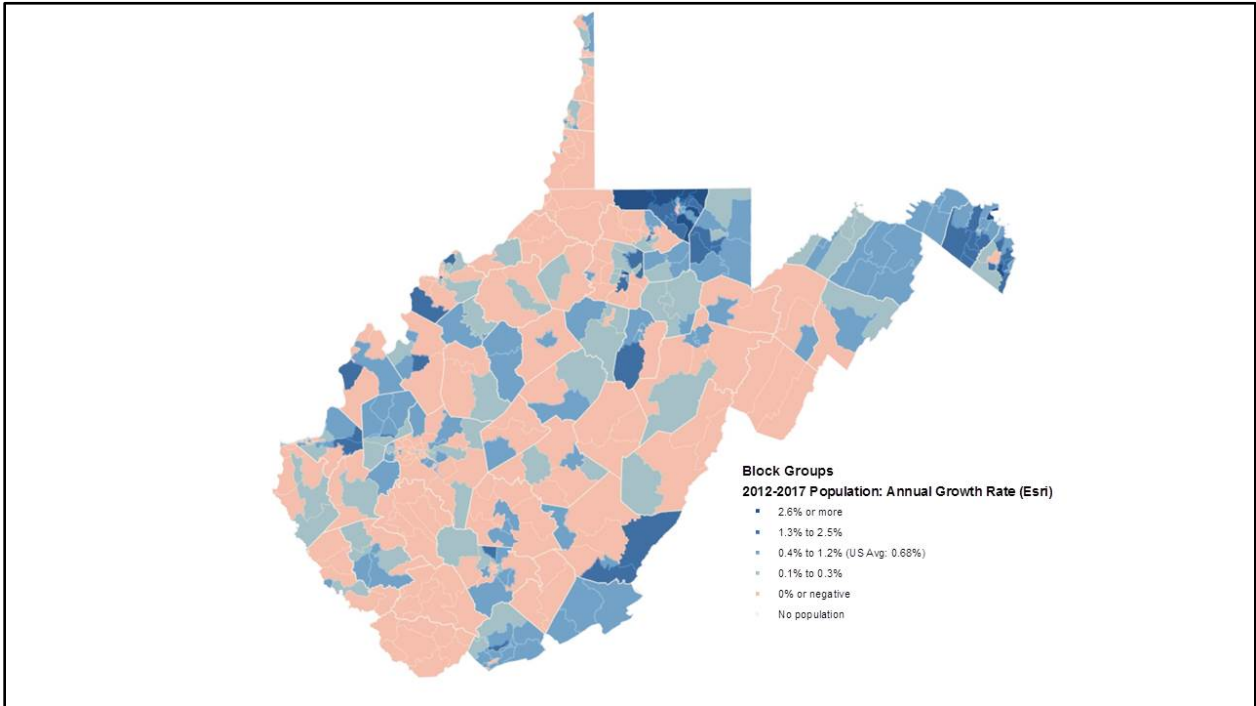
Future Windpower Development Probability in West Virginia



5.6.2: Population Growth

As with energy development, the probability of significant population growth, and the probability of associated commercial and residential development, varies by location in the state. Population change through 2017, as modeled by ESRI using United States Bureau of Census data, is presented here to illustrate probable areas of commercial and residential development in the state. Population growth is expected to be most substantial in portions of the Ridge and Valley, north-central and western Western Allegheny Plateau, and northern and southern extremes of the Allegheny Mountains.

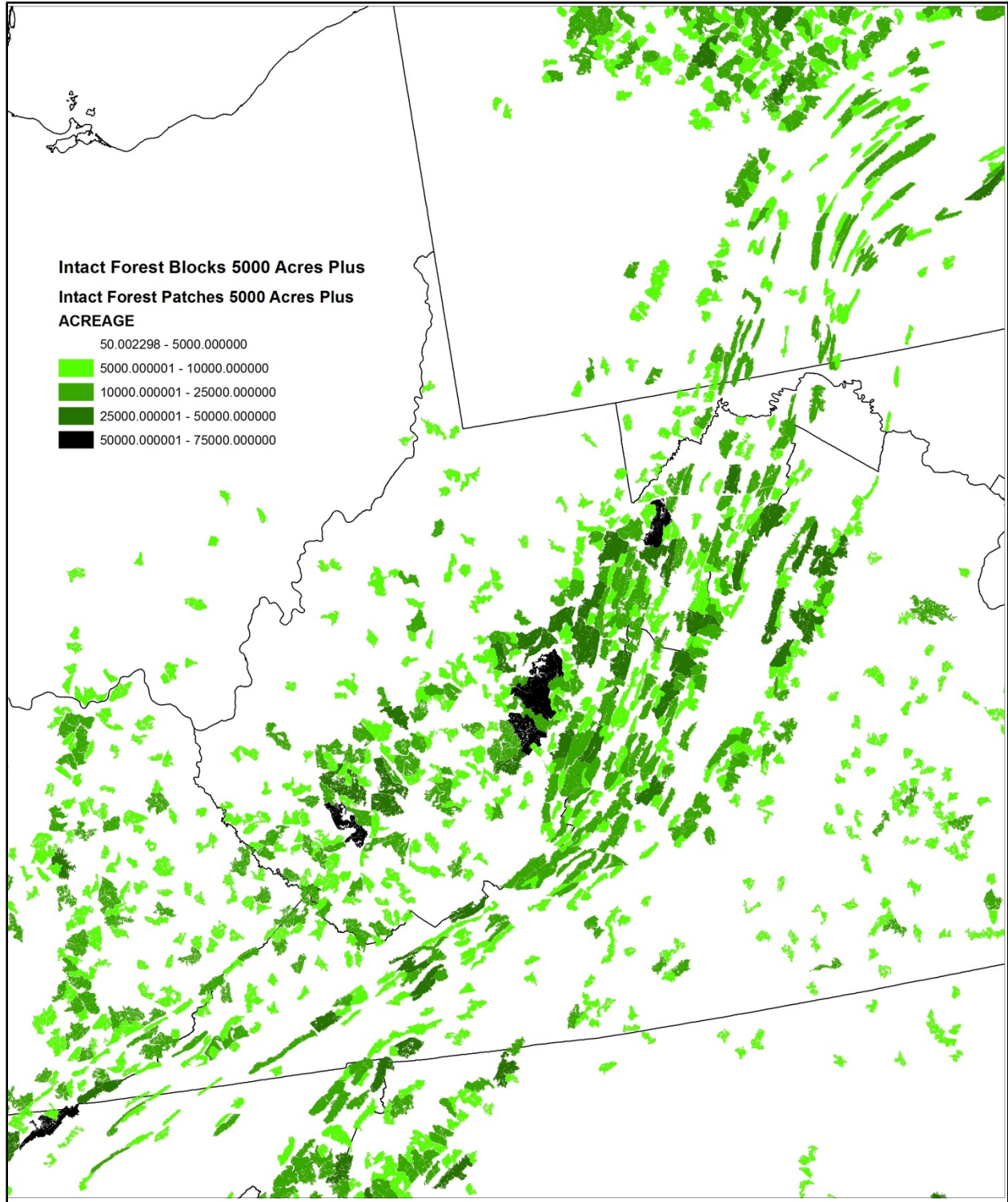
Projected Population Change (%) for West Virginia



5.6.3: Forest Fragmentation

West Virginia is the third most heavily forested state in the nation, behind only Maine and New Hampshire. Forests cover 78 percent (12 million acres) of the state’s 15.4 million acres. Compared to most areas of the mid-Atlantic region, large blocks of relatively intact forest remain in the Appalachians, including West Virginia, contributing significantly to the regional and state diversity of wildlife and plant species. Development, energy extraction, transmission lines, roads, and other land uses continue to fragment many of the remaining blocks. As these blocks of intact forestland change ownership in the future, parcelization will undoubtedly mean more blocks will become smaller and more fragmented. This is both a regional and state concern. The Nature Conservancy has mapped these large forest blocks at a multi-state regional scale and for West Virginia. Once again, these large forest blocks are unevenly distributed across ecoregions in West Virginia. The greatest number and most extensive blocks occur in the mountainous areas, primarily on public land in the Allegheny Mountains and Ridge and Valley. There are quite a few forest blocks in the Cumberland Mountains, where most are on large corporate properties. It is possible that some of these have been very recently fragmented by coal mining. In the Western Allegheny Plateau, forest blocks are relatively rare and not as large as elsewhere in the State.

Distribution of Large Intact Forest Blocks in West Virginia and Surrounding States



Chapter 6: Conservation Focus Areas

6.1: Introduction

Throughout West Virginia, species and habitats frequently occur together within certain places due to shared geographical contexts of their natural habitat distribution, biogeography, and effects of land use. For example, cave-dwelling species are found in areas with extensive limestone at or near the surface and forest interior birds are often more abundant where public lands provide extensive, unfragmented forest cover. These places also have geographically linked stresses and conservation actions. Conservation Focus Areas (CFAs) are a set of these geographies which have been identified across West Virginia. Investing conservation resources in the CFAs can potentially be more efficient, effective, and provide more opportunities for ensuring successful outcomes. This chapter describes the conservation contexts of each CFA, along with stresses, conservation actions, and conservation opportunities unique or distinctive to it. Conservation Focus Areas often will be important stages for addressing statewide stresses and conservation actions in addition to those mentioned here. It is envisioned that conservation actions will be prioritized and specific tasks and measurable outcomes fully defined for most State Wildlife Action Plan (SWAP)-based activities in West Virginia at the CFA level. Therefore, future planning at the CFA level will be necessary to fully implement successful conservation.

6.1.1: Outside of Conservation Focus Areas

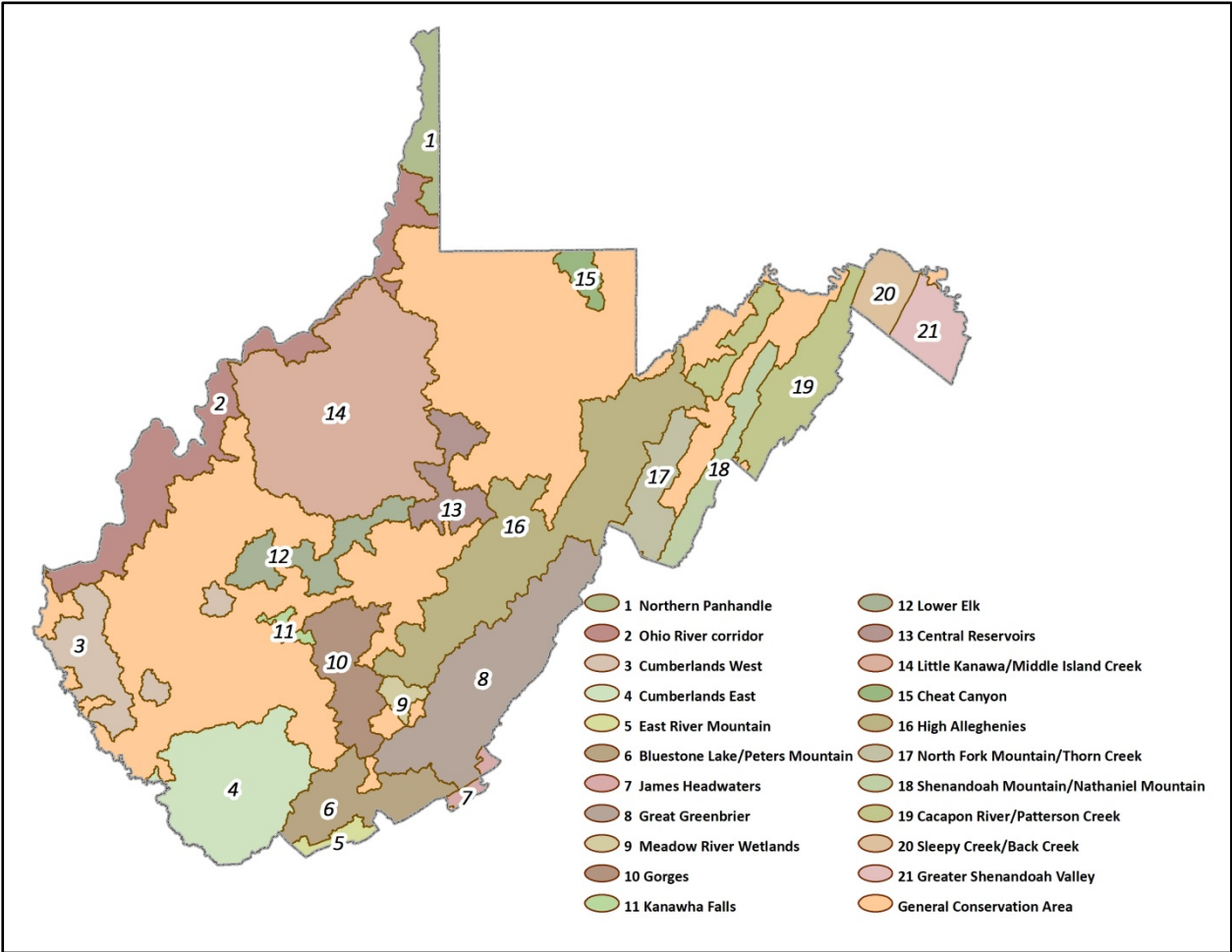
Not all Species of Greatest Conservation Need (SGCN) are found within CFAs. Animals and plants of conservation concern occur throughout West Virginia. Some of West Virginia's most important wildlife habitats, such as Cranesville Swamp and Dunkard Creek, occur outside of CFAs. The protection and restoration of some species requires that certain conservation actions will need to be undertaken outside of CFAs. Partners, especially locally based organizations, can play important roles in advancing conservation in these areas. Additionally, some conservation actions, such as policy actions, will broadly benefit wildlife populations both within and outside of CFAs.

6.1.2: Notes on CFA Maps in this Chapter

Maps of terrestrial habitats presented in this chapter for individual CFAs show all mapped and classified terrestrial habitats within the boundaries of each CFA. The West Virginia Division of Natural Resources (WVDNR) has conducted some preliminary mapping of high-priority habitats within CFAs. Because that process is incomplete, mapping is not presented here. It will be completed as part of the planning process for each CFA and will be presented as part of individual CFA plans which will follow the West Virginia SWAP.

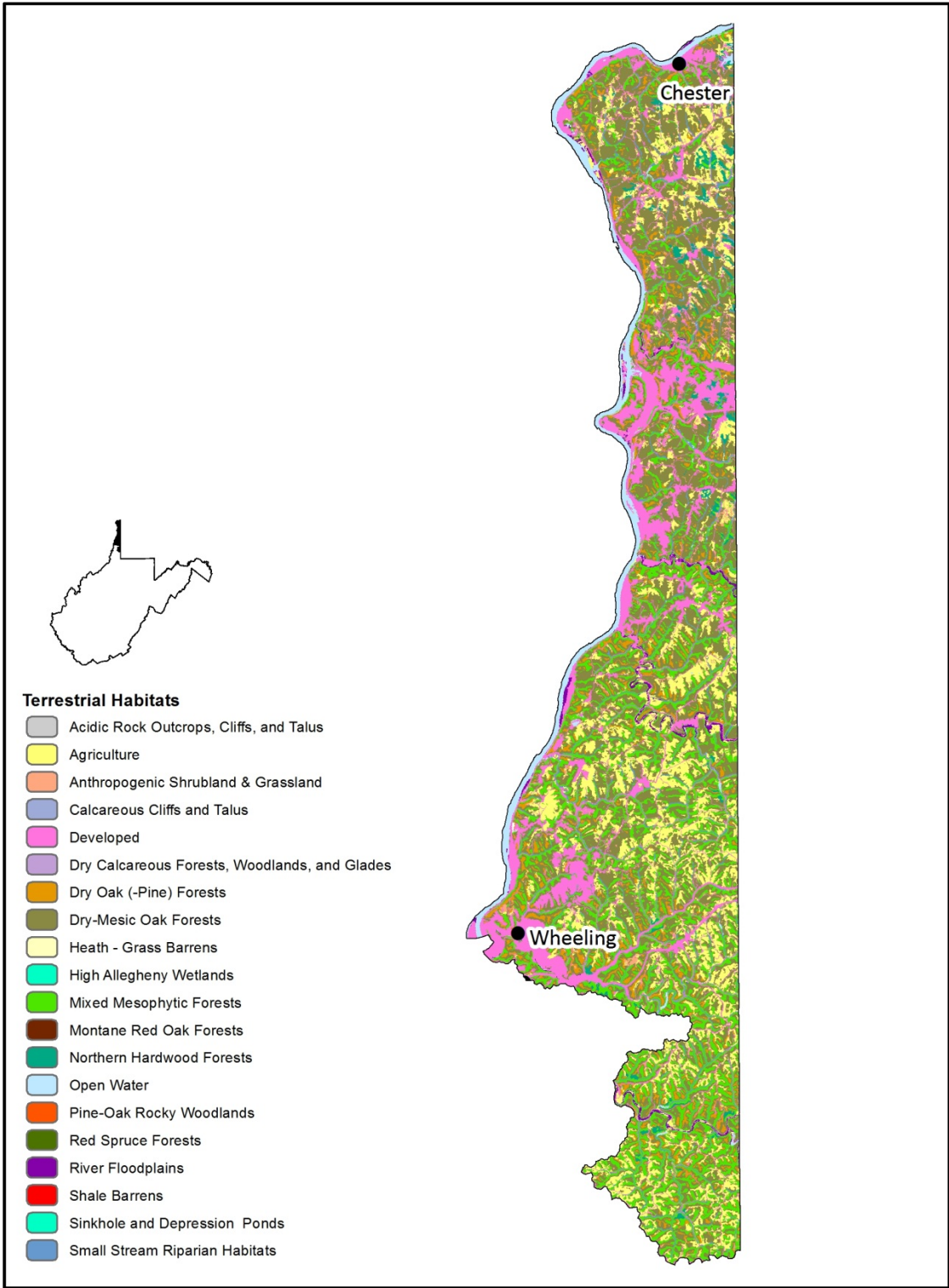
On an additional note, the separate processes that generated the terrestrial and aquatic habitat mapping for the West Virginia SWAP have produced an effect that is particularly apparent at the CFA level and merits some explanation. One will note that aquatic habitat maps in this chapter and elsewhere do not include a classification for lakes and reservoirs. The Northeast Aquatic Habitat Classification System (NEAHCS) and mapping used for the West Virginia SWAP included only rivers and streams, not lakes and reservoirs. The terrestrial habitat mapping did, however, include mapping for Open Water. The reservoirs that do not appear on aquatic habitat maps in this chapter do appear on the terrestrial habitat maps.

West Virginia SWAP Conservation Focus Areas

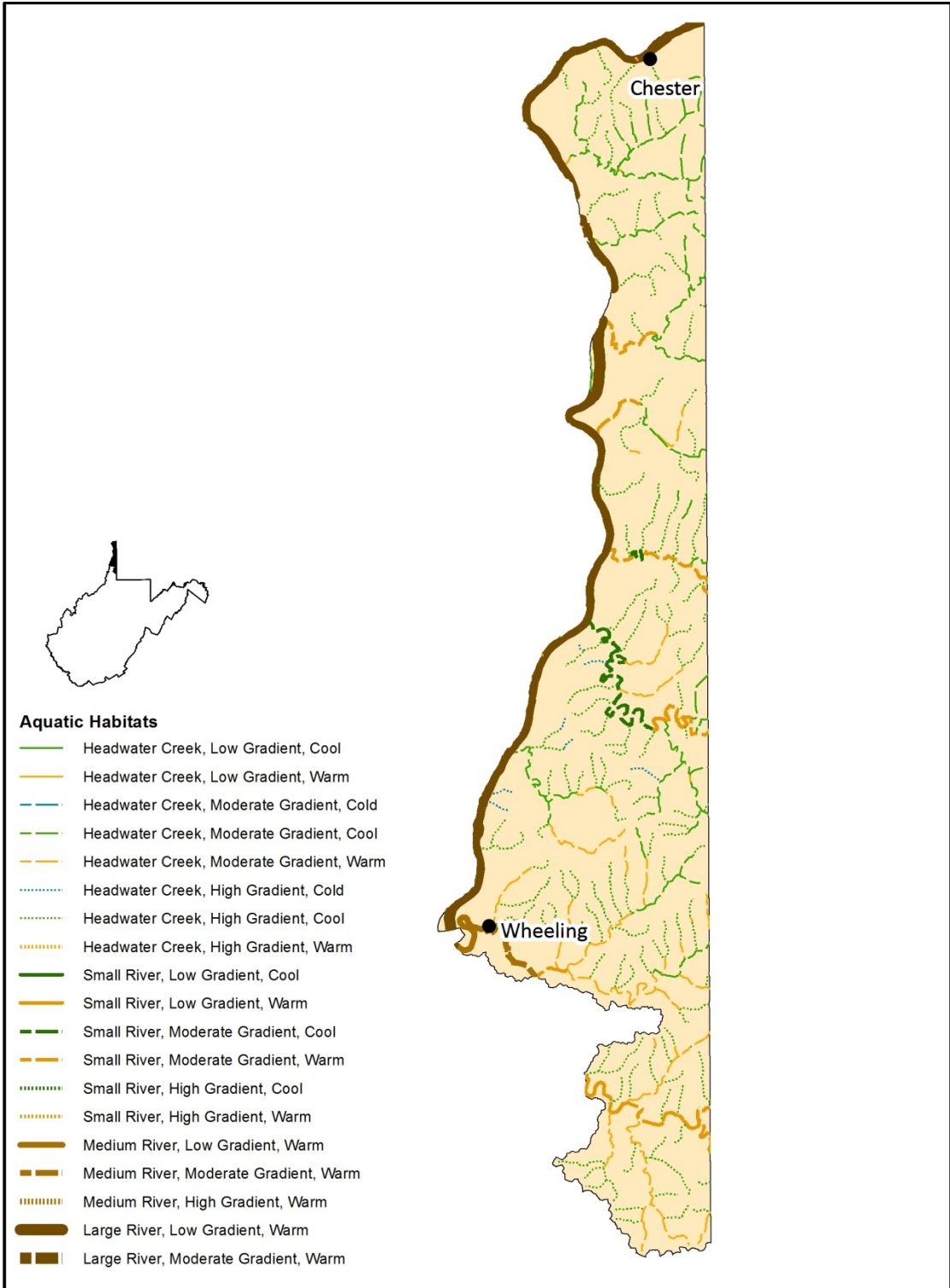


6.2: Northern Panhandle CFA

Northern Panhandle CFA – Terrestrial Habitats



Northern Panhandle CFA- Aquatic Habitats



6.2.1: Description

In the Western Allegheny Plateau Ecoregion, the Northern Panhandle CFA covers most of West Virginia's Northern Panhandle from Hancock County southward into Marshall County, including the northern reaches of the Ohio River. The Ohio River floodplain at 650 to 700 feet in elevation meets bluffs and rolling hills that rise to 1300 feet which are dissected by numerous tributaries that cut through sandstone, coal, and small areas of limestone. The larger tributaries of the Ohio River that make up this CFA originate in Pennsylvania. The original matrix of deciduous forests has been significantly fragmented into smaller forest patches mostly by ridgetop agricultural areas, reclaimed surface mines, suburban housing, and urban areas. The floodplain and adjacent areas along the Ohio River typically have intense residential, urban, and industrial development, including two large cities: Wheeling and Weirton. Horizontal gas drilling and associated infrastructure are increasing. The mainstem of the Ohio River is completely controlled by locks and dams for navigation.

6.2.2: Significant Wildlife Values

As elsewhere in West Virginia (see 6.3), the Ohio River and its tributaries (especially Wheeling and Buffalo creeks) provide significant aquatic habitat for 30 known SGCN mussel species (with additional species regularly being re-discovered), 17 SGCN fish, and Eastern Hellbender (*Cryptobranchus alleganiensis*). Forested areas provide important summering habitat for the federally listed Indiana Bat (*Myotis sodalis*) and Northern Long-eared Bat (*Myotis septentrionalis*), which has not declined here from White-Nose Syndrome (WNS) as much as it has elsewhere. Anthropogenic grassland areas, predominantly found on bluffs and ridges are among the most extensive in the Western Allegheny Plateau Ecoregion of West Virginia.

6.2.3: Distinctive Stresses

Sand and gravel dredging is still permitted in the upper Ohio River (with the current permit expiring in 2017). Altered flow, pre-Clean Water Act (CWA) water quality degradation, and intensive industrial and other development occur along the mainstem Ohio River. Natural gas development and infrastructure can fragment and destroy forest habitat.

6.2.4: Conservation Actions

- Reconnect fragmented river habitat by modifying operational regimes to improve aquatic organism passage.
- Implement approaches that assure stream segments with high water quality are maintained.
- Limit disturbances to the river bottom.
- Incorporate steps to reduce forest habitat loss and fragmentation in planning for gas well developments, as well as associated infrastructure.

6.2.5: Conservation Opportunities

- Key WVDNR Partners: West Virginia Department of Environmental Protection (WVDEP), United States Army Corps of Engineers (USACOE), Oglebay Good Zoo, numerous large corporate landowners along the Ohio River, United States Fish and Wildlife Service (USFWS), Ohio River Valley Sanitation Commission (ORSANCO).

- Public Lands: Hillcrest, Cross Creek, Castleman Run, Burches Run, Bear Rocks, and Dunkard Fork wildlife management areas (WMAs), Tomlinson Run State Park, and the Ohio River Islands National Wildlife Refuge (ORINWR).

This section of the mainstem Ohio River has great potential for mussel restoration in those areas that are not impacted by commercial sand and gravel dredging. Additional improvements in water quality are needed and stream segments with high water quality need to be maintained.

6.2.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	2	9
Birds	20	12
Butterflies and Moths	1	1
Cave Invertebrates		1
Dragonflies and Damselflies		4
Fish	5	12
Mammals	2	
Mussels	11	19
Plants	1	12
Reptiles	2	4
Snails		5
Totals	44	79

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Northern Panhandle

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	145	0.07%	0.16%
Agriculture	29,995	14.27%	2.09%
Anthropogenic Shrubland & Grassland	4,263	2.03%	2.68%
Calcareous Cliffs and Talus	48	0.02%	0.52%
Developed	32,288	15.36%	2.83%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	10,130	4.82%	0.41%
Dry-Mesic Oak Forests	75,652	35.99%	1.52%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	38,316	18.23%	1.30%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	2,952	1.40%	0.30%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	1,958	0.93%	1.63%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	5,842	2.78%	1.18%
Unresolved	8,634	4.11%	7.40%
Totals	210,223	100.00%	

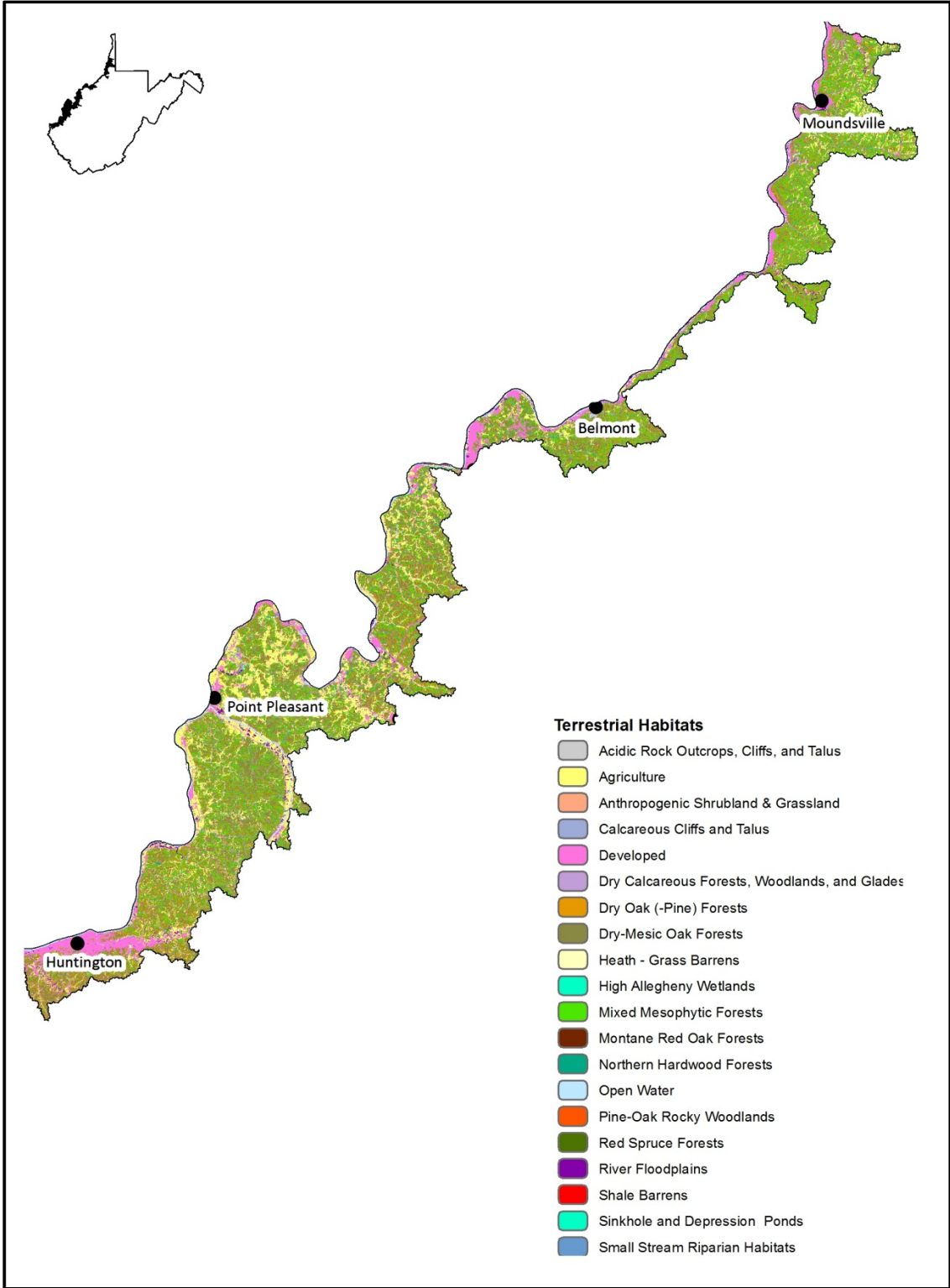
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Northern Panhandle

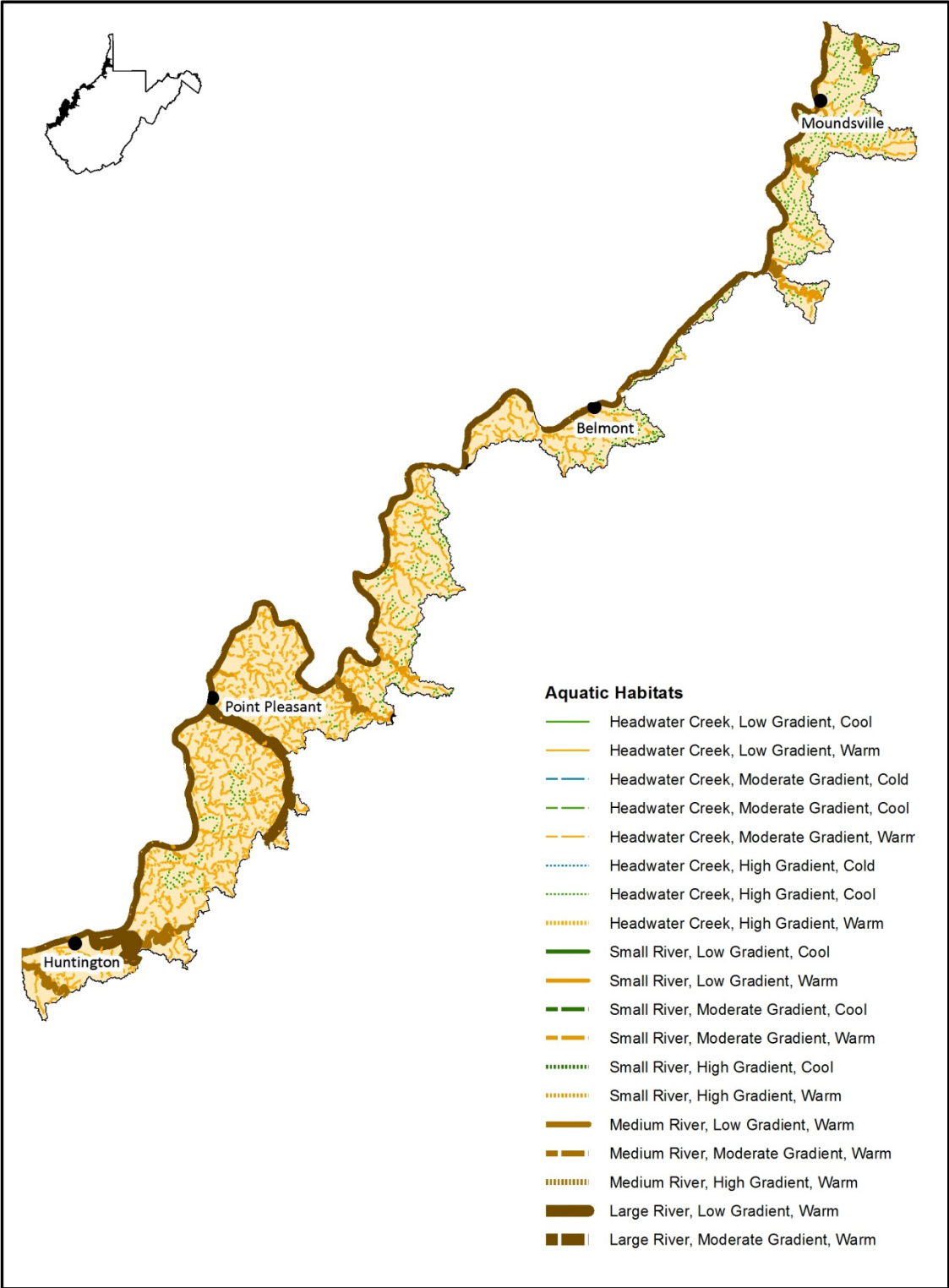
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	2	0.52%	0.44%
Headwater Creek,Moderate Gradient,Cool	93	19.87%	4.24%
Headwater Creek,Moderate Gradient,Warm	69	14.66%	1.76%
Headwater Creek,High Gradient,Cold	6	1.30%	0.21%
Headwater Creek,High Gradient,Cool	190	40.61%	3.03%
Small River,Low Gradient,Cool	1	0.19%	2.40%
Small River,Low Gradient, Warm	9	1.96%	2.00%
Small River,Moderate Gradient,Cool	14	2.94%	2.95%
Small River,Moderate Gradient,Warm	25	5.43%	4.69%
Medium River, Low Gradient,Warm	4	0.84%	0.82%
Medium River,Moderate Gradient,Warm	4	0.83%	1.12%
Large River,Low Gradient,Warm	50	10.59%	8.53%
Large River,Moderate Gradient,Warm	1	0.26%	1.13%
Totals	468	100.00%	

6.3: Ohio River Corridor CFA

Ohio River Corridor CFA - Terrestrial Habitats



Ohio River Corridor CFA - Aquatic Habitats



6.3.1: Description

The Ohio River Corridor CFA extends for over 200 miles, following the meanders of the Ohio River and also encompassing many of its shorter tributaries, which originate in West Virginia. Completely within the Western Allegheny Plateau Ecoregion, the Ohio River is West Virginia's largest river. Although forming the State's border with Ohio, this portion of the river is entirely within West Virginia. Historically consisting of complex habitats of riffle, runs and pools, the Ohio is now fully constrained by six locks and dams and is heavily used for commercial navigation. Extending back from the sometimes extensive floodplain of the Ohio are low, rolling hills, often lower than 1000 feet in elevation, of shales and sandstones. The original deciduous forest of the floodplains and adjacent areas has been extensively fragmented and altered by large cities, including Parkersburg and Huntington, small towns, agricultural areas, and industrial complexes, including coal loading facilities, chemical plants, and manufacturing plants. No extensive areas of floodplain forest remain along the Ohio River in West Virginia, although there are scattered small woodlots.

6.3.2: Significant Wildlife Values

The large Ohio River is a unique habitat in West Virginia. The portion in this CFA accounts for 44% of the warm, low gradient river habitat in the State, contains significant amounts of other warmwater habitats, and provides aquatic habitat for a diversity of fish (30 SGCN) and freshwater mussels (46 SGCN). Freshwater mussel beds in the Ohio River host six species listed under the federal Endangered Species Act. The Greenup and Belleville pools are significant hotspots for the river's freshwater mussel diversity. Tributary backwaters and sloughs harbor a wide diversity of fishes, including the majority of the occurrences in the state for Warmouth (*Lepomis gulosus*) and Orangespotted Sunfish (*Lepomis humilis*). Floodplain forests, sloughs, backwaters and wetlands, such as at Greenbottom Swamp and on the Ohio River Islands, host breeding birds, amphibians, and plants that are rare or absent elsewhere in the state, such as Streamside and Smallmouth Salamanders (*Ambystoma barbouri*, *A. texanum*), Smooth Softshell Turtle (*Apalone mutica*), Eastern Spadefoot Toad (*Scaphiopus holbrookii*), rails, and Prothonotary Warbler (*Protonotaria citrea*). This is an important area for nesting birds, with 44 SGCN, including both nesting Bald Eagle (*Haliaeetus leucocephalus*) and Peregrine Falcon (*Falco peregrinus*).

6.3.3: Distinctive Stresses

Altered flow, in-river structures (locks and dams), pre-CWA water quality degradation, dredging, excessive bank stabilization and armoring, isolation of key habitats from river mainstem, pollution received from tributaries, and intensive industrial and other development along the mainstem Ohio River collectively stress fish and mussel populations in the river.

6.3.4: Conservation Actions

- Reconnect fragmented river habitat by modifying operational regimes of the locks and dams to improve aquatic organism passage.
- Reconnect floodplain habitat on priority river sections to allow aquatic organisms access to key habitat areas.
- Implement approaches that assure stream segments with high water quality are maintained.
- Limit disturbances to the river bottom.
- Protect and restore key wetland, slough and backwater habitats.

6.3.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, WVDOH, USFWS, USACOE, ORSANCO, Ohio River Basin Fish Habitat Partnership (ORBFHP), Marshall University, West Virginia Land Trust, numerous large corporate landowners along the Ohio River, local county planning commissions.
- Public Lands: Chief Cornstalk, Greenbottom, and McClintic WMAs, ORINWR, and Johnson T. James Nature Preserve and Conservation Park.

6.3.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	8	16
Birds	26	18
Butterflies and Moths	2	4
Crayfish	1	1
Dragonflies and Damselflies	4	11
Fish	8	22
Mammals	2	4
Mussels	20	26
Plants	9	50
Reptiles	8	10
Snails		5
Tiger Beetles	1	1
Totals	89	168

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Ohio River Corridor

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	136	0.02%	0.15%
Agriculture	123,468	15.08%	8.60%
Anthropogenic Shrubland & Grassland	9,129	1.12%	5.74%
Calcareous Cliffs and Talus	164	0.02%	1.78%
Developed	98,685	12.05%	8.66%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	93,804	11.46%	3.80%
Dry-Mesic Oak Forests	256,065	31.28%	5.13%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	169,351	20.69%	5.75%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	223	0.03%	0.02%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	8,761	1.07%	7.29%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	20,447	2.50%	4.14%
Unresolved	38,477	4.70%	32.96%
Totals	818,708	100.00%	

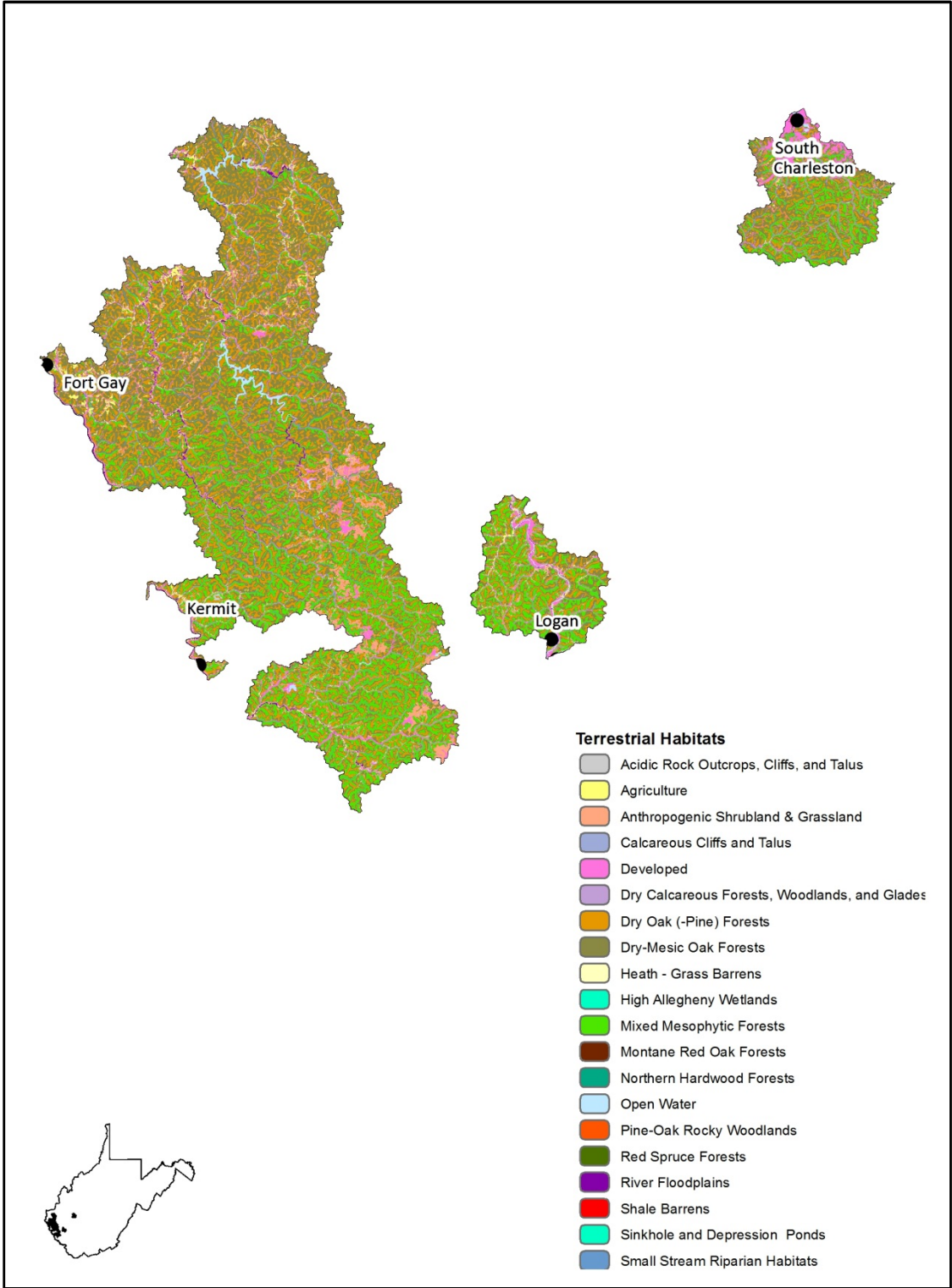
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Ohio River Corridor

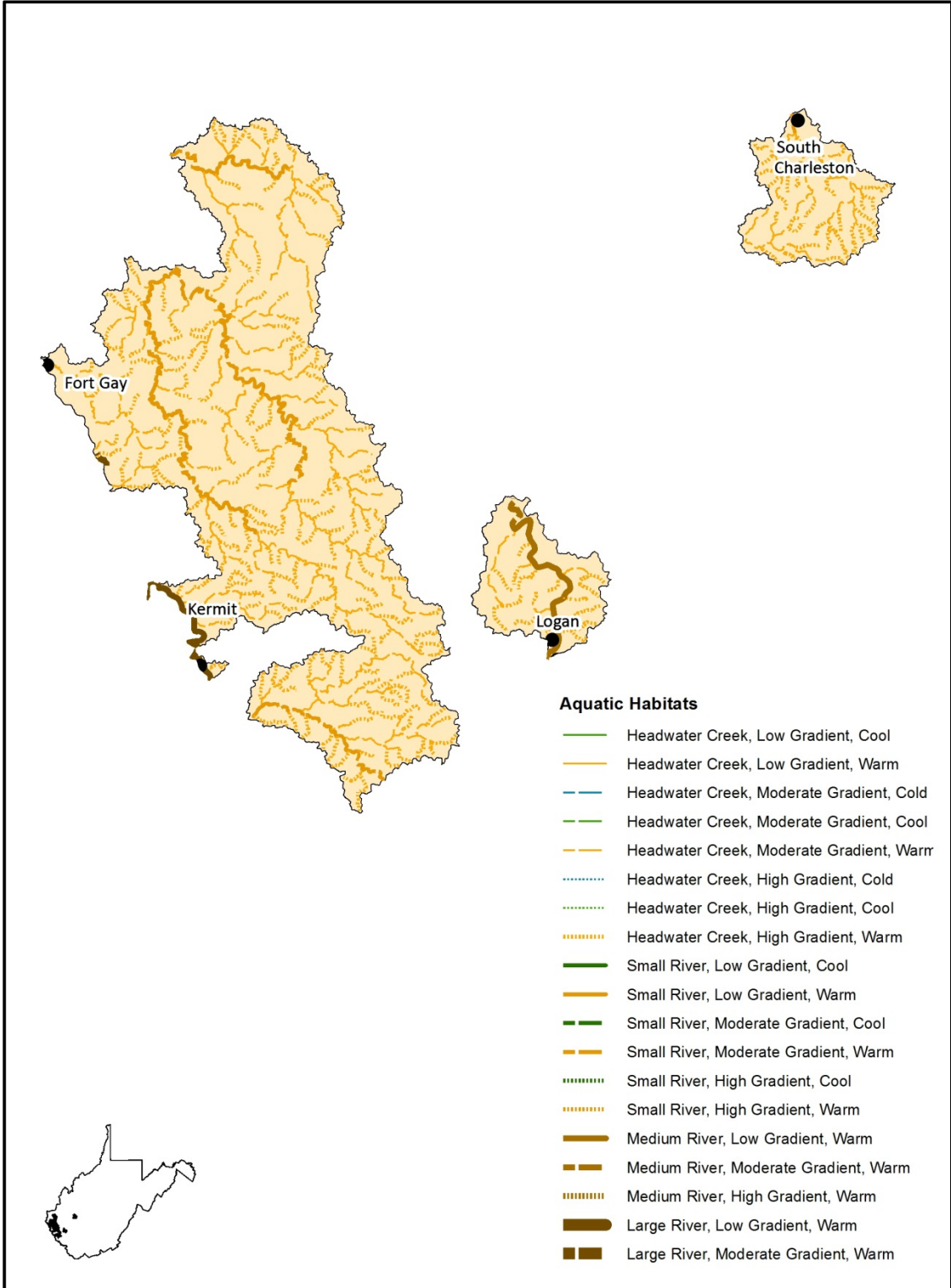
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	93	4.99%	16.78%
Headwater Creek,Moderate Gradient,Warm	889	47.46%	22.78%
Headwater Creek,High Gradient,Cool	355	18.93%	5.66%
Headwater Creek,High Gradient,Warm	138	7.38%	18.21%
Small River,Low Gradient, Warm	50	2.69%	10.97%
Small River,Moderate Gradient,Warm	12	0.63%	2.17%
Medium River, Low Gradient,Warm	57	3.04%	11.99%
Medium River,Moderate Gradient,Warm	15	0.82%	4.44%
Large River,Low Gradient,Warm	261	13.92%	44.91%
Large River,Moderate Gradient,Warm	3	0.14%	2.38%
Totals	1,874	100.00%	

6.4: Cumberlands West CFA

Cumberlands West CFA – Terrestrial Habitats



Cumberlands West CFA – Aquatic Habitats



6.4.1: Description

Located in the westernmost part of the state and spanning across parts of the Cumberland Mountains and Western Allegheny Plateau ecoregions, this is a hilly, highly dissected landscape typically with low elevation but sometimes-steep ridges and narrow valleys and small hollows. It is comprised of three disjunct areas: the Kanawha State Forest unit, the Chief Logan State Park unit, and the Western Lands unit. Ridgetops are dominated by Dry Oak (-Pine) and Dry-Mesic Oak Forests, with Mixed Mesophytic and Cove Forests typical on lower slopes. Numerous small streams dissect the landscape and mostly flow into the Guyandotte, Big Sandy, or Ohio rivers. The CFA is centered on public lands managed by the state and includes USACOE lands associated with reservoirs. The landscape remains largely forested, with some medium-sized blocks of relatively unfragmented forest remaining, primarily on public land. Human population densities are low, but there are large population centers nearby (Charleston and Huntington). Some deep and surface coal mining areas are within the CFA, but not as extensively as in areas nearby. Most forested acreage is primarily in small to medium-sized, private non-industrial holdings but some major industrial forest holdings also occur.

6.4.2: Significant Wildlife Values

Although heavily degraded overall, streams here remain biologically significant with 18 SGCN fish and 17 SGCN mussels. Two regionally endemic crayfish occur in this CFA: Coalfields Crayfish (*Cambarus theepiensis*) and Tug Valley Crayfish (*Cambarus hatfieldi*). The rivers (Big Sandy, Tug Fork, and Guyandotte) and especially their tributaries provide habitat for many rare species that occur nowhere else in the state. Blocks of forest and embedded patch habitats support relatively high densities of a number of forest interior bird species of special concern (including Wood Thrush (*Hylocichla mustelina*), Louisiana Waterthrush (*Parkesia motacilla*), Worm-eating Warbler (*Helmitheros vermivorum*), Kentucky Warbler (*Geothlypis formosa*), and Cerulean Warbler (*Setophaga cerulea*) and the only known West Virginia populations for Guyandotte Beauty (*Synandra hispidula*) and Sandstone Fire-pink (*Silene rotundifolia*). This CFA contains one of two known maternity colonies of Rafinesques Big-eared Bat (*Corynorhinus rafinesquii*) in the state. Kanawha and Cabwaylingo state forests support notably diverse and abundant nesting forest interior birds and rare plants and animals.

6.4.3: Distinctive Stresses

Forest habitat loss and fragmentation from coal mining, private roads, gas wells, and pipelines are widespread. Water pollution and sedimentation from mining, other resource development, residential use, and all-terrain vehicle (ATV) recreation can impact aquatic habitats.

6.4.4: Conservation Actions

- Protect remaining intact forest areas, especially on and near public lands.
- Direct mitigation resources to restoring key aquatic systems.
- Restore legacy mined lands.
- Incorporate steps to reduce forest habitat loss and fragmentation in planning for mine and gas well developments, as well as associated infrastructure.
- Provide guidance to corporate landowners on practices benefiting forest interior birds.
- Establish guidelines for ATV parks and trail systems that protect both the terrestrial and aquatic habitats.

6.4.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, West Virginia Division of Forestry (WVDOF), USFWS, USACOE, Appalachian Mountains Joint Venture (AMJV), motorized recreational trail groups, corporate landowners.
- Public Lands: Beech Fork Lake WMA and State Park, East Lynn Lake WMA, Laurel Lake WMA, Cabwaylingo and Kanawha state forest, Chief Logan State Park

6.4.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	5	12
Birds	18	9
Butterflies and Moths	4	2
Crayfish	1	1
Dragonflies and Damselflies	4	5
Fish	4	14
Mammals	5	1
Mussels	3	14
Plants	6	29
Reptiles	7	6
Snails		3
Totals	57	96

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cumberlands West

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	1,000	0.24%	1.11%
Agriculture	7,988	1.95%	0.56%
Anthropogenic Shrubland & Grassland	17,362	4.24%	10.91%
Calcareous Cliffs and Talus	0	0.00%	0.00%
Developed	32,191	7.85%	2.83%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	94,680	23.09%	3.83%
Dry-Mesic Oak Forests	153,487	37.44%	3.08%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	88,454	21.58%	3.00%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	0	0.00%	0.00%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	2,172	0.53%	1.81%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	8,869	2.16%	1.79%
Unresolved	3,755	0.92%	3.22%
Totals	409,958	100.00%	

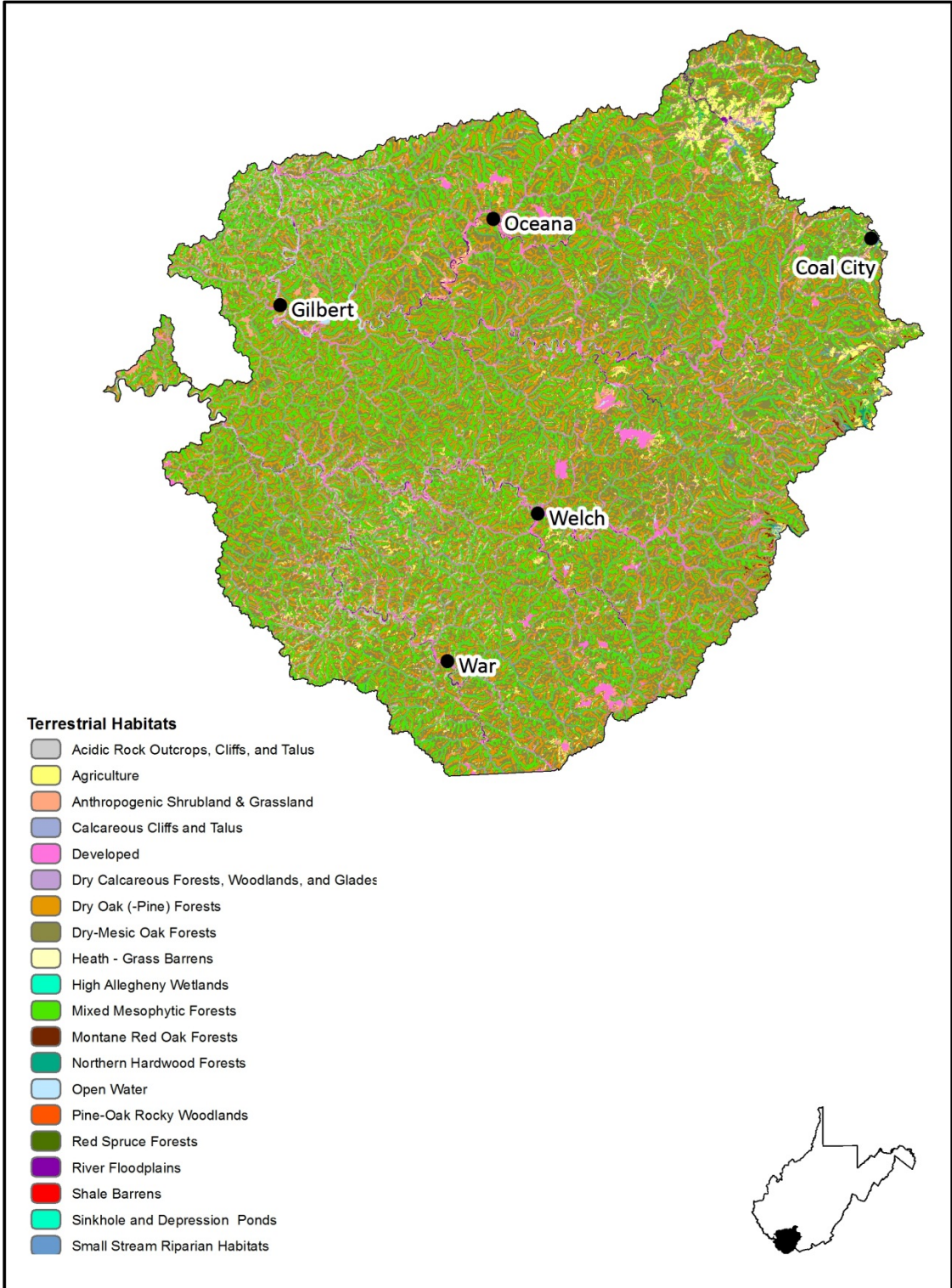
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Cumberlands West**

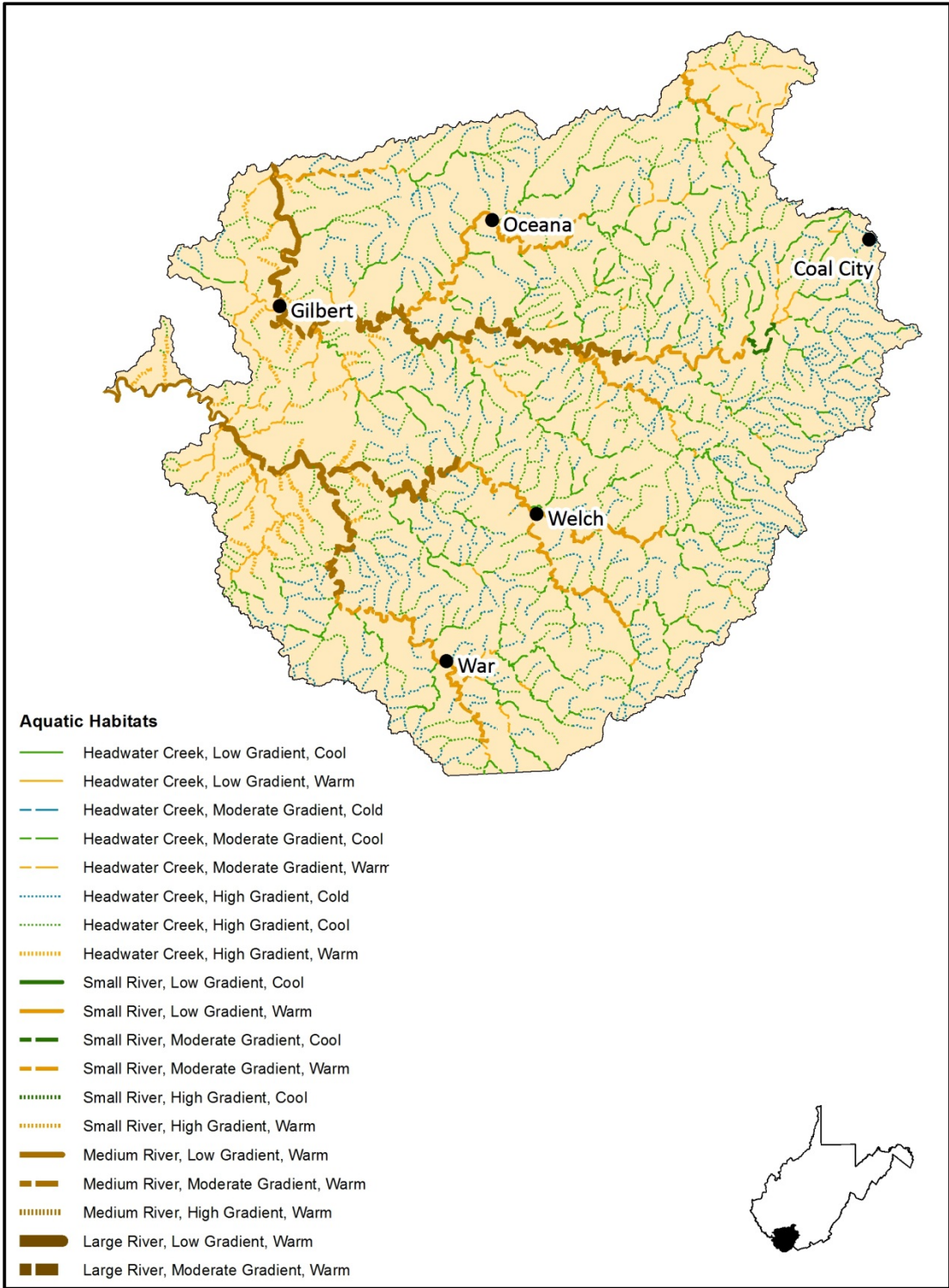
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	27	3.47%	4.83%
Headwater Creek,Moderate Gradient,Warm	303	39.04%	7.76%
Headwater Creek,High Gradient,Warm	329	42.43%	43.35%
Small River,Low Gradient, Warm	45	5.82%	9.82%
Small River,Moderate Gradient,Warm	44	5.62%	8.04%
Small River,High Gradient,Warm	0	0.02%	1.08%
Medium River, Low Gradient,Warm	13	1.62%	2.64%
Medium River,Moderate Gradient,Warm	3	0.44%	0.98%
Large River,Low Gradient,Warm	11	1.41%	1.88%
Large River,Moderate Gradient,Warm	1	0.13%	0.91%
Totals	776	100.00%	

6.5: Cumberlands East CFA

Cumberlands East CFA – Terrestrial Habitats



Cumberlands East CFA – Aquatic Habitats



6.5.1: Description

This CFA in the Cumberland Mountain Ecoregion is dominated by very rugged, steep, highly dissected topography on the headwaters of the Tug Fork and Guyandotte River. Valleys are narrow. Much of the area is low to mid-elevation, with some mountains rising to over 3000 feet, and predominantly on sandstones and shales. Ridgetops are dominated by Dry Oak (-Pine) and Dry-Mesic Oak Forests, with Mixed Mesophytic Forests typical on lower slopes. Mixed Mesophytic Forests, while still common in the CFA, have been significantly displaced over many areas by oak forests due to repeated burning by human-caused fires. The landscape remains mostly forested, with a number of small to medium-sized blocks of relatively unfragmented forest remaining, primarily on public land. The area is sparsely settled with a declining population which is largely restricted to (often narrow) valleys. There is substantial acreage in large corporate land holdings. Extensive surface and deep mine complexes and reclaimed and abandoned mines exist throughout the area.

6.5.2: Significant Wildlife Values

Although heavily degraded overall, streams here remain biologically significant, especially for species with small, regionally restricted ranges, and include significant amounts of headwater stream habitats. Two crayfishes proposed for federal listing as endangered species occur here: Big Sandy Crayfish (*Cambarus callainus*), and Guyandotte River Crayfish (*Cambarus veteranus*). The only extant populations known for the Guyandotte River Crayfish are within this CFA. Streams also support half of the state's distribution of the regionally endemic Coalfields Crayfish and about half of the state's range for the regionally endemic Black Mountain Salamander (*Desmognathus welteri*). The relatively intact blocks of deciduous forests in this CFA are the northern portion of a series of forest blocks extending southward through the Cumberland Mountains Ecoregion into Tennessee and which collectively are globally-significant, including some of the most diverse temperate deciduous forest examples known. In this CFA, these forests are critically important to a number of forest interior breeding birds (especially Wood Thrush, Swainson's Warbler (*Limnothlypis swainsonii*), Cerulean Warbler, and Kentucky Warbler), salamanders, and regionally endemic species. A number of Southern Appalachian endemics at or near the northernmost limit of their ranges have all or nearly all of their known West Virginia occurrences in this CFA, such as land snails (including both *Punctum blandianum* and *Ventridens lasmodon*), Diana Fritillary butterfly (*Speyeria diana*), and plants, including Carolina Saxifrage (*Saxifraga caroliniana*), Red-Twig Doghobble (*Leucothoe recurva*), and Yellow Mandarin (*Prosartes maculata*).

6.5.3: Distinctive Stresses

Forest habitat loss and fragmentation from coal mining, private roads, gas wells, and pipelines are widespread. Water pollution and sedimentation from mining, other resource development, residential use, and ATV recreation can impact aquatic habitats.

6.5.4: Conservation Actions

- Protect remaining intact forest areas (which is difficult here because mineral rights are typically separated).
- Direct mitigation resources to restoring key aquatic systems.
- Restore legacy mined lands.

- Incorporate steps to reduce forest habitat loss and fragmentation in planning for mine and gas well developments, as well as associated infrastructure.
- Provide guidance to corporate landowners on practices benefiting forest interior birds.
- Establish guidelines for ATV parks and trail systems that protect both the terrestrial and aquatic habitats.

6.5.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, WVDOF, USFWS, UACOE, AMJV, motorized recreational trail groups, corporate landowners, West Virginia Land Trust.
- Public Lands: Panther State Forest; Berwind Lake, RD Bailey Lake, Tug Fork, and Anawalt WMAs, Twin Falls State Park.

6.5.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	6	13
Birds	20	7
Butterflies and Moths	4	3
Crayfish	2	1
Dragonflies and Damselflies	5	7
Fish	2	6
Mammals	4	1
Mussels	1	2
Plants	12	16
Reptiles	4	8
Snails	1	10
Tiger Beetles	1	1
Totals	62	75

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cumberlands East

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	22,997	2.71%	25.61%
Agriculture	22,872	2.70%	1.59%
Anthropogenic Shrubland & Grassland	18,813	2.22%	11.82%
Calcareous Cliffs and Talus	0	0.00%	0.00%
Developed	58,860	6.94%	5.17%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	164,745	19.44%	6.67%
Dry-Mesic Oak Forests	273,425	32.26%	5.48%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	255,936	30.19%	8.69%
Montane Red Oak Forests	894	0.11%	4.23%
Northern Hardwood Forests	494	0.06%	0.05%
Pine-Oak Rocky Woodlands	695	0.08%	0.91%
Red Spruce Forests	16	0.00%	0.01%
River Floodplains	3,490	0.41%	2.90%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	21,446	2.53%	4.34%
Unresolved	2,946	0.35%	2.52%
Totals	847,629	100.00%	

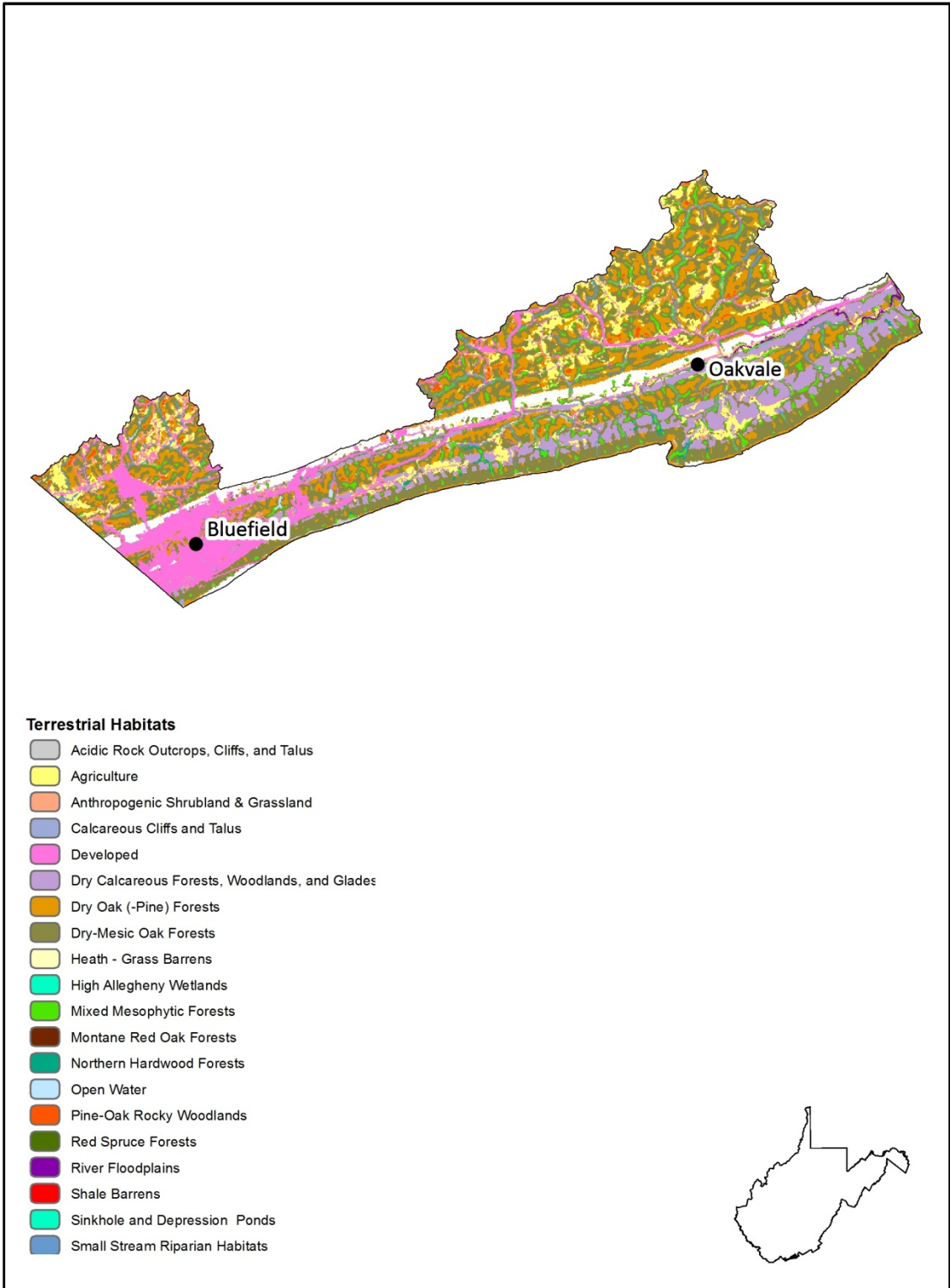
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Cumberlands East**

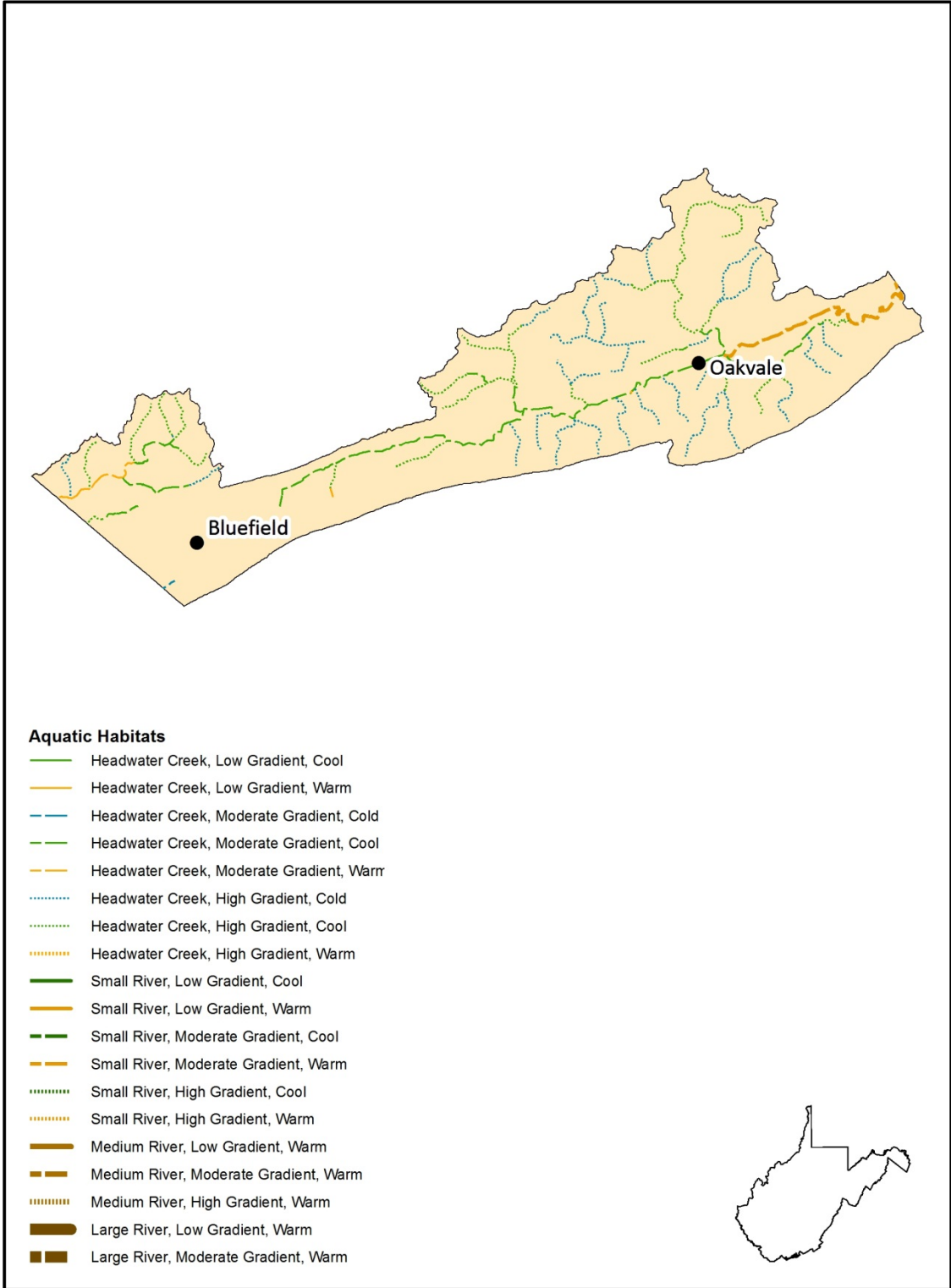
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	1	0.06%	7.61%
Headwater Creek,Low Gradient, Warm	19	1.06%	3.35%
Headwater Creek,Moderate Gradient,Cool	308	17.54%	14.03%
Headwater Creek,Moderate Gradient,Warm	110	6.28%	2.82%
Headwater Creek,High Gradient,Cold	557	31.72%	18.99%
Headwater Creek,High Gradient,Cool	474	27.02%	7.57%
Headwater Creek,High Gradient,Warm	51	2.92%	6.76%
Small River,Low Gradient, Warm	26	1.50%	5.74%
Small River,Moderate Gradient,Cool	4	0.25%	0.93%
Small River,Moderate Gradient,Warm	99	5.64%	18.25%
Small River,High Gradient,Warm	0	0.00%	0.55%
Medium River, Low Gradient,Warm	47	2.68%	9.88%
Medium River,Moderate Gradient,Warm	58	3.30%	16.69%
Medium River,High Gradient,Warm	0	0.02%	8.73%
Totals	1,755	100.00%	

6.6: East River Mountain CFA

East River Mountain CFA – Terrestrial Habitats



East River Mountain CFA – Aquatic Habitats



6.6.1: Description

This CFA includes the southwestern edge of the Ridge and Valley Ecoregion in West Virginia. It borders Virginia along the crest of East River Mountain, which is capped by Tuscarora sandstone and culminates at Buckhorn Knob at over 4000 feet in elevation. West of East River Mountain, the landscape is 2000-2300 feet in elevation and is underlain by limestone which has developed many caves, sinkholes, and springs. The area is drained by the East River, a cool, moderate gradient stream attributing much of its quality to the numerous high quality cave-fed springs flowing into it along its length. The landscape is predominately forested with some sparse development located in the East River Valley. Heavier, but not expanding, development exists in the city of Bluefield to the southwest. The rugged topography limits easy development within this CFA.

6.6.2: Significant Wildlife Values

Several caves exist in this CFA which support seven SGCN cave invertebrates, as well as Indiana Bat (*Myotis sodalis*) and Cave Salamander (*Eurycea lucifuga*). The springs originating from this karst provide a rich, coldwater source for several fish species dependent on cooler water temperatures. Important stream species include Blackbelly Salamander (*Desmognathus quadramaculatus*), the state's southernmost native population of Brook Trout (*Salvelinus fontinalis*), and New River Shiner (*Notropis scabriceps*) and Kanawha Sculpin (*Cottus kanawhae*), both endemic to the New River Basin. East River Mountain is an important bird migration corridor.

6.6.3: Distinctive Stresses

Sinkhole dumping, run-off from development and agriculture, and quarrying potentially place cave faunas at risk. Any wind energy development on East River Mountain could impact migrating birds.

6.6.4: Conservation Actions

- Actively work with landowners to provide sinkhole clean-up, sinkhole and sinking stream fencing, and to reduce other impacts to cave systems.
- Secure conservation lands, through ownership or easement, to protect significant terrestrial and subterranean habitats.
- Conservation easements on forested ridgetops to reduce threat from wind energy development.

6.6.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, WV Cave Conservancy.
- Public Lands: Tate Lohr WMA.

6.6.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = East River Mountain

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	5	10
Birds	6	2
Cave Invertebrates	1	6
Dragonflies and Damselflies	1	
Fish	3	
Mammals	4	2
Plants	5	5
Reptiles	1	
Snails		13
Totals	26	38

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = East River Mountain

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	165	0.27%	0.18%
Agriculture	5,419	8.99%	0.38%
Anthropogenic Shrubland & Grassland	1,110	1.84%	0.70%
Calcareous Cliffs and Talus	89	0.15%	0.96%
Developed	8,656	14.36%	0.76%
Dry Calcareous Forests, Woodlands, and Glades	5,559	9.22%	7.77%
Dry Oak (-Pine) Forests	10,659	17.68%	0.43%
Dry-Mesic Oak Forests	19,943	33.08%	0.40%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	2,654	4.40%	0.09%
Montane Red Oak Forests	148	0.24%	0.70%
Northern Hardwood Forests	164	0.27%	0.02%
Pine-Oak Rocky Woodlands	592	0.98%	0.78%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	140	0.23%	0.12%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	1,397	2.32%	0.28%
Unresolved	3,586	5.95%	3.07%
Totals	60,280	100.00%	

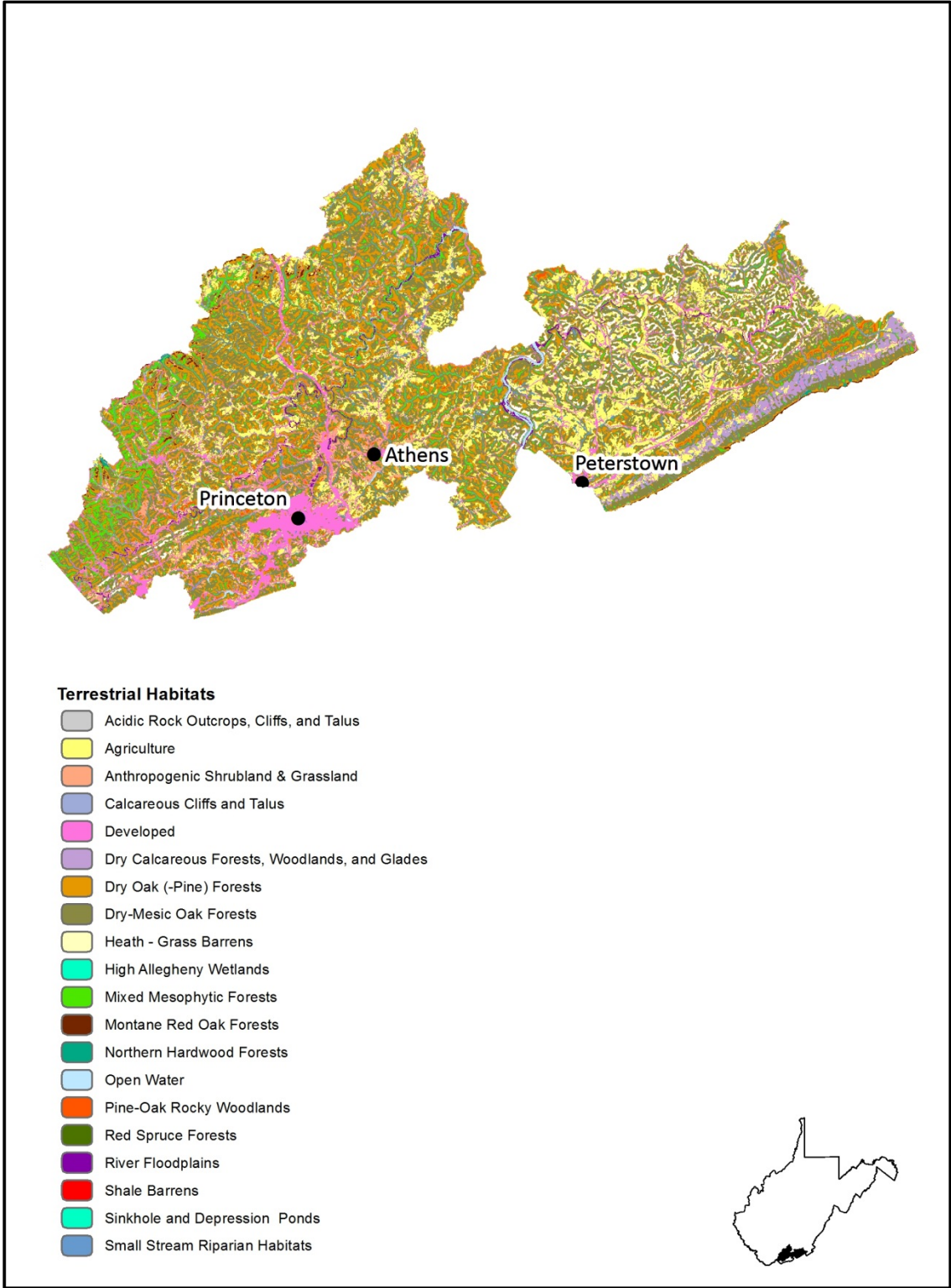
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = East River Mountain

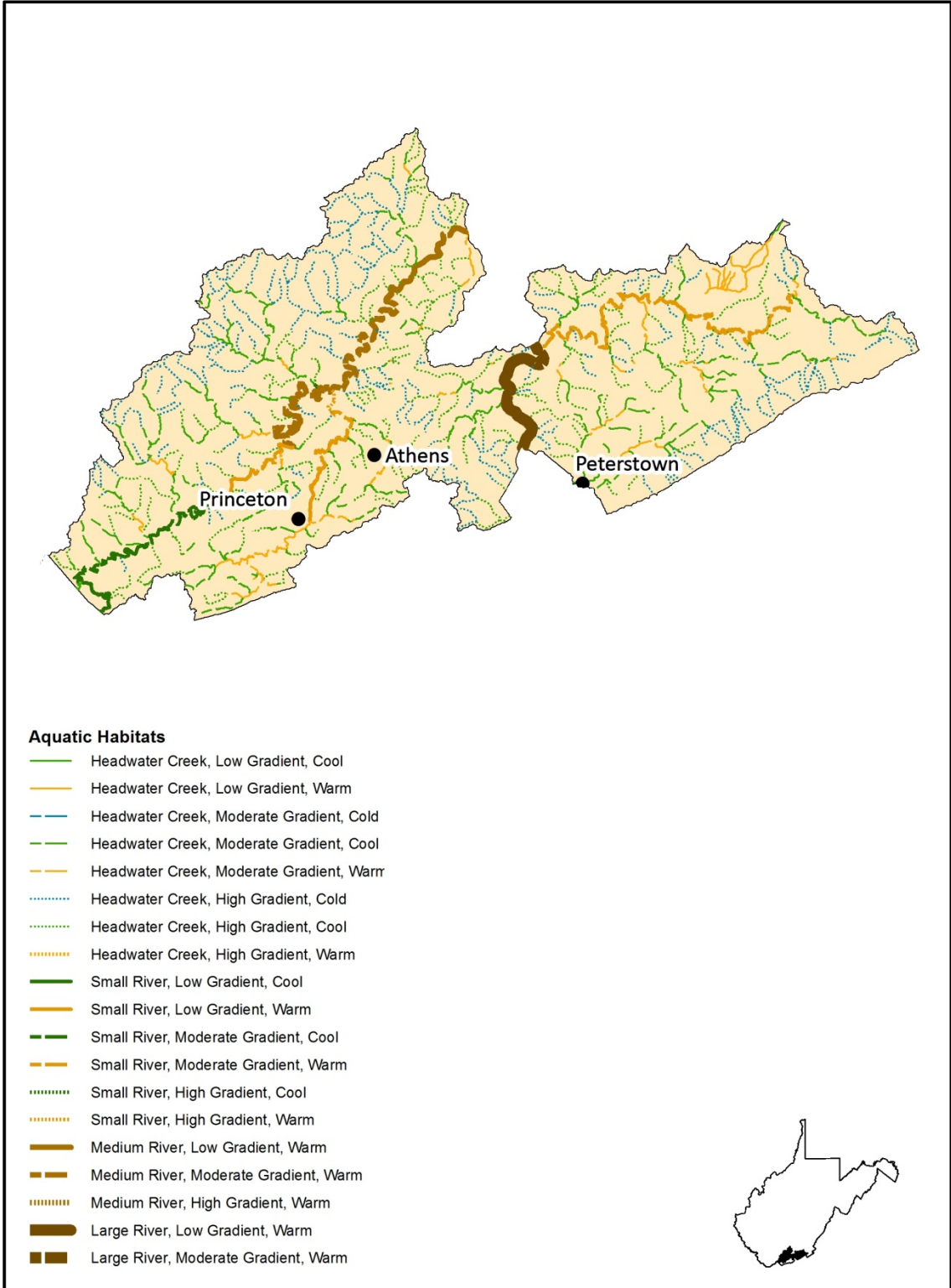
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	1	0.88%	0.17%
Headwater Creek,Moderate Gradient,Cool	25	23.84%	1.15%
Headwater Creek,Moderate Gradient,Warm	4	3.33%	0.09%
Headwater Creek,High Gradient,Cold	33	31.09%	1.13%
Headwater Creek,High Gradient,Cool	36	33.53%	0.57%
Small River,Moderate Gradient,Warm	8	7.32%	1.43%
Totals	106	100.00%	

6.7: Bluestone Lake/Peters Mountain CFA

Bluestone Lake/Peters Mountain CFA – Terrestrial Habitats



Bluestone Lake/Peters Mountain CFA – Aquatic Habitats



6.7.1: Description

This diverse landscape, spanning across parts of the Allegheny Mountains and Ridge and Valley ecoregions, has a wide variety of landforms including karst, big rivers, deep river gorges, and high mountain ridges. The Bluestone Dam forms the 2040 acre Bluestone Reservoir on the New River. Upstream from Bluestone Reservoir, the New River flows freely for 13 miles upon entering West Virginia from Virginia. The Bluestone River flows out of Virginia, eventually enters the Bluestone Gorge and finally empties into the reservoir from the south. Indian Creek drains much of Monroe County and then flows into the reservoir from the north. A large portion of this CFA is a karst area that is a southward extension of the Greenbrier Valley karst. East of this karst area is the high ridge of Peters Mountain, the beginning of the Ridge and Valley Ecoregion. Elevations are often moderate (2000 - 2500 feet), but rise over 4000 feet on Peters Mountain. Landuse changes substantially across the landscape due to the broad variety of habitats and landforms. Forested areas characterize the Bluestone Gorge and Peters Mountain. Otherwise, the forests have been fragmented by farming and small communities.

6.7.2: Significant Wildlife Values

Numerous caves in the karst area contain several highly localized, endemic cave invertebrates and Indiana Bats. Two caves contain invertebrates species found only at that site and nowhere else. The New River Basin is home to ten endemic fishes, of which at least seven (five SGCN) have been documented in this CFA. This CFA contains the West Virginia portion of the Bluestone Sculpin (*Cottus sp. cf. carolinae*) range, an endemic to the Bluestone Watershed. Thirteen SGCN mussel species are documented in the CFA and the riparian areas support the federally threatened Virginia Spiraea (*Spiraea virginiana*). Extensive farmland (contiguous with the Greenbrier River CFA) supports Anthropogenic Shrubland and Grassland habitats important for several bird species of concern, including Barn Owl (*Tyto alba*), Golden-winged Warbler (*Vermivora chrysoptera*), Grasshopper Sparrow (*Ammodramus savannarum*), and Eastern Meadowlark (*Sturnella magna*). Forested areas are important for forest interior breeding birds such as Worm-eating Warbler (*Helmitheros vermivorum*) and several rare plants, including West Virginia's only known Carolina Lily (*Lilium michauxii*) populations. This CFA has a significant amount of Dry Calcareous Forest, Woodlands, and Glades habitat, which supports a rich diversity of snails (16 SGCN), including the recently described *Triodopsis juxtidentis robiniae* and a newly discovered but still undescribed *Triodopsis*, both of which may be endemic to the Bluestone River Gorge. These calcareous habitats also support a number of rare plants, such as the globally rare Canby's Mountain-lover (*Paxistima canbyi*). Peters Mountain is an important bird migration corridor.

6.7.3: Distinctive Stresses

Sinkhole dumping, run-off from development and agriculture, and quarrying potentially place cave faunas at risk. Any wind energy development on Peters Mountain could impact migrating bats and birds.

6.7.4: Conservation Actions

- Actively work with landowners to provide sinkhole clean-up, sinkhole and sinking stream fencing, and to reduce other impacts to cave systems.
- Secure conservation lands, through ownership or easement, to protect significant terrestrial and subterranean habitats.

- Provide assistance and incentives to landowners to maintain grassland and shrubland habitats for birds.

6.7.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, West Virginia Cave Conservancy, Institute for Earth Education, National Park Service, Natural Resources Conservation Service (NRCS), county farmland protection programs.
- Public Lands: Pipestem State Park, Bluestone Lake State Park and Bluestone WMA, Bluestone National Scenic River, Camp Creek State Forest and State Park.

6.7.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	5	14
Birds	19	9
Butterflies and Moths	4	2
Cave Invertebrates	6	9
Crayfish	1	1
Dragonflies and Damselflies	1	7
Fish	5	
Mammals	4	3
Mussels	5	8
Plants	15	42
Reptiles	2	6
Snails		16
Tiger Beetles	1	
Totals	68	117

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	853	0.21%	0.95%
Agriculture	60,057	14.80%	4.18%
Anthropogenic Shrubland & Grassland	10,007	2.47%	6.29%
Calcareous Cliffs and Talus	195	0.05%	2.12%
Developed	38,248	9.43%	3.36%
Dry Calcareous Forests, Woodlands, and Glades	7,661	1.89%	10.71%
Dry Oak (-Pine) Forests	80,108	19.74%	3.24%
Dry-Mesic Oak Forests	148,577	36.61%	2.98%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	22,140	5.46%	0.75%
Montane Red Oak Forests	1,686	0.42%	7.97%
Northern Hardwood Forests	426	0.10%	0.04%
Pine-Oak Rocky Woodlands	4,518	1.11%	5.91%
Red Spruce Forests	21	0.01%	0.01%
River Floodplains	2,907	0.72%	2.42%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	4	0.00%	2.38%
Small Stream Riparian Habitats	13,219	3.26%	2.67%
Unresolved	15,185	3.74%	13.01%
Totals	405,810	100.00%	

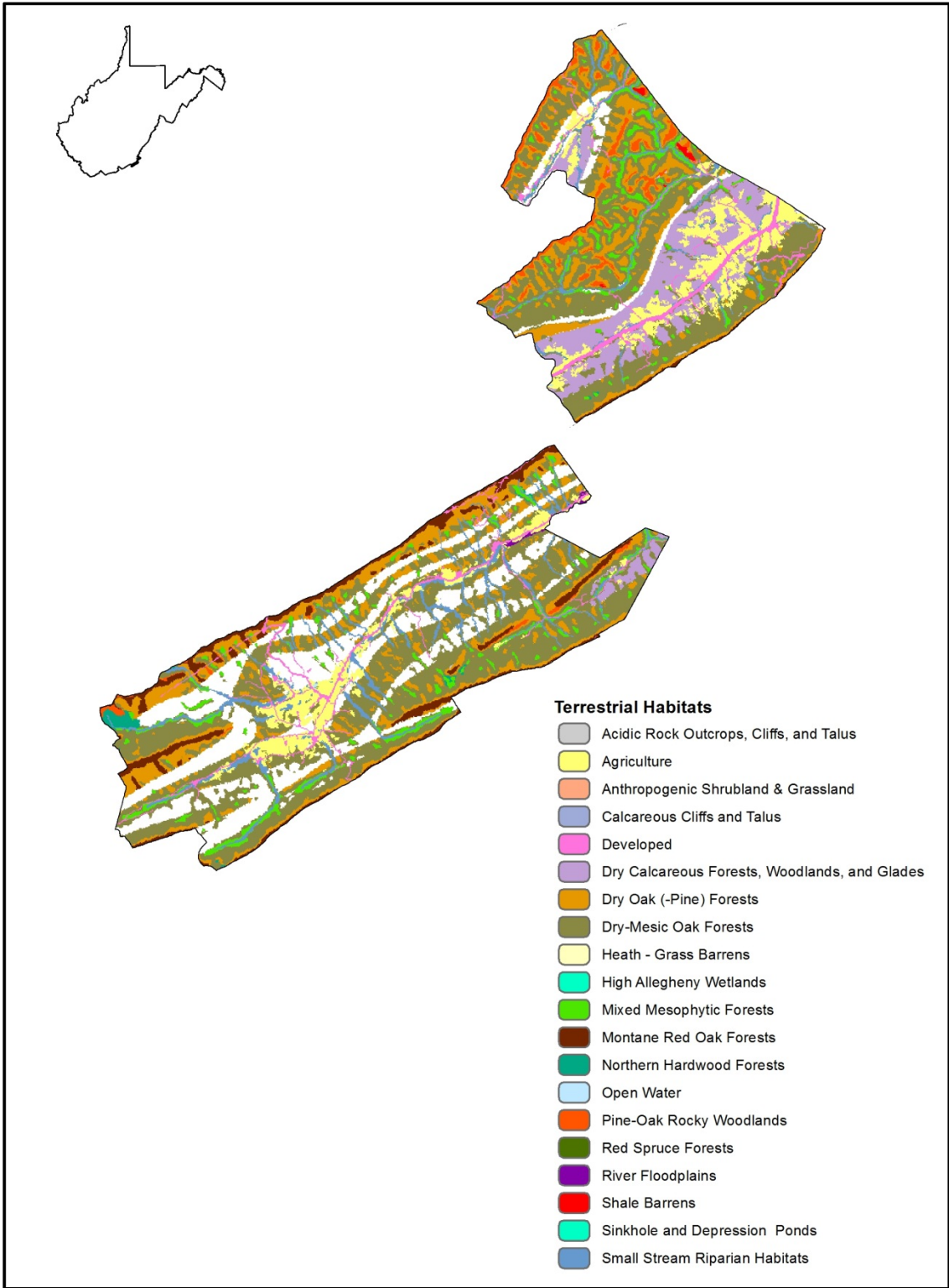
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Bluestone Lake/Peters Mountain**

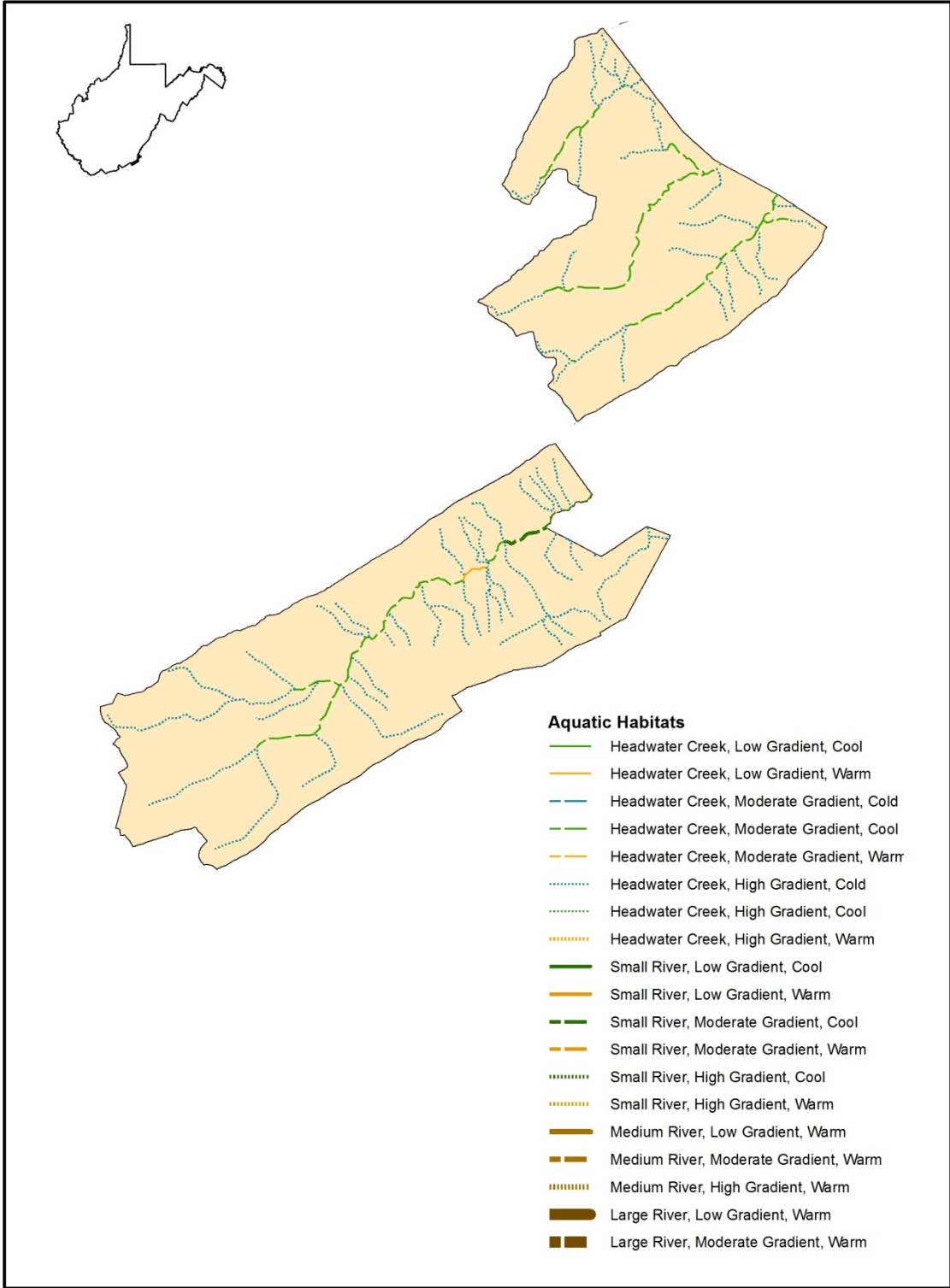
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	34	3.76%	6.11%
Headwater Creek,Moderate Gradient,Cool	205	22.63%	9.33%
Headwater Creek,Moderate Gradient,Warm	38	4.15%	0.96%
Headwater Creek,High Gradient,Cold	270	29.88%	9.22%
Headwater Creek,High Gradient,Cool	237	26.16%	3.78%
Small River,Low Gradient,Cool	8	0.90%	21.47%
Small River,Low Gradient, Warm	15	1.65%	3.25%
Small River,Moderate Gradient,Cool	15	1.60%	3.11%
Small River,Moderate Gradient,Warm	39	4.32%	7.19%
Small River,High Gradient,Warm	2	0.19%	10.57%
Medium River, Low Gradient,Warm	5	0.57%	1.08%
Medium River,Moderate Gradient,Warm	28	3.14%	8.19%
Large River,Low Gradient,Warm	7	0.77%	1.21%
Large River,Moderate Gradient,Warm	2	0.27%	2.23%
Totals	905	100.00%	

6.8: James Headwaters CFA

James Headwaters CFA – Terrestrial Habitats



James Headwaters CFA – Aquatic Habitats



6.8.1: Description

The Potts Creek and Dunlap Creek watersheds in the Ridge and Valley Ecoregion are the only portion of the James River Watershed in West Virginia. The valleys are moderately wide and mostly shaley, with some areas of limestone. Parallel southwest to northeast-oriented shale and sandstone ridges rise above the valleys, including the steep southeastern-facing slope of Peters Mountain and the northwestern-facing slope of Potts Mountain. Elevations are generally moderate but rise to about 4000 feet at the higher summits. The James River headwaters lie in a rain shadow and have lower precipitation than most portions of West Virginia. Grazing farms exist within the valleys of Potts Creek and Sweet Springs Creek. Most forestland is small to medium-sized, non-industrial private holdings and National Forest land. Although a large (5000 acre) industrial timberland tract occurs on Back Creek. The human population is relatively small and dispersed.

6.8.2: Significant Wildlife Values

The James River Watershed supports an aquatic fauna not found in other West Virginia watersheds. The South Fork of Potts Creek is the only known location in West Virginia for the federally endangered James Spiny mussel (*Pleurobema collina*). Similarly, the only West Virginia populations of the James River endemics Longfin Darter (*Etheostoma longimanum*) and Stripeback Darter (mountain subspecies of *Percina notogramma*) are here. Several upland Central Appalachian endemics occur here, including shale barren plants on Slaty Mountain and the headwaters of Cove Creek, and Bentley's Coralroot (*Corallorhiza bentleyi*), a globally rare orchid found only in the Virginias. Some of the largest forest blocks remaining in southeastern West Virginia are in this CFA, primarily on public land. Peters Mountain is an important bird migration corridor.

6.8.3: Distinctive Stresses

Livestock along and within the Potts Creek Watershed impact the aquatic resources by increasing sediment loads, directly crushing mussels, and increasing nutrient loads. Any wind energy development could impact migrating bats and birds.

6.8.4: Conservation Actions

- Promote riparian restoration activities including streamside fencing, riparian buffer establishment, and farming best management practices (BMPs).
- Public land provides an outstanding opportunity for maintaining large, intact forest blocks and protecting many other special habitats.
- Conservation easements on forested ridgetops to reduce threat from wind energy development.

6.8.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, USFWS, United States Forest Service (USFS), NRCS, Monroe County Farmland Protection Program.
- Public Lands: George Washington and Jefferson National Forests, Andrew Rowan WMA.

6.8.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = James Headwaters

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	1	7
Birds	10	1
Butterflies and Moths	1	4
Fish	4	1
Mussels	1	2
Plants	8	11
Reptiles	1	1
Snails		1
Totals	26	28

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = James Headwaters

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	23	0.05%	0.03%
Agriculture	3,652	7.73%	0.25%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	0	0.00%	0.00%
Developed	1,685	3.57%	0.15%
Dry Calcareous Forests, Woodlands, and Glades	3,401	7.20%	4.76%
Dry Oak (-Pine) Forests	7,159	15.16%	0.29%
Dry-Mesic Oak Forests	16,668	35.29%	0.33%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	2,010	4.26%	0.07%
Montane Red Oak Forests	1,933	4.09%	9.15%
Northern Hardwood Forests	184	0.39%	0.02%
Pine-Oak Rocky Woodlands	930	1.97%	1.22%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	44	0.09%	0.04%
Shale Barrens	54	0.11%	3.01%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	2,230	4.72%	0.45%
Unresolved	7,259	15.37%	6.22%
Totals	47,232	100.00%	

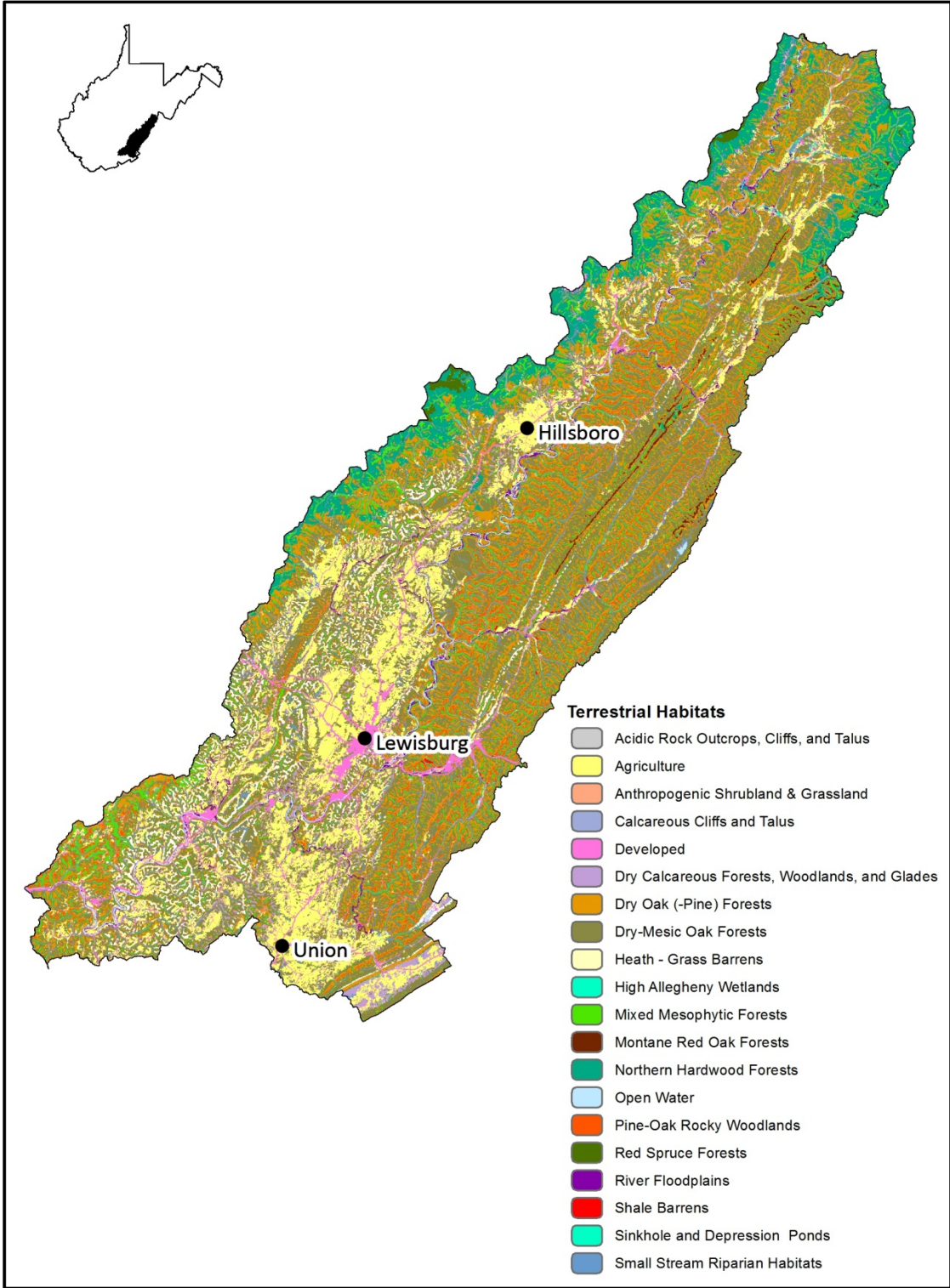
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = James Headwaters

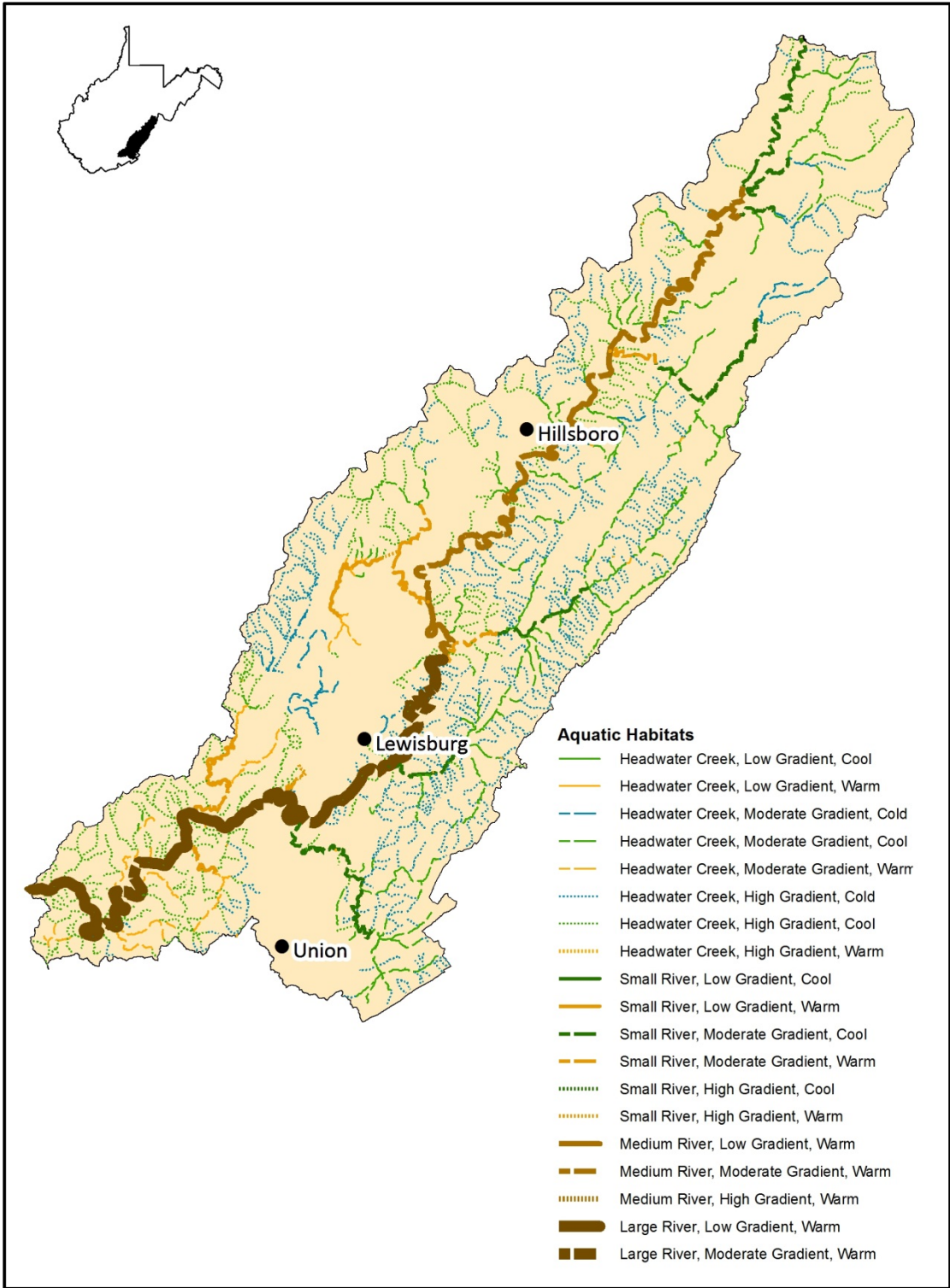
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	1	0.61%	0.13%
Headwater Creek,Moderate Gradient,Cool	26	21.96%	1.17%
Headwater Creek,High Gradient,Cold	88	75.34%	3.00%
Small River,Moderate Gradient,Cool	2	2.08%	0.52%
Totals	117	100.00%	

6.9: Greater Greenbrier CFA

Greater Greenbrier CFA – Terrestrial Habitats



Greater Greenbrier CFA – Aquatic Habitats



6.9.1: Description

The Greater Greenbrier CFA encompasses the Greenbrier Watershed from the joining of the East and West forks at Durbin downstream to the Greenbrier River's confluence with the New River. In the Allegheny Mountains Ecoregion, it includes a globally significant karst landscape surrounded by ridges and valleys of shale and sandstone. More caves occur here than anywhere else in West Virginia, with sinkhole and cave densities reaching an average of seven per square mile (18 per square kilometer) in the Big Levels region. Davis Spring, with an average volume of 110 cubic feet per second (cfs), is the largest spring in the state, and Friars Hole, with 44 miles of mapped passage, is the sixth largest cave in the United States. Allegheny Mountain, whose crest forms the border with Virginia, defines the eastern boundary of the landscape, with a series of parallel shale and sandstone ridges running west to the karst region. In the karst region, most surface drainage is limited due to numerous sinking streams. The Greenbrier River and its major tributaries to its east are the main surface streams. The Greenbrier River is the longest undammed river in the Central Appalachians. Elevations are generally moderate but rise to over 4000 feet at higher summits. The Greenbrier Valley is in a rain shadow and has lower precipitation than most portions of West Virginia. The karst region was originally forested by deciduous forests, which have been largely displaced by farmland with scattered woodlots and towns such as Lewisburg. The shale and sandstone ridges remain largely forested, especially on public land, with small farms and communities in some valley areas. Portions east of the Greenbrier River originally supported the most extensive White Pine (*Pinus strobus*) forests south of northern Pennsylvania, but most of the White Pine area converted to mixed oak and oak-pine forests after the original forest was logged and burned. Some of the most extensive intact forest blocks (primarily Dry-Mesic Oak) in the Central Appalachians Ecoregion occur in this eastern portion, where the largest landowner is the USFS. Most private forestland exists as small to medium-sized, non-industrial holdings. A few large, corporate-owned tracts exist in the vicinity of White Sulphur Springs. Residential development is expanding around Lewisburg and second home development is expanding along the Greenbrier River and locally elsewhere.

6.9.2: Significant Wildlife Values

The Greenbrier Valley is recognized as a globally significant center of cave endemism and is one of the six most endemic rich karst regions in North America. Well over one thousand caves are known, with nine caves supporting single cave endemics and 41 SGCN cave invertebrates overall. Organ Cave supports more known cave invertebrate species endemic to a single cave than any other cave in the state. Caves here also support important rare bat populations. The presumed extinct Buckeye Creek Cave Sculpin (*Cottus sp. cf. carolinae*) was known only from one cave system in this CFA. A substantial statewide portion of several stream habitats occur in this CFA, including about 40% of all moderate gradient, cold headwater streams. Surface streams support significant rare mussel populations including the largest known population of the Green Floater (*Lasmigona subviridis*) in West Virginia (and is also the largest segment of the Ohio Basin metapopulation); the regionally endemic New River Crayfish (*Cambarus chasmodactylus*); Eastern Hellbender; and eight of the ten fish species recognized as endemic to the New River Basin. One of two known global populations of a newly discovered crayfish in the *Cambarus dubius* group also occurs here. The federally listed Virginia Spiraean also occurs in riparian areas. Dry Oak-Pine and Dry-Mesic Oak Forests in the CFA's eastern valleys and ridges and embedded Shale Barren patches support one of the largest and most diverse assemblages of the regionally endemic shale barren flora, including the federally listed Shale Barren Rockcress (*Arabis serotina*) and globally rare Nodding Wild Onion (*Allium oxyphilum*), a critically imperiled Appalachian population of Grizzled Skipper (*Pyrgus centaureae wyandot*, which may survive in West Virginia only here), and globally significant populations of Box Huckleberry (*Gaylussacia brachycera*) and Swordleaf Phlox (*Phlox*

buckleyi). A considerable portion of the state's Calcareous Cliffs and Talus and Dry Calcareous Forests, Woodlands, and Glades occur here, supporting three new species of locally endemic land snails, globally imperiled Canby's Mountain-lover and Tall Larkspur (*Delphinium exaltatum*), and other rare plants. The significant mix of forest interior, forest successional, and grassland habitats support 51 SGCN birds. Intact forest blocks support many forest interior breeding birds, including Broad-winged Hawk (*Buteo platypterus*), Wood Thrush, Cerulean Warbler, Worm-eating Warbler, and Eastern Whip-poor-will (*Antrostomus vociferous*), plus Timber Rattlesnake (*Crotalus horridus*), and possibly the federally listed orchid Small Whorled Pogonia (*Isotria medeoloides*). Early successional forest habitats support the highest densities of remaining Golden-winged Warbler and are critical to the species' continued presence in West Virginia. Grasslands associated with karst topography are among the most extensive in West Virginia and important in the state for the Loggerhead Shrike (*Lanius ludovicianus*), as well as Eastern Meadowlark, and Grasshopper, Vesper (*Pooecetes gramineus*) and Henslow's sparrows (*Ammodramus henslowii*).

6.9.3: Distinctive Stresses

Sinkhole dumping, run-off from development and agriculture, and quarrying potentially place cave faunas at risk. Algal blooms observed in the Greenbrier River in recent years are evidence of nutrient pollution. Residential and second home development is fragmenting forested habitats near streams and adjacent to public lands.

6.9.4: Conservation Actions

- Actively work with landowners to encourage sinkhole clean-up, sinkhole and sinking stream fencing, and to reduce other impacts to cave systems.
- Secure conservation lands, through ownership or easement, to protect significant terrestrial and subterranean habitats.
- Actively work with landowners to provide stream bank fencing, stream restoration, and development of riparian buffers - primarily on tributaries of the Greenbrier River.
- Provide assistance and incentives to landowners to maintain grassland, shrubland, and early forest successional habitats for birds.
- Augment Green Floater mussel populations through propagation/reintroduction projects to maintain and expand populations.
- Develop cooperative agreements with public landowners to maintain large, intact forest blocks thus protecting many other special habitats.
- Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.

6.9.5: Conservation Opportunities

- Key WVDNR Partners: WVDOF, WVDEP, West Virginia Cave Conservancy, Monongahela National Forest, Greenbrier Watershed Association, NRCS, USFWS Partners Program, West Virginia Land Trust, New River Conservancy, TNC, county farmland protection boards, Wild Turkey Federation, AMJV.

- Public Lands: Monongahela National Forest; Calvin Price, Greenbrier, and Seneca state forests; Greenbrier River Trail; Droop Mountain Battlefield; Cass Scenic Railroad, Beartown and Watoga state parks; Moncove Lake State Park and WMA.

6.9.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	8	14
Birds	30	21
Butterflies and Moths	11	6
Cave Invertebrates	27	14
Crayfish	2	1
Dragonflies and Damselflies	12	23
Fish	6	2
Mammals	8	2
Mussels	5	5
Plants	39	72
Reptiles	7	8
Snails	3	14
Tiger Beetles	1	
Totals	159	182

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Greater Greenbrier

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	4,179	0.43%	4.65%
Agriculture	135,883	13.97%	9.47%
Anthropogenic Shrubland & Grassland	1	0.00%	0.00%
Calcareous Cliffs and Talus	935	0.10%	10.15%
Developed	50,268	5.17%	4.41%
Dry Calcareous Forests, Woodlands, and Glades	19,911	2.05%	27.84%
Dry Oak (-Pine) Forests	186,630	19.18%	7.55%
Dry-Mesic Oak Forests	344,933	35.45%	6.91%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	1,051	0.11%	5.02%
Mixed Mesophytic Forests	59,242	6.09%	2.01%
Montane Red Oak Forests	4,490	0.46%	21.24%
Northern Hardwood Forests	63,991	6.58%	6.43%
Pine-Oak Rocky Woodlands	21,290	2.19%	27.87%
Red Spruce Forests	3,636	0.37%	2.04%
River Floodplains	7,597	0.78%	6.32%
Shale Barrens	333	0.03%	18.57%
Sinkhole and Depression Ponds	11	0.00%	7.29%
Small Stream Riparian Habitats	29,855	3.07%	6.04%
Unresolved	38,736	3.98%	33.18%
Totals	972,971	100.00%	

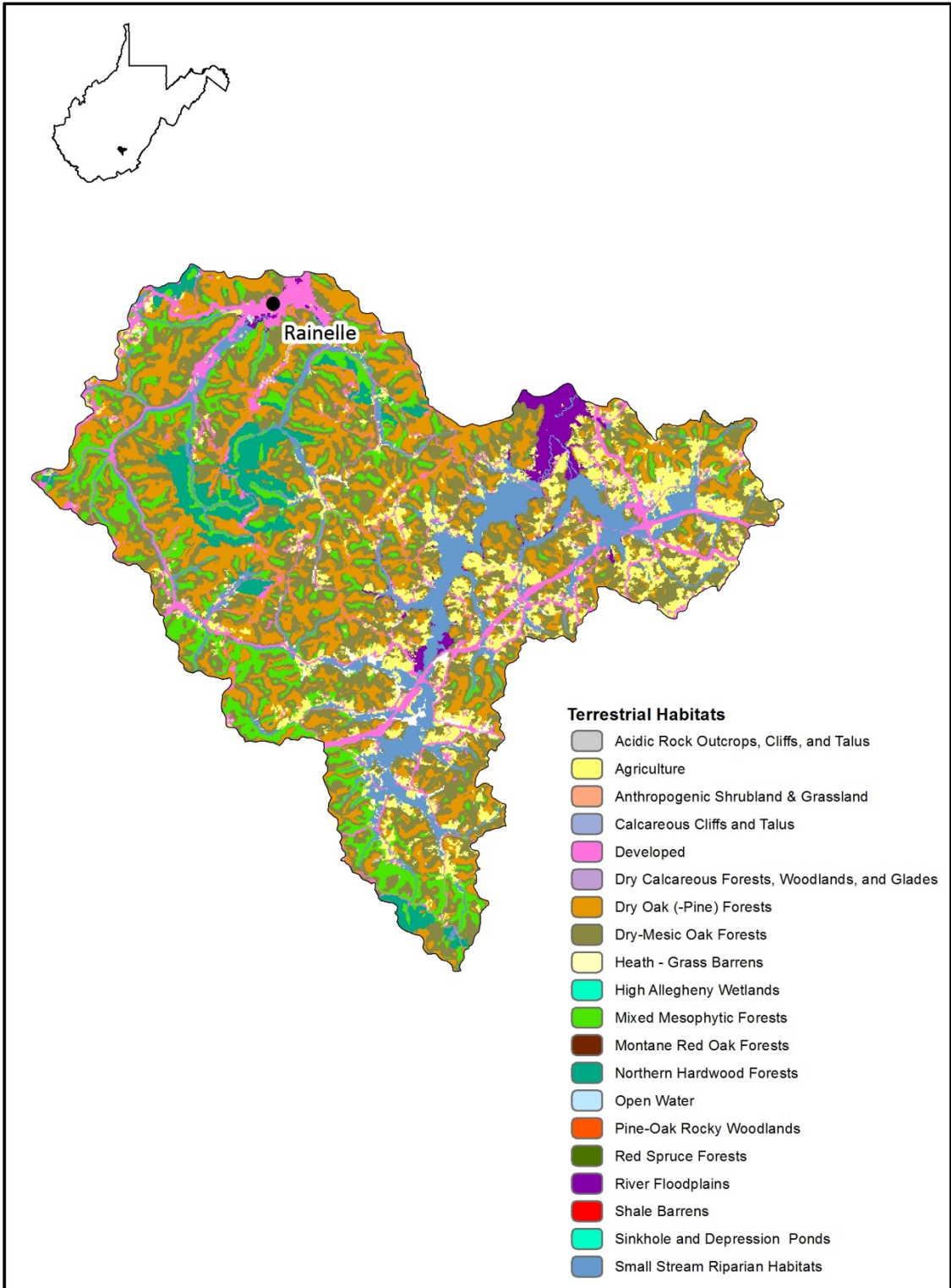
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Greater Greenbrier

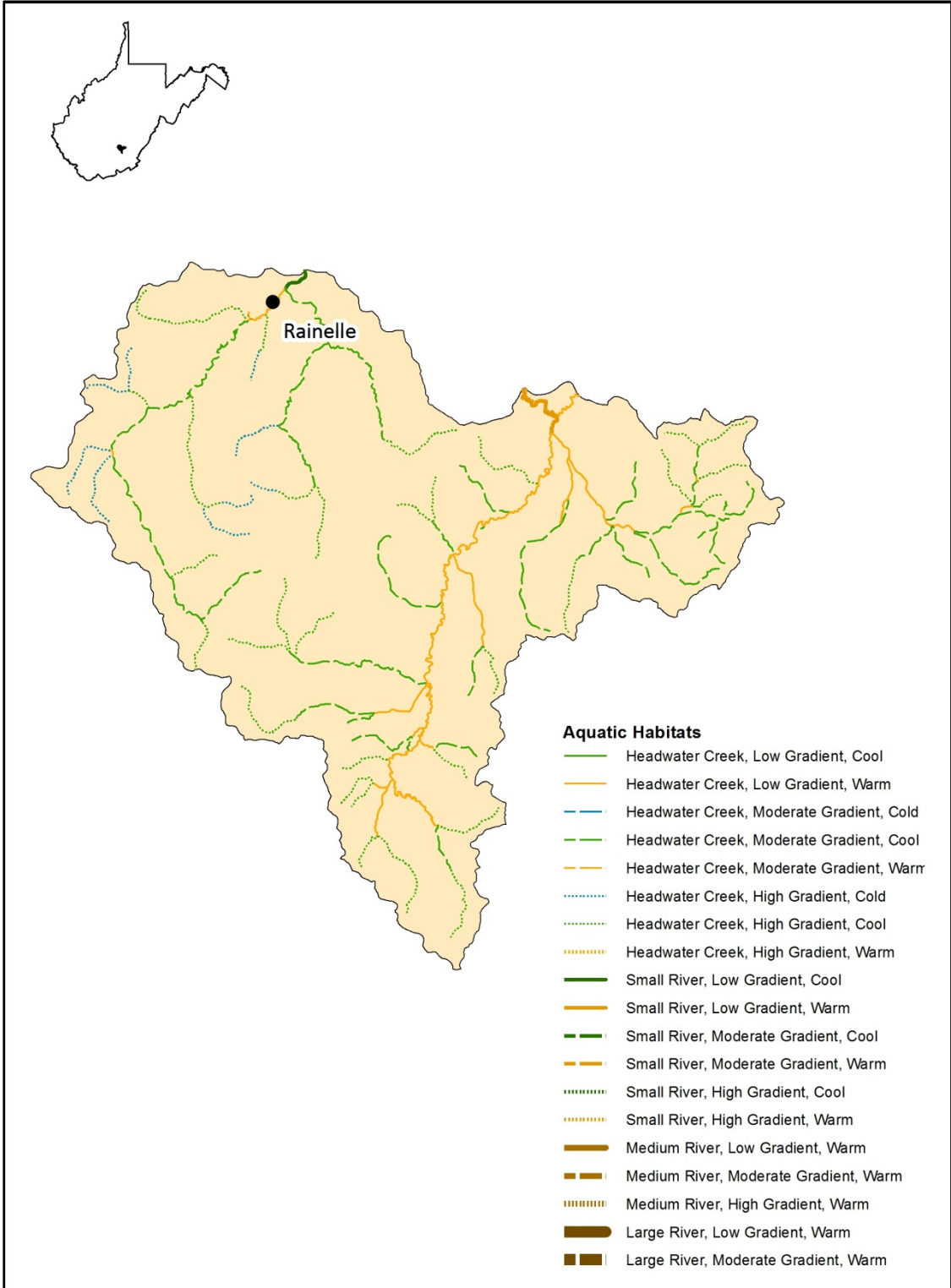
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	1	0.09%	9.76%
Headwater Creek,Low Gradient, Warm	16	1.03%	2.84%
Headwater Creek,Moderate Gradient,Cold	21	1.36%	39.80%
Headwater Creek,Moderate Gradient,Cool	274	17.73%	12.47%
Headwater Creek,Moderate Gradient,Warm	47	3.05%	1.21%
Headwater Creek,High Gradient,Cold	548	35.50%	18.68%
Headwater Creek,High Gradient,Cool	361	23.38%	5.76%
Small River,Low Gradient,Cool	3	0.18%	7.45%
Small River,Low Gradient, Warm	22	1.45%	4.86%
Small River,Moderate Gradient,Cool	76	4.91%	16.26%
Small River,Moderate Gradient,Warm	36	2.30%	6.54%
Small River,High Gradient,Warm	4	0.25%	24.22%
Medium River, Low Gradient,Warm	31	2.04%	6.63%
Medium River,Moderate Gradient,Warm	41	2.68%	11.91%
Large River,Low Gradient,Warm	41	2.66%	7.06%
Large River,Moderate Gradient,Warm	22	1.40%	19.70%
Totals	1,543	100.00%	

6.10: Meadow River Wetlands CFA

Meadow River Wetlands CFA – Terrestrial Habitats



Meadow River Wetlands CFA – Aquatic Habitats



6.10.1: Description

At the transition between the Allegheny Mountains and the Cumberland Mountains ecoregions, the floodplain of the Meadow River supports the second largest wetland complex in the state and one of the largest complexes in the Central Appalachians. These wetlands include forested swamps dominated by Pin Oak (*Quercus palustris*) and Black Ash (*Fraxinus nigra*), and smaller areas of shrub swamps and marshes. Surrounding mid-elevation uplands are covered by deciduous forests with scattered farms used mostly for pasture and hay.

6.10.2: Significant Wildlife Values

This area is most notable for its wetland species and in West Virginia is second only to Canaan Valley for its significance for wetland animals and plants. Bird species of special concern found in this area include nesting Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides virescens*), and American Woodcock (*Scolopax minor*), and it is an important migration stopover for Rusty Blackbird (*Euphagus carolinus*). The federally threatened Virginia Spiraea (*Spiraea virginiana*) exists within the wetlands. One of only two known global populations for a species of crayfish in the *Cambarus dubius* group, currently being described, is in this CFA.

6.10.3: Distinctive Stresses

Livestock graze in many wetland areas of Meadow River. Some wetland filling and draining has occurred.

6.10.4: Conservation Actions

- There are high ecological benefits possible from focusing mitigation resources into additional wetland protection and restoration in these wetlands.

6.10.5: Conservation Opportunities

- Key WVDNR Partners: West Virginia Division of Highways (WVDOH), West Liberty University, WVDEP, NRCS.
- Public Lands: Meadow River WMA.

6.10.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	1	5
Birds	7	2
Crayfish	1	
Dragonflies and Damselflies		3
Fish	1	
Plants	5	18
Reptiles	2	
Totals	17	28

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Meadow River Wetlands

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	34	0.06%	0.04%
Agriculture	6,688	10.87%	0.47%
Anthropogenic Shrubland & Grassland	1	0.00%	0.00%
Calcareous Cliffs and Talus	0	0.00%	0.00%
Developed	5,025	8.16%	0.44%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	13,361	21.71%	0.54%
Dry-Mesic Oak Forests	19,701	32.01%	0.39%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	1	0.00%	0.01%
Mixed Mesophytic Forests	6,229	10.12%	0.21%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	2,571	4.18%	0.26%
Pine-Oak Rocky Woodlands	3	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	1,132	1.84%	0.94%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	6,252	10.16%	1.26%
Unresolved	545	0.89%	0.47%
Totals	61,543	100.00%	

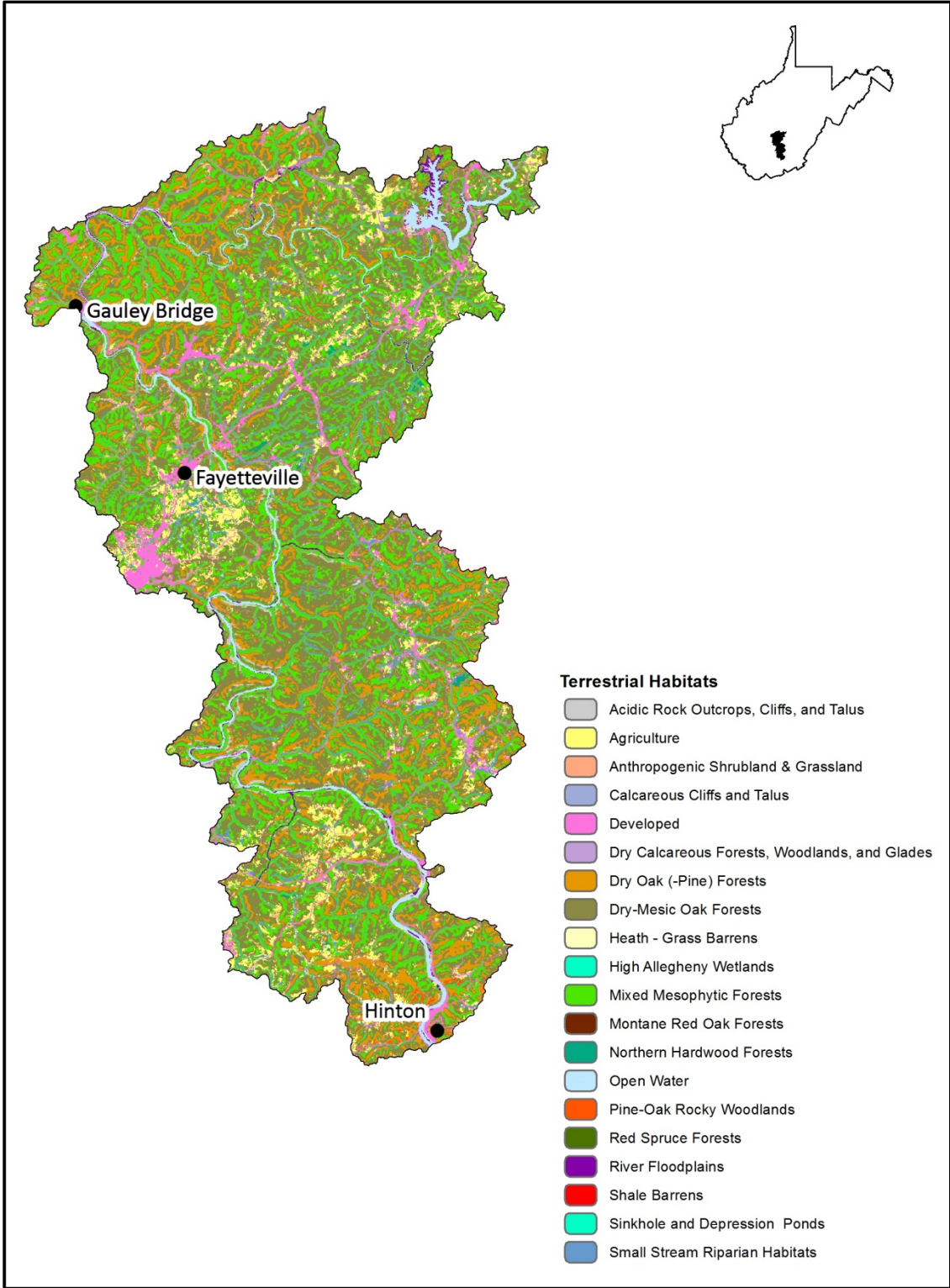
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Meadow River Wetlands

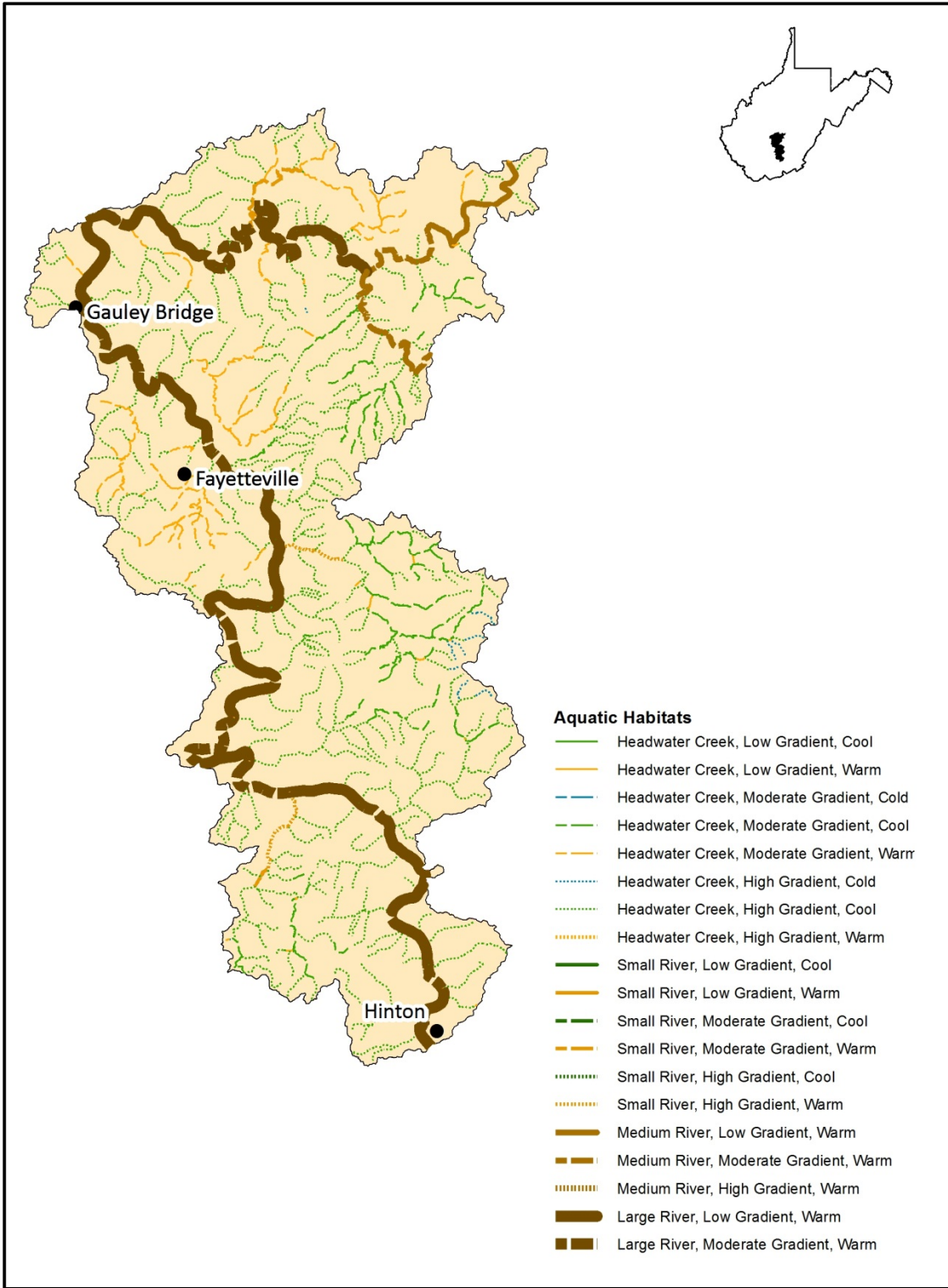
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	27	21.06%	4.80%
Headwater Creek,Moderate Gradient,Cool	49	38.41%	2.22%
Headwater Creek,High Gradient,Cold	10	7.69%	0.33%
Headwater Creek,High Gradient,Cool	41	32.48%	0.66%
Small River,Low Gradient, Warm	0	0.37%	0.10%
Totals	127	100.00%	

6.11: Gorges CFA

Gorges CFA – Terrestrial Habitats



Gorges CFA – Aquatic Habitats



6.11.1: Description

The deep, forested gorges of the New, Gauley, and Meadow rivers and surrounding mountainous uplands characterize this Cumberland Mountains Ecoregion landscape. The New River Gorge, more than 50 miles long, is the largest river gorge in eastern North America. These rivers are typically high gradient and high gradient tributaries plunge into the gorges to meet them. Steep slopes of the gorges are covered by Mixed Mesophytic, mixed oak and hardwood/hemlock forests. Large, intact forest blocks remain, primarily in and adjacent to the New River Gorge. Many areas of the gorges contain talus slopes, boulder fields, and extensive sandstone cliffs. The gorges are used today primarily for recreation. A generally rolling, moderate elevation sandstone plateau extends between the gorges, with some ridges rising to elevations over 3000 feet. These largely forested uplands areas dry oak and Mixed Mesophytic Forests and are often managed for timber production. There is a mix of small to medium, private non-industrial holdings and larger industrial timber holdings. Mixed Mesophytic Forests, while still common in the CFA, have been significantly displaced here by oak forests due to repeated burning by human-caused fires. An extensive area along the US Route 19 Corridor is heavily developed for residential and commercial purposes including the Boy Scouts of America Bechtel/The Summit High Adventure Camp. Legacy deep mining and some surface mining occurs throughout most of the area. Residential and second home development has been episodic and mostly clustered along US Route 19 or adjacent to federal lands.

6.11.2: Significant Wildlife Values

The forest of the New River Gorge is recognized as a globally significant example of the Appalachian cove hardwood/Mixed Mesophytic Forest. The CFA includes some of the largest forest blocks in the West Virginia portion of the Cumberland Mountains Ecoregion. The three gorges and forest blocks are important for their populations of regionally endemic salamanders and forest interior nesting birds such as Broad-winged Hawk, Wood Thrush, Louisiana Waterthrush, Worm-eating Warbler, and Cerulean Warbler, and is important to conservation and management of the Appalachian population of Swainson's Warbler. Cliffs, talus, portals and other upland patch habitats embedded in the forests are important for Allegheny Woodrat (*Neotoma magister*), Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*), Rafinesques Big-eared Bat, Eastern Small-footed Bat (*Myotis leibii*), Indiana Bat, Long-tailed Shrew (*Sorex dispar*), Green Salamander (*Aneides aeneus*), Timber Rattlesnake, and nesting Peregrine Falcon (*Falco peregrinus*). Floodplains along the New and Gauley rivers include some of the most extensive riverscour prairies and woodlands in the eastern United State, supporting many rare plant species including the globally rare Monongahela Barbara's-Buttons (*Marshallia grandiflora*). Upland and riparian habitats in the CFA support a high number (109) of SGCN plants. The federally threatened Virginia Spiraea is found along the Gauley and Meadow rivers. Rivers in the CFA contain substantial statewide portions of several river habitat types. The New River in the Gorge CFA, along with the Kanawha Falls area just downstream, provides the last stronghold for the Purple Wartback mussel (*Cyclonaias tuberculata*) in West Virginia.

6.11.3: Distinctive Stresses

The Gauley River, historically a warm water stream, is impounded by the Summersville Dam. Water is released (seasonally) from the Summersville Dam to accommodate recreational boating. However, water released from Summersville Dam is coldwater which impedes mussel reproduction on the river. In addition, fish and other aquatic life are impacted when the river substrate is removed by excessive

scouring as a result of frequent water releases. Episodic development, especially for second homes, near and adjacent to federal lands has substantially increased forest fragmentation.

6.11.4: Conservation Actions

- Develop cooperative agreements with public landowners to maintain large, intact forest blocks thus protecting many other special habitats with emphasis on those lands adjacent to and near existing public lands.
- Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.
- Assess opportunities for improving mussel, fish, and riparian plant populations in the Gauley River gorge.

6.11.5: Conservation Opportunities

- Key WVDNR Partners: WVDOF, WVDEP, USACOE, National Park Service, Boy Scouts of America, TNC, New River Conservancy, NRCS, AMJV.
- Public Lands: New River Gorge National River, Gauley River National Recreation Area, Beury Mountain WMA; Hawks Nest, Carnifex Ferry, and Babcock state parks.

6.11.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	6	16
Birds	21	8
Butterflies and Moths	4	4
Cave Invertebrates	1	
Dragonflies and Damselflies	2	6
Fish	4	1
Mammals	7	2
Mussels	4	9
Plants	27	82
Reptiles	7	7
Snails		5
Tiger Beetles	1	
Totals	84	140

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Gorges

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	4,393	1.10%	4.89%
Agriculture	22,569	5.66%	1.57%
Anthropogenic Shrubland & Grassland	2,750	0.69%	1.73%
Calcareous Cliffs and Talus	48	0.01%	0.53%
Developed	26,610	6.67%	2.34%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	48,115	12.07%	1.95%
Dry-Mesic Oak Forests	157,917	39.60%	3.16%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	105,675	26.50%	3.59%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	631	0.16%	0.06%
Pine-Oak Rocky Woodlands	432	0.11%	0.57%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	2,721	0.68%	2.26%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	17,276	4.33%	3.50%
Unresolved	9,651	2.42%	8.27%
Totals	398,789	100.00%	

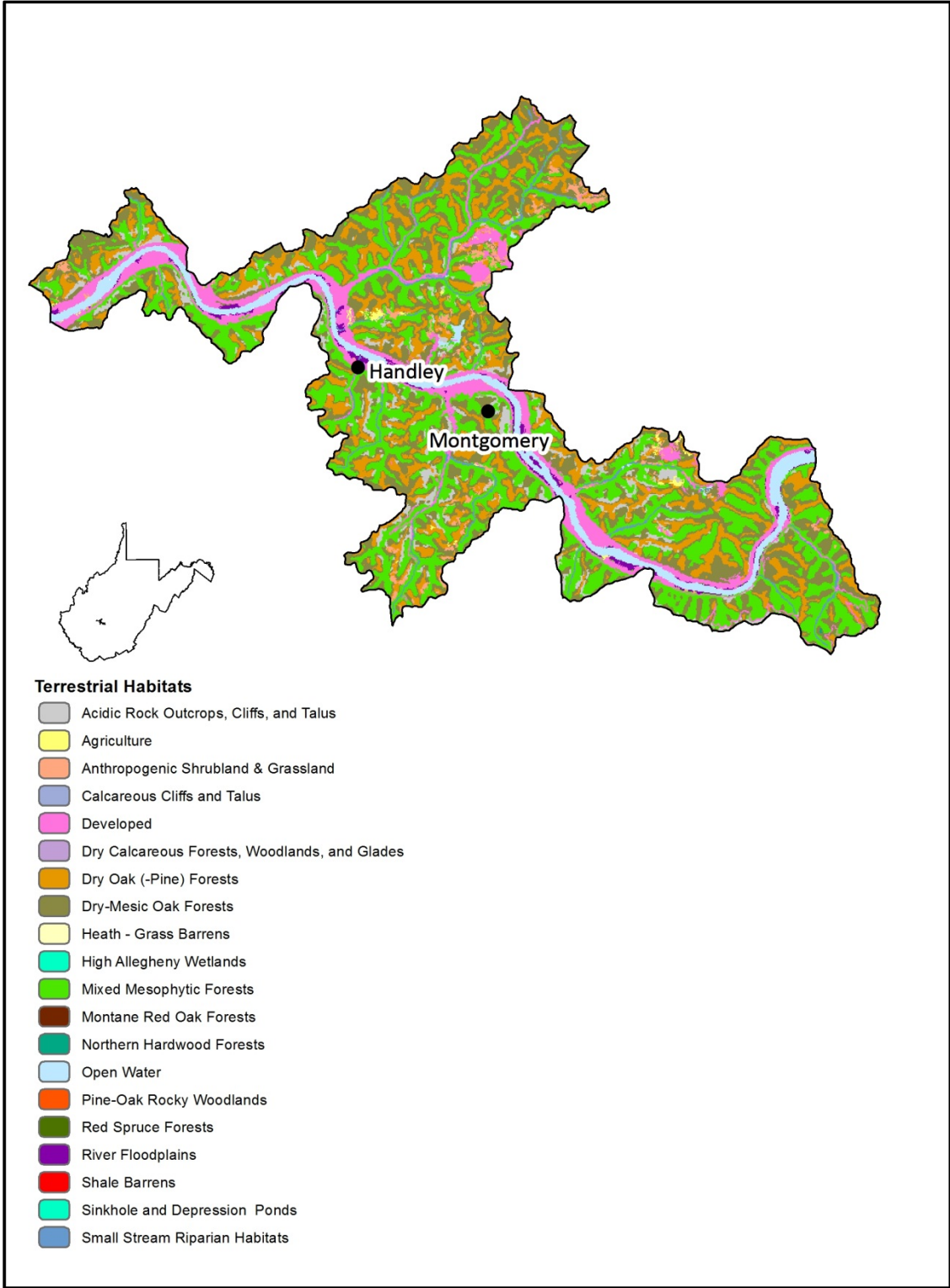
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Gorges

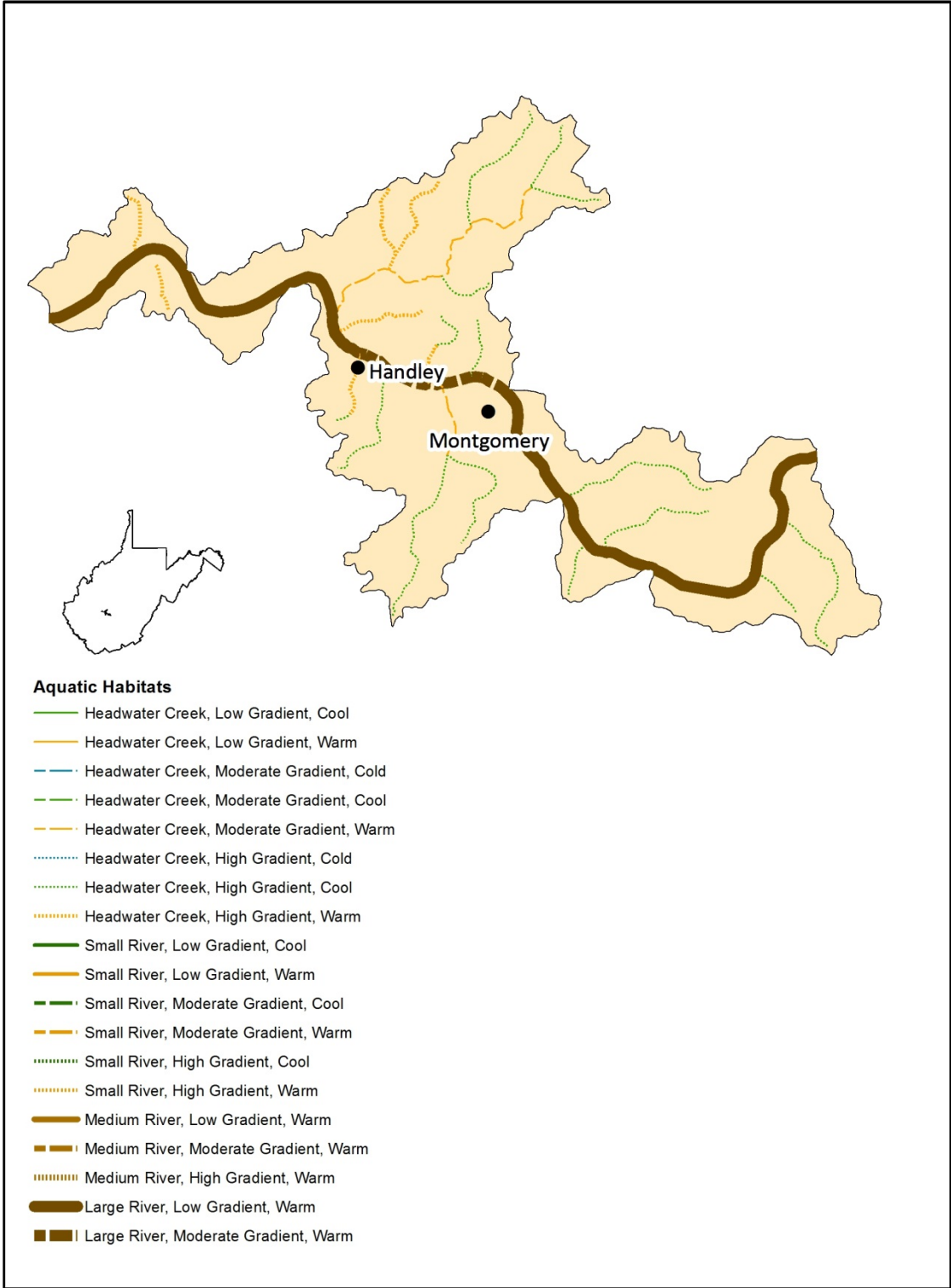
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	7	0.85%	1.23%
Headwater Creek,Moderate Gradient,Cool	85	10.57%	3.89%
Headwater Creek,Moderate Gradient,Warm	88	10.87%	2.25%
Headwater Creek,High Gradient,Cold	8	0.95%	0.26%
Headwater Creek,High Gradient,Cool	482	59.71%	7.70%
Small River,Low Gradient, Warm	2	0.23%	0.41%
Small River,Moderate Gradient,Warm	7	0.86%	1.28%
Small River,High Gradient,Warm	9	1.16%	58.97%
Medium River, Low Gradient,Warm	14	1.68%	2.86%
Medium River,Moderate Gradient,Warm	8	1.01%	2.35%
Medium River,High Gradient,Warm	3	0.38%	78.27%
Large River,Low Gradient,Warm	55	6.81%	9.47%
Large River,Moderate Gradient,Warm	40	4.94%	36.37%
Totals	808	100.00%	

6.12: Kanawha Falls CFA

Kanawha Falls CFA – Terrestrial Habitats



Kanawha Falls CFA – Aquatic Habitats



6.12.1: Description

The Kanawha Falls CFA consists of a five mile reach of the Kanawha River from Kanawha Falls at Glen Ferris, downstream to Deep Water and Montgomery Heights. This river reach is the last section of any great river in West Virginia that remains un-impounded. Although flow is still regulated by dams upstream on the Gauley and New Rivers, this reach maintains its flowing riffle, pool, and run complex of habitats. Much of the uplands in this small Cumberland Mountains Ecoregion CFA consist of mostly forested steep slopes. Extensive residential and commercial development is concentrated along the narrow floodplain of the Kanawha River. The river is also paralleled by US Route 60 and a railroad.

6.12.2: Significant Wildlife Values

The falls, a barrier to passage, provides a natural break point for fish and mussel species diversity between the mainstem Kanawha River downstream and the New River drainage upstream. Thirty-seven SGCN mussels occur here, including four federally endangered species. One of these, the Northern Riffleshell (*Epioblasma torulosa rangiana*), became extirpated but was subsequently reintroduced here in 2014. Along with the New River in the Gorge just upstream, this provides the last stronghold for the Purple Wartyback mussel in West Virginia. There is a highly diverse fish fauna here. Seventy-three fish species are documented in this CFA including 10 SGCN.

6.12.3: Distinctive Stresses

The Glen Ferris Hydropower facility has the potential to change flow patterns across established mussel beds. Spill from tanker truck wrecks or train derailments could be disastrous.

6.12.4: Conservation Actions

- Protecting the un-impounded condition of this reach is of utmost priority.
- This reach has the potential to provide broodstock for restoration of mussel species throughout the state. Due to the lack of the exotic zebra mussels this area is also important for restoration of big river mussel species such as the on-going Northern Riffleshell restoration project.
- Develop a hazardous spill prevention and response protocol that addresses biological and ecological concerns.

6.12.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, USFWS, hydropower operator, CSX Corporation, National Transportation Safety Board, Federal Energy Regulatory Commission (FERC).
- Public Lands: Kanawha Falls Stream Access Site (privately owned, but managed by WVDNR).

6.12.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	4	8
Birds	7	2
Butterflies and Moths	1	1
Fish	3	7
Mussels	16	21
Plants		1
Reptiles	2	4
Totals	33	44

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Kanawha Falls

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	1,792	4.57%	2.00%
Agriculture	144	0.37%	0.01%
Anthropogenic Shrubland & Grassland	741	1.89%	0.47%
Calcareous Cliffs and Talus	0	0.00%	0.00%
Developed	3,953	10.07%	0.35%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	7,143	18.20%	0.29%
Dry-Mesic Oak Forests	10,882	27.73%	0.22%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	11,381	29.00%	0.39%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	3	0.01%	0.00%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	401	1.02%	0.33%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	651	1.66%	0.13%
Unresolved	2,156	5.49%	1.85%
Totals	39,247	100.00%	

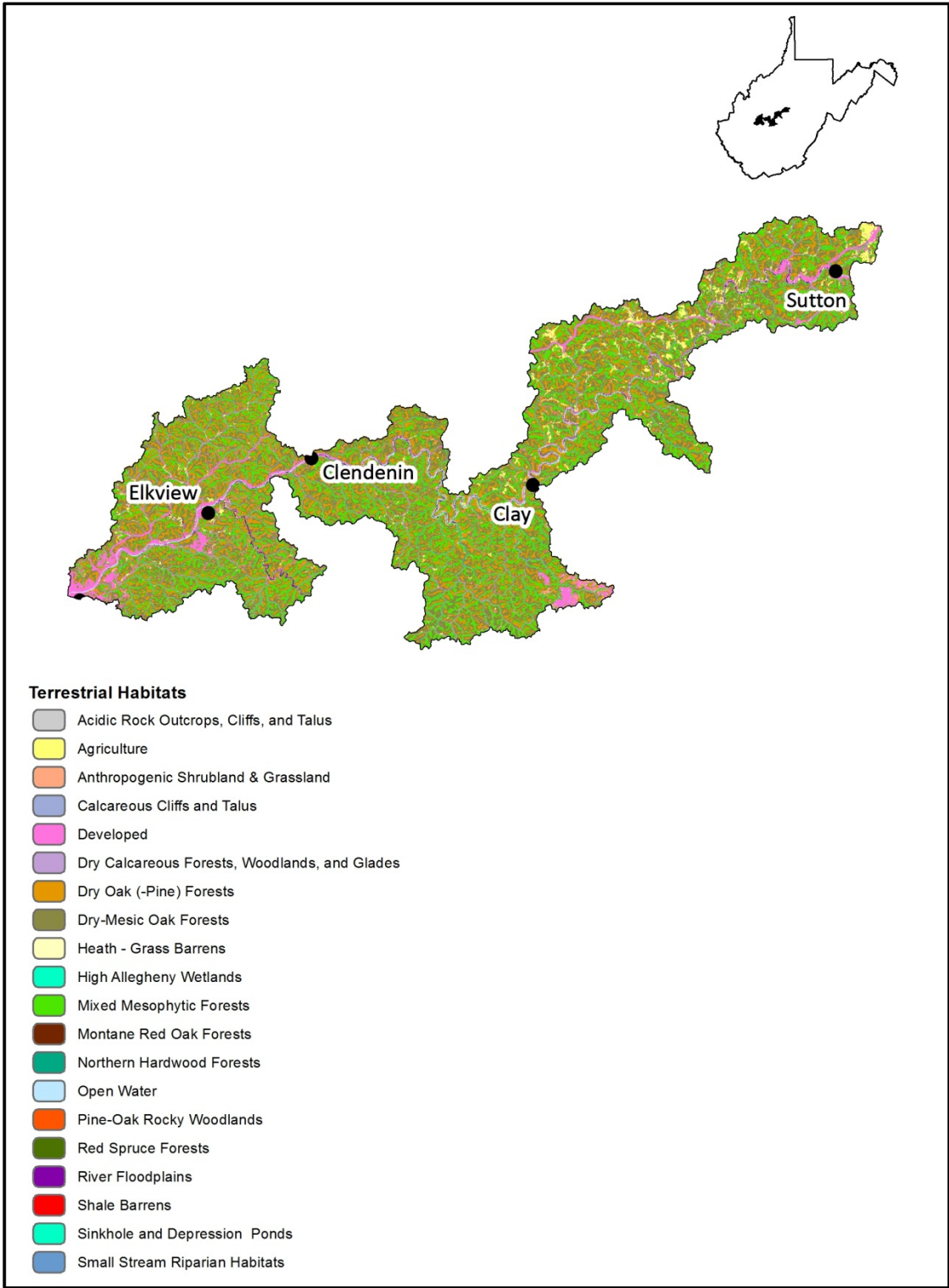
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Kanawha Falls

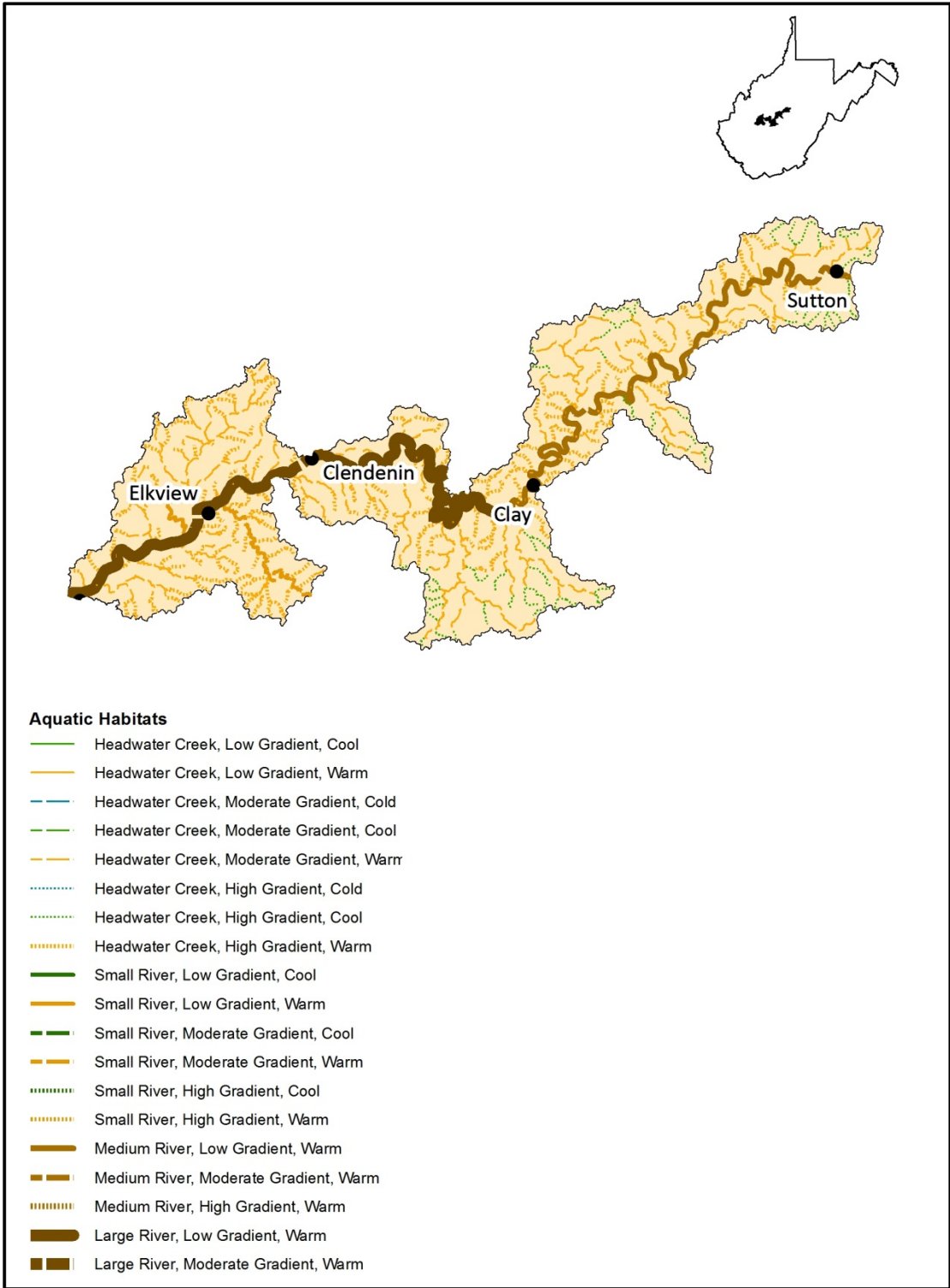
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	0	0.57%	0.08%
Headwater Creek,Moderate Gradient,Warm	9	12.25%	0.24%
Headwater Creek,High Gradient,Cool	30	40.57%	0.49%
Headwater Creek,High Gradient,Warm	9	12.08%	1.19%
Small River,Low Gradient, Warm	0	0.13%	0.02%
Small River,Moderate Gradient,Warm	3	4.57%	0.63%
Small River,High Gradient,Warm	0	0.08%	0.38%
Large River,Low Gradient,Warm	18	24.62%	3.18%
Large River,Moderate Gradient,Warm	4	5.13%	3.51%
Totals	75	100.00%	

6.13: Lower Elk River CFA

Lower Elk River CFA – Terrestrial Habitats



Lower Elk River CFA – Aquatic Habitats



6.13.1: Description

The Lower Elk River CFA is that portion of the river from below Sutton Dam to its confluence with the Kanawha River and surrounding uplands, stretching along the juncture of the Western Allegheny Plateau and Cumberland Mountains ecoregions. The river, met by many small to medium tributaries, meanders across a hilly, dissected low sandstone plateau, with ridge crests usually well below 2000 feet. West Virginia's largest city, Charleston, occurs at the mouth of the Elk, but for much of its length, the lower Elk passes by small towns and farms. In this deeply dissected region of West Virginia, the river valley is used as a transportation corridor, with either roads or railroads, and often both, running along both sides. The uplands remain primarily forested, with the original Mixed Mesophytic Forest generally highly fragmented, but several moderate sized forest blocks remain. Forestland is mostly in small to medium-sized non-industrial, private holdings, but there are some medium-sized industrial timber holdings. Oil and gas wells and coal mines are widespread in the uplands. Characterized by its excellent water quality, the Elk River provides drinking water to several communities including Charleston.

6.13.2: Significant Wildlife Values

The Lower Elk River is one of the most biologically significant watersheds in the Ohio River system. It has one of the richest diversities of freshwater mussels in the state with 36 SGCN species, five of which are federally listed. Queen Shoals is a location where federally endangered mussel species restoration is being conducted. The once extirpated Rayed Bean (*Villosa fabalis*) was reintroduced in 2006 and augmentation of the small existing Northern Riffleshell population began in 2012. Spread Shoals near Mary Chilton Roadside Park is another special location for snorkeling to observe the diversity of darters in this river. The Elk River also hosts a diverse fish community with 98 fish species documented, including the only extant population remaining anywhere of the federally endangered Diamond Darter (*Cryallaria cincotta*) and 23 other SGCN fishes. Streams and wetlands in the CFA support seven SGCN dragonflies and damselflies. Forested uplands support populations of forest interior bird species, with some of the highest suspected breeding densities of Cerulean Warbler anywhere in the country and the northernmost breeding extent of Swainson's Warbler in the state.

6.13.3: Distinctive Stresses

Energy development contributes to habitat loss, forest fragmentation, water pollution, and acid mine drainage. Additional water pollution problems arise from industrial and sewage discharges and spills. The Elk River is a warmwater stream, and although Sutton Dam has a multilevel release, high flows in the summer significantly reduce water temperatures when the dam is forced to release a large portion of its discharge from the bottom port. Cooler water temperatures impact mussel reproduction. In 2014 a mussel kill was observed in the upper reaches of the lower Elk. No freshwater mussel reproduction has been observed in this area in over ten years. Likewise, significant algae blooms occur between Duck and Ivydale.

6.13.4: Conservation Actions

- Engage with the public and especially local watershed and environmental groups, to instill awareness and concern for the aquatic resources.

- Partner with local watershed groups, and local governments to elevate efforts to reduce water pollution and avoid future spills.
- Partner with land managers (public and private) to implement forest management practices that benefit forest interior birds.
- Identify factors impacting mussel reproduction and creating algae blooms and develop corrective strategies.

6.13.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, USFWS, USACOE, watershed groups, NRCS, AMJV.
- Public Lands: Morris Creek and Wallback WMAs, Coonskin Park.

6.13.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	3	10
Birds	16	6
Butterflies and Moths		2
Crayfish	1	
Dragonflies and Damselflies	3	4
Fish	11	13
Mammals	2	
Mussels	15	21
Plants		5
Reptiles	1	5
Snails		4
Totals	52	70

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Lower Elk

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	1,688	0.54%	1.88%
Agriculture	8,092	2.61%	0.56%
Anthropogenic Shrubland & Grassland	2,111	0.68%	1.33%
Calcareous Cliffs and Talus	16	0.01%	0.17%
Developed	26,559	8.57%	2.33%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	62,893	20.29%	2.55%
Dry-Mesic Oak Forests	113,195	36.51%	2.27%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	82,620	26.65%	2.80%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	36	0.01%	0.00%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	1,973	0.64%	1.64%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	7,736	2.50%	1.57%
Unresolved	3,092	1.00%	2.65%
Totals	310,012	100.00%	

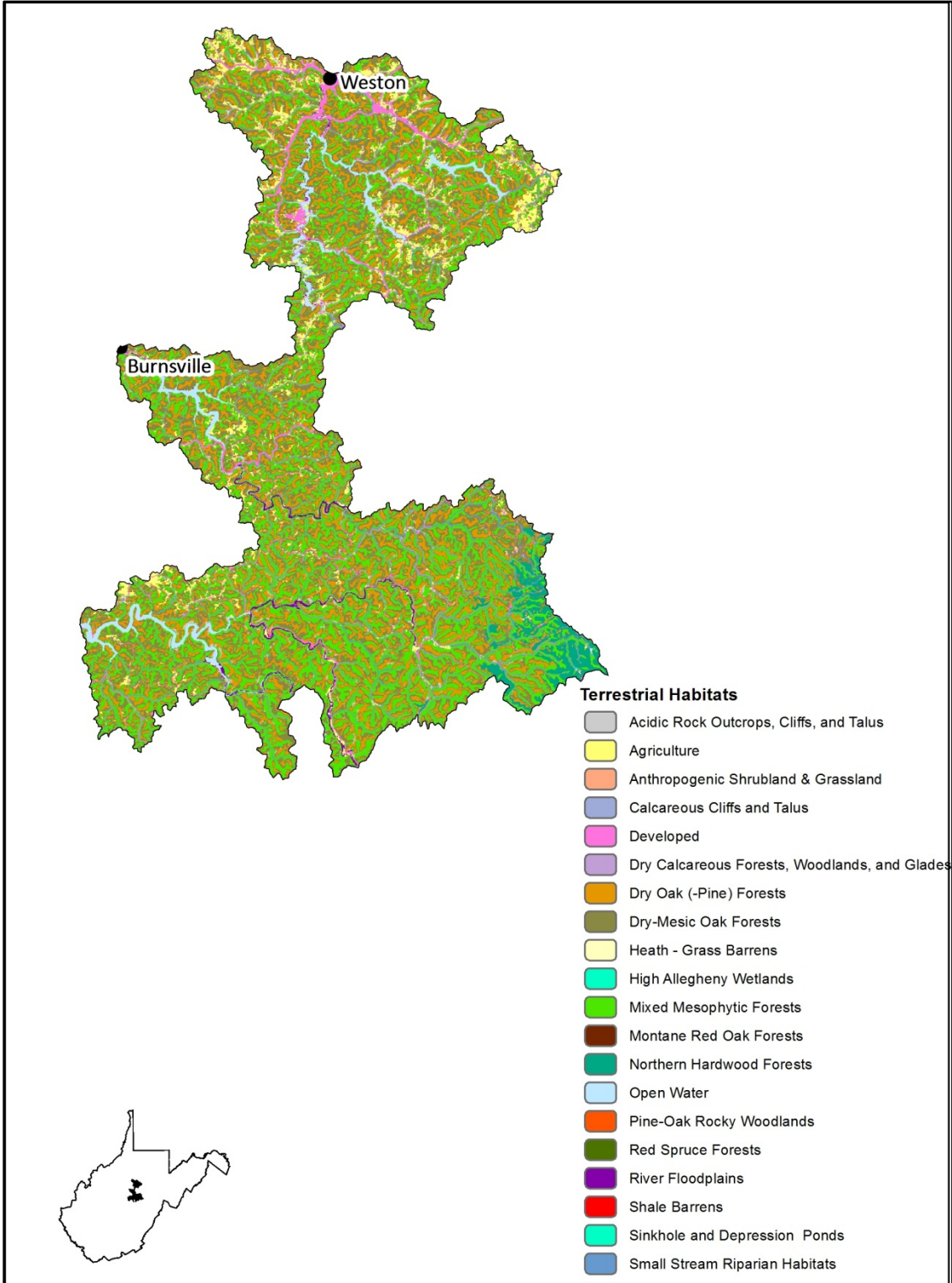
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Lower Elk

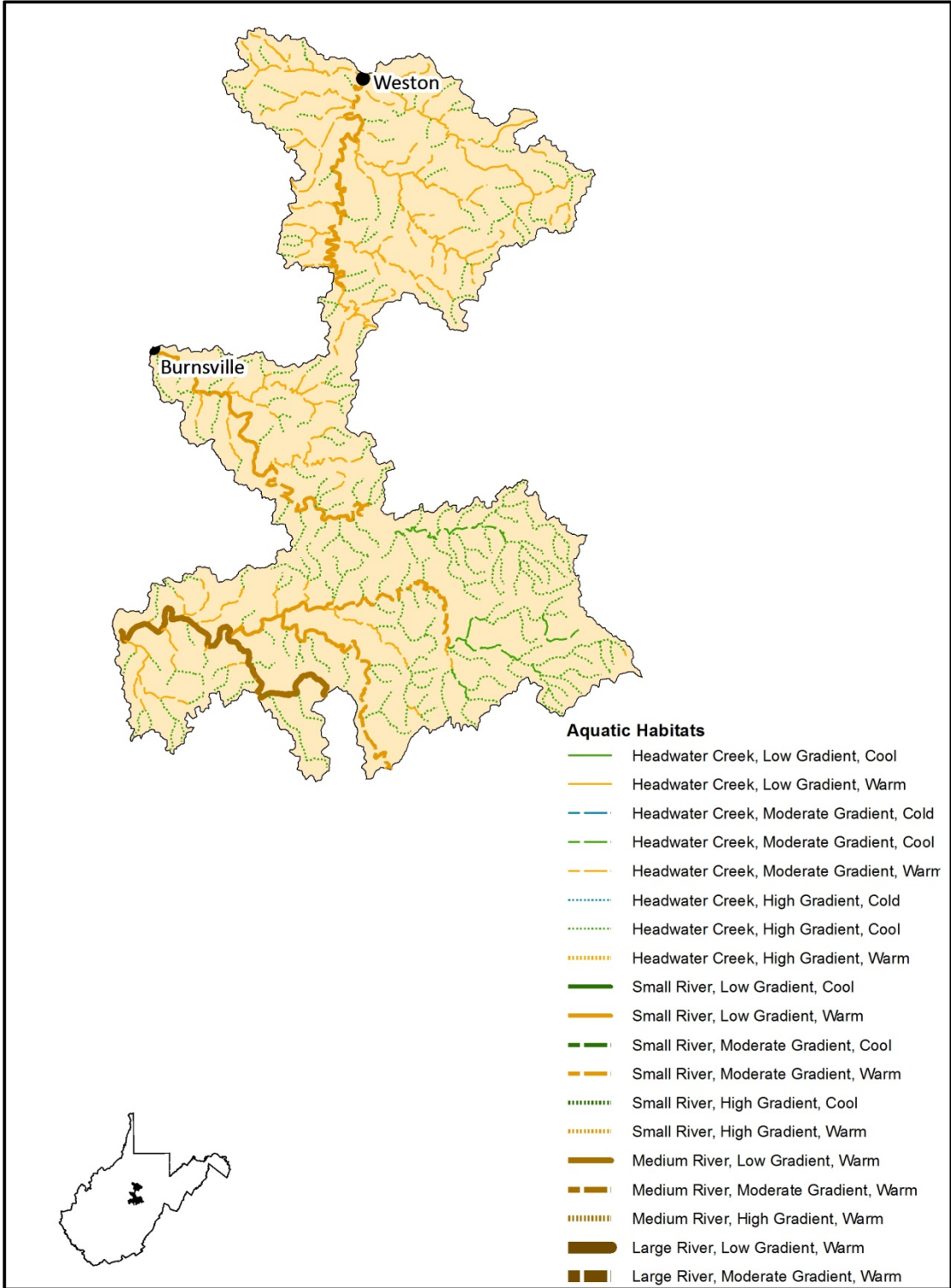
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	10	1.49%	1.76%
Headwater Creek,Moderate Gradient,Warm	232	35.31%	5.94%
Headwater Creek,High Gradient,Cool	75	11.36%	1.19%
Headwater Creek,High Gradient,Warm	217	33.04%	28.57%
Small River,Low Gradient, Warm	7	1.09%	1.55%
Small River,Moderate Gradient,Warm	15	2.29%	2.77%
Medium River, Low Gradient,Warm	46	6.98%	9.64%
Medium River,Moderate Gradient,Warm	6	0.86%	1.64%
Large River,Low Gradient,Warm	45	6.81%	7.69%
Large River,Moderate Gradient,Warm	5	0.77%	4.63%
Totals	657	100.00%	

6.14: Central Reservoirs CFA

Central Reservoirs CFA – Terrestrial Habitats



Central Reservoirs CFA – Aquatic Habitats



6.14.1: Description

In the Western Allegheny Plateau Ecoregion, the Central Reservoirs landscape centers around USACOE reservoirs on the upper reaches of the Elk River, Little Kanawha River, and West Fork River, and a power company reservoir on Stonecoal Creek within the West Fork River Watershed. Together, these reservoirs cover 5268 acres and provide a significant portion of the large lentic waters in West Virginia. Most of the upland areas are low-elevation (below 2000 feet), forested, dissected hills, which are locally rugged. Small farms are locally extensive on ridgelines. This is generally a fragmented forested landscape of mostly small to medium-sized non-industrial, private holdings. The area is dotted with small towns, and services to support the recreation provided by the reservoirs. A few blocks of relatively intact forests remain on public lands, with significant stands of old growth forests at Elk River, Stonewall Jackson, and Stonecoal Lake WMAs.

6.14.2: Significant Wildlife Values

This CFA supports important habitats for many aquatic species, including 23 mussels and six fish of concern. Elk River Crayfish (*Cambarus elkensis*), endemic to the upper Elk Watershed, is largely restricted to the Elk and Holly river systems upstream of Sutton Lake. Inlet marshes, backwaters, and open waters on the reservoirs provide habitat for a variety of wetland and open water birds, including breeding Osprey (*Pandion haliaetus*) and Great Blue and Green herons. Streams and wetlands in the CFA support seven SGCN dragonflies and damselflies. Forested uplands are important for a number of breeding forest interior and early successional forest species, including American Woodcock, Wood Thrush, Louisiana Waterthrush, Worm-eating Warbler, Blue-winged Warbler (*Vermivora cyanoptera*), Cerulean Warbler, and Kentucky Warbler. Stonewall Jackson WMA, with its diverse terrestrial and aquatic habitats, hosts rich communities of butterflies and dragonflies of concern.

6.14.3: Distinctive Stresses

Issues in this CFA include water contamination from municipal and residential sources and potential habitat loss and fragmentation from gas development. The impacts from a large invasive population of the Chinese Mystery Snail (*Cipangopaludina chinensis malleata*) are unknown.

6.14.4: Conservation Actions

- Incorporate steps to reduce forest habitat loss and fragmentation in planning for gas well development, as well as associated infrastructure.
- Continue to improve and maintain water quality of significant streams.
- Partner with land managers (public and private) to implement forest management practices that benefit bird species such as American Woodcock, Wood Thrush, and Cerulean Warbler.
- Where feasible and appropriate, public and private land managers should be encouraged to implement appropriate practices for American Woodcock, Wood Thrush and Cerulean Warbler.

6.14.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, USFWS, USACOE, watershed groups, NRCS, AMJV, National Wild Turkey Federation, gas companies.

- Public Lands: Stonecoal Lake, Elk River, Burnsville Lake, and Stonewall Jackson WMAs; Stonewall Jackson Resort and Holly River state parks.

6.14.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	1	12
Birds	17	8
Butterflies and Moths	4	4
Crayfish	1	
Dragonflies and Damselflies	3	4
Fish	3	3
Mammals	2	
Mussels	8	15
Plants	1	4
Reptiles	4	4
Snails		5
Totals	44	59

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Central Reservoirs

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	1,074	0.53%	1.20%
Agriculture	14,152	6.93%	0.99%
Anthropogenic Shrubland & Grassland	185	0.09%	0.12%
Calcareous Cliffs and Talus	6	0.00%	0.07%
Developed	11,473	5.62%	1.01%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	39,225	19.21%	1.59%
Dry-Mesic Oak Forests	66,451	32.55%	1.33%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	58,255	28.53%	1.98%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	0	0.00%	0.00%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	1,790	0.88%	1.49%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	5,198	2.55%	1.05%
Unresolved	6,364	3.12%	5.45%
Totals	204,172	100.00%	

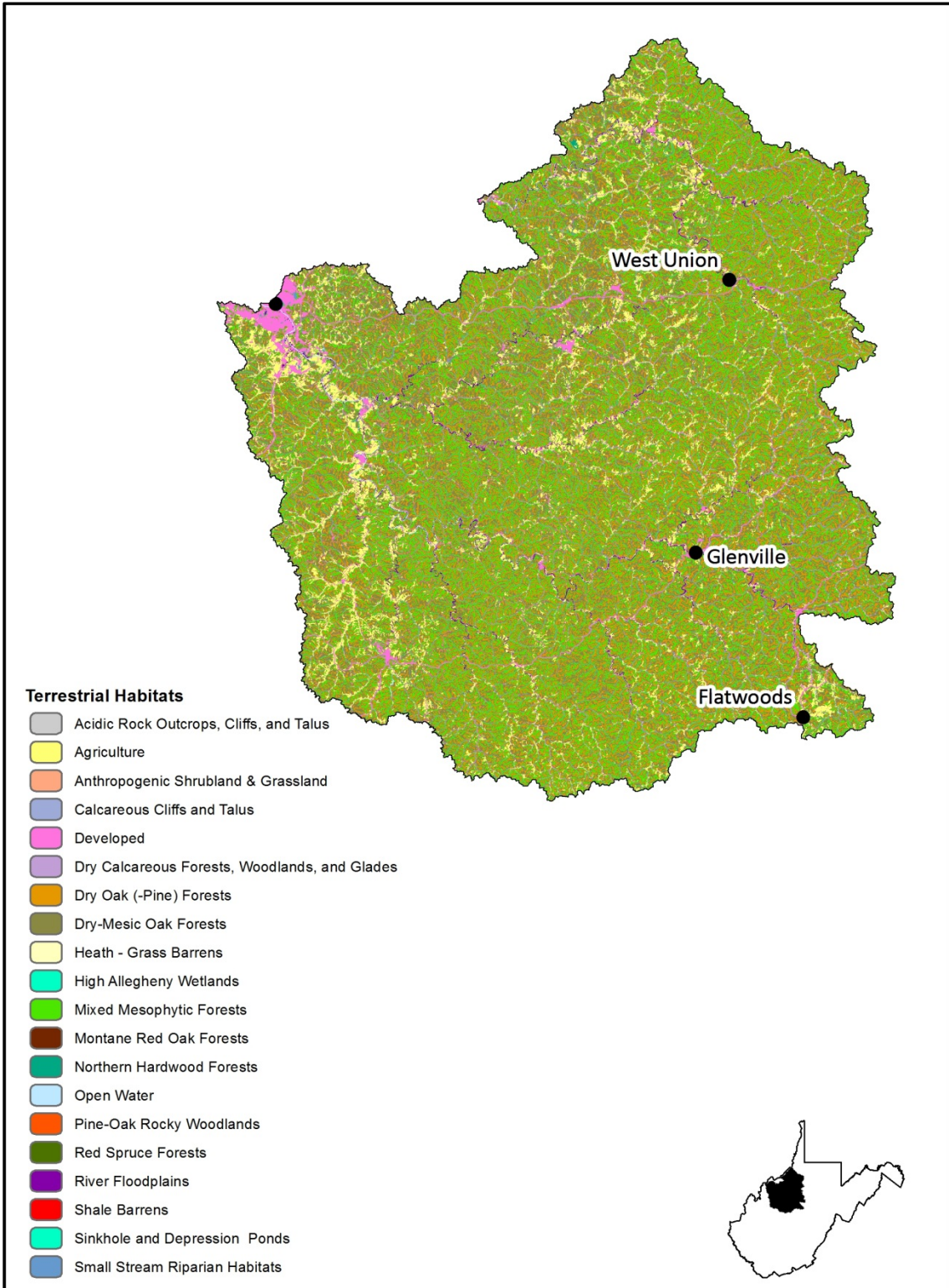
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Central Reservoirs

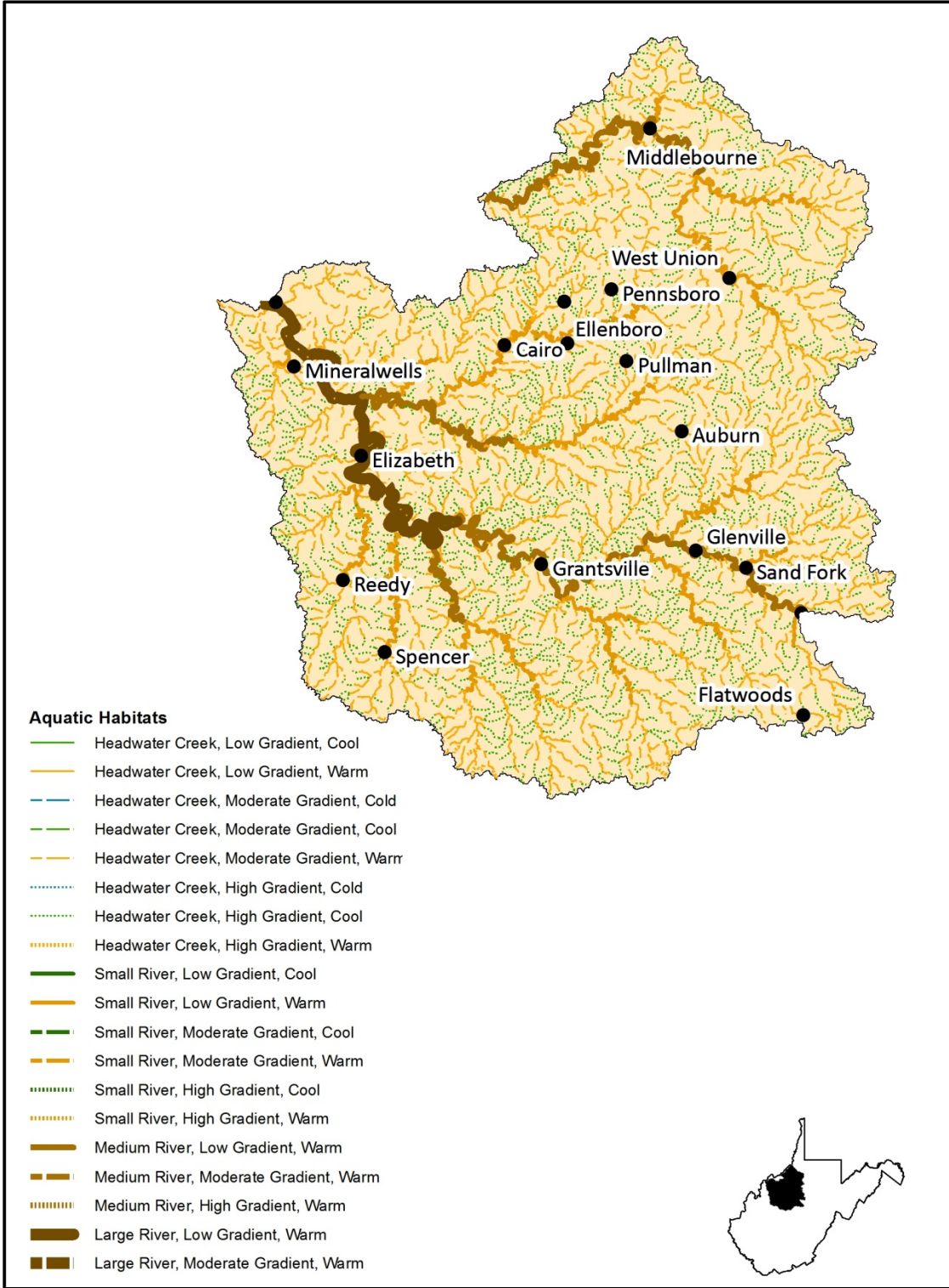
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	34	5.67%	6.11%
Headwater Creek,Moderate Gradient,Cool	20	3.30%	0.90%
Headwater Creek,Moderate Gradient,Warm	155	25.80%	3.96%
Headwater Creek,High Gradient,Cool	296	49.35%	4.73%
Small River,Low Gradient, Warm	45	7.52%	9.81%
Small River,Moderate Gradient,Warm	32	5.26%	5.81%
Small River,High Gradient,Warm	0	0.03%	0.96%
Medium River, Low Gradient,Warm	18	3.08%	3.88%
Totals	600	100.00%	

6.15: Little Kanawha and Middle Island Creek CFA

Little Kanawha and Middle Island Creek CFA – Terrestrial Habitats



Little Kanawha and Middle Island Creek CFA – Aquatic Habitats



6.15.1: Description

The Little Kanawha River and Middle Island Creek are two significant tributaries of the Ohio River. Their Western Allegheny Plateau Ecoregion watersheds are characterized by a primarily forested, dissected topography of rolling, lower elevation shale and sandstone hills bisected by numerous streams. Ridges remain largely covered by second and third growth mixed oak and Mixed Mesophytic Forests. Forested areas are primarily small to medium, non-industrial, private holdings with some industrial timber land. Small farms (mostly grazing) occur on ridges and in stream bottoms. Several small cities (West Union, Harrisville, Elizabeth, Grantsville, Glenville) and numerous small towns occur in the narrow valleys. Wider valley bottoms are often small farms primarily used for hayfields or pastures. Gas and oil development was historically widespread, with deep mining for coal in the eastern portions. Horizontal gas drilling is significant and increasing.

6.15.2: Significant Wildlife Values

Both Middle Island Creek and Little Kanawha River watersheds include significant portions of the State's warm and coolwater habitats, which support a significant portion of the mussel and fish diversity in West Virginia. They are home to 111 known fishes (23 SGCN) and 41 SGCN mussels, including two federally endangered species (Snuffbox (*Epioblasma triquetra*) and Clubshell (*Pleurobema clava*)), and Eastern Hellbender. The streams are the state's best location for the Snuffbox, and in 2013 Clubshell populations were augmented as part of a large-scale restoration effort. A 35-mile reach of the Little Kanawha River from Yellow Creek downstream to Reedy Creek, easily accessed in several places by WV Route 5, is particularly diverse with habitats for an abundance of mussels and fishes. Streams and wetlands in the CFA are among the state's most important habitats for dragonflies and damselflies (25 SGCN). The extensive forests make this area important for conservation of these widespread forest types (oak hickory, mesic cove, and maple beech), and contain several of the most extensive, relatively unfragmented forest blocks remaining in the Western Allegheny Plateau Ecoregion. These watersheds provide significant breeding habitat for interior forest birds, including a large percentage of the Cerulean Warblers that breed in West Virginia.

6.15.3: Distinctive Stresses

This is an area of intensive and expanding shale gas development and associated infrastructure that fragments or eliminates habitat and adds sediment loads to the streams. Spills containing brine fluids and hazardous materials and/or water withdrawals put aquatic species at risk. The minimum flow below North Bend Dam is only 1 cfs, which prolongs drought conditions and may harm aquatic life. Because of the geology in this portion of the state, any ground-disturbing activities can result in significant siltation of the streams.

6.15.4: Conservation Actions

- Engage with the gas industry to develop infrastructure plans that reduce fragmentation and other habitat impacts.
- Partner with state parks and other public land agencies to develop management plans that maintain intact forest habitat.
- Partner with the WVDEP and WVDNR Fisheries to identify the causes of low flow and low dissolved oxygen and develop corrective strategies.

- Partner with WVDEP, gas extraction companies, and local governments to develop and implement ecologically sustainable water use protocol for streams.

6.15.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, USFWS, NRCS, watershed groups, AMJV, gas industry county planning commissions.
- Public Lands: North Bend, North Bend Rails Trail, and Cedar Creek state parks; The Jug, Ritchie Mines, Sand Hill, Stumptown, and Buffalo Run WMAs; Mountwood Community Park and other local parks.

6.15.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	6	12
Birds	19	10
Butterflies and Moths	1	3
Dragonflies and Damselflies	9	16
Fish	8	15
Mammals	2	
Mussels	17	24
Plants	2	17
Reptiles	7	8
Snails		15
Totals	71	120

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	210	0.01%	0.23%
Agriculture	128,132	7.40%	8.93%
Anthropogenic Shrubland & Grassland	8,199	0.47%	5.15%
Calcareous Cliffs and Talus	647	0.04%	7.03%
Developed	99,534	5.75%	8.74%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	350,836	20.27%	14.20%
Dry-Mesic Oak Forests	583,210	33.69%	11.69%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	491,375	28.39%	16.68%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	203	0.01%	0.02%
Pine-Oak Rocky Woodlands	0	0.00%	0.00%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	13,167	0.76%	10.95%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	49,914	2.88%	10.10%
Unresolved	5,510	0.32%	4.72%
Totals	1,730,938	100.00%	

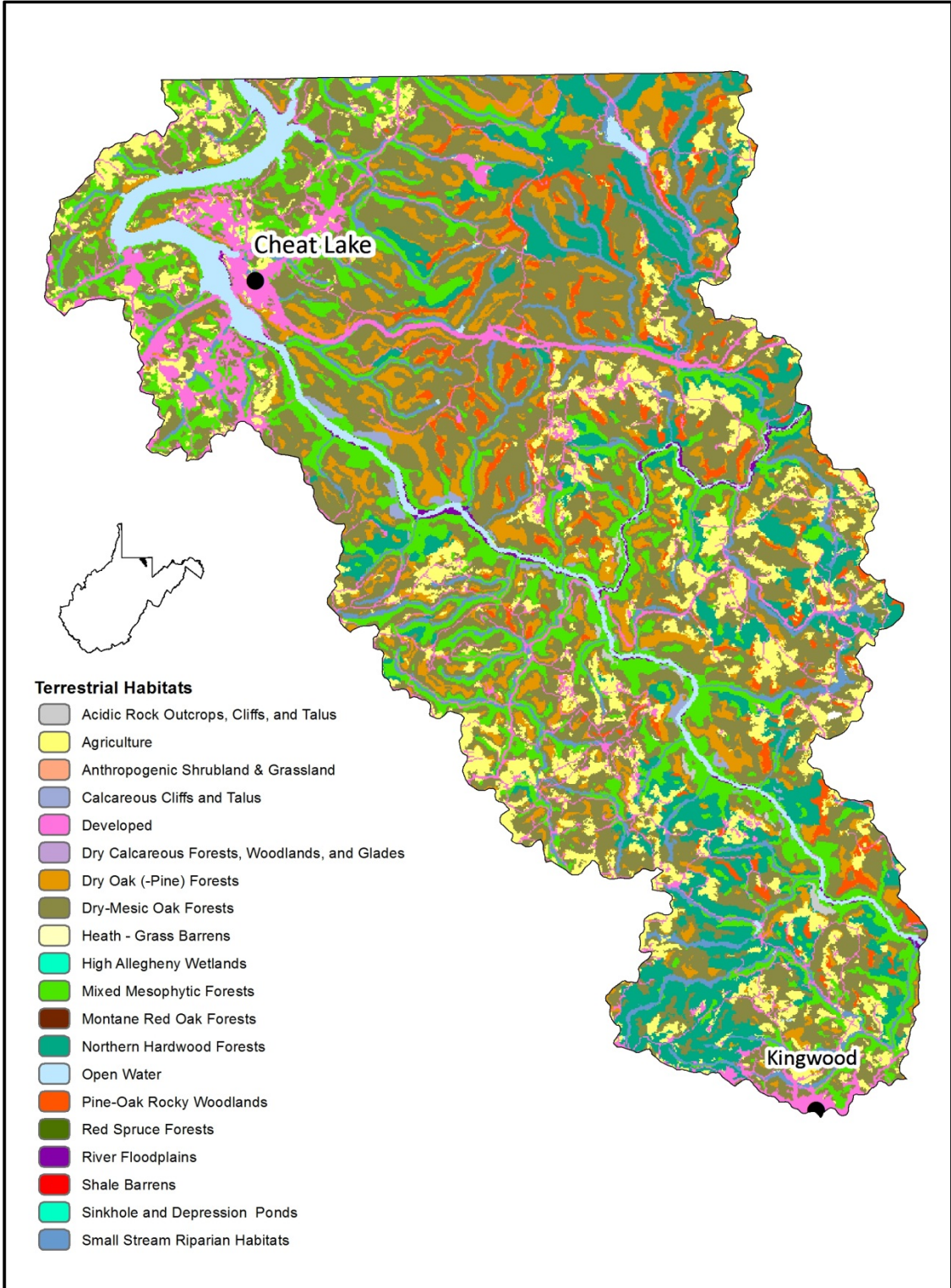
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

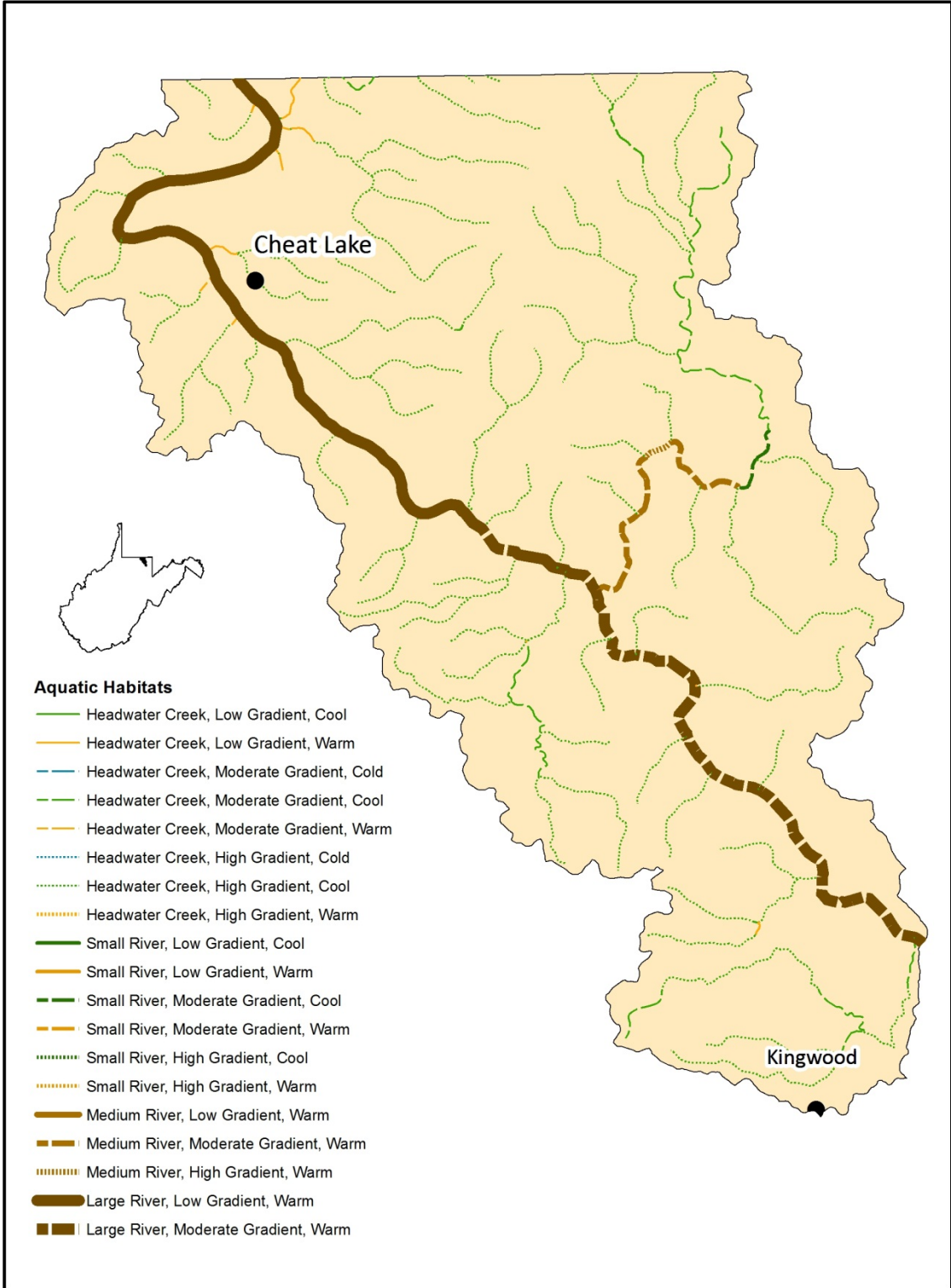
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	211	5.30%	37.95%
Headwater Creek,Moderate Gradient,Warm	1,697	42.58%	43.45%
Headwater Creek,High Gradient,Cool	1,557	39.06%	24.85%
Headwater Creek,High Gradient,Warm	13	0.33%	1.71%
Small River,Low Gradient, Warm	206	5.18%	44.92%
Small River,Moderate Gradient,Warm	83	2.09%	15.35%
Small River,High Gradient,Warm	0	0.00%	1.18%
Medium River, Low Gradient,Warm	147	3.70%	30.99%
Medium River,Moderate Gradient,Warm	15	0.38%	4.34%
Large River,Low Gradient,Warm	51	1.29%	8.85%
Large River,Moderate Gradient,Warm	4	0.09%	3.32%
Totals	3,985	100.00%	

6.16: Cheat Canyon CFA

Cheat Canyon CFA – Terrestrial Habitats



Cheat Canyon CFA – Aquatic Habitats



6.16.1: Description

Cheat Canyon is a steep, narrow gorge along the mainstem Cheat River, with cliff faces of mostly Pottsville sandstone and steep, forested slopes. A layer of Greenbrier limestone is exposed in the lower reaches of the canyon and contains several caves. Terrestrial habitats in the canyon are mostly Mixed Mesophytic Forests surrounding a narrow zone of River Floodplains. The surrounding upland areas are rolling, mid-elevation, hilly plateaus, culminating in Chestnut Ridge (2600 feet), which are on the western edge of the Allegheny Mountains Ecoregion. Forests on the rolling uplands are mostly Dry Mesic Oak Forests and Northern Hardwood Forests. The uplands are dissected by several drainages, the largest of which is Big Sandy Creek. The mainstem Cheat River is dammed into Cheat Lake, which backs into the lower reaches of the canyon. This CFA is primarily forested and used for timber production and low intensity, dispersed recreational activities such as hunting and hiking. Scattered small farms and residential communities occur on the uplands. There are legacy deep and surface mines throughout the area, some limestone quarrying, and increasing gas development. Because of the presence of federally listed species, timber harvesting and more intensive recreational activities such as mountain biking and rock climbing are not allowed in portions of the river gorge. Cheat Lake supports a variety of recreational activities including fishing and boating.

6.16.2: Significant Wildlife Values

The canyon contains the entire known range of the federally threatened Flat-spined Three-toothed Landsnail (*Triodopsis platysayoides*) and includes a cave that is a hibernaculum for the federally endangered Indiana Bat, the federally threatened Northern Long-eared Bat and three other SGCN bats. The cave also contains globally rare cave invertebrate species. Forests support the federally endangered Northern Long-eared Bat and important populations of forest interior nesting birds including Wood Thrush, Kentucky Warbler, Louisiana Waterthrush, and Cerulean Warbler. The steep sandstone cliffs and rocky habitats that line both sides of the canyon provide habitat for Allegheny Woodrat, Appalachian Cottontail (*Sylvilagus obscurus*), Green Salamander, and Timber Rattlesnake. The river floodplains along the Cheat are poorly surveyed, but include habitat for several rare plant species including the globally rare Monongahela Barbara's-Buttons. The Cheat River provides habitat for several SGCN dragonflies including the Midland Clubtail (*Gomphus fraternus*) and Rapids Clubtail (*Gomphus quadricolor*).

6.16.3: Distinctive Stresses

Timber harvest may threaten the rocky habitats of the Flat-spined Three-toothed Landsnail and other rare species which occur on private land. Recreational activities can also impact the sensitive habitats in the canyon. Acid mine drainage has substantially degraded aquatic habitats. Energy development may fragment remaining forested areas.

6.16.4: Conservation Actions

- Partnering with the recreational community (rock climbers) may help reduce and avoid impacts to rocky habitats.
- Continue to support and partner with watershed groups working to eliminate effects from acid mine drainage in the Cheat River.
- Coordinate with the active land trust and farmland protection community to protect habitat through land conservation.

6.16.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, WVDOF, Friends of the Cheat Watershed Association, West Virginia University, Coopers Rock Foundation, TNC, the rafting community, The Conservation Fund, AMJV, West Virginia Geologic and Economic Survey.
- Public Lands: Snake Hill and Cheat Canyon WMAs, Cooper's Rock State Forest, Chestnut Ridge Regional Park.

6.16.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	2	9
Birds	16	9
Butterflies and Moths	1	2
Cave Invertebrates	2	4
Dragonflies and Damselflies	2	
Fish		1
Mammals	4	1
Mussels	2	6
Plants	6	5
Reptiles	3	2
Snails	2	12
Totals	40	51

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cheat Canyon

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	160	0.18%	0.18%
Agriculture	9,137	10.49%	0.64%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	381	0.44%	4.13%
Developed	6,896	7.92%	0.61%
Dry Calcareous Forests, Woodlands, and Glades	0	0.00%	0.00%
Dry Oak (-Pine) Forests	7,624	8.75%	0.31%
Dry-Mesic Oak Forests	31,827	36.54%	0.64%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	11,906	13.67%	0.40%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	9,073	10.41%	0.91%
Pine-Oak Rocky Woodlands	2,665	3.06%	3.49%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	353	0.40%	0.29%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	4,251	4.88%	0.86%
Unresolved	2,838	3.26%	2.43%
Totals	87,111	100.00%	

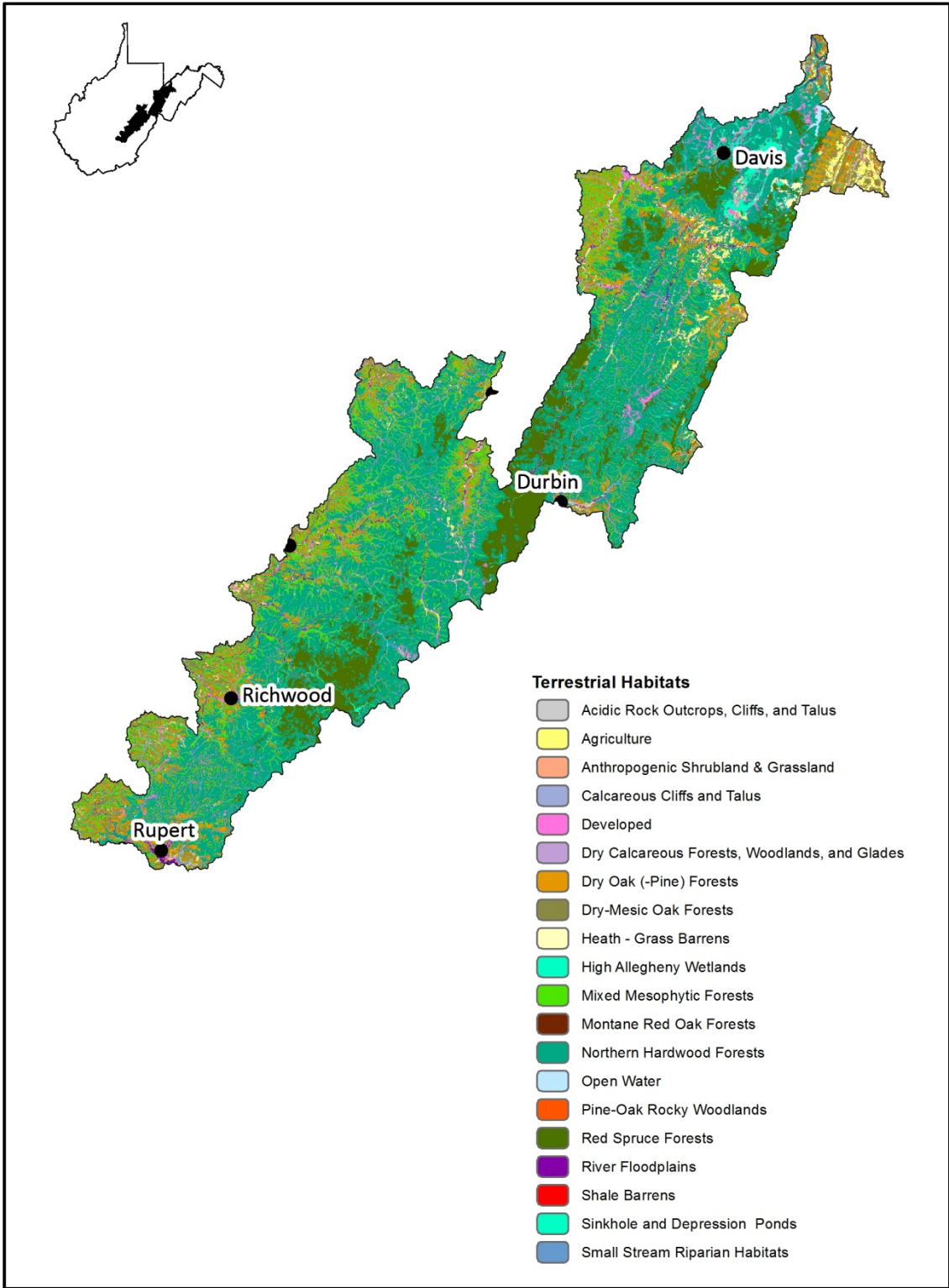
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cheat Canyon

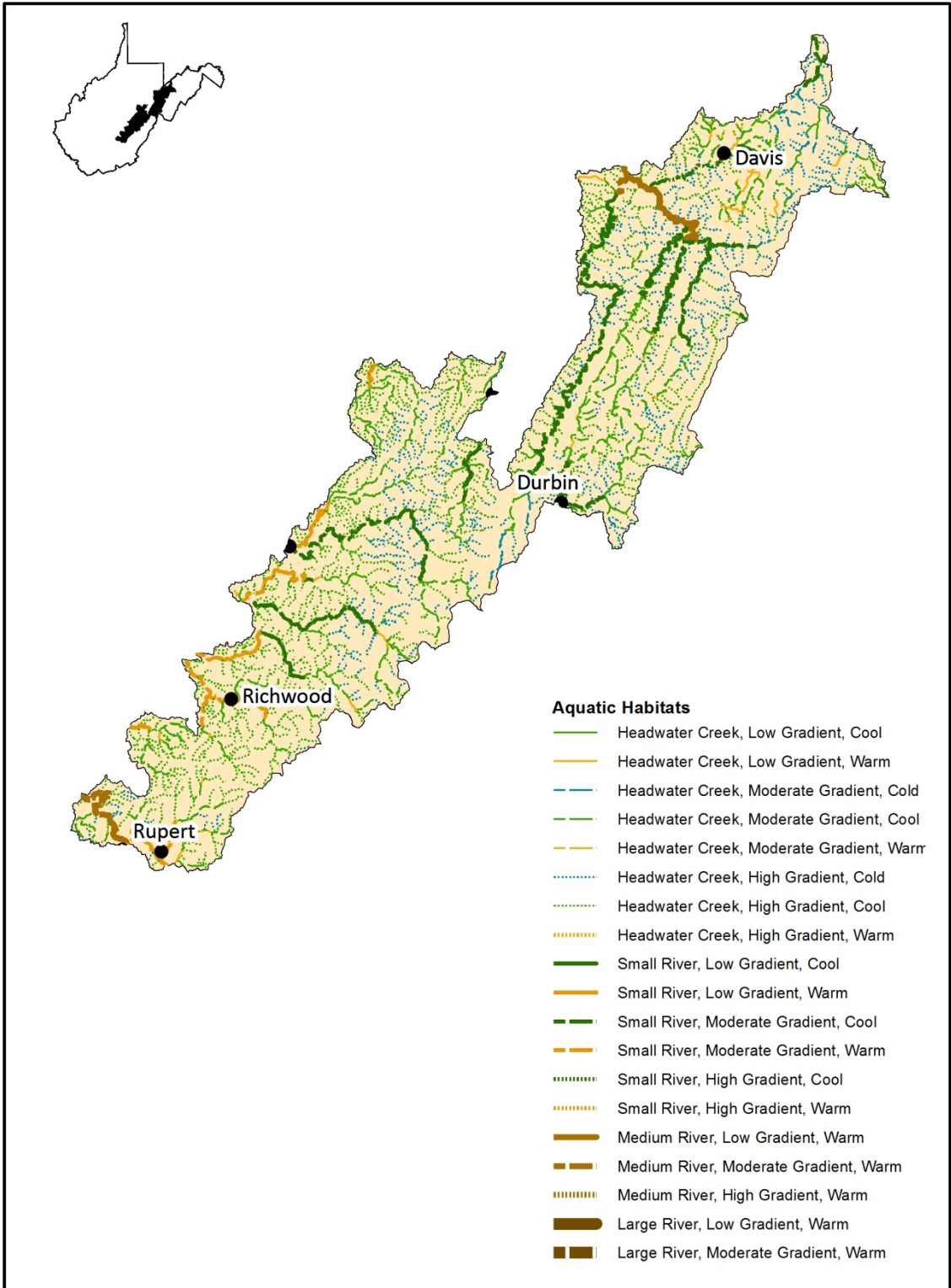
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	3	1.58%	0.56%
Headwater Creek,Moderate Gradient,Cool	20	10.21%	0.92%
Headwater Creek,Moderate Gradient,Warm	1	0.43%	0.02%
Headwater Creek,High Gradient,Cool	140	71.05%	2.24%
Small River,Moderate Gradient,Cool	2	1.07%	0.45%
Medium River, Low Gradient,Warm	0	0.01%	0.01%
Medium River,Moderate Gradient,Warm	5	2.32%	1.32%
Medium River,High Gradient,Warm	1	0.26%	13.00%
Large River,Low Gradient,Warm	15	7.36%	2.50%
Large River,Moderate Gradient,Warm	11	5.71%	10.28%
Totals	197	100.00%	

6.17: High Alleghenies CFA

High Alleghenies CFA – Terrestrial Habitats



High Alleghenies CFA – Aquatic Habitats



6.17.1: Description

This Allegheny Mountain Ecoregion CFA spans the highest mountains (above 4000 feet) of West Virginia, from the Huckleberry Plains atop the Allegheny Front, Canaan Valley, and Blackwater Canyon region in the north, south across Spruce Mountain and the headwaters region of the Cheat and Greenbrier rivers, then southwest across the Gauley and Yew mountains and headwaters of the Gauley River.

Mountaintops are generally broad, resulting in substantial areas of high elevation, and are often separated by broad valleys at medium elevations (1800-2500 feet). The CFA has substantial variations in elevation, underlying geology, and landforms. This CFA includes the wettest, snowiest, and coldest parts of West Virginia. The area is predominantly forested with largest land ownership in federal lands of the Monongahela National Forest. Most private forestland is in small to medium-sized non-industrial, private holdings. Many large industrial forestlands have changed hands in the last 10 to 15 years, with very large industrial tracts currently limited to the vicinity of Canaan Valley, Kumbrabow State Forest, and Gauley River headwaters. Valleys are typically sparsely settled with small grazing farms.

6.17.2: Significant Wildlife Values

For West Virginia, this CFA supports nearly all of the Red Spruce Forests, most Heath-Grass Barrens, the majority of High Elevation Allegheny Wetlands, a significant amount of coolwater stream habitats, and caves with highly endemic cave species and significant bat populations. Canaan Valley supports the largest wetland complex in West Virginia and the unglaciated Appalachian Mountains. Cheat Mountain supports the most extensive spruce forests remaining south of the Adirondacks and has the most extensive high country in the East outside of the southern Blue Ridge Mountains. Shavers Fork is the highest river of its size in the East. It also includes some of the largest intact forest blocks, representing several major forest types, between the Adirondacks and Great Smoky mountains. Cranberry Wilderness and vicinity is the largest intact forest block in the Mid-Atlantic States and Central Appalachian Mountains. These forest blocks are critical for forest interior nesting birds, maintaining embedded patch habitats, regional connectivity, and functional, resilient forest communities. Some high elevation and cave species are endemic or nearly so to the High Alleghenies CFA, including Cheat Mountain Salamander (*Plethodon nettingi*), West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*), and Gandy Creek Cave Springtail (*Pseudosinella certa*). It also supports all or most of the West Virginia distribution for many taxa endemic to the Central/Southern Appalachians, such as Southern Rock Vole (*Microtus chrotorrhinus carolinensis*), Southern Water-shrew (*Sorex palustris punctulatus*), Spruce Knob Threetooth Snail (*Triodopsis picea*), Shriver's Frilly Orchid (*Platanthera shriveri*), and Blue Ridge St. John's-wort (*Hypericum mitchellianum*). Many northern species have all or most of their West Virginia distribution here, including Snowshoe Hare (*Lepus americanus*), Northern Goshawk (*Accipiter gentilis*), Harris' Checkerspot (*Chlosyne harrisii*), and White Monkshood (*Aconitum reclinatum*). Caves in the CFA support 30 SGCN cave invertebrates, one cave houses one of the largest known maternity colonies rangewide of Virginia Big-eared Bats, and several caves serve as hibernacula for Virginia Big-eared Bats, Indiana Bats and other SGCN bats. With 61 SGCN birds, the importance of this CFA to birds cannot be overstated. The area is of large significance to most bird species of concern across all habitat groupings and is important for the continued breeding presence in West Virginia for many, especially species of northern affinities and forest interiors. Seven of the ten New River endemic fishes occur here, including the largest remaining global occurrences of Candy Darter (*Etheostoma osburni*). Forested streams in the Monongahela National Forest are increasingly recognized as strongholds for the Eastern Hellbender in West Virginia. The amazing diversity and extent of high quality habitats here also support 25 SGCN butterflies and moths, 36 SGCN dragonflies and damselflies, 15 SGCN mammals, 23 SGCN snails, and 176 SGCN plants.

6.17.3: Distinctive Stresses

This CFA has been significantly affected by historic industrial logging and related fires, which substantially altered wetlands and upland deciduous forest structure and composition and greatly reduced the area and quality of spruce forests. Historic tanneries and past mining also degraded water quality. Acid precipitation has degraded many medium to high elevation streams and caused spruce die-offs and reduced deciduous forest growth and productivity. Energy development, transmission corridors, and resort development have fragmented high elevation habitats. Climate change has significant likelihood of impacting high elevation species and habitats.

6.17.4: Conservation Actions

- Cooperative efforts with public landowners to maintain large, intact forest blocks thus protecting many other special habitats.
- Partner with public land managers to avoid habitat loss and fragmentation by renewable energy and other development.
- Continue and expand spruce/high elevation forest restoration.
- Continue stream treatments to offset acidification.
- Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.
- Assist with the management of industrial timberlands to provide opportunities that benefit early successional forest species.

6.17.5: Conservation Opportunities

- Key WVDNR Partners: US Forest Service, WVDOF, USFWS, Central Appalachian Spruce Restoration Initiative, Potomac Highlands Cooperative Weed and Pest Management Area, TNC, AMJV, Wild Turkey Federation, corporate landowners.
- Public Lands: Monongahela National Forest; Canaan Valley National Wildlife Refuge; Canaan Valley, Blackwater Falls, and Cass Scenic Railroad state parks; Little Canaan, Huttonsville, Becky's Creek, and Handley WMAs; and Kumbrabow State Forest.

6.17.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	6	14
Birds	34	27
Butterflies and Moths	11	14
Cave Invertebrates	21	9
Crayfish	3	1
Dragonflies and Damselflies	12	24
Fish	9	3
Mammals	9	6
Mussels	4	1
Plants	35	141
Reptiles	8	5
Snails	4	19
Tiger Beetles	2	
Totals	158	264

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = High Alleghenies

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	4,433	0.30%	4.94%
Agriculture	34,674	2.37%	2.42%
Anthropogenic Shrubland & Grassland	2	0.00%	0.00%
Calcareous Cliffs and Talus	1,055	0.07%	11.46%
Developed	60,629	4.15%	5.32%
Dry Calcareous Forests, Woodlands, and Glades	1,501	0.10%	2.10%
Dry Oak (-Pine) Forests	112,399	7.70%	4.55%
Dry-Mesic Oak Forests	124,146	8.50%	2.49%
Heath-Grass Barrens	2,723	0.19%	96.69%
High Allegheny Wetlands	17,158	1.18%	81.96%
Mixed Mesophytic Forests	182,223	12.48%	6.19%
Montane Red Oak Forests	637	0.04%	3.02%
Northern Hardwood Forests	676,577	46.34%	68.01%
Pine-Oak Rocky Woodlands	1,895	0.13%	2.48%
Red Spruce Forests	168,441	11.54%	94.65%
River Floodplains	13,434	0.92%	11.18%
Shale Barrens	55	0.00%	3.06%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	50,883	3.49%	10.29%
Unresolved	7,101	0.49%	6.08%
Totals	1,459,967	100.00%	

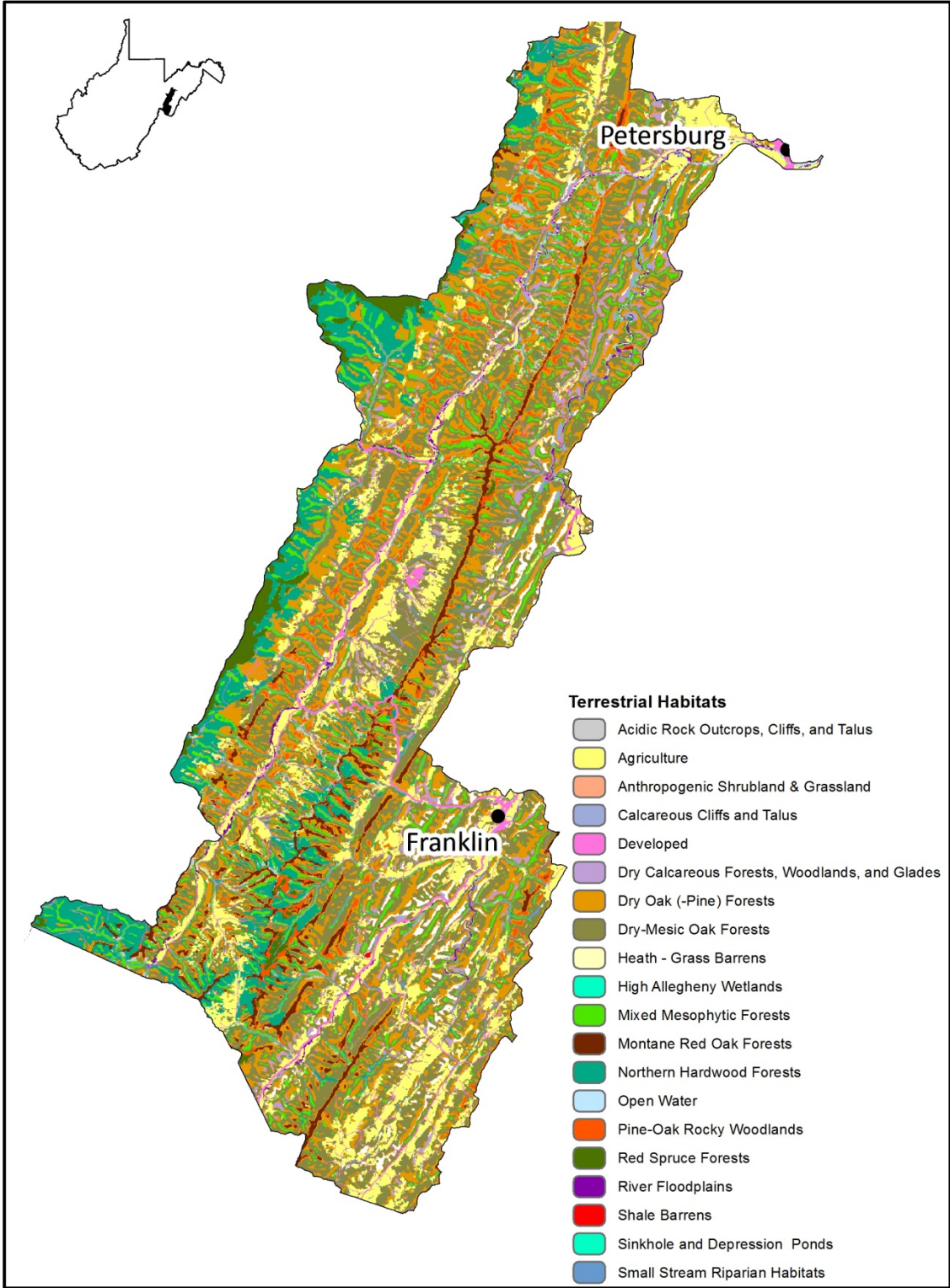
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = High Alleghenies

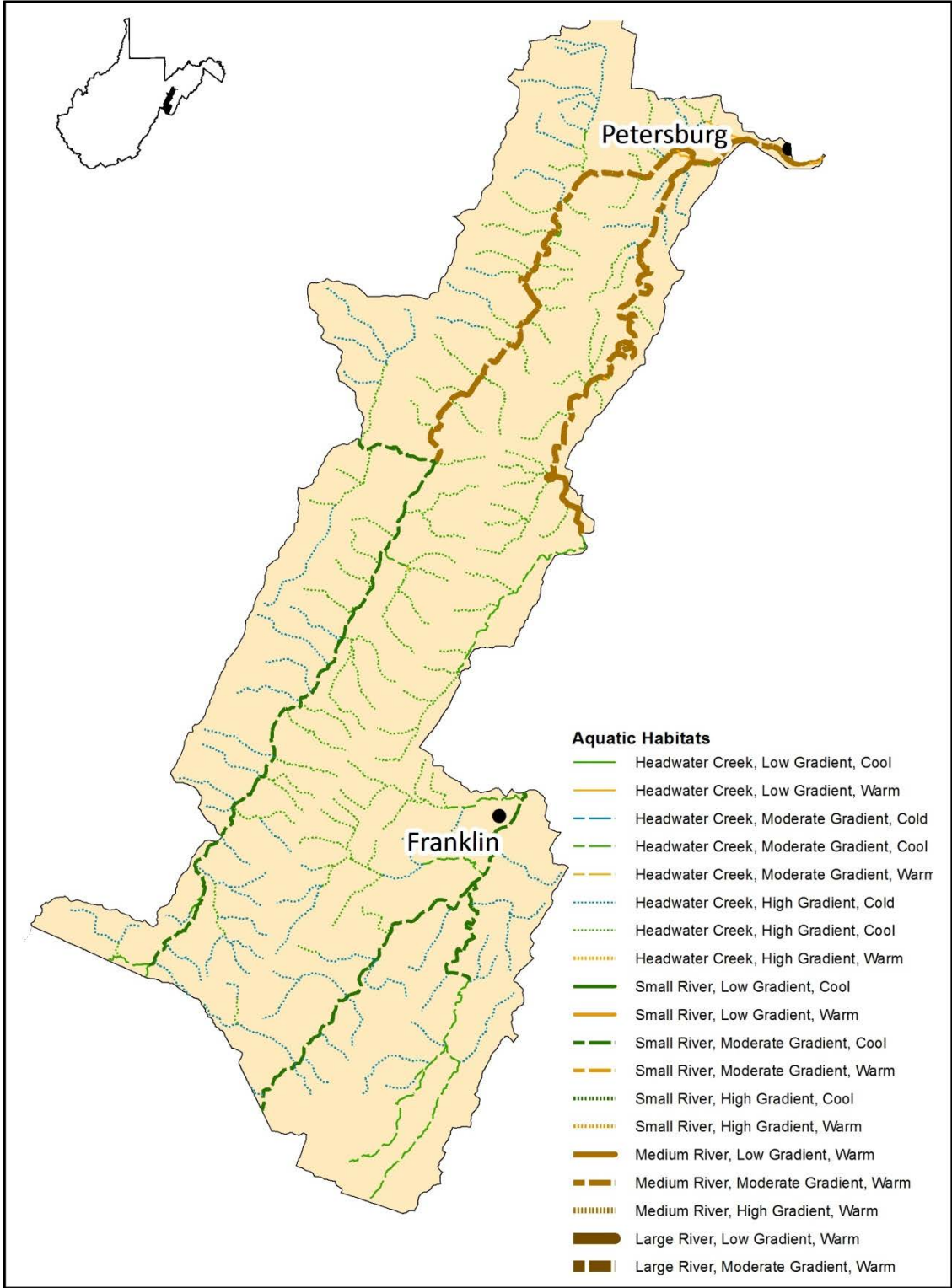
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	10	0.39%	73.98%
Headwater Creek,Low Gradient, Warm	54	2.03%	9.69%
Headwater Creek,Moderate Gradient,Cold	32	1.19%	60.20%
Headwater Creek,Moderate Gradient,Cool	478	17.95%	21.79%
Headwater Creek,Moderate Gradient,Warm	1	0.04%	0.03%
Headwater Creek,High Gradient,Cold	648	24.33%	22.10%
Headwater Creek,High Gradient,Cool	1,073	40.29%	17.14%
Small River,Low Gradient,Cool	17	0.64%	45.09%
Small River,Low Gradient, Warm	12	0.46%	2.68%
Small River,Moderate Gradient,Cool	228	8.54%	48.83%
Small River,Moderate Gradient,Warm	64	2.38%	11.70%
Small River,High Gradient,Cool	9	0.32%	100.00%
Small River,High Gradient,Warm	0	0.01%	1.92%
Medium River, Low Gradient,Warm	7	0.27%	1.54%
Medium River,Moderate Gradient,Warm	31	1.16%	8.89%
Totals	2,664	100.00%	

6.18: North Fork Mountain/Thorn Creek CFA

North Fork Mountain/Thorn Creek CFA – Terrestrial Habitats



North Fork Mountain/Thorn Creek CFA – Aquatic Habitats



6.18.1: Description

This landscape extends along the north to south spine of North Fork Mountain, the highest mountain in the Ridge and Valley Ecoregion (4500+ feet), extends westward to the crests of Spruce Mountain and the Allegheny Front, and includes Germany Valley and the valley of the North Fork South Branch of the Potomac River. To the east it includes the rugged Smoke Hole Canyon along the mainstem South Branch of the Potomac River and nearby ridges, most notably Cave Mountain. It also includes the nearby but disjunct watershed of Thorn Creek, which flows into the South Branch of the Potomac River south of Franklin. Most of the area is in the rain shadow of the Allegheny Front and has some of the lowest precipitation in eastern North America. Consequently, most upland habitats are notably dry. Sandstone and conglomerates dominate North Fork Mountain and several other ridges, with shales in the lowlands and extensive areas of limestone in the Smoke Hole, Germany Valley, and Cave Mountain. This is a notably rugged, scenic mountainous area. The ridgetops, middle and upper slopes are primarily forested, with extensive federal ownership in the Monongahela National Forest. Large to medium-sized blocks of relatively intact forest remain. The lower slopes and valleys are mostly in agriculture, primarily pasture and hay. Vacation home developments occur scattered on Cave and North Fork mountains. This is an important area for outdoor recreation (hunting, hiking, camping, rock climbing, caving, fishing, canoeing, mountain biking).

6.18.2: Significant Wildlife Values

Caves within this landscape support highly endemic cave invertebrates (21 SGCN, including four cave species known from only one cave each). Caves here also support all West Virginia SGCN bats including 40% of the global population of Virginia Big-eared Bat, the largest concentrations of Indiana Bats and Little Brown Bats (*Myotis lucifugus*) in West Virginia. Prior to WNS infections, Hellhole Cave supported an estimated 200,000 bats, the largest concentration of wild mammals in the State and one of the largest bat hibernacula in the eastern United States. Thorn Creek Valley is literally a valley of caves, many supporting significant populations of bats. The CFA has moderately large blocks of Dry Oak (-Pine) and Dry-Mixed Oak Forests, the state's most extensive Montane Red Oak Forests, and high proportions of Dry Calcareous Forests, Woodlands, and Glades. These forests and the embedded patch communities are of regional significance for forest interior nesting birds, Allegheny Woodrat, Timber Rattlesnake, Eastern Small-footed Bats, 15 SGCN snails, 95 SGCN plants, and many other animals of concern. The Smoke Hole and Cave Mountain support the most extensive limestone glade and barren complex in the Central Appalachians, providing habitat for the globally rare Smoke Hole Bergamot (*Monarda fistulosa* var. *brevis*), many other rare plants, and butterflies of concern. North Fork Mountain supports a very rich complex of acidic, dry, high elevation habitats important for many rare plants and animals, including the largest pine barren/woodland complex in the Central Appalachians and the southernmost native forests of Red Pine (*Pinus resinosa*). Pike and Panther Knobs on North Fork Mountain support outstanding examples of rare high elevation habitats; including high elevation Acidic Rock Outcrops, Cliffs, and Talus, red pine forests, and pine barrens. Thorn Creek supports some of the state's coldest and most productive spring-fed stream habitats. The as-yet undescribed Checkered Sculpin (*Cottus* sp. cf. *cognatus*) can still be found in the coldest streams and the springs that feed them. Thorn Creek and Seneca Creek are renowned for the size and abundance of Brook Trout that are reported by anglers each year.

6.18.3: Distinctive Stresses

Vacation home developments have occurred in ecologically significant areas and exceptional scenery here makes future development likely. A limestone quarry in Germany Valley could potentially impact cave resources, but the company has worked closely with the WVDNR and USFWS to insure their operations do not impact the important caves near the quarry. Non-native invasive (NNIS) plant species are expanding from developed areas and agricultural fields into natural habitats containing sensitive plant communities (including several SGCN species).

6.18.4: Conservation Actions

- Continue to coordinate with the quarry company to minimize potential for impacting cave resources.
- There is exceptional opportunity for increased protection and management of important habitats on federal land, including addressing invasives, avoiding habitat loss and fragmentation by various activities, and avoiding impacts from recreational use.
- Coordinate with the active land trust and farmland protection community to protect habitat through land conservation.
- Coordinate with the Potomac Highlands Cooperative Weed Pest management Area to identify habitats impacted by NNIS and coordinate control or eradication efforts.

6.18.5: Conservation Opportunities

- Key WVDNR Partners: Monongahela National Forest, TNC, WVDOF, Greer Lime Company, National Speleological Society, private cave owners, Germany Valley Karst Survey, Potomac Highlands Cooperative Weed and Pest Management Area.
- Public Lands: Monongahela National Forest, Thorn Creek WMA. The Nature Conservancy also has over 5,000 acres in fee ownership and conservation easements.

6.18.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	4	12
Birds	24	12
Butterflies and Moths	7	8
Cave Invertebrates	16	5
Dragonflies and Damselflies	2	5
Fish	4	2
Mammals	7	1
Mussels	1	3
Plants	24	71
Reptiles	8	5
Snails	1	14
Tiger Beetles	2	
Totals	100	138

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	2,752	1.03%	3.07%
Agriculture	35,467	13.22%	2.47%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	1,828	0.68%	19.85%
Developed	10,249	3.82%	0.90%
Dry Calcareous Forests, Woodlands, and Glades	5,735	2.14%	8.02%
Dry Oak (-Pine) Forests	57,087	21.28%	2.31%
Dry-Mesic Oak Forests	83,394	31.09%	1.67%
Heath-Grass Barrens	93	0.03%	3.32%
High Allegheny Wetlands	22	0.01%	0.11%
Mixed Mesophytic Forests	19,255	7.18%	0.65%
Montane Red Oak Forests	7,037	2.62%	33.29%
Northern Hardwood Forests	20,413	7.61%	2.05%
Pine-Oak Rocky Woodlands	6,727	2.51%	8.81%
Red Spruce Forests	4,888	1.82%	2.75%
River Floodplains	1,754	0.65%	1.46%
Shale Barrens	45	0.02%	2.49%
Sinkhole and Depression Ponds	3	0.00%	1.93%
Small Stream Riparian Habitats	5,033	1.88%	1.02%
Unresolved	6,459	2.41%	5.53%
Totals	268,242	100.00%	

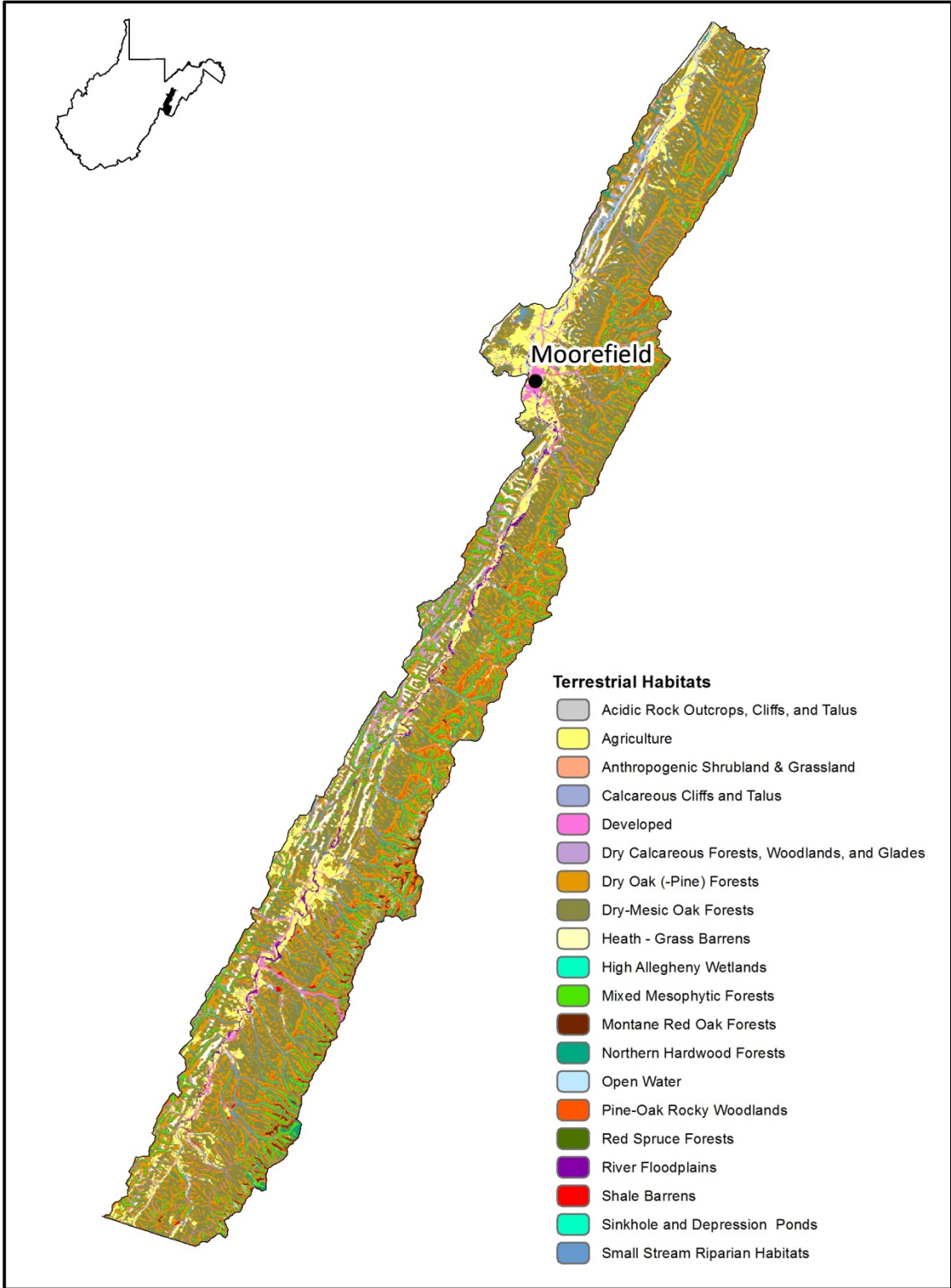
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

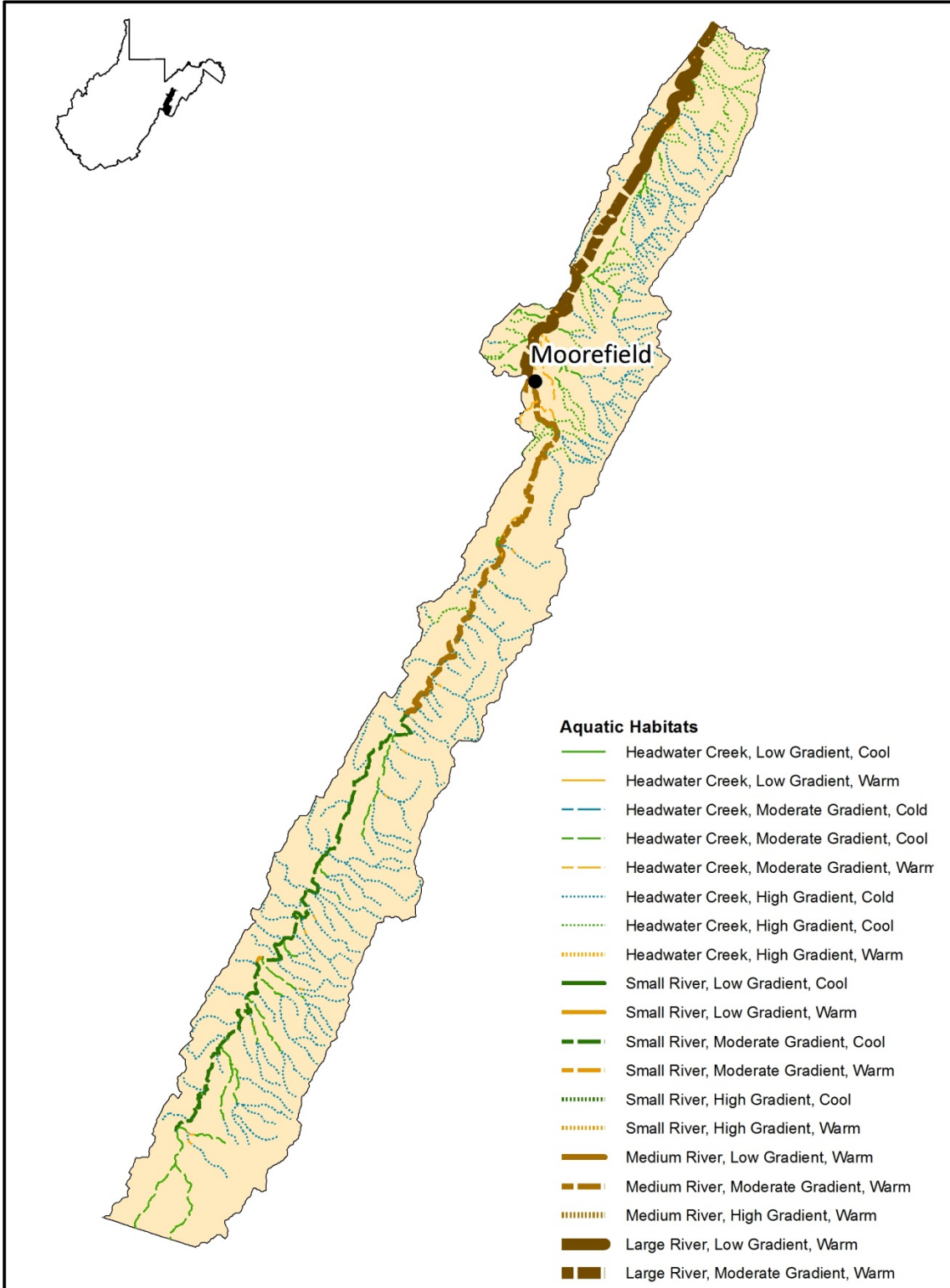
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	0	0.03%	1.05%
Headwater Creek,Low Gradient, Warm	2	0.41%	0.36%
Headwater Creek,Moderate Gradient,Cool	46	9.63%	2.12%
Headwater Creek,Moderate Gradient,Warm	2	0.36%	0.04%
Headwater Creek,High Gradient,Cold	157	32.56%	5.36%
Headwater Creek,High Gradient,Cool	179	37.10%	2.86%
Small River,Low Gradient,Cool	0	0.08%	1.04%
Small River,Moderate Gradient,Cool	48	9.98%	10.33%
Medium River, Low Gradient,Warm	11	2.25%	2.29%
Medium River,Moderate Gradient,Warm	37	7.59%	10.57%
Totals	483	100.00%	

6.19: Shenandoah and Nathaniel Mountains CFA

Shenandoah and Nathaniel Mountains CFA – Terrestrial Habitats



Shenandoah and Nathaniel Mountains CFA – Aquatic Habitats



6.19.1: Description

Shenandoah Mountain is the largest massif in the Ridge and Valley Ecoregion, rising dramatically above the valley of the South Fork of the South Branch Potomac River to elevations above 4000 feet. The Virginia state line follows the crest of the mountain for much of its length in West Virginia. The CFA extends northward, into West Virginia, where it encompasses South Branch Mountain and eventually Nathaniel Mountain. River valleys are low in elevation. The South Fork of the South Branch of the Potomac River (South Fork) valley tends to be narrow with a well-developed floodplain that quickly gives way to foothills. North of the confluence of the South Fork and mainstem South Branch, the CFA includes The Trough, a narrow, steep canyon along the South Branch. Mountains tend to be sandstone, the valleys shale. Small areas of limestone also occur in the valleys. This landscape is almost entirely forested, with large blocks of forest remaining. Several hunt clubs own large, forested parcels including one 11,000+ acre property which is the largest private tract in the Potomac Watershed of West Virginia. Farmland (mostly poultry, livestock pasture, hay, and corn) occurs primarily in the river bottom along the South Fork River, on top of South Branch Mountain and Shenandoah Mountains in Hardy County, and in an area east of Nathaniel Mountain. Low density residential and second home development is occurring throughout the area north of Pendleton County. There is substantial public land in the southern and northern thirds, but none in the middle third of this landscape.

6.19.2: Significant Wildlife Values

This CFA, including its ecological continuation in Virginia, includes some of the largest intact forest blocks between the Adirondacks and Great Smoky mountains, representing regionally significant habitat for several forest interior nesting birds, species of embedded rocky patch habitats (such as Allegheny Woodrat, Timber Rattlesnake, and Appalachian Oak Fern (*Gymnocarpium appalachianum*)), wintering Golden Eagle (*Aquila chrysaetos* - one of the highest wintering densities in the eastern United States), and globally rare, highly restricted endemic plants. These forest blocks are critical for maintaining embedded patch habitats, regional connectivity, and functional, resilient forest communities. Almost the entire ranges of the Cow Knob and Shenandoah Mountain salamanders (*Plethodon punctatus*, *P. virginia*) are found here and in adjoining Virginia. Along the South Fork is one of the most globally significant assemblages of Shale Barrens, which support many plants and butterflies of concern, including the federally endangered Shale Barren Rockcress. Many species are known in West Virginia only or primarily from here, including (at least formerly) Olympia Marble (*Euchloe olympia*), Turkeybeard (*Xerophyllum asphodeloides*), and Dwarf Trillium (*Trillium pusillum*). Overall, the forests and embedded patch habitats support 16 SGCN moths and butterflies, 12 SGCN snails, and 52 SGCN plants. A cave with a significant summer colony and hibernating concentration of Virginia Big-eared Bats and a small population of Indian Bats occurs along the South Fork. American Eel (*Anguilla rostrata*) adults are still commonly found in larger streams. The Trough supports several breeding pairs of Bald Eagles.

6.19.3: Distinctive Stresses

Low density housing and second home development has significantly fragmented forest habitat in portions of this CFA, including the largest second home development in West Virginia (which covers 10,000 acres). Industrial wind energy projects have been proposed for portions of the area. Forest management activities (e.g. timber harvesting, prescribed fire and road construction) perforate intact forest and enable non-native invasive plant species establishment.

6.19.4: Conservation Actions

- Cooperative efforts with public landowners to maintain large, intact forest blocks thus protecting many other special habitats.
- Partner with public landowners so that habitat loss and fragmentation by renewable energy and other development can be avoided on public lands.
- Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.
- Coordinate with the Potomac Highlands Cooperative Weed Pest management Area to identify habitats impacted by NNIS and coordinate control or eradication efforts.

6.19.5: Conservation Opportunities

- Key WVDNR Partners: George Washington National Forest, WVDOF, NRCS, Potomac Highlands Cooperative Weed and Pest Management Area, AMJV, large hunt clubs.
- Public Lands: George Washington National Forest; Nathaniel Mountain and South Branch WMAs; Sugar Grove Naval Base.

6.19.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	2	13
Birds	17	11
Butterflies and Moths	9	7
Dragonflies and Damselflies	2	1
Fish	3	3
Mammals	5	4
Mussels	4	2
Plants	15	37
Reptiles	5	5
Snails		12
Totals	62	95

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mount

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	1,545	0.61%	1.72%
Agriculture	25,331	9.98%	1.76%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	1,660	0.65%	18.03%
Developed	9,228	3.63%	0.81%
Dry Calcareous Forests, Woodlands, and Glades	3,317	1.31%	4.64%
Dry Oak (-Pine) Forests	59,172	23.31%	2.39%
Dry-Mesic Oak Forests	105,238	41.45%	2.11%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	15,474	6.09%	0.53%
Montane Red Oak Forests	2,274	0.90%	10.76%
Northern Hardwood Forests	2,003	0.79%	0.20%
Pine-Oak Rocky Woodlands	5,885	2.32%	7.70%
Red Spruce Forests	117	0.05%	0.07%
River Floodplains	2,424	0.95%	2.02%
Shale Barrens	387	0.15%	21.61%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	9,267	3.65%	1.87%
Unresolved	10,563	4.16%	9.05%
Totals	253,887	100.00%	

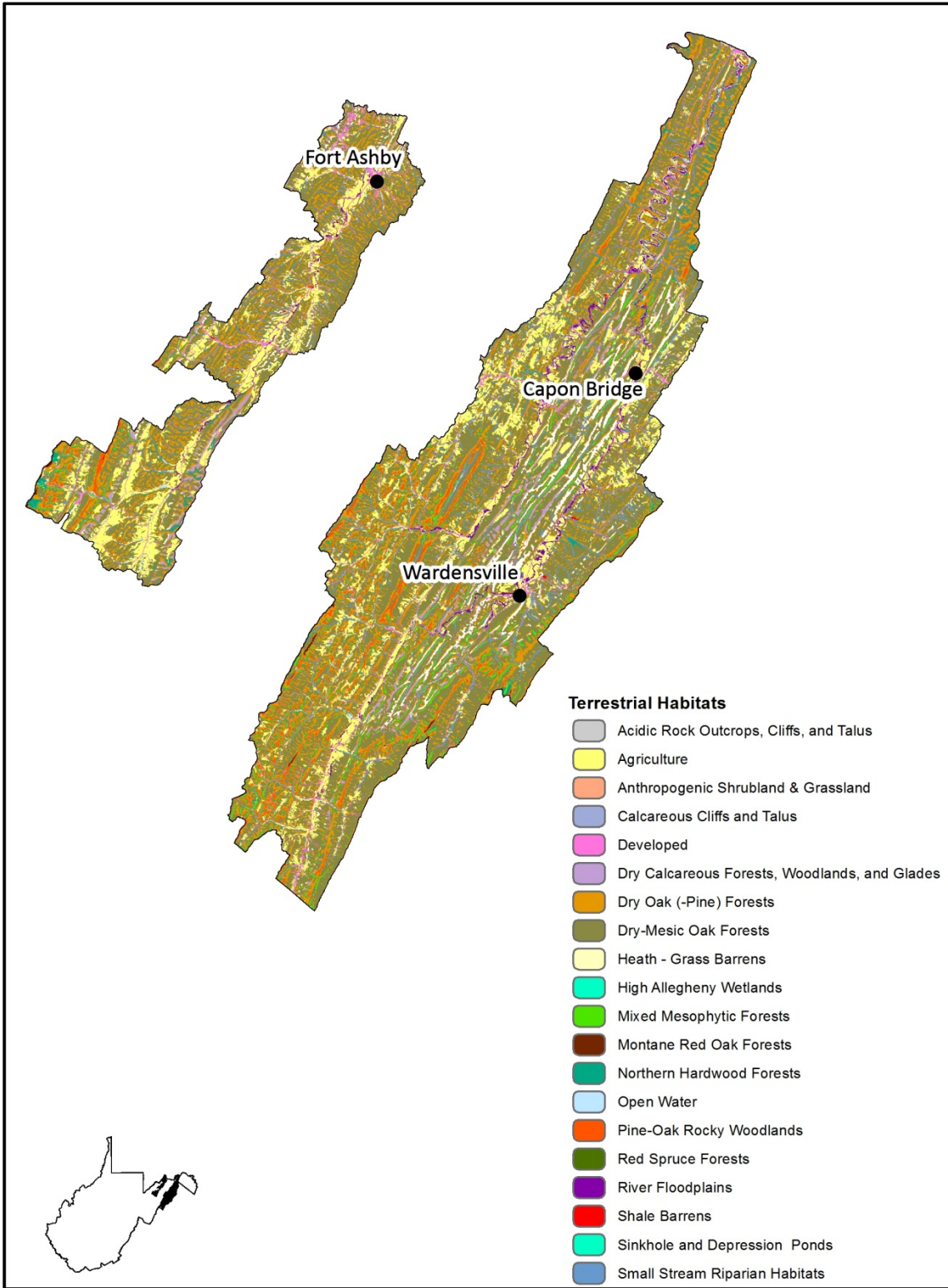
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mou

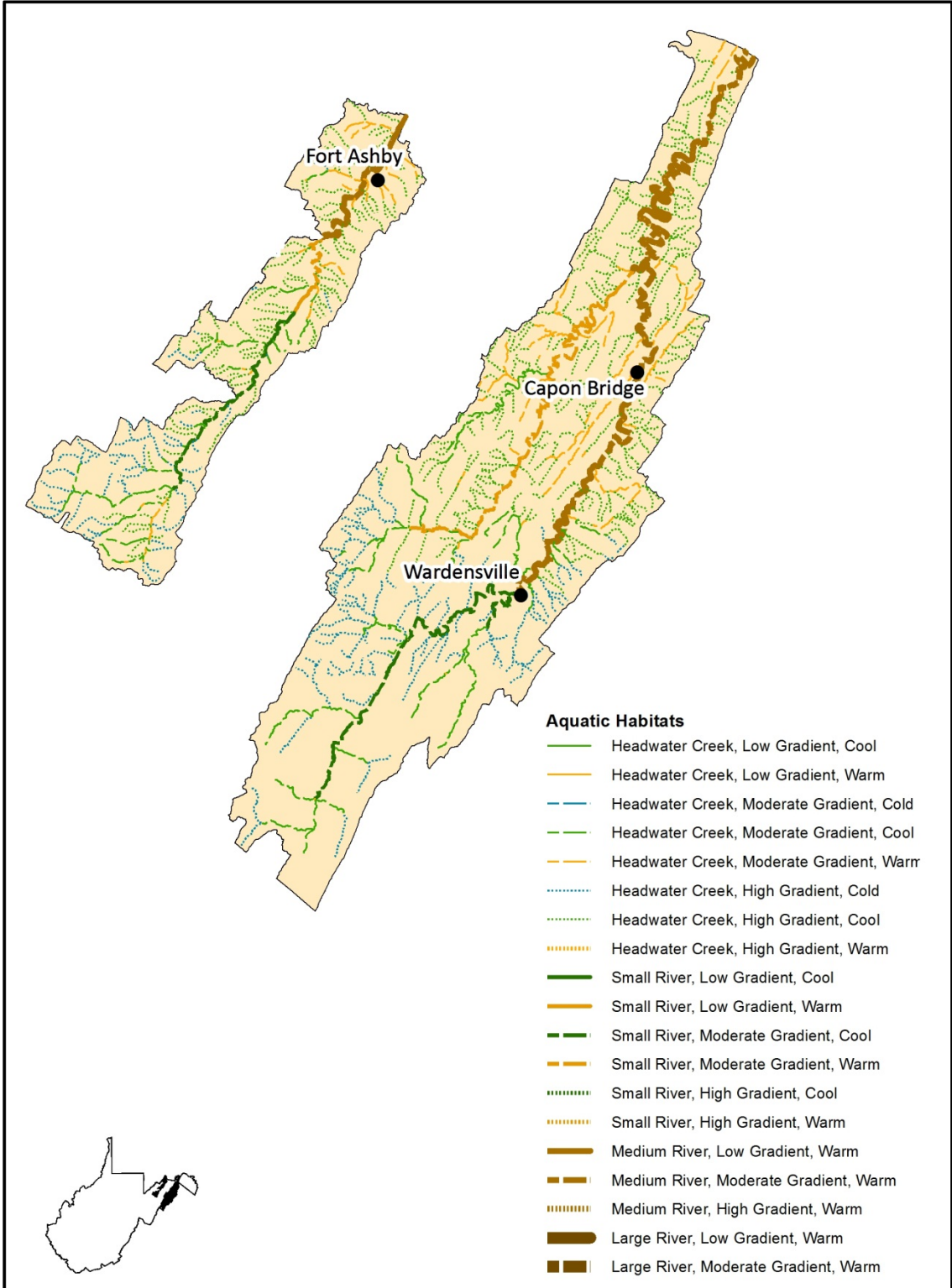
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	0	0.03%	1.42%
Headwater Creek,Low Gradient, Warm	4	0.61%	0.64%
Headwater Creek,Moderate Gradient,Cool	71	12.00%	3.22%
Headwater Creek,Moderate Gradient,Warm	14	2.40%	0.36%
Headwater Creek,High Gradient,Cold	334	56.78%	11.40%
Headwater Creek,High Gradient,Cool	82	13.87%	1.30%
Small River,Low Gradient,Cool	3	0.45%	6.92%
Small River,Low Gradient, Warm	0	0.01%	0.01%
Small River,Moderate Gradient,Cool	31	5.33%	6.74%
Small River,Moderate Gradient,Warm	1	0.09%	0.10%
Small River,High Gradient,Warm	0	0.00%	0.17%
Medium River, Low Gradient,Warm	4	0.76%	0.94%
Medium River,Moderate Gradient,Warm	21	3.49%	5.92%
Large River,Low Gradient,Warm	13	2.20%	2.23%
Large River,Moderate Gradient,Warm	12	1.98%	10.63%
Totals	589	100.00%	

6.20: Cacapon River and Patterson Creek CFA

Cacapon River and Patterson Creek CFA – Terrestrial Habitats



Cacapon River and Patterson Creek CFA – Aquatic Habitats



6.20.1: Description

This Ridge and Valley Ecoregion CFA includes the entire watersheds of the Cacapon River and Patterson Creek, which, while not adjacent, are both in the Potomac Basin and have many ecological and land-use similarities. The Cacapon Watershed includes two large tributary drainages (North and Lost rivers). The valleys in both the Cacapon and Patterson Creek watersheds are low elevation (below 1000 feet), have narrow but well-developed floodplains along the larger streams, and have extensive low elevation, primarily shaley uplands which give way to parallel ridges of mostly shale and sandstone. Areas of limestone occur in both watersheds. Higher mountains, some of which rise above 3000 feet, include Cacapon, Great North, Short, Long, Patterson Creek, and Knobly, and the Allegheny Front. The ridgetops and upper slopes are mostly forested, with several medium and large forest blocks remaining, primarily in the Cacapon Watershed. Private forestland is mostly in small to medium sized tracts and used for forestry and recreation. Some lower ridges support apple orchards. The lower uplands and river bottoms are mostly in agriculture with scattered small towns such as Wardensville and Great Cacapon. Agriculture is primarily livestock production and includes pasture and hay lands, and corn production. Poultry operations also occur in both watersheds. Second home development is prevalent in the Cacapon Watershed, especially along the Cacapon River downstream of North River and adjacent to public land. There is substantial public land in the eastern portion of the Cacapon Watershed. The only public land in the Patterson Creek Watershed is Larenim County Park.

6.20.2: Significant Wildlife Values

Stream and riparian habitats in this CFA are important for many species restricted in West Virginia to the Potomac Basin, including Wood and Spotted turtles (*Glyptemis insculpta*, *Clemmys guttata*), the federally endangered plant Harperella (*Ptilimnium nodosum*), 13 SGCN mussels, (including Triangle Floater (*Alasmidonta undulata*), Brook Floater (*Alasmidonta varicosa*), and Green Floater, and fishes such as Common Shiner (*Luxilus cornutus*), the as-yet undescribed Checkered Sculpin, and Tessellated Darter (*Etheostoma olmstedi*). Headwater tributaries in both Cacapon River and Patterson Creek, although at low elevations, are coldwater streams that support natural Brook Trout populations. The Cacapon River and Patterson Creek are especially notable for their large populations of many aquatic species. Streams and wetlands in the CFA support 28 SGCN dragonflies and damselflies, a large number for West Virginia. These watersheds also contain shale banks and barrens that support Shale Barren endemic plants and Shale Barren associated lepidopterans, with 14 SGCN moths and butterflies in the CFA. This is also an important CFA for birds (44 SGCN). Pastures and hayfields are important for a number of grassland bird species. Upland forests, especially larger intact forest blocks on the national forest, support a suite of forest interior bird species. Altogether, natural habitats in the CFA support 75 SGCN plants. The algific talus community (which holds subsurface ice into the summer) at Ice Mountain is a notable refugium for rare plants and snails, and the extensive, high quality wetlands on Short Mountain WMA are of global significance.

6.20.3: Distinctive Stresses

Development pressure is significant in the Cacapon Watershed, with substantial residential and second home development, especially along major streams and adjacent to public land. Water quality impacts from agriculture and development exist throughout both watersheds. Fragmenting intact forests increases surface water temperatures (and consequently headwater stream temperatures) and storm water run-off.

6.20.4: Conservation Actions

- Promote practices for restoring riparian habitat, including streamside fencing and establishing riparian buffers, and for reducing sedimentation and nutrient runoff from farms.
- Coordinate with the active land trust and farmland protection community to protect habitat through land conservation.
- Engage public landowners to maintain large, intact forest blocks thus protecting many other special habitats.
- Implement a comprehensive plan to enhance climate change resiliency through reducing other stressors (such as invasive species), identifying, maintaining and creating key habitat cores and corridors, and protecting areas of high landscape complexity and integrity.

6.20.5: Conservation Opportunities

- Key WVDNR Partners: George Washington National Forest, WVDOF, WVDEP, NRCS, West Virginia Conservation Agency, county farmland protection boards, The Cacapon and Lost Rivers Land Trust, Friends of the Cacapon, The Cacapon Institute, Potomac Conservancy.
- Public Lands: George Washington National Forest; Short Mountain, Edwards Run, Nathaniel Mountain, and Sideling Hill WMAs; Cacapon and Lost River state parks.

6.20.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	5	13
Birds	29	15
Butterflies and Moths	11	3
Cave Invertebrates	6	1
Dragonflies and Damselflies	10	18
Fish	8	4
Mammals	4	1
Mussels	8	5
Plants	15	60
Reptiles	7	7
Snails	1	8
Tiger Beetles	1	
Totals	105	135

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	442	0.07%	0.49%
Agriculture	79,674	13.17%	5.55%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	494	0.08%	5.37%
Developed	24,267	4.01%	2.13%
Dry Calcareous Forests, Woodlands, and Glades	11,225	1.86%	15.69%
Dry Oak (-Pine) Forests	111,198	18.39%	4.50%
Dry-Mesic Oak Forests	293,876	48.59%	5.89%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	14,076	2.33%	0.48%
Montane Red Oak Forests	1,103	0.18%	5.22%
Northern Hardwood Forests	3,769	0.62%	0.38%
Pine-Oak Rocky Woodlands	11,782	1.95%	15.42%
Red Spruce Forests	11	0.00%	0.01%
River Floodplains	7,213	1.19%	6.00%
Shale Barrens	408	0.07%	22.75%
Sinkhole and Depression Ponds	0	0.00%	0.00%
Small Stream Riparian Habitats	24,126	3.99%	4.88%
Unresolved	21,147	3.50%	18.12%
Totals	604,812	100.00%	

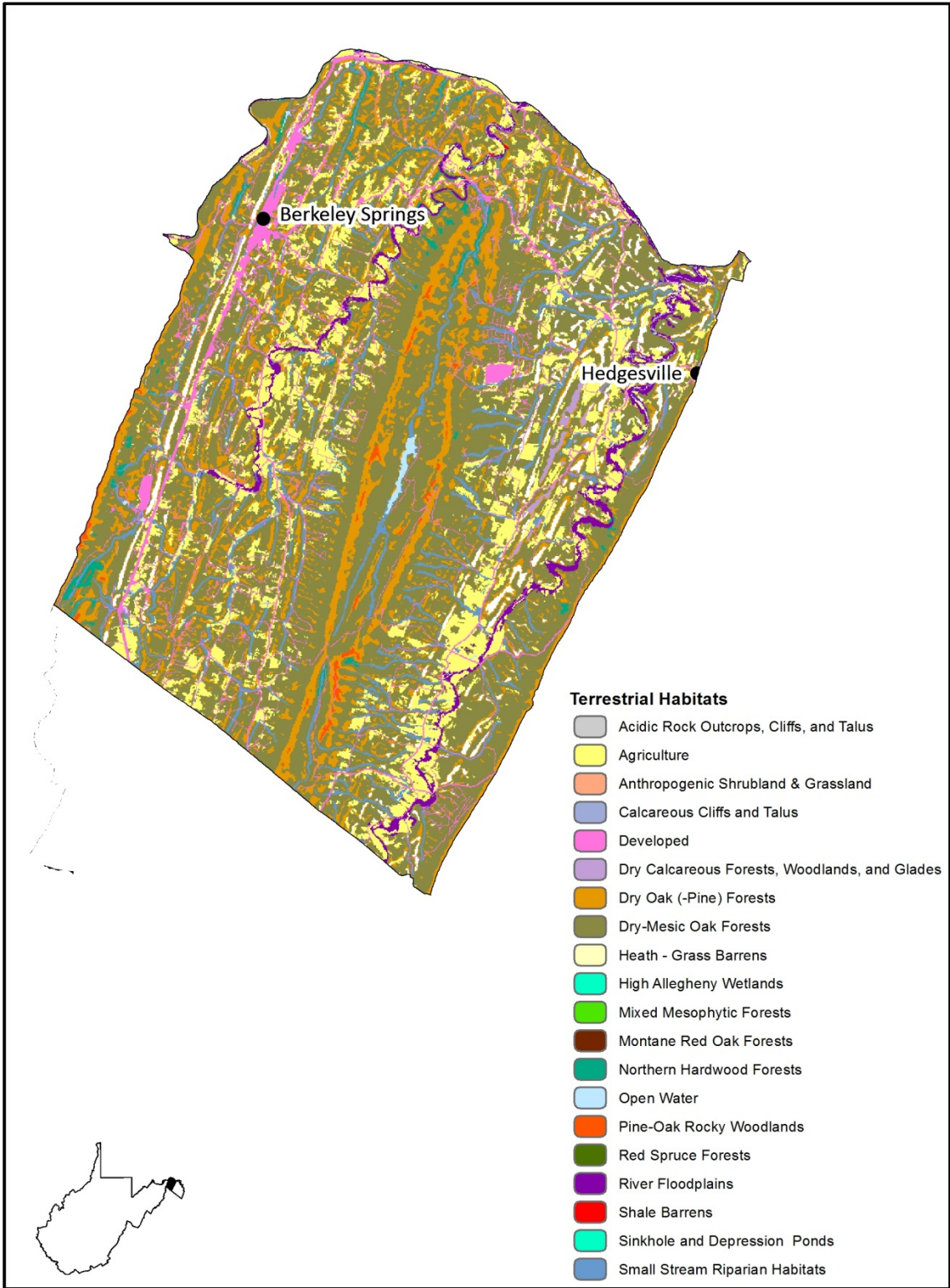
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

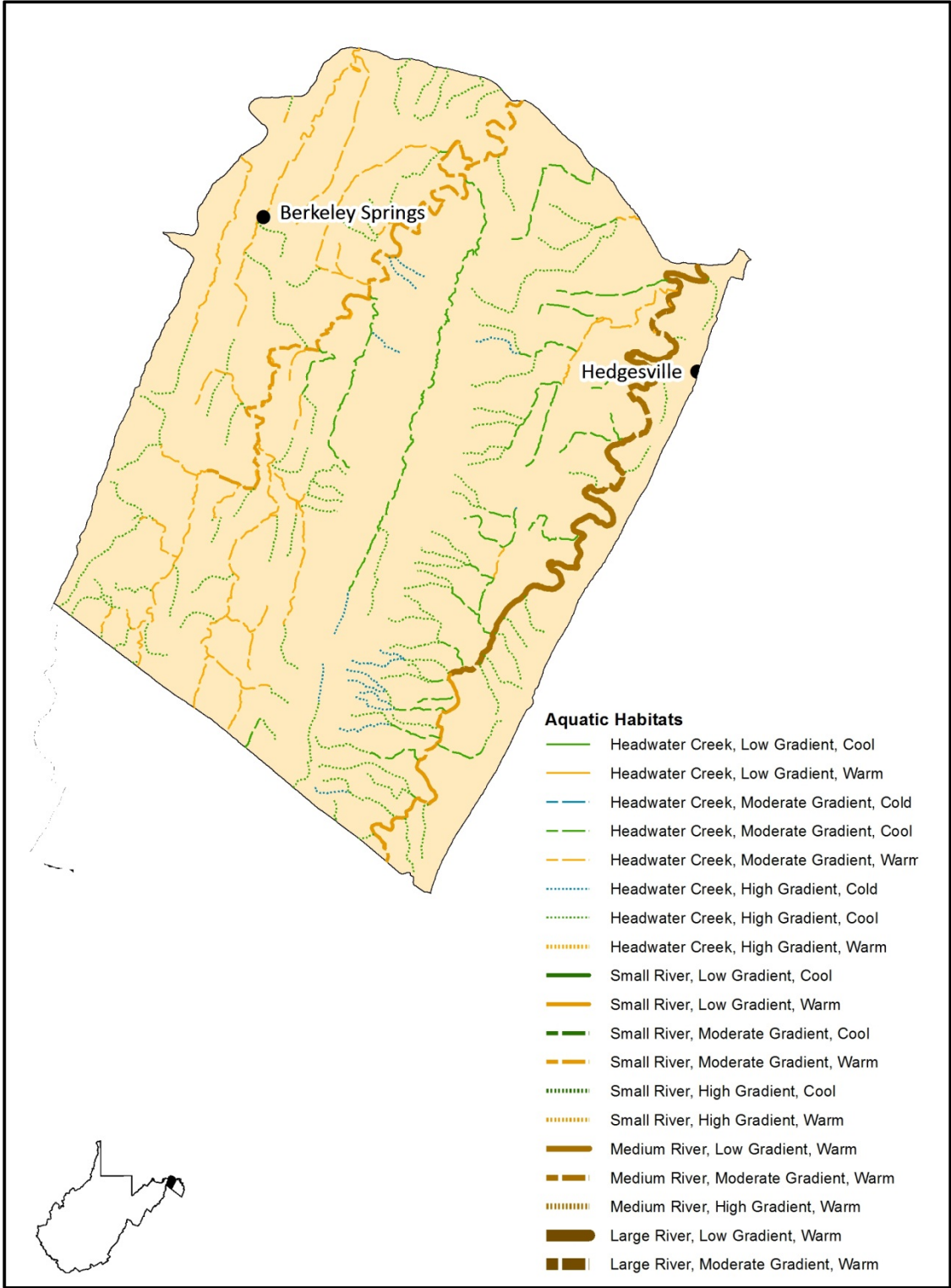
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient,Cool	1	0.07%	6.18%
Headwater Creek,Low Gradient, Warm	7	0.59%	1.31%
Headwater Creek,Moderate Gradient,Cool	173	13.99%	7.89%
Headwater Creek,Moderate Gradient,Warm	119	9.64%	3.05%
Headwater Creek,High Gradient,Cold	249	20.13%	8.49%
Headwater Creek,High Gradient,Cool	494	39.90%	7.88%
Small River,Low Gradient,Cool	6	0.48%	15.63%
Small River,Low Gradient, Warm	5	0.41%	1.11%
Small River,Moderate Gradient,Cool	46	3.72%	9.88%
Small River,Moderate Gradient,Warm	45	3.65%	8.31%
Medium River, Low Gradient,Warm	34	2.76%	7.19%
Medium River,Moderate Gradient,Warm	58	4.66%	16.62%
Totals	1,237	100.00%	

6.21: Sleepy Creek and Back Creek CFA

Sleepy Creek and Back Creek CFA – Terrestrial Habitats



Sleepy Creek and Back Creek CFA – Aquatic Habitats



6.21.1: Description

This CFA encompasses three adjoining watersheds within the Ridge and Valley Ecoregion: Warm Spring Run, Sleepy Creek, and Back Creek. All streams flow north and drain directly into the Potomac River (which belongs to Maryland). Valleys are low elevation, generally broad, with narrow but well-defined floodplains along the larger streams (including mainstem Potomac), and have extensive shaley (but still low elevation) uplands, flanked by steeply sided, narrow mid-elevation sandstone ridges (primarily Cacapon, Sleepy Creek, Little North, and Third Hill mountains), which occasionally rise above 2000 feet. The watersheds of Sleepy Creek and Back Creek originate in Virginia. The ridgetops and upper slopes are mostly forested, with significant moderate-sized forest blocks surviving only in Cacapon State Park and Sleepy Creek WMA. Most forest land is in private, small to medium-sized non-industrial holdings. The lower slopes and valleys are a mosaic of forest, agriculture, and residential/second home development. Population growth has been steady over last 50 years, and developed areas are extensive, but often of low to medium density. Commercial development is centered along US Route 522 and WV Route 9, and includes the town of Berkeley Springs. Agriculture, mostly on the shaley uplands, includes beef and dairy production with associated hay, corn, and pasture lands. Apple orchards still operate on some of the lower ridges.

6.21.2: Significant Wildlife Values

Streams (especially Back and Sleepy creeks), riparian habitats, and wetlands (such as Stauffers Marsh) are important for the continued survival in West Virginia for several species, many of which have limited distributions in the State, including Wood Turtle (core of its distribution in State), Northern Cricket Frog (*Acris crepitans*), Northern Red-bellied Cooter (*Pseudomys rubiventris*), eight mussel species of concern (including Green Floater, Triangle Floater and Brook Floater), the declining Tessellated Darter, and two federally endangered plants: Harperella and Barbed-bristle (Northeastern) Bulrush (*Scirpus ancistrochaetus*). On state lands, and especially Sleepy Creek WMA, blocks of upland forests (primarily mixed oak) and embedded rocky habitats are important for many species, including interior forest nesting birds, wintering Golden Eagle, Allegheny Woodrat, and Timber Rattlesnake. A cave in the Back Creek Watershed contains a cave amphipod species known only from that site.

6.21.3: Distinctive Stresses

The streams and forests are under very heavy, widespread pressure from development and associated habitat impacts, including habitat loss and fragmentation, stormwater runoff, and invasive species.

6.21.4: Conservation Actions

- Watershed restoration and protection is a priority. A framework for watershed protection could help guide development so that impacts to water quality and thus habitat, are minimized.
- Coordinate with the active land trust and farmland protection community to protect habitat through land conservation.

6.21.5: Conservation Opportunities

- Key WVDNR Partners: WVDEP, West Virginia Conservation Agency, NRCS, WVDOF, Morgan County and Berkeley County Planning Commissions, Sleepy Creek Watershed Association, Warm

Springs Run Watershed Association, Blue Heron Environmental Network, Potomac Valley Audubon Society, county farmland protection boards, Land Trust of the Eastern Panhandle. Comprehensive watershed protection also includes engaging with the State of Virginia and Frederick County, Virginia, on water quality issues in the respective watersheds.

- Public Lands: Sleepy Creek WMA, Cacapon State Park.

6.21.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	4	14
Birds	17	10
Butterflies and Moths	4	1
Cave Invertebrates	1	
Dragonflies and Damselflies	1	9
Fish	6	2
Mammals	1	3
Mussels	6	4
Plants	8	25
Reptiles	4	7
Snails		6
Totals	52	81

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	50	0.03%	0.06%
Agriculture	25,449	14.20%	1.77%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	43	0.02%	0.46%
Developed	11,478	6.41%	1.01%
Dry Calcareous Forests, Woodlands, and Glades	706	0.39%	0.99%
Dry Oak (-Pine) Forests	25,512	14.24%	1.03%
Dry-Mesic Oak Forests	94,514	52.75%	1.89%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	16	0.01%	0.00%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	1,254	0.70%	0.13%
Pine-Oak Rocky Woodlands	749	0.42%	0.98%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	3,969	2.21%	3.30%
Shale Barrens	14	0.01%	0.76%
Sinkhole and Depression Ponds	1	0.00%	0.74%
Small Stream Riparian Habitats	9,469	5.28%	1.92%
Unresolved	5,954	3.32%	5.10%
Totals	179,178	100.00%	

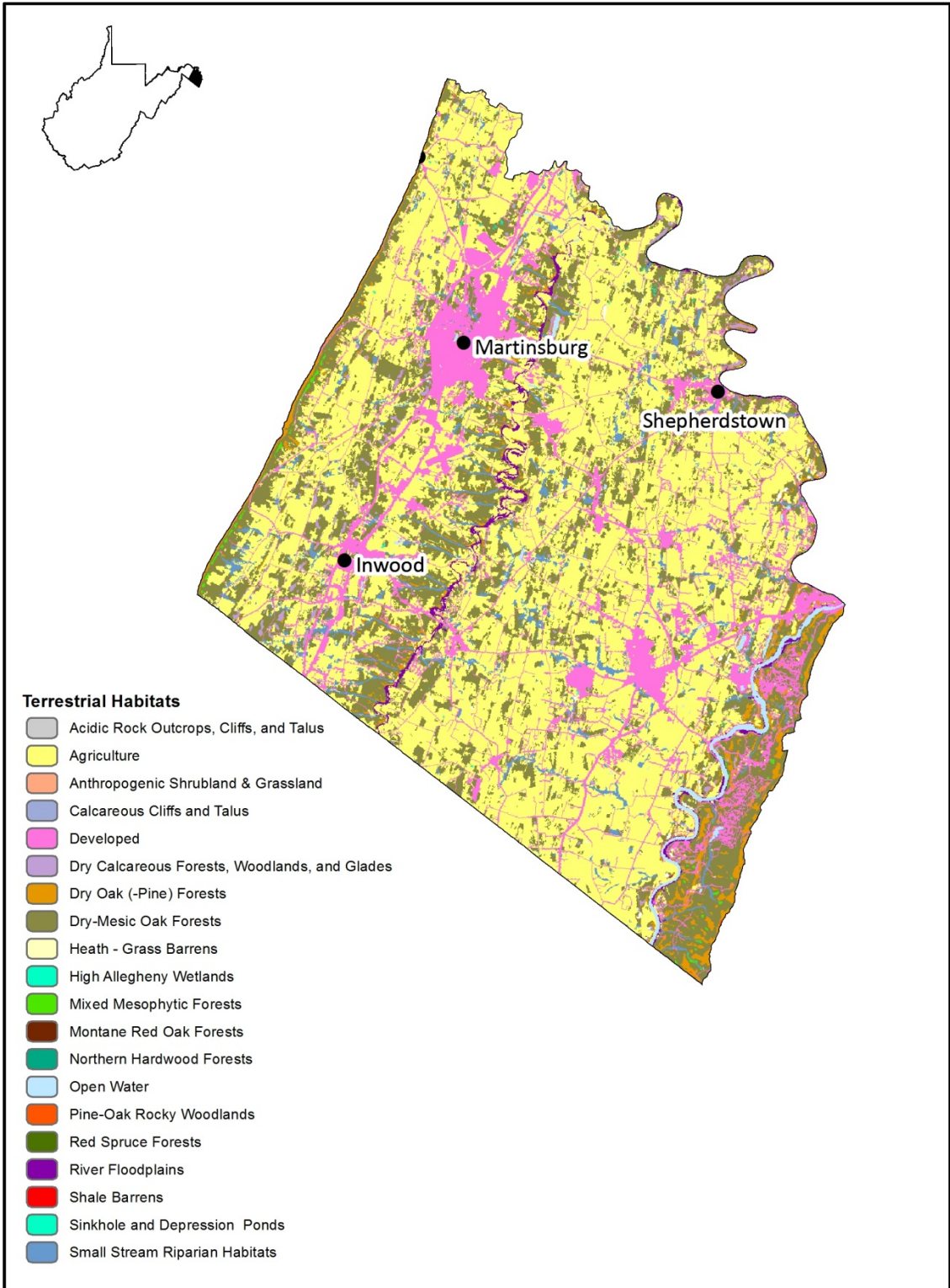
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

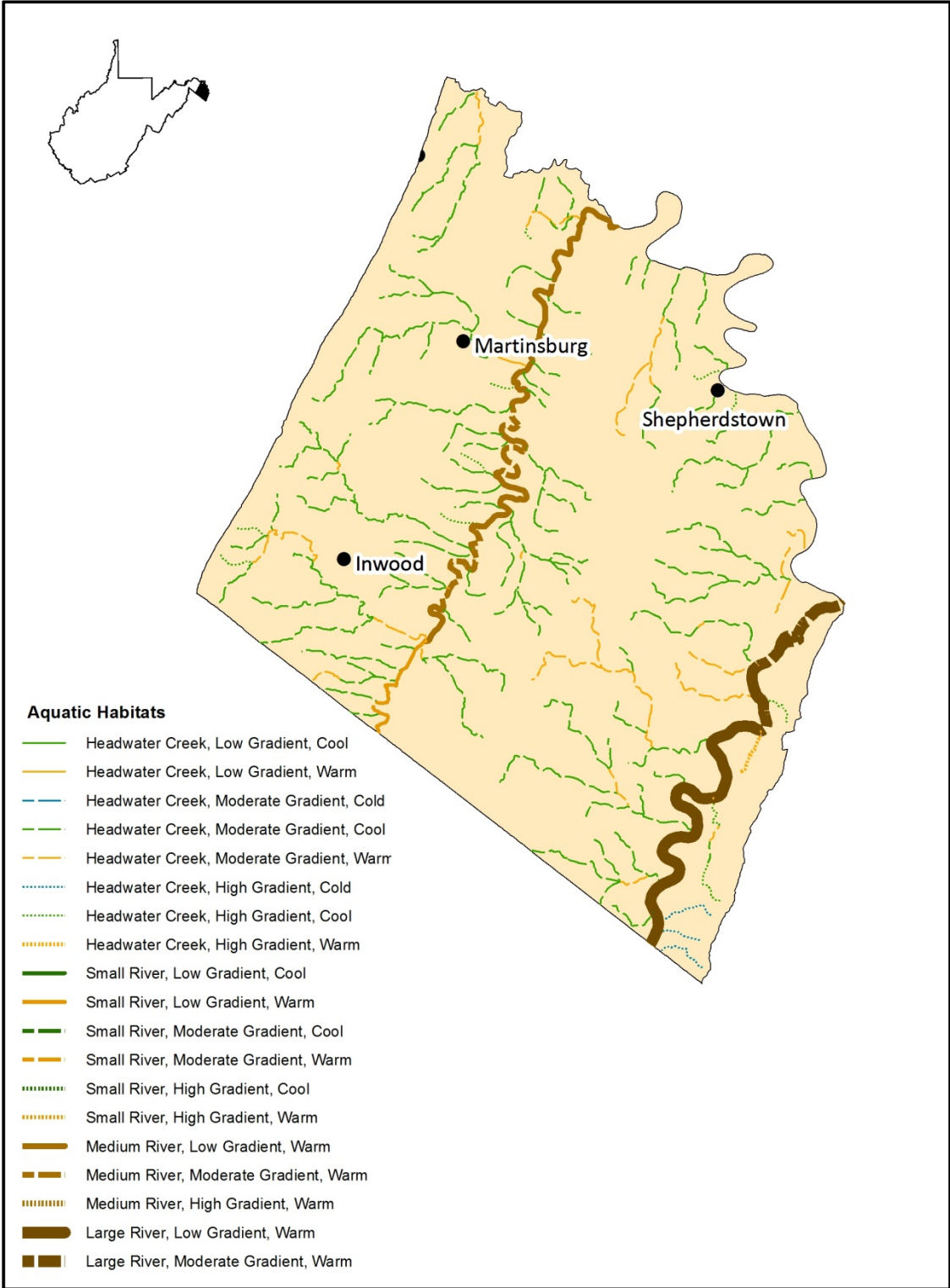
HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	2	0.42%	0.29%
Headwater Creek,Moderate Gradient,Cool	72	18.61%	3.28%
Headwater Creek,Moderate Gradient,Warm	84	21.65%	2.15%
Headwater Creek,High Gradient,Cold	18	4.62%	0.61%
Headwater Creek,High Gradient,Cool	148	38.20%	2.36%
Small River,Low Gradient, Warm	8	2.07%	1.74%
Small River,Moderate Gradient,Warm	31	7.89%	5.63%
Medium River, Low Gradient,Warm	19	4.87%	3.97%
Medium River,Moderate Gradient,Warm	6	1.68%	1.87%
Totals	387	100.00%	

6.22: Shenandoah Valley CFA

Shenandoah Valley CFA – Terrestrial Habitats



Shenandoah Valley CFA – Aquatic Habitats



6.22.1: Description

This Ridge and Valley CFA spans most of West Virginia from Little North Mountain east to the crest of the Blue Ridge. Terrain between these two ridges is flat to gently rolling, low elevation uplands of the Shenandoah Valley and includes the lowest elevations in the State. Much of the valley is limestone, although there is a significant shale belt. The Blue Ridge in West Virginia is a low elevation ridge (under 1700 feet) primarily of sandstone and quartzite, but also including a metabasalt (a modified form of lava) that is the state's oldest surface rocks. The limestone terrain has numerous spring-fed streams, marl marshes, and caves. The entire West Virginia portion of the Shenandoah River passes through this CFA, which is bounded on the north with substantial frontage on the mainstem Potomac, which is part of Maryland. The original deciduous forest of the Shenandoah Valley has been almost completely displaced by agriculture, residential, and industrial development. Due to its proximity to Washington, DC, this is West Virginia's most rapidly growing population center. Many cities and towns are here, including Martinsburg, Charles Town, Ranson, and Shepherdstown. Agricultural land use includes beef production, horse farms, apple and peach orchards, hay, and corn. Industry includes active and legacy limestone quarries around Martinsburg and along the Shenandoah River. The Blue Ridge is largely forested, but much of it is covered with low to medium density residential and second home development.

6.22.2: Significant Wildlife Values

Marl wetlands, spring creeks, and cave/subterranean karst habitats support many important species in this CFA. Altona Marsh, Harewood Marsh, and Lake Louise are among the most important marl wetlands and are among the highest quality alkaline wetlands in the unglaciated Appalachians. Marl wetlands support a number of wetland animals of concern, including Virginia Rail (*Rallus limicola*) and Spotted Turtle, along with a number of plants found nowhere else in West Virginia, such as Ontario Lobelia (*Lobelia kalmii*) and Baltic Rush (*Juncus balticus*). The federally threatened Madison Cave Isopod (*Antrolana lira*) occurs in pockets of karst groundwater in the Shenandoah Valley, where it is encountered in caves and wells that intersect the water table. There are eight other SGCN cave invertebrates, including a cave amphipod known only from one site. This is an important CFA for birds (37 SGCN). The farmlands are among the most extensive Anthropogenic Grasslands and Shrublands in the state and represent a significant portion of the state's habitat for a suite of grassland birds, including loggerhead shrike, horned lark (*Eremophila alpestris*), grasshopper sparrow, and eastern meadowlark. Many species of limited distribution in West Virginia are found in this CFA, including Northern Cricket Frog, Northern Red-bellied Cooter (*Pseudemys rubriventris*), Prothonotary Warbler (*Protonotaria citrea*), and Nodding Trillium (*Trillium cernuum*). The Shenandoah River is a dominant landscape feature that supports riparian birds of concern and as many as ten SGCN fish. Eighty SGCN plants are known from the varied habitats in the CFA. Many rare plants of concern are found in Harpers Ferry National Historical Park.

6.22.3: Distinctive Stresses

The CFA is the fastest growing region in the state in terms of population and subsequent development. Residential and commercial development are displacing agriculture (which is compatible with many elements) and encroaching on important habitats (streams, marshes, farmland, groundwater).

6.22.4: Conservation Actions

- Watershed restoration and protection is a priority. A framework for watershed protection could help guide development so that impacts to water quality and thus habitat, are minimized.
- Opequon Creek should be considered for a reintroduction of mussels if studies suggest water quality is acceptable. If so, a pilot project could be developed that introduces common species and monitors their survival.
- Coordinate with the active land trust and farmland protection community to protect habitat through land conservation.

6.22.5: Conservation Opportunities

- Key WVDNR Partners: Berkeley and Jefferson county farmland protection boards, Berkeley and Jefferson County Planning Commissions, WVDEP, West Virginia Conservation Agency, Opequon Creek Watershed Association, NRCS, Land Trust of the Eastern Panhandle, Potomac Valley Audubon Society, Leetown Science Center (USGS), Freshwater Institute, National Park Service. Water quality issues on Opequon Creek and Shenandoah River require engaging with the state of Virginia and planning commissions in Frederick and Clarke Counties, Virginia.
- Public Lands: Shannondale Springs WMA, National Conservation Training Center, Harpers Ferry National Historical Park, Appalachian Trail National Scenic Trail, Leetown Science Center (USGS), and numerous county parks.

6.22.6: SWAPMASTER Summary Tables of Species and Habitats

The following three pages contain summary tables of species and habitats generated from the SWAPMASTER database for this CFA. See Appendix 4 for a complete list of species recorded by the WVDNR within the boundaries of each CFA.

SPECIES SUMMARY BY TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	2	11
Birds	23	14
Butterflies and Moths	2	8
Cave Invertebrates	6	3
Dragonflies and Damselflies		7
Fish	9	5
Mussels	6	3
Plants	14	66
Reptiles	6	7
Snails		10
Totals	68	134

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA AREA	PERCENT OF WV TOTAL FOR TYPE
Acidic Rock Outcrops, Cliffs, and Talus	8	0.00%	0.01%
Agriculture	132,544	53.58%	9.23%
Anthropogenic Shrubland & Grassland	0	0.00%	0.00%
Calcareous Cliffs and Talus	4	0.00%	0.04%
Developed	36,450	14.73%	3.20%
Dry Calcareous Forests, Woodlands, and Glades	2,779	1.12%	3.88%
Dry Oak (-Pine) Forests	6,416	2.59%	0.26%
Dry-Mesic Oak Forests	55,233	22.33%	1.11%
Heath-Grass Barrens	0	0.00%	0.00%
High Allegheny Wetlands	0	0.00%	0.00%
Mixed Mesophytic Forests	353	0.14%	0.01%
Montane Red Oak Forests	0	0.00%	0.00%
Northern Hardwood Forests	0	0.00%	0.00%
Pine-Oak Rocky Woodlands	19	0.01%	0.02%
Red Spruce Forests	0	0.00%	0.00%
River Floodplains	2,254	0.91%	1.88%
Shale Barrens	0	0.00%	0.00%
Sinkhole and Depression Ponds	123	0.05%	82.44%
Small Stream Riparian Habitats	7,804	3.15%	1.58%
Unresolved	3,395	1.37%	2.91%
Totals	247,382	100.00%	

AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Greater Shenandoah Valley**

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA MILES	PERCENT OF WV TOTAL FOR TYPE
Headwater Creek,Low Gradient, Warm	3	0.88%	0.59%
Headwater Creek,Moderate Gradient,Cool	250	67.06%	11.37%
Headwater Creek,Moderate Gradient,Warm	44	11.93%	1.14%
Headwater Creek,High Gradient,Cold	6	1.67%	0.21%
Headwater Creek,High Gradient,Cool	14	3.69%	0.22%
Headwater Creek,High Gradient,Warm	2	0.44%	0.21%
Small River,Low Gradient, Warm	5	1.23%	1.00%
Small River,Moderate Gradient,Warm	1	0.15%	0.10%
Medium River, Low Gradient,Warm	17	4.68%	3.66%
Medium River,Moderate Gradient,Warm	11	2.93%	3.14%
Large River,Low Gradient,Warm	15	3.91%	2.50%
Large River,Moderate Gradient,Warm	5	1.45%	4.90%
Totals	372	100.00%	

Chapter 7: Monitoring, Adaptive Management, Research and Data Acquisition, Data Management and Plan Revision

7.1: Introduction

Ten years ago, when the first West Virginia State Wildlife Action Plan (SWAP) was published, conservation planning for Species of Greatest Conservation Need (SGCN) populations and habitats was in its infancy. The conservation priorities that emerged from that plan were to better understand species distribution, species/habitat associations, trends in both species numbers and habitat quantity and quality and what stresses were impacting species and habitats. The past decade has witnessed significant progress in those areas but also the emergence or increased awareness of stresses that were barely mentioned in that first plan, such as the development of shale gas resources and climate change. It is clear that the world is changing faster than our collective ability to understand and respond to those changes. The human and financial resources that are being committed to conservation in the face of these landscape and global-level changes are simply inadequate to allow the conservation community to do the job. That situation must change if this plan and the legislation that fostered it are to achieve the goal of stemming species declines. In the meantime, there is much that can be done to ensure that the conservation community does the best it can with the resources that it has. Efficient monitoring, adaptive management, prioritized research/data acquisition and responsive plan revision, all with good feedback connections, clearly comprise a recipe for better conservation results. The sections that follow present a framework for that recipe.

7.2: Monitoring

An integral component of the framework is monitoring to assess species and habitat trends and responses to management actions. Many of the key partners with WVDNR have emphasized the degree to which they rely on the species monitoring efforts conducted by the WVDNR and the importance of continuing those efforts. However, monitoring can easily consume so many limited human and financial resources that few resources remain for conservation action. Achieving and maintaining the proper balance between monitoring and action is therefore the dominant focus of this framework.

The importance of scale in maintaining an effective, but not excessive, monitoring effort cannot be overstated. Our framework proposes to commit some resources for extensive monitoring of species and habitats across the entire state, but proposes to commit more resources for more intensive monitoring in key areas of species and habitat occurrence, i.e., Conservation Focus Areas (CFA's). As it is the intent of the plan to focus more conservation action in the CFA's, it is entirely appropriate to maintain a more intensive monitoring effort there. This scale factor will be invoked repeatedly as the framework addresses monitoring related to the following issues.

7.2.1: Species Monitoring

7.2.1.1: Statewide Species Monitoring

The WVDNR currently tracks all SGCN identified in the West Virginia SWAP in the Biotics5 database. Biotics5 contains taxonomic information and global and state conservation status ranks (based on degree of endangerment), for over 800 plant and animal species, and detailed information, including locations, population numbers and extent, habitats, and threats for over 7,000 occurrences of these species. Biotics5 uses methodology and software which is shared throughout the network of Natural Heritage Programs, enabling analysis of species trends across regional and global scales. As new SGCN occurrences are discovered or old ones resurveyed, the records in Biotics5 can be updated to reflect new information. For the WVDNR, Biotics5 will continue to be the primary, statewide species monitoring component of the framework.

In addition to Biotics5, the WVDNR and its partners plan to continue the numerous, ongoing monitoring efforts that contribute to a fuller understanding of species status and trends in West Virginia. These ongoing activities include, but are not limited to the following.

ONGOING SPECIES MONITORING ACTIVITIES

Species Monitoring Action	Implementation Lead	Monitoring Targets	Level of Monitoring (Species, Species Group or Habitat)
American kestrel	WVDNR	Nest boxes	Species
American woodcock	WVDNR	Survey routes	Species
Bald eagle nest monitoring	WVDNR	All known, active nests	Species
Bank swallow	WVDNR	Nest colonies	Species
Barn owl	WVDNR	All known nesting/roosting sites	Species
Breeding Bird Survey	WVDNR	Annual surveys	Species Group
Christmas Bird Counts	WVDNR, Brooks Bird Club, Audubon	Annual surveys	Species Group
Ebird/WV bird listserv monitoring	WVDNR	All SGCN S1, S2, select S3 reports	Species Group
Golden-winged warbler	Cornell Lab of Ornithology	115-120 points surveyed	Species
Great Backyard Bird Count	Cornell Lab of Ornithology	All species	Species Group
Great blue heron	WVDNR	Document rookeries	Species
Loggerhead shrike	WVDNR, VADGIF, SCBI	All known nesting/wintering sites	Species
Nightjar Survey Network	Center for Conservation Biology	Nightjars	Species Group
Northern goshawk	WVDNR	Survey transects, nest monitoring	Species
Northern harrier	WVDNR, USFWS	Nest monitoring	Species
Northern saw-whet owl nest box monitoring	WVDNR	Northern saw-whet owl	Species
Osprey	WVDNR	Nest monitoring	Species
Peregrine falcon	WVDNR	All known, active nests	Species
Rusty blackbird	Rusty Blackbird Working Group	Spring migration blitz	Species
Secretive marsh bird monitoring	WVDNR	Notable wetlands statewide	Habitat, Species Group
Winter Bird Count	WVDNR	Feeder/yard species	Species Group
Ruffed Grouse Drumming Counts	WVDNR	Ruffed Grouse	Species
Biotics	WVDNR	All rare, threatened and endangered species statewide	Species
PIF point counts (past)	WVDNR	Birds	Species, Species group
Federally listed plants	WVDNR	Listed plants	Species

2015 WV State Wildlife Action Plan

District fish surveys	WVDNR	Game fish	Species
Mid-winter eagle survey	USACE	Bald and golden eagles	Species
Mid-winter waterfowl survey	USFWS	Waterfowl	Species, Species Group
WV Butterfly Atlas	WVDNR	Lepidoptera	Species, Habitat
Allegheny Front Migration Observatory	Brooks Bird Club	Birds	Species
Stream monitoring	WVDEP	Water quality	Species Group, Habitat
NABA summer butterfly count (Preston Co)	North American Butterfly Association	Butterflies	Species
National Moth week activities	EBEC/National Moth Week	Moths	Species
Mast survey	WVDNR	Hard and soft mast	Species, Habitat
Bird banding projects	Individuals	Birds	Species, Species Group
Mourning dove banding	USFWS	Mourning doves	Species
Mourning dove coo counts	WVDNR	Mourning doves	Species
Pheasant crow counts	WVDNR	Ring-necked pheasant	Species
Brood reports	WVDNR	Ruffed grouse, wild turkey	Species
Emerald ash borer monitoring	WVDA	Emerald ash borer	Species, Habitat
Gypsy moth monitoring	WVDA, WVDOF	Gypsy moth	Species, Habitat
Avian flu monitoring	USFWS	Waterfowl	Species
Mussels-Cacapon River at Bradfields	WVDNR	All mussels	Species, Habitat
Mussels-Cacapon River at Great Cacapon	WVDNR	All mussels	Species, Habitat
Mussels- Elk River at Sutton	WVDNR	All mussels	Species, Habitat
Mussels – Elk River at Queen Shoals	WVDNR	All mussels/Northern Riffleshell Restoration	Species, Habitat
Mussels – Middle Island Creek at Falls Mills	WVDNR, USFWS	All mussels/Clubshell Restoration	Species, Habitat
Mussels- Meathouse Fork at New Milton	WVDNR	All mussels	Species, Habitat
Mussels – Little Kanawha River at Burning Springs	WVDNR	All mussels	Species, Habitat
Mussels – Little Kanawha River at Annamoriah	WVDNR, USFWS	All mussels/Clubshell Restoration	Species, Habitat
Mussels – Greenbrier River downstream of Thorny Creek	WVDNR	All mussels	Species, Habitat
Mussels - Hackers Creek	WVDNR	All mussels	Species, Habitat
Mussels - Kanawha River at Kanawha Falls	WVDNR	All mussels/Fanshell and Northern Riffleshell Restoration	Species, Habitat
Mussels – Kanawha River at Watsons Island	WVDNR	All mussels	Species, Habitat
Mussels – Monongahela River downstream of Opekiska	WVDNR	All mussels/Restoration	Species, Habitat
Mussels – Monongahela River downstream of Hilderbrand	WVDNR	All mussels/Restoration	Species, Habitat
Mussels – New River at Thurmond	WVDNR	All mussels	Species, Habitat
Mussels – North Fork Hughes River at Sears Road	WVDNR	All mussels	Species, Habitat
Mussels – Ohio River at Old Lock 18	WVDNR/USFWS	All mussels/Restoration	Species, Habitat
Mussels – Ohio River at Muskingum Island	WVDNR/USFWS	All mussels/Pink Mucket Pearly Mussel, Northern Riffleshell, and Clubshell Restoration	Species, Habitat
Mussels – Ohio River at Buckley Island	WVDNR/USFWS	All mussels/Northern Riffleshell and Clubshell Restoration	Species, Habitat
Mussels – Ohio River at Neal Island	WVDNR/USFWS	All mussels/Restoration	Species, Habitat
Mussels – Ohio River at Blennerhassett Island	WVDNR/USFWS	All mussels/Restoration	Species, Habitat
Mussels – Ohio River at Degussa	WVDNR/USFWS	All mussels	Species, Habitat

Mussels – Ohio River at River Mile 284	WVDNR/USFWS	All mussels/Northern Riffleshell and Clubshell Restoration	Species, Habitat
Mussels – Dunkard Creek Mason Dixon	WVDNR	All mussels/Restoration	Species, Habitat
Mussels – Dunkard Creek Blacks Run	WVDNR	All mussels/Restoration	Species, Habitat
Mussels – Dunkard Creek DOH	WVDNR	All mussels/Restoration	Species, Habitat
Mussels – Dunkard Creek Blacksville	WVDNR	All mussels/Restoration	Species, Habitat
Eastern spotted skunk telemetry	WVDNR, Virginia Tech	Eastern spotted skunk	Species
Allegheny woodrat monitoring	WVDNR	Allegheny woodrat	Species
Aquatic Community Assessment and Restoration Program	WVDNR	Fishes	Species Group, Habitat
WV Fishes Atlas Project	WVDNR, USGS, WVU Co-op Unit	Fishes	Species
Acoustic bat routes and stationary acoustic sites.	WVDNR	Bats	Species Group
Winter bat hibernacula surveys.	WVDNR	Bats and Allegheny woodrat	Species
Northern flying squirrel nest box monitoring.	WVDNR	Northern flying squirrels.	Species
Intense northern flying squirrel monitoring at specific sites on the National Forest.	USFS -MNF	Northern flying squirrel	Species
Long-term bat monitoring using mist net surveys	USFS - MNF	Bats	Species
Virginia big-eared bat summer colony censuses.	WVDNR	Virginia big-eared bat	Species
Bat fall swarm trapping at abandoned mines in New River Gorge area.	NPS	Bats	Species
Monitoring of bats at a large roost using an I-77 bridge.	WVDOH	Bats	Species
Compilation of bat captures from WV Scientific Collecting permit reports.	WVDNR	Bats	Species
Long-term monitoring of Allegheny Woodrat populations (live trapping).	WVDNR	Allegheny Woodrat	Species
Monitoring of cliffs for nesting peregrine falcons in New River Gorge area.	NPS	Peregrine Falcon	Species

7.2.1.2: Monitoring Species in Conservation Focus Areas

As noted in Chapter 9, identification of 21 CFA's in the state presents a real opportunity to simultaneously narrow and intensify monitoring efforts for species and habitats. The initial focus of species monitoring efforts in the CFA's will be to establish better baselines for species distribution and abundance. Subsequent monitoring in the CFA's will yield information that has been lacking on trends in SGCN populations. Specific monitoring protocols will be incorporated in CFA conservation plans that will be developed to implement the West Virginia SWAP. Working with local partners in the CFA's, such as the USFS, can provide synergistic opportunities to gain better trend information with greater efficiency and at lower cost.

7.2.2: Habitat Monitoring

7.2.2.1: Statewide Habitat Monitoring

Occurrences of selected natural habitats, like SGCN, are tracked in the Biotics5 database. WVDNR tracks all known occurrences of rare habitats and high quality occurrences of all habitats. Occurrences are mapped, vegetation structure and composition are described, threats are identified, and quality ranks are assigned based on size, condition, and landscape context.

WVDNR has established permanent vegetation monitoring plots in some locations. Plots were established and are designed to detect and document changes to habitats in response to climate change, deer herbivory, and succession. WVDNR will consider establishing additional permanent plots in high priority habitats. WVDNR has also cooperated with NPS to establish monitoring plots on their lands. WVDNR also has data from over 4,000 vegetation plots across the state, most with accurate GPS location data, which, combined with air photo interpretation or revisits, can be used for monitoring gross changes to habitat.

Habitat mapping has great potential as a monitoring tool, but will require increased thematic and spatial accuracy. The WV Habitat map produced for the SWAP is an improvement over recent regional maps and additional low cost improvements are within the capacity of WVDNR to achieve in the next decade.

As with species monitoring, the WVDNR and its partners will continue to implement a wide array of habitat monitoring activities that include, but are not limited to, the following.

ONGOING HABITAT MONITORING ACTIVITIES

Habitat Monitoring Action	Implementation Lead	Monitoring Targets	Level of Monitoring (Species, Species Group or Habitat)
Ice Mountain Permanent Vegetation Plot	WVDNR	Vegetation around ice vents (Acidic Rock Outcrops, Cliffs, and Talus; Mixed Mesophytic Forests)	Habitat
Bear Rocks Burn Monitoring	WVDNR	Heath Grass Barrens	Habitat
Canaan Valley Deer Exlosures	WVDNR	High Allegheny Wetlands	Habitat
Forest Health Monitoring Plots	NPS	Forest habitats	Habitat
Rare Riparian Plant Community Monitoring	NPS	River Floodplains	Habitat
West Virginia Vegetation Classification Plots	WVDNR	Statewide Vegetation	Habitat
West Virginia Terrestrial Habitat Map	WVDNR	All terrestrial habitats statewide	Habitat
Biotics	WVDNR	All terrestrial habitats statewide	Habitat
National Wetland Condition Assessment	EPA	High Allegheny Wetlands, River Floodplains, Small Stream Riparian Habitats	Habitat
Mussels-Cacapon River at Bradfields	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels-Cacapon River at Great Cacapon	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels- Elk River at Sutton	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Elk River at Queen Shoals	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Middle Island Creek at Falls Mills	WVDNR	Temperature/Pebble Counts	Species, Habitat

2015 WV State Wildlife Action Plan

Mussels- Meathouse Fork at New Milton	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Little Kanawha River at Burning Springs	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Little Kanawha River at Annamoriah	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Greenbrier River downstream of Thorny	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels - Hackers Creek	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels - Kanawha River at Kanawha Falls	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Kanawha River at Watsons Island	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Monongahela River downstream of Opekiska	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Monongahela River downstream of Hilderbrand	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – New River at Thurmond	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – North Fork Hughes River at Sears Road	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Old Lock 18	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Muskingum Island	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Buckley Island	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Neal Island	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Blennerhassett Island	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at Degussa	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Ohio River at River Mile 284	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Dunkard Creek Mason Dixon	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Dunkard Creek Blacks Run	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Dunkard Creek DOH	WVDNR	Temperature/Pebble Counts	Species, Habitat
Mussels – Dunkard Creek Blacksville	WVDNR	Temperature/Pebble Counts	Species, Habitat
AMD liming stations	WVDNR, WVDEP, Trout Unlimited?	Stream water quality	Habitat
Stream monitoring	Friends of the Cheat	Water quality	habitat
Stream monitoring	Friends of Deckers Creek	Water quality	habitat
Stream monitoring	Dunkard Creek Watershed Assoc	Water quality	habitat
Stream monitoring	West Fork Watershed Assoc	Water quality	Habitat
Secretive marsh bird monitoring	WVDNR	Notable wetlands statewide	Species Group, Habitat
WV Butterfly Atlas	WVDNR	Lepidoptera	Species, Habitat
Stream monitoring	WVDEP	Water quality	Species Group, Habitat
Mast survey	WVDNR	Hard and soft mast	Species, Habitat
Gypsy moth monitoring	WVDA, WVDOF	Gypsy moth	Species, Habitat
Emerald Ash borer monitoring	WVDA	Emerald ash borer	Species, Habitat
Aquatic Community Assessment and Restoration Program	WVDNR	Fishes	Species Group, Habitat
Inspection of cave gates at significant bat caves	WVDNR	Security of site	Habitat
Inspection of fences that protect <i>Triodopsis platysayoides</i> habitat at Coopers Rock State Forest.	WVDNR	Security of site	Habitat

7.2.2.2: Monitoring Habitats in Conservation Focus Areas

Implementing effective conservation actions in CFA's will require finer scale habitat mapping, with regular updates to the spatial data. This strategy too has been elevated in Section 7.4 and will benefit from synergies with species monitoring in the CFA's and with collaborative efforts of local CFA partners.

7.2.3: Monitoring Results of Conservation Actions

7.2.3.1: Monitoring Statewide Results

Quantifying the results of implemented statewide conservation actions, most of which will be of a collaborative nature, can best be done by incorporating feedback assessments from partners and collaborators. Each statewide conservation action identified in Chapter 4 will be implemented with integrated opportunities for such feedback. Statewide monitoring efforts for species and habitats will also provide opportunities to assess aggregate improvements that may result from implementation of multiple statewide conservation actions.

7.2.3.2: Monitoring Results of Actions at the CFA Level

The West Virginia SWAP envisions many conservation actions being implemented at the CFA level. The CFA conservation plans that will be developed from the SWAP present real opportunities for both targeted action and targeted measurement and monitoring of the results. These plans will incorporate measurement and monitoring protocols that will be integrated with conservation actions themselves. There will be no implementation of conservation action without integrated monitoring protocols. These protocols will include biological components and feedback assessments from partners.

7.2.3.3 Proposed Effectiveness Measures for Conservation Projects and Activities

In implementing the 2015 West Virginia SWAP, the WVDNR proposes to use relevant effectiveness measures to evaluate, track and report the results of projects and activities that implement conservation actions. Effectiveness measures have been developed by the Association of Fish and Wildlife Agencies' State Wildlife Grant Effectiveness Measures Working Group (AFWA 2011). Pursuant to AFWA's recommendation, the WVDNR proposes to use selected measures to report and track project effectiveness as part of the State of West Virginia's regular reporting to the U. S. Fish and Wildlife Service via the Wildlife TRACS database when that system is fully implemented. The following examples illustrate the proposed tracking and reporting protocol for various types of conservation projects and activities. Other metrics may be added as necessary.

Conservation Project/Activity Type: Direct Management of Natural Resources

Description: Covers all direct management activities intended to benefit natural resources, including fish and wildlife species and their habitats, as well as stress reduction activities that directly result in improvements to fish and wildlife species and/or their habitats.

Sample Actions: The following actions are examples of the direct management of natural resources:

- Implement priority restoration projects for Lepidoptera and/or Mussel habitats.
- Implement burn management on priority parcels.

- Establish identified micro-features, including nest structures, substrate, and cover types.
- Use "soft" shoreline modification approaches (e.g., vegetative plantings, and placement of large woody debris).
- Develop and implement invasive species management program.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of Direct Management of Natural Resources

Project Type	Effectiveness Measure
Direct Management of Natural Resources	Percent Management Actions Implemented As Planned
Direct Management of Natural Resources	Evidence that Direct Management Action is Reducing Key Stresses
Direct Management of Natural Resources	Degree to which target SGCNs respond as expected to direct management actions
Direct Management of Natural Resources	Degree to which target habitats/processes respond as expected from direct management actions
Direct Management of Natural Resources	Species Measures

Conservation Project/Activity Type: Acquisition, Easement, or Lease

Description: Land conservation activities that involve fee title acquisition, conservation easements, or lease.

Sample Actions: The following actions are examples of acquisition, easement, or lease:

- Identify key unprotected parcels in focal areas.
- Facilitate acquisition or easement of key parcels in focal areas.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of acquisition, easement, or lease.

Project Type	Effectiveness Measure
Acquisition Easement or Lease	Amount Received or Needed for Initial Transaction
Acquisition Easement or Lease	Number of Acres Prioritized for Purchase, Lease, or Easement
Acquisition Easement or Lease	Number of Acres Purchased, Leased, or Put in Easement
Acquisition Easement or Lease	Existence of a management and monitoring plan that outlines steps required to achieve desired conservation results
Acquisition Easement or Lease	Amount of funding requested for management and monitoring annually

Acquisition Easement or Lease	Amount of funding that was allocated by Agency leadership for management and monitoring annually
Acquisition Easement or Lease	Evidence of Management Plan being Implemented
Acquisition Easement or Lease	Evidence that Management Plan is Reducing Key Stresses
Acquisition Easement or Lease	Evidence of Lease Renewal or Conversion to Easement or Acquisition
Acquisition Easement or Lease	Evidence of Lease Compliance per Year
Acquisition Easement or Lease	Species Measures
Acquisition Easement or Lease	Habitat Measures

Conservation Project/Activity Type: Environmental Review

Description: Formal review of a proposed project or activity, to determine its potential effects on species or habitats or other important aspects of the environment.

Sample Actions: The following actions are examples of environmental review:

- Provide input in existing environmental review processes.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of environmental review.

Project Type	Effectiveness Indicator
Environmental Review	Available Staff or Capacity
Environmental Review	Availability of Information
Environmental Review	Degree to which Review is Timely Complete and Comprehensive
Environmental Review	Delivery of Recommendations
Environmental Review	Degree to which Recommendations are incorporated into relevant permits and documentation
Environmental Review	If not accepted, reasons for non-implementation
Environmental Review	Degree to which Recommendations are accepted by the implementer
Environmental Review	Degree to which implementers apply statutory recommendations from the permitting agency into project plan or policy
Environmental Review	Degree to which Implementers accept Voluntary Recommendations

Environmental Review	Degree to which implemented project avoids impacts in sensitive places
Environmental Review	Degree to which implemented project minimizes impacts in sensitive places
Environmental Review	Degree to which implemented project mitigates or compensates impacts in sensitive places
Environmental Review	Species Measures
Environmental Review	Habitat Measures

Conservation Project/Activity Type: Management Planning

Description: Development of management plans that will guide species or habitat conservation activities.

Sample Actions: The following actions are examples of management planning:

- Develop process to facilitate research priorities.
- Develop strategy to monitor landscape contiguity.
- Develop fire prescriptions for priority parcels.
- Develop strategies to mitigate aquatic degradation.
- Use an adaptive management plan for wetland loss and fragmentation with ecological indicators to oversee monitoring and ensure mitigation objectives are met; take corrective action as needed.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of management planning.

Project Type	Effectiveness Measure
Management Planning	Compelling Argument is Developed for why Plan is Needed to meet Specific and Measureable Stress Reduction or Restoration Goals
Management Planning	Key Stakeholders and the Roles they Play
Management Planning	Key Stakeholder Support for the Plan
Management Planning	Assessment of Elements of Management Plan against Standards for a Complete Plan
Management Planning	Degree to which responsible agencies incorporate plan elements into their own workplans and resource it appropriately
Management Planning	Degree to which Agencies Complete Agreed Upon Activities in a Timely Manner
Management Planning	Evidence of appropriate monitoring of both the effectiveness of actions and the biological response of key targets
Management Planning	Evidence that CFA recognition is Restoring Habitats or Species
Management Planning	Evidence that Management Plan is Reducing Key Stresses
Management Planning	Species Measures
Management Planning	Habitat Measures

Conservation Project/Activity Type: Training and Technical Assistance

Description: Providing training and technical assistance to individuals who will undertake conservation actions.

Sample Actions: The following actions are examples of training and technical assistance:

- Organize workshops and technical training for staff in GIS, statistics, etc.
- Increase number and training of oil spill response teams.
- Provide technical assistance in conservation planning where required.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of training and technical assistance.

Project Type	Effectiveness Measure
Training and Technical Assistance	Compelling Argument is Developed for Appropriate needs or skills to solve a pressing Stress Reduction or Restoration Problem
Training and Technical Assistance	Appropriate Individuals are Targeted
Training and Technical Assistance	Qualitative Assessment of Appropriate Curriculum Development
Training and Technical Assistance	Qualitative Assessment of Appropriate Trainers Selected
Training and Technical Assistance	Number of Trainings
Training and Technical Assistance	Number of Individuals Trained
Training and Technical Assistance	Percent of Targeted Individuals Trained
Training and Technical Assistance	Percent of Trainees Demonstrating Proficiencies
Training and Technical Assistance	Percent of Trained Individuals Applying Skills
Training and Technical Assistance	Percent Increase in Capacity of People with Skills
Training and Technical Assistance	Number of Individuals Receiving Technical Assistance
Training and Technical Assistance	Percent of Targeted Individuals Receiving Technical Assistance
Training and Technical Assistance	Evidence that Training is Reducing Stresses
Training and Technical Assistance	Species Measures
Training and Technical Assistance	Habitat Measures

Conservation Project/Activity Type: Data Collection and Analysis

Description: Collection and analysis of data to inform fish, wildlife, and habitat conservation efforts.

Sample Actions: The following actions are examples of data collection and analysis:

- Create GIS coverage of forest age-class.
- Facilitate detection and diagnosis of disease outbreaks.
- Continue established long-term monitoring protocols.
- Develop and implement sampling protocol for aquatic exotics.
- Undertake multi season, pre- and post- dredging biological surveys to assess impacts to animal and submerged aquatic vegetation communities.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of data collection and analysis.

Project Type	Effectiveness Measure
Data Collection and Analysis	Evidence that clear management needs and outcomes have been identified with input from relevant data users
Data Collection and Analysis	Evidence that the researcher clearly provides answers to relevant questions
Data Collection and Analysis	Evidence that data are reaching relevant audiences, by audience
Data Collection and Analysis	Evidence that data collection effort resulted in conservation action recommendations
Data Collection and Analysis	Utility of recommendations
Data Collection and Analysis	Evidence that data are being used to inform conservation actions

Conservation Project/Activity Type: Outreach to Key Resource Users

Description: Conducting outreach to individuals who are users of important fish and wildlife resources or wildlife habitats.

Sample Actions: The following actions are examples of outreach to key resource users:

- Expand public relations for fire management.
- Develop and provide educational information about invasive species.
- Develop and provide educational materials to reduce incidental mortality and take from humans.
- Expand public relations for snakes.
- Expand public awareness of fish passage issues.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of outreach to key resource users.

Project Type	Effectiveness Measure
Outreach to Key Resource Users	Percent of Target Audience that Receives Message
Outreach to Key Resource Users	Percent of Target Audience that has Desired Attitudes and Values
Outreach to Key Resource Users	Percent of Target Audience that has Adopted or Continued Desired Behavior
Outreach to Key Resource Users	Stress Reduction Measures
Outreach to Key Resource Users	Species Measures
Outreach to Key Resource Users	Habitat Measures

Conservation Project/Activity Type: Stakeholder Involvement

Description: Engagement of individuals who have a vested interest in a conservation action, project, or program.

Sample Actions: The following actions are examples of stakeholder involvement:

- Coordinate with mosquito abatement personnel for chemical management.
- Outreach to appropriate landowners concerning chemical management.
- Coordinate invasive species management with other state and regional programs.
- Establish discussions with state and local WVDOH.
- Coordinate incidental take programs with regional or national initiatives.

Effectiveness Measures: The following effectiveness measures could be reported and tracked using the Wildlife TRACS database for actions in this category of stakeholder involvement.

Project Type	Effectiveness Indicator
Stakeholder Involvement	Number of Stakeholders or Stakeholder Groups Identified
Stakeholder Involvement	Percentage of Stakeholders with whom communication has been achieved and expectation shared
Stakeholder Involvement	Percentage of contacted Stakeholders who agree to participate
Stakeholder Involvement	Percentage of participating stakeholders who fulfill commitments

7.3: Adaptive Management

7.3.1: The Adaptive Management Process

Adaptive management is the process of continually improving management policies and practices by learning from the outcome of management actions. Simply put, we want to do more of what works and less of what doesn't. Adaptive management protocols incorporate rapid evaluation/analysis of management results to facilitate rapid adjustment and modification of management policies and actions. The WVDNR recognizes that where opportunities exist and resources permit, controlled research can improve the effectiveness and efficiency of conservation action and, where circumstances warrant, applied research opportunities will be pursued. The WVDNR also believes that the collective

assessment of conservation partners during and after action implementation can often be the simplest and most practical component of adaptive management. The agency commits itself and urges its partners to similarly commit to a careful evaluation of each conservation action taken to implement the West Virginia SWAP and subsequent incorporation of those evaluations into future actions and policies.

7.3.2: The Adaptive Management Team

To establish and maintain a process for (1) monitoring results at both the statewide and CFA scales and (2) incorporating those assessments into planning for future conservation actions, the WVDNR proposes to form a permanent SWAP Adaptive Management Team (AMT). The AMT will include:

- WVDNR diversity program administrators and managers
- WVDNR species and habitat specialists
- Species and habitat experts from state and federal agencies and academia, and
- Program managers from private conservation entities and public agencies, including the USFWS

Beginning in 2016, at the conclusion of the each annual field season, the WVDNR will host a project review and planning workshop for the AMT and SWAP partners. The scope of the workshop will include activities implemented by the WVDNR as well as those implemented by partners. The workshop's annual agenda will include:

- Presentation, discussion and evaluation of conservation projects that have been implemented
- Proposed modifications to ongoing projects and management activities
- Proposed projects for the coming year/s
- Proposed revisions to the West Virginia SWAP

Proceedings of each annual project review and planning workshop will be included in annual performance reports and applications for federal aid submitted to the USFWS for the Continuous SWAP Planning Project discussed further in Section 7.6 below.

7.4: Research and Data Acquisition Priorities

Several applied research and data acquisition needs have been identified during the planning process for the West Virginia SWAP. The following needs were identified as priorities for the state's conservation community.

7.4.1: Applied Research Priorities

- Biological control mechanisms for invasive species
- Impacts of shale gas development on forest interior songbirds, bats, and aquatic species
- Impacts of West Nile Virus and avian influenza on select SGCN bird species
- Impacts of non-native birds and mammalian predators on SGCN birds

- Impacts of feral livestock such as goats and hogs on SGCN habitats
- Potential for reducing impacts to SGCN species by using environmentally responsible and resource efficient (Green Construction) methods
- Potential for an urban wildlife program to advance conservation of SGCN species
- Impacts to aquatic life from chemical spills and other polluting events, including opportunities for post-event restoration of mussels and other aquatic species populations
- Impacts of mining on forest interior songbirds
- Effects of pharmaceuticals on aquatic life
- Feasibility of treating raccoons with drugs to eliminate roundworms at key sites
- Toxicity of herbicides and pesticides on aquatic SGCN's, especially mussels
- Life histories and potential restoration techniques for mussels
- Mechanisms to reduce contamination of aquatic resources by airborne mercury
- Abatement/mitigation strategies for White Nose Syndrome in bats
- Impacts of climate change in West Virginia
- Plant indicator species and develop thresholds for determining acceptable levels of deer herbivory in key SGCN habitats
- Assessing species viability prior to large scale restoration actions

7.4.2: Data Acquisition Priorities

- Complete and publish a statewide habitat classification consistent with the U. S. National Vegetation Classification.
- Improve and regularly update habitat mapping at the statewide scale
- Finer scale habitat mapping for CFA's
- Habitat condition data at the CFA scale
- Disease prevalence for indicator species such as hellbenders, wood frogs, box turtles, and timber rattlesnakes

- Toxoplasmosis prevalence and mortality in SGCN's
- Status of SCGN's and habitats believed most sensitive to climate change
- Water quality data as part of WVDNR's standard aquatic survey protocol
- Water quality data incorporated into a consolidated and publicly accessible data management system
- Permanent monitoring stations within existing high-value aquatic habitats for SGCN's
- Survey and inventory aquatic ecosystems prior to long term restoration plans
- Status and distribution of insects, fungi, lichen, green algae
- Crayfish status and distribution, especially burrowing crayfish, *C. nerterius*, *C. veteranus* and *C. callainus*
- Status and distribution of 12 species in the Other Invertebrate taxa group

7.5: Data Management

To develop the West Virginia SWAP, the WVDNR drew heavily upon its existing Biotics5 databases for species ranks and element occurrences. Support staff for these critical data is needed if the data are going to be available for tracking, monitoring and plan revision in the future. The WVDNR anticipates increasing its data management staff to meet this need.

To develop the West Virginia SWAP, the WVDNR built a new MS Access database (SWAPMASTER) to archive and facilitate analyses and reporting of species and habitat attributes for the plan. It is the agency's intention to keep this database current with periodic updates from its Biotics5 database and to make the SWAPMASTER database and the CFA shapefiles available to conservation partners and the public. The WVDNR believes that making these data available in this way will enhance implementation of the West Virginia SWAP by other agencies, NGO's, and private entities.

7.6: Plan Revision

The decade that has passed since the 2005 West Virginia SWAP has witnessed profound landscape- and global-scale changes, such as shale gas development, that are affecting SGCN populations and habitats in the state. Because of the pace of such changes, many of them were only dimly recognized in 2005. If SWAP planning is to keep pace, the planning paradigm must evolve from the traditional model of expensive, complicated, and rapidly outdated 10-year revisions to a leaner, more dynamic model of continuous updates. SWAP's should be constantly re-evaluated and revised. Planners know that it is not the plan that is the most valuable product of any planning effort. It is the planning process itself. The inventory, assessment, pro-active thinking, and collaboration that are part of that process are the real drivers of progress. To that end, the WVDNR is changing its own SWAP planning paradigm to a continuous one. It is the agency's intent to annually update this plan and the CFA plans that flow from

it. That effort will be incorporated in a new federal aid project for the agency. Application for federal aid funds for the new Continuous SWAP Planning Project will be made in 2015 with an anticipated grant start date of January 1, 2016. Annual federal aid reports for the project will contain all of the updated elements of the continuously revised West Virginia State Wildlife Action Plan as well as the proceedings of the annual project review and planning workshop discussed in Section 7.3.2.

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Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog	SH	G5
	<i>Acris crepitans</i> *	Northern Cricket Frog	S2	G5
	<i>Ambystoma barbouri</i> *	Streamside Salamander	S1	G4
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Ambystoma texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Gyrinophilus subterraneus</i> *	West Virginia Spring Salamander	S1	G1
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5

Sunday, August 30, 2015

Page 1 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus</i> *	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad	S1	G5

Sunday, August 30, 2015

Page 2 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Accipiter gentilis</i> *	Northern Goshawk	S1B,S1N	G5
	<i>Actitis macularius</i> *	Spotted Sandpiper	S2B	G5
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Ammodramus henslowii</i> *	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes</i> *	American Black Duck	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos</i> *	Golden Eagle	S3N	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Asio flammeus</i>	Short-eared Owl	S2N	G5
	<i>Asio otus</i> *	Long-eared Owl	S1B,S1N	G5
	<i>Bartramia longicauda</i> *	Upland Sandpiper	S1B,S1N	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Botaurus lentiginosus</i> *	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	S3B	G5
	<i>Carduelis pinus</i>	Pine Siskin	S2B,S4N	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Catharus ustulatus</i>	Swainson's Thrush	S3B	G5

Sunday, August 30, 2015

Page 3 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Chordeiles minor</i> *	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Empidonax flaviventris</i>	Yellow-bellied Flycatcher	SHB	G5
	<i>Empidonax minimus</i>	Least Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Euphagus carolinus</i>	Rusty Blackbird	S1N	G4
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5

Sunday, August 30, 2015

Page 4 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<i>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Lanius ludovicianus</i> *	Loggerhead Shrike	S1B,S1N	G4
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler	S3B	G4
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia</i> *	Bank Swallow	S2B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis</i> *	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5

Sunday, August 30, 2015

Page 5 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

Sunday, August 30, 2015

Page 6 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Acronicta dolli</i> *	Doll's Merolonche	SH	G3G4
	<i>Aplectoides condita</i>	A Noctuid Moth	S1	G4
	<i>Atrytonopsis hianna</i> *	Dusted Skipper	S1	G4G5
	<i>Autochton cellus</i> *	Golden-banded Skipper	S1S2	G4
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Brachionycha borealis</i> *	Boreal Fan Moth	S1	G4
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Callophrys irus</i> *	Frosted Elfin	S1	G3
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Catocala dulciola</i> *	Sweet Underwing	SU	G3
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing	SU	G3T3
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Cerastis salicarum</i>	Willow Dart Moth	S1	G5
	<i>Chaetagnaea cerata</i> *	Waxed Sallow Moth	S1	G3G4
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Colias interior</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Eilema bicolor</i>	Bicolored Moth	S1	G5

Sunday, August 30, 2015

Page 7 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis lucilius</i> *	Columbine Duskywing	S2	G4
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Euchlaena effecta</i>	Effective Euchaena Moth	S1	G5
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Euphyes conspicua</i>	Black Dash	S1	G4
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hadena ectypa</i> *	Starry Champion Moth	S1	G3G4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Lophocampa maculata</i> *	Spotted Tussock Moth	S1	G5
	<i>Lycaena epixanthe</i>	Bog Copper	S1	G4G5
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Melanchnra assimilis</i>	Black Arches	S1	G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5TNR

Sunday, August 30, 2015

Page 8 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma	S1	G5T3
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth	SH	G4
	<i>Pyrgus wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak	S2	G4
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Satyrium favonius ontario</i>	Northern Hairstreak	S1S2	G4T4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Speyeria diana</i> *	Diana Fritillary	S2S3	G3G4
	<i>Speyeria idalia</i> *	Regal Fritillary	SH	G3
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5
	<i>Zale calycanthata</i> *	Double-banded Zale	SU	G4

Sunday, August 30, 2015

Page 9 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Anthrobia coylei</i>	Spider	S2	G2?
	<i>Antrolana lira</i> *	Madison Cave Isopod	S1	G2G4
	<i>Apochthonius paucispinosus</i> *	Dry Fork Valley Cave Pseudoscorpion	S1	G1
	<i>Arrhopalites commorus</i> *	A Collembola	S1	G2G3
	<i>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G3?
	<i>Arrhopalites sacer</i> *	A Collembola	S1	G2
	<i>Arrhopalites sp. 3</i> *	A Collembola	S1	G1
	<i>Bathyphantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2
	<i>Caecidotea franzi</i> *	Franz's Cave Isopod	S1	G2G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Caecidotea pricei</i> *	Price's Cave Isopod	S1	G5
	<i>Caecidotea scypha</i> *	An Isopod	S1	G1G2
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1
	<i>Chitrella regina</i> *	Royal Syarinid Pseudoscorpion	S1	G1
	<i>Conotyla vista</i> *	A Cave Millipede	SH	GH
	<i>Crangonyx sp. 2</i> *	An Amphipod	S2	G2
	<i>Erebomaster nr. acanthina</i>	A Cave Spider	S2	GNR
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<i>Geocentrophora cavernicola</i> *	Cave Flatworm	SH	G1G2

Sunday, August 30, 2015

Page 10 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Haplotaxis brinkhursti</i> *	An Oligochaete	S1	G1
	<i>Horologion speokites</i>	Arbuckle Cave Ground Beetle	SH	GH
	<i>Islandiana sp. 1</i> *	A Spider	S1	G1
	<i>Islandiana speophila</i> *	Cavern Sheet-web Spider	S1	G1
	<i>Kleptochthonius henroti</i> *	Greenbrier Valley Cave Pseudoscorpion	S1	G2
	<i>Kleptochthonius hetricki</i> *	Organ Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius orpheus</i> *	Orpheus Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius proserpinae</i> *	Proserpina Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi</i> *	Diplura	S2	G2G3
	<i>Litocampa sp. 1</i> *	Diplura	S1	G1
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Nesticus tennesseensis</i> *	A Cave Spider	SU	G3G4
	<i>Onychiurus janus</i> *	A Cave Springtail	S1	G2G3
	<i>Phagocata angusta</i> *	A Cave Planarian	S1	G1
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Poecilophysis weyerensis</i> *	A Cave Mite	S1	G3?
	<i>Poecilophysis wolmsdorfensis</i> *	A Cave Mite	SH	G4?
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus grandis elevatus</i> *	A Cave Beetle	S1	G3T1

Sunday, August 30, 2015

Page 11 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Pseudanophthalmus grandis grandis</i> *	A Cave Beetle	S3	G4T4
	<i>Pseudanophthalmus grandis ssp. 1</i> *	A Cave Beetle	S1	G3TNR
	<i>Pseudanophthalmus hadenoecus</i> *	Timber Ridge Cave Beetle	S1	G1
	<i>Pseudanophthalmus henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus higginbothami</i> *	A Cave Beetle	S2	G2
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G3
	<i>Pseudanophthalmus lallemanti</i> *	Lallemant's Cave Beetle	S1	G1
	<i>Pseudanophthalmus montanus</i> *	Dry Fork Valley Cave Beetle	S1	G1
	<i>Pseudanophthalmus orthosulcatus</i> *	A Cave Beetle	S1	G1
	<i>Pseudanophthalmus potomaca</i> *	South Branch Valley Cave Beetle	S1	G3G4
	<i>Pseudanophthalmus senecae</i> *	Seneca Cave Beetle	S1	G1
	<i>Pseudanophthalmus sp. 1</i> *	A Beetle	S1	G1
	<i>Pseudanophthalmus sp. 2</i> *	A Beetle	S1	G1
	<i>Pseudanophthalmus sp. 3</i> *	A Beetle	S1	G1
	<i>Pseudosinella certa</i> *	Gandy Creek Cave Springtail	S1	G1
	<i>Pseudosinella gisini gisini</i> *	A Cave Springtail	S3	G3G4T3
	<i>Pseudosinella orba</i> *	A Cave Springtail	S1	G3G4
	<i>Pseudosinella sp. 8</i> *	A Springtail	S2	G2
	<i>Pseudosinella testa</i> *	Shelled Cave Springtail	S1	G2G3
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G3
	<i>Pseudotremia lusciosa</i> *	Germany Valley Cave Millipede	S1	G1

Sunday, August 30, 2015

Page 12 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Pseudotremia princeps</i> *	South Branch Valley Cave Millipede	S1	G1
	<i>Pseudotremia sp. 1</i> *	General Davis Cave Millipede	S1	G1?
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella agna</i> *	A Springtail	S3	G3G4
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Sphalloplana culveri</i> *	Culver's Planarian	S1	G1
	<i>Sphalloplana percoeca</i> *	A Cave Planarian	S1	G5
	<i>Stygobromus allegheniensis</i> *	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus biggersi</i> *	Biggers' Cave Amphipod	S1	G2G4
	<i>Stygobromus cooperi</i> *	Cooper's Cave Amphipod	S1	G1G2
	<i>Stygobromus culveri</i> *	Culver's Cave Amphipod	S1	G1G2
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus gracilipes</i> *	Shenandoah Valley Cave Amphipod	S1	G3G4
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod	S2	G5
	<i>Stygobromus morrisoni</i> *	Morrison's Cave Amphipod	S1	G2G3
	<i>Stygobromus nanus</i> *	Pocahontas Cave Amphipod	S1	G1
	<i>Stygobromus parvus</i> *	Minute Cave Amphipod	S1	G2G3
	<i>Stygobromus pollostus</i> *	An Amphipod	S1	G2G3
	<i>Stygobromus redactus</i> *	An Amphipod	S1	G1
	<i>Stygobromus spinatus</i> *	Spring Cave Amphipod	S2	G2G3

Sunday, August 30, 2015

Page 13 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Stygobromus tenuis potomacus*</i>	Potomac Groundwater Amphipod	S1	G4T4
	<i>Stylodrilus beattiei*</i>	A Cave Lumbriculid Worm	S1	G2G3
	<i>Trichodrilus culveri*</i>	An Oligochaete	S1	G1
	<i>Zygonopus krekeleri*</i>	West Virginia Blind Cave Millipede	S1	G4
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4
	<i>Zygonopus weyerienseis*</i>	Grand Caverns Blind Cave Millipede	S2	G3G4
	<i>Zygonopus whitei*</i>	Luray Caverns Blind Cave Millipede	S1	G3G4

Sunday, August 30, 2015

Page 14 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus callainus</i> *	Big Sandy Crayfish	S1	GNR
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus dubius A</i> *	Teays Valley Mudbug	S2	GNR
	<i>Cambarus dubius B</i> *	Meadow River Mudbug	S2	GNR
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus hatfieldi</i> *	Tug Valley Crayfish	S2	GNR
	<i>Cambarus nerterius</i> *	Greenbrier Cave Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	G2
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR
	<i>Cambarus veteranus</i> *	Guyandotte River Crayfish	S1	G1
	<i>Fallicambarus fodiens</i> *	Digger Crayfish	S1	G5
	<i>Procambarus acutus</i> *	White River Crayfish	S1	G5

Sunday, August 30, 2015

Page 15 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Argia bipunctulata</i> *	Seepage Dancer	S1	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Enallagma vernale</i>	Vernal Bluet	S1	G4Q
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Epitheca canis</i>	Beaverpond Baskettail	S3	G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4

Sunday, August 30, 2015

Page 16 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Gomphus fraternus*</i>	Midland Clubtail	S2	G5
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi*</i>	Sable Clubtail	S1	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons*</i>	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Hetaerina titia</i>	Smoky Rubyspot	S1	G5
	<i>Ischnura kellicotti</i>	Lilypad Forktail	S1	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lanthus vernalis*</i>	Southern Pygmy Clubtail	S1	G4
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Lestes disjunctus</i>	Northern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Leucorrhinia glacialis*</i>	Crimson-ringed Whiteface	S1	G5
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4

Sunday, August 30, 2015

Page 17 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Nehalennia gracilis*</i>	Sphagnum Sprite	S1	G5
	<i>Neurocordulia molesta</i>	Smoky Shadowdragon	S2	G4
	<i>Neurocordulia obsoleta</i>	Umber Showdragon	S1	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus carolus*</i>	Riffle Snaketail	S2	G5
	<i>Ophiogomphus incurvatus alleghaniensis*</i>	Appalachian Snaketail	SH	G3T2T3
	<i>Ophiogomphus mainensis fastigiatus*</i>	Maine Snaketail	S3	G4TU
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5
	<i>Rhionaeschna mutata*</i>	Spatardock Darner	S1	G4
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Somatochlora forcipata</i>	Forcipate Emerald	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus notatus*</i>	Elusive Clubtail	S1S2	G3
	<i>Stylurus plagiatus</i>	Russet-tipped Clubtail	SH	G5
	<i>Stylurus scudderii*</i>	Zebra Clubtail	SH	G4
	<i>Stylurus spiniceps*</i>	Arrow Clubtail	S2	G5
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5

Sunday, August 30, 2015

Page 18 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Telebasis byersi</i>	Duckweed Firetail	S1	G5
	<i>Tamea carolina</i>	Carolina Saddlebags	S3	G5
	<i>Tamea onusta</i>	Red Saddlebags	S1	G5

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta clara</i> *	Western Sand Darter	S1	G3
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G4
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpionodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpionodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Catostomus catostomus</i>	Longnose Sucker	SX	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Cottus sp. 1</i> *	Bluestone Sculpin	S1	G2
	<i>Cottus sp. c.f. cognatus</i> *	Checkered Sculpin	S1	G1*
	<i>Crystallaria cincotta</i> *	Diamond Darter	S1	G1
	<i>Cycleptus elongatus</i> *	Blue Sucker	S1	G3G4
	<i>Cyprinella analostana</i> *	Satinfin Shiner	S1	G5
	<i>Erimystax dissimilis</i>	Streamline Chub	S4	G4
	<i>Erimystax x-punctatus</i>	Gravel Chub	S1	G4
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Esox americanus vermiculatus</i>	Grass Pickerel	S1S2	G5T5
	<i>Etheostoma longimanum</i> *	Longfin Darter	S1	G4

Sunday, August 30, 2015

Page 20 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2G3
	<i>Etheostoma olmstedii</i> *	Tessellated Darter	S1S2	G5
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter	S2	G3G4
	<i>Exoglossum laurae</i> *	Tonguetied Minnow	S2	G4
	<i>Exoglossum maxillingua</i>	Cutlip Minnow	S4	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	S1	G5
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon fossor</i> *	Northern Brook Lamprey	S1	G4
	<i>Ichthyomyzon greeleyi</i> *	Mountain Brook Lamprey	S1	G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	S1	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lepomis humilis</i> *	Orangespotted Sunfish	S1	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Lythrurus umbratilis</i> *	Redfin Shiner	S3	G5

Sunday, August 30, 2015

Page 21 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Margariscus margarita</i> *	Pearl Dace	S2S3	G4
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis boops</i> *	Bigeye Shiner	S1	G5
	<i>Notropis burchanani</i>	Ghost Shiner	S3	G5
	<i>Notropis procne</i> *	Swallowtail Shiner	S1	G5
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Noturus eleutherus</i>	Mountain Madtom	S2	G4
	<i>Noturus stigmosus</i> *	Northern Madtom	S1	G3
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina evides</i>	Gilt Darter	S2	G4
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Percina notogramma</i> *	Stripeback Darter	S1	G4
	<i>Percina oxyrhynchus</i>	Sharpnose Darter	S4	G4
	<i>Percina peltata</i> *	Shield Darter	S1	G5

Sunday, August 30, 2015

Page 22 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Percina phoxocephala</i>	Slenderhead Darter	S1	G5
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Percina shumardi</i>	River Darter	S1	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Phenacobius teretulus*</i>	Kanawha Minnow	S1	G3G4
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5
	<i>Polyodon spathula</i>	Paddlefish	S1	G4
	<i>Salvelinus fontinalis*</i>	Brook Trout	S5	G5
	<i>Scaphirhynchus platorynchus</i>	Shovelnose Sturgeon	S1	G4
	<i>Thoburnia rhotroeca</i>	Torrent Sucker	S3	G4
	<i>Umbra limi</i>	Central Mudminnow	S1	G5

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G3G4T2
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Erethizon dorsatum</i>	Porcupine	S3	G5
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel	S2	G5T2
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Lasiurus borealis</i> *	Eastern Red Bat	S4	G5
	<i>Lasiurus cinereus</i> *	Hoary Bat	S3	G5
	<i>Lasiurus seminolus</i>	Seminole Bat	S1	G5
	<i>Lepus americanus</i>	Snowshoe Hare		G5
	<i>Microtus chrotorrhinus carolinensis</i> *	Southern Rock Vole	S2	G4T3
	<i>Microtus ochrogaster</i>	Prairie Vole	S3	G5
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis lucifugus</i> *	Little Brown Bat	S2*	G3G4
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Nycticeius humeralis</i>	Evening Bat	S1	G5
	<i>Ochrotomys nuttalli</i> *	Golden Mouse	S2	G5
	<i>Perimyotis subflavus</i> *	Tricolored Bat	S2*	G3G4

Sunday, August 30, 2015

Page 24 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse	SH	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Sorex palustris punctulatus*</i>	Southern Water Shrew	S1	G5T3
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Alasmidonta marginata</i> *	Elktoe	S1	G4
	<i>Alasmidonta undulata</i> *	Triangle Floater	S1	G4
	<i>Alasmidonta varicosa</i> *	Brook Floater	S2	G3
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Ellipsaria lineolata</i>	Butterfly	S2	G4G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell	S1	G2T2
	<i>Epioblasma triquetra</i> *	Snuffbox	S2	G3
	<i>Fusconaia ebena</i> *	Ebonyshell	S3	G4G5
	<i>Fusconaia flava</i>	Wabash Pigtoe	S1	G5
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5

Sunday, August 30, 2015

Page 26 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lampsilis radiata*</i>	Eastern Lampmussel	S1	G5
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Lasmigona complanata</i>	White Heelsplitter	S3	G5
	<i>Lasmigona compressa*</i>	Creek Heelsplitter	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5
	<i>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria olivaria</i>	Hickorynut	S1	G4
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G1G2
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema cordatum</i>	Ohio Pigtoe	S2	G4
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell	S3	G4G5

Sunday, August 30, 2015

Page 27 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Pyganodon cataracta</i>	Eastern Floater	S2	G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula nodulata</i>	Wartyback	S1	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa iris</i>	Rainbow	S2	G5Q
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

Sunday, August 30, 2015

Page 28 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Other Invertebrates				
	<i>Allocapnia frumi</i>	A Stonefly	S2	G2
	<i>Alloperla aracoma</i>	A Stonefly	S1	G3
	<i>Alloperla biserrata</i>	A Stonefly	S1	G3
	<i>Chrosiothes jenningsi*</i>	A Spider	S1	G1
	<i>Diploperla kanawholensis</i>	Little Kanawha Perlodid Stonefly	S1	G3
	<i>Hansonoperla appalachia</i>	Hanson's Appalachian Stonefly	S2	G3
	<i>Hansonoperla hokolessqua</i>	A Stonefly	S1	G2
	<i>Megaleuctra flinti</i>	A Stonefly	S1	G2
	<i>Ostrocerca complexa</i>	A Stonefly	S1	G4
	<i>Ostrocerca prolongata</i>	A Stonefly	S1	G3
	<i>Sweltsa pocahontas</i>	A Stonefly	S2	G2
	<i>Utaperla gaspesiana</i>	A Stonefly	S1	G3

Sunday, August 30, 2015

Page 29 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Agalinis auriculata</i>	Earleaf False Foxglove	SH	G3
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Agrostis mertensii</i>	Northern Bentgrass	S1	G5
	<i>Allium allegheniense</i> *	Allegheny Onion	S2	G3?
	<i>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Amelanchier bartramiana</i>	Oblong-fruit Serviceberry	S2	G5
	<i>Amorpha fruticosa</i>	Tall Indigobush	S2S3	G5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Andromeda polifolia</i> var. <i>glaucophylla</i>	Bog-rosemary	S1	G5T5
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arctostaphylos uva-ursi</i>	Kinniinnick	S1	G5

Sunday, August 30, 2015

Page 30 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aristida purpurascens</i> var. <i>purpurascens</i>	Arrowfeather Three-awn	S1	G5T5
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Asclepias hirtella</i>	Green Milkweed	S2	G5
	<i>Asplenium septentrionale</i>	Forked Spleenwort	S2	G4G5
	<i>Astilbe biternata</i>	Appalachian False Goat's-beard	SH	G4G5
	<i>Astragalus distortus</i> var. <i>distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Astranthium integrifolium</i> ssp. <i>integrifolium</i>	Daisy	S1	G5TNR
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Bartonia paniculata</i> ssp. <i>paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Bolboschoenus fluviatilis</i>	River Bulrush	S1	G5
	<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lanceolate Grapefern	S1	G5T4
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calamagrostis stricta</i> ssp. <i>stricta</i> var. <i>stricta</i>	Reedgrass	S1	G5T5
	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Calycanthus floridus</i> var. <i>glaucus</i>	Eastern Sweetshrub	SH	G5T5

Sunday, August 30, 2015

Page 31 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Campylopus flexuosus</i>	Campylopus Moss	S1	G5?
	<i>Cardamine flagellifera var. flagellifera*</i>	Bittercress	S2	G3
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Carex albolutescens</i>	Greenish-white Sedge	S1	G5
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex aquatilis var. substricta</i>	Water Sedge	S1	G5T5
	<i>Carex arctata</i>	Drooping Woodland Sedge	S1	G5
	<i>Carex atherodes</i>	Awned Sedge	S1	G5
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex bushii</i>	Bush's Sedge	S2S3	G4
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex canescens</i>	Silvery Sedge	S3	G5
	<i>Carex careyana*</i>	Carey's Sedge	S1	G4G5
	<i>Carex cephaloidea</i>	Thinleaf Sedge	S1	G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex conoidea</i>	Field Sedge	S1	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex davisii*</i>	Davis' Sedge	S1	G4

Sunday, August 30, 2015

Page 32 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex deflexa</i>	Northern Sedge	S1	G5
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex haydenii</i>	Cloud Sedge	S1	G5
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex interior</i>	Inland Sedge	S1	G5
	<i>Carex kraliana</i>	Kral's Sedge	S1	G5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex lasiocarpa</i> var. <i>americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex lucorum</i> var. <i>australucorum</i> *	Blue Ridge Sedge	S1	G4T3T4
	<i>Carex lupuliformis</i> *	False Hop Sedge	S1	G4
	<i>Carex manhartii</i> *	Manhart's Sedge	S1	G3G4
	<i>Carex meadii</i> *	Mead's Sedge	S1	G4G5
	<i>Carex mesochorea</i>	Midland Sedge	S2	G4G5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex molestiformis</i>	Frightful Sedge	S2	G4
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex novae-angliae</i>	New England Sedge	S1	G5
	<i>Carex oligosperma</i> var. <i>oligosperma</i>	Fewseed Sedge	S1	G5T5

Sunday, August 30, 2015

Page 33 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex pauciflora</i>	Few-flower Sedge	S1	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex polymorpha*</i>	Variable Sedge	S1	G3
	<i>Carex prairea</i>	Prairie Sedge	S1	G5
	<i>Carex projecta</i>	Necklace Sedge	S3	G5
	<i>Carex purpurifera*</i>	Purple Sedge	S1	G4?
	<i>Carex roanensis*</i>	Roan Mountain Sedge	S2	G2G3
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex straminea</i>	Straw Sedge	S2	G5
	<i>Carex styloflexa*</i>	Bent Sedge	S1	G4G5
	<i>Carex suberecta*</i>	Prairie Straw Sedge	S1	G4
	<i>Carex tetanica*</i>	Rigid Sedge	S1	G4G5
	<i>Carex tonsa var. rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex tonsa var. tonsa</i>	Shaved Sedge	S1	G5T5
	<i>Carex trichocarpa*</i>	Hairy-fruit Sedge	S1	G4
	<i>Carex tuckermanii*</i>	Tuckerman's Sedge	S1	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Carex utriculata</i>	Beaked Sedge	S3	G5
	<i>Carex vesicaria</i>	Inflated Sedge	S2	G5

Sunday, August 30, 2015

Page 34 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Ceanothus herbaceus</i>	Prairie Redroot	S1	G5
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort	S1	G4?
	<i>Chamaesyce vermiculata</i>	Hairy Spurge	S2	G5
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Chenopodium standleyanum</i>	Standley's Goosefoot	S2	G5
	<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock	S1	G5
	<i>Cleistis bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Commelina erecta</i>	Slender Dayflower	S2	G5T5
	<i>Coptis trifolia</i>	Threeleaf Goldthread	S2	G5
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G2
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Corallorhiza trifida</i>	Early Coralroot	S1	G5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5

Sunday, August 30, 2015

Page 35 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Crataegus pringlei</i>	Pringle's Hawthorn	SH	G5
	<i>Crataegus spathulata</i>	Littlehip Haw	S1	G5
	<i>Croton glandulosus var. septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5
	<i>Cuscuta indecora var. neuropetala</i>	Dodder	S1	G5T5
	<i>Cuscuta rostrata</i>	Beaked Dodder	S2	G4
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5
	<i>Cypripedium reginae*</i>	Showy Lady's-slipper	S1	G4
	<i>Dalibarda repens</i>	Robin-run-away	S3	G5
	<i>Danthonia sericea</i>	Silky Oatgrass	S1?	G5?
	<i>Dasistoma macrophylla</i>	Mullein Foxglove	S2	G4
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Delphinium exaltatum*</i>	Tall Larkspur	S2	G3
	<i>Descurainia pinnata ssp. brachycarpa</i>	Tansy Mustard	SH	G5T5
	<i>Desmodium lineatum</i>	Tick-trefoil	S1	G5
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil	S1	G5
	<i>Diarrhena obovata*</i>	Twin Grass	S1	G4G5
	<i>Dichanthelium acuminatum ssp. acuminatum</i>	Hairy Panicgrass	S1	G5T5

Sunday, August 30, 2015

Page 36 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Dichanthelium acuminatum ssp. columbianum</i>	District Of Columbia Panicgrass	S1	G5T5
	<i>Dichanthelium boreale</i>	Panicgrass	S1	G5
	<i>Dichanthelium meridionale</i>	Matting Witchgrass	S3	G5
	<i>Dichanthelium scoparium</i>	Broom Witchgrass	SH	G5
	<i>Dichanthelium xanthophysum</i>	Panicgrass	SH	G5
	<i>Digitaria filiformis</i>	Slender Crabgrass	S1	G5
	<i>Drosera rotundifolia var. rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Dryopteris celsa</i>	Log Fern	SH	G4
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis elliptica</i>	Elliptic Spikerush	S1	G5
	<i>Eleocharis engelmannii*</i>	Engelmann's Spikerush	S1	G4G5
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Eleocharis quadrangulata</i>	Squarestem Spikerush	S2	G4
	<i>Eleocharis rostellata</i>	Beaked Spikerush	S1	G5
	<i>Elodea nuttallii</i>	Western Waterweed	S3	G5
	<i>Elymus trachycaulus ssp. trachycaulus</i>	Slender Wild Rye	S2	G5T5
	<i>Enemion biternatum</i>	Eastern False Rue-anemone	S1	G5
	<i>Equisetum fluviatile</i>	Water Horsetail	S2	G5
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	S1	G5
	<i>Eragrostis hirsuta</i>	Big-top Lovegrass	SH	G5

Sunday, August 30, 2015

Page 37 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Erysimum capitatum</i> var. <i>capitatum</i>	Western Wallflower	S1	G5T5
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort	S2S3	G4
	<i>Eupatorium hyssopifolium</i> var. <i>hyssopifolium</i>	Hyssopleaf Thoroughwort	S1	G5T5
	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i> *	Hyssopleaf Thoroughwort	S1	G5T4T5
	<i>Eupatorium maculatum</i> var. <i>maculatum</i>	Spotted Joe-pyeweed	S1	G5T5
	<i>Eupatorium pilosum</i>	Rough Boneset	S2	G5
	<i>Euphorbia pubentissima</i>	False Flowering Spurge	S1	G5
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Fimbristylis annua</i>	Annual Fimbry	S1	G5
	<i>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Fraxinus quadrangulata</i>	Blue Ash	S1	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	S3	G5
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gaylussacia dumosa</i>	Dwarf Huckleberry	S1	G5
	<i>Gentiana alba</i> *	Yellow Gentian	S1	G4
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Gentianopsis crinita</i>	Greater Fringed Gentian	S1	G5
	<i>Geum aleppicum</i>	Yellow Avens	S1	G5
	<i>Geum rivale</i>	Purple Avens	S1	G5

Sunday, August 30, 2015

Page 38 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria grandis</i> var. <i>grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gratiola viscidula</i> *	Short's Hedgehyssop	S1	G4G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Gymnopogon ambiguus</i> *	Bearded Skeleton Grass	S1	G4
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Helianthemum bicknellii</i>	Hoary Frostweed	S1	G5
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<i>Helianthemum propinquum</i> *	Low Frostweed	S1	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Helianthus occidentalis</i> ssp. <i>occidentalis</i>	Western Sunflower	S2	G5T5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hierochloe hirta</i> ssp. <i>arctica</i>	Holy Grass, Sweetgrass	S1	G5T5

Sunday, August 30, 2015

Page 39 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Hottonia inflata*</i>	Featherfoil	S1	G4
	<i>Hudsonia tomentosa var. tomentosa</i>	False Heather	S1	G5T5
	<i>Huperzia porophila*</i>	Rock Clubmoss	S1	G4
	<i>Hydrocotyle ranunculoides</i>	Swamp Pennywort	S2	G5
	<i>Hypericum adpressum</i>	Creeping St. John's-wort	SH	G3
	<i>Hypericum drummondii</i>	Nits-and-lice	S1	G5
	<i>Hypericum mitchellianum*</i>	Blue Ridge St. John's-wort	S1	G3
	<i>Hypericum virgatum*</i>	Sharpleaf St. John's-wort	S1	G4?
	<i>Ilex collina*</i>	Hill Holly	S2	G3
	<i>Isoetes riparia var. riparia</i>	Shore Quillwort	SH	G5T5?Q
	<i>Isoetes valida*</i>	True Quillwort	S1	G4?
	<i>Isotria medeoloides*</i>	Small Whorled Pogonia	S1	G2?
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus articulatus</i>	Jointleaf Rush	S2	G5
	<i>Juncus balticus var. littoralis</i>	Baltic Rush	S1	G5T5
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus brachycarpus</i>	Short-fruit Rush	SH	G4G5
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5
	<i>Juncus nodosus var. nodosus</i>	Knotted Rush	S1S2	G5T5?
	<i>Juncus scirpoides</i>	Needle-pod Rush	S2	G5

Sunday, August 30, 2015

Page 40 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Juncus torreyi</i>	Torrey's Rush	S2	G5
	<i>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Larix laricina</i>	Tamarack	S1	G5
	<i>Lechea minor</i>	Thymeleaf Pinweed	S1	G5
	<i>Lechea pulchella</i> var. <i>pulchella</i>	Pinweed	SH	G5T4
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Leucothoe recurva</i> *	Red-twig Doghobble	S1	G4G5
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Liatris squarrulosa</i> *	Appalachian Gayfeather	S1	G4G5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Lilium philadelphicum</i> var. <i>philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Lindernia dubia</i> var. <i>anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Linnaea borealis</i> ssp. <i>americana</i>	Twinflower	S1	G5T5
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax	S2	G5T5
	<i>Linum sulcatum</i> var. <i>sulcatum</i>	Grooved Yellow Flax	S1	G5T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera cordata</i> var. <i>cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lobelia kalmii</i>	Ontario Lobelia	S1	G5

Sunday, August 30, 2015

Page 41 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lonicera canadensis</i>	Fly Honeysuckle	S2	G5
	<i>Ludwigia leptocarpa</i>	River Seedbox	S2	G5
	<i>Ludwigia polycarpa</i> *	Top-pod Primrose-willow	S1	G4
	<i>Lupinus perennis ssp. perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5
	<i>Lycopodiella alopecuroides</i>	Foxtail Clubmoss	S1	G5
	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss	S2	G5
	<i>Lycopodium lagopus</i>	One-cone Groundpine	S1	G5
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Lysimachia quadriflora</i>	Four-flower Loosestrife	S1	G5?
	<i>Lysimachia thysiflora</i>	Water Loosestrife	S1	G5
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Lythrum alatum var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Malaxis bayardii</i>	Bayard Long's Adder's Mouth	SH	G1G2
	<i>Manfreda virginica</i>	Eastern Agave	S1	G5
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5

Sunday, August 30, 2015

Page 42 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Melica nitens</i>	Three-flower Melicgrass	S1	G5
	<i>Melothria pendula</i> var. <i>pendula</i>	Creeping Cucumber	S1	G5?T5?
	<i>Menyanthes trifoliata</i>	Buckbean	S1	G5
	<i>Minuartia groenlandica</i>	Greenland Stitchwort	S1	G5
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1T2
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<i>Muhlenbergia capillaris</i> var. <i>capillaris</i>	Hair-awn Muhly	S1	G5T5?
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Myriophyllum pinnatum</i>	Cutleaf Water-milfoil	S1	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue	SH	G5
	<i>Oryzopsis asperifolia</i>	Roughleaf Ricegrass	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera paupercula</i>	Balsam Ragwort	S2	G5
	<i>Packera plattensis</i>	Prairie Ragwort	S1	G5
	<i>Panicum flexile</i>	Wiry Panicgrass	S1	G5
	<i>Panicum verrucosum</i> *	Warty Panicgrass	S1	G4

Sunday, August 30, 2015

Page 43 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus	S1	G3
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paronychia virginica</i>	Yellow Nailwort	S2	G4
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass	S1	G5
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Phacelia covillei</i> *	Phacelia	S1	G3
	<i>Phlox buckleyi</i> *	Swordleaf Phlox	S2	G2
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Pinus resinosa</i>	Red Pine	S1	G5
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass	S1	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Platanthera peramoena</i>	Pride-of-the-peak	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid	S1	G1
	<i>Poa paludigena</i> *	Bog Bluegrass	S1	G3

Sunday, August 30, 2015

Page 44 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Poa saltuensis</i>	Old-pasture Bluegrass	S1	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polemonium vanbruntiae</i> *	Bog Jacob's-ladder	S2	G3G4
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Polygonum careyi</i>	Carey's Smartweed	SH	G4
	<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	Balsam Poplar	S1	G5T5
	<i>Potamogeton illinoensis</i>	Illinois Pondweed	S2	G5
	<i>Potamogeton pulcher</i>	Spotted Pondweed	S1	G5
	<i>Potamogeton pusillus</i> var. <i>tenuissimus</i>	Slender Pondweed	S1	G5T5
	<i>Potamogeton spirillus</i>	Spiral Pondweed	S2	G5
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2G3
	<i>Potamogeton zosteriformis</i>	Flatstem Pondweed	SH	G5
	<i>Prenanthes crepidinea</i> *	Corymbed Rattlesnake-root	S1	G4
	<i>Prosartes maculata</i> *	Yellow Mandarin	S1	G3G4
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Prunus angustifolia</i> var. <i>angustifolia</i> *	Chickasaw Plum	S1	G5T4T5
	<i>Prunus pumila</i> var. <i>depressa</i>	Sand Cherry	S1	G5T5
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Pycnanthemum beadlei</i> *	Beadle's Mountainmint	S1	G2G4

Sunday, August 30, 2015

Page 45 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Pycnanthemum clinopodioides</i>	Basil Mountain-mint	SH	G1G2
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint	S2	G4?
	<i>Pycnanthemum montanum</i>	Thinleaf Mountainmint	SH	G3G5
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Pycnanthemum torrei*</i>	Torrey's Mountain-mint	S1	G2
	<i>Pyrola chlorantha</i>	Green-flower Wintergreen	SH	G5
	<i>Quercus prinoides</i>	Dwarf Chinquapin Oak	S1	G5
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus flammula var. filiformis</i>	Greater Creeping Spearwort	S1	G5T5
	<i>Ranunculus hispidus var. caricetorum</i>	Bristly Buttercup	S1	G5T5
	<i>Ranunculus macounii</i>	Macoun's Buttercup	S1	G5
	<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Ranunculus pusillus var. pusillus*</i>	Low Spearwort	S1	G5T4?
	<i>Ranunculus sceleratus var. sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Ranunculus trichophyllus var. trichophyllus</i>	Threadleaf Water Crowfoot	SH	G5T5
	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	S1S2	G5
	<i>Rhamnus lanceolata ssp. lanceolata*</i>	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Rhexia mariana var. mariana</i>	Maryland Meadowbeauty	S1	G5T5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora fusca*</i>	Brown Beaksedge	S1	G4G5
	<i>Rhynchospora recognita</i>	Beaked Rush	S2	G5?

Sunday, August 30, 2015

Page 46 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Ribes hirtellum</i>	Hairy-stem Gooseberry	S1	G5
	<i>Ribes lacustre</i>	Bristly Black Currant	S2	G5
	<i>Ribes missouriense</i>	Missouri Gooseberry	S1	G5
	<i>Ribes triste</i>	Swamp Red Currant	S1	G5
	<i>Rorippa sessiliflora</i>	Southern Yellow Cress	S1	G5
	<i>Rosa acicularis ssp. sayi</i>	Bristly Rose	S1	G5T5
	<i>Rosa blanda var. blanda</i>	Smooth Rose	S2	G5T5
	<i>Rubus prestonensis</i>	Blackberry	SH	G3
	<i>Rubus pubescens var. pubescens</i>	Dwarf Red Bramble	S1	G5T5
	<i>Rudbeckia fulgida var. fulgida</i>	Orange Coneflower	S2	G5T4?
	<i>Ruellia humilis</i>	Low Wild Petunia	S1	G5
	<i>Ruellia purshiana</i>	Pursh's Wild Petunia	SH	G3
	<i>Sagittaria calycina var. calycina</i>	Long-lobe Arrowhead	S2	G5T5?
	<i>Salix amygdaloides</i>	Peachleaf Willow	S1	G5
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Salix lucida ssp. lucida</i>	Shining Willow	S1	G5T5
	<i>Samolus valerandi ssp. parviflorus</i>	Seaside Brookweed	S2	G5T5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga careyana*</i>	Golden-eye Saxifrage	S3	G3
	<i>Saxifraga caroliniana*</i>	Carolina Saxifrage	S1	G3
	<i>Saxifraga michauxii*</i>	Cliff Saxifrage	S1	G4G5

Sunday, August 30, 2015

Page 47 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Scheuchzeria palustris ssp. americana</i>	Pod Grass	SH	G5T5
	<i>Schizachne purpurascens</i>	False Melicgrass	S1	G5
	<i>Schoenoplectus acutus var. acutus</i>	Hardstem Bulrush	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scirpus ancistrochaetus*</i>	Barbed-bristle Bulrush	S1	G3
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Scleria oligantha</i>	Little-head Nutrush	S1	G5
	<i>Scleria pauciflora var. pauciflora</i>	Nutrush	S1	G5T5?
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Scutellaria galericulata</i>	Hooded Skullcap	S1	G5
	<i>Scutellaria ovata ssp. ovata</i>	Heart-leaved Skullcap	S1	G5T5
	<i>Scutellaria ovata ssp. virginiana</i>	Heart-leaved Skullcap	S1?	G5TNR
	<i>Scutellaria saxatilis*</i>	Rock Skullcap	S2	G3
	<i>Sedum nevii</i>	Nevius' Stonecrop	SH	G3
	<i>Sericocarpus linifolius</i>	Narrowleaf Whitetop Aster	S1	G5
	<i>Sibara virginica</i>	Virginia Cress	S2?	G5
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Sida hermaphrodita*</i>	Virginia Mallow	S3	G3
	<i>Silene caroliniana ssp. wherryi*</i>	Sticky Catchfly	S1	G5T2T4Q

Sunday, August 30, 2015

Page 48 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Silene rotundifolia</i> *	Sandstone Fire-pink	S1	G4
	<i>Silene virginica</i> var. <i>robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Silphium compositum</i> var. <i>reniforme</i> *	Rosinweed	S1	G5T3T5
	<i>Silphium perfoliatum</i> var. <i>connatum</i> *	Cup-plant	S1	G5T3T4
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Solidago patula</i> var. <i>patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Solidago simplex</i> ssp. <i>randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Sparganium angustifolium</i>	Greenfruit Bur-reed	S1S2	G5
	<i>Spermacoce glabra</i> *	Buttonweed	S1	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes lacera</i> var. <i>lacera</i>	Northern Slender Ladies'-tresses	S1	G5T5
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes ovalis</i> var. <i>erostellata</i> *	Oval Ladies'-tresses	S1	G5?T4?
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Spiranthes vernalis</i>	Spring Ladies'-tresses	S3	G5
	<i>Sporobolus clandestinus</i>	Secret Dropseed	S1	G5
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Stachys eplingii</i>	Epling's Hedge-nettle	S1	G5

Sunday, August 30, 2015

Page 49 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stellaria borealis ssp. borealis</i>	Northern Stitchwort	S1	G5T5
	<i>Stenanthium gramineum var. gramineum</i>	Featherbells	S2S3	G4G5T3T5
	<i>Stenanthium gramineum var. micranthum*</i>	Tiny-flower Featherbells	S1	G4G5TNR
	<i>Stenanthium gramineum var. robustum*</i>	Stout Featherbells	S1S2	G4G5T3T5
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<i>Symphyotrichum laeve var. concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Symphyotrichum novi-belgii</i>	New Belgium American-aster	S2S3	G5
	<i>Synandra hispidula*</i>	Guyandotte Beauty	S1	G4
	<i>Taenidia montana*</i>	Mountain-pimpernel	S3	G3
	<i>Talinum teretifolium*</i>	Eastern Fameflower	S1	G4
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thelypteris simulata*</i>	Bog Fern	S1	G4G5
	<i>Thermopsis villosa</i>	Blue-ridge Buckbean	SH	G3?
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Torreyochloa pallida var. fernaldii</i>	Mannagrass	S2	G5T4Q
	<i>Torreyochloa pallida var. pallida</i>	Pale False Mannagrass	S1	G5T5?
	<i>Tortula ammonsiana*</i>	Ammons' Twist Moss	S1	G1G3
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5

Sunday, August 30, 2015

Page 50 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Triadenum walteri</i>	Greater Marsh-st. John's-wort	S1	G5
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel	S1	G5
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trifolium reflexum</i> *	Buffalo Clover	S1	G3G4
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Trillium pusillum</i> var. <i>virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Utricularia geminiscapa</i> *	Hidden-fruit Bladderwort	S1	G4G5
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Utricularia macrorhiza</i>	Greater Bladderwort	S1	G5
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vaccinium oxycoccos</i>	Small Cranberry	S3	G5
	<i>Vernonia glauca</i>	Broad-leaved Ironweed	S1	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5

Sunday, August 30, 2015

Page 51 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Viburnum lentago</i>	Nannyberry	S1S2	G5
	<i>Viburnum opulus var. americanum</i>	Highbush Cranberry	S1	G5T5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola appalachiensis*</i>	Appalachian Blue Violet	S3	G4
	<i>Viola blanda var. palustriformis</i>	Violet	SH	G4G5T4T5
	<i>Viola nephrophylla</i>	Northern Bog Violet	SH	G5
	<i>Viola septentrionalis</i>	Northern Blue Violet	S2	G5
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Vitis rotundifolia var. rotundifolia</i>	Muscadine	SH	G5T5
	<i>Vitis rupestris*</i>	Sand Grape	S2	G3
	<i>Vittaria appalachiana*</i>	Appalachian Shoestring Fern	S1	G4
	<i>Wolffia columbiana</i>	Columbian Watermeal	S1	G5
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5
	<i>Xerophyllum asphodeloides*</i>	Eastern Turkeybeard	S1	G4
	<i>Xyris torta</i>	Slender Yellow-eyed-grass	S2	G5
	<i>Zannichellia palustris</i>	Horned Pondweed	S1	G5
	<i>Zigadenus elegans ssp. glaucus*</i>	Mountain Deathcamas	S1	G5T4T5
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas	S2	G4Q

Sunday, August 30, 2015

Page 52 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone mutica mutica*</i>	Midland Smooth Softshell	S1	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Aspidoscelis sexlineata*</i>	Eastern Six-lined Racerunner	S1	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G3
	<i>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Liochlorophis vernalis*</i>	Smooth Greensnake	S5	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Pantherophis guttatus*</i>	Red Cornsnake	S1	G5
	<i>Pituophis melanoleucus melanoleucus*</i>	Northern Pinesnake	SH	G4T4
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5

Sunday, August 30, 2015

Page 53 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake	S2	G5T3T4
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira clarki</i>	Elfin Tigersnail	S1	GNR
	<i>Anguispira kochi</i>	Banded Tigersnail	S1	G5
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Anguispira stihleri*</i>	Greenbrier Tigersnail	S1	GNR
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail	S2	G5
	<i>Carychium exiguum</i>	Obese Thorn	S3	G5
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Discus catskillensis</i>	Angular Disk	S2	G5
	<i>Discus whitneyi</i>	Forest Disc	S2	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Euconulus polygyratus</i>	Fat Hive	S1	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Fontigens turritella*</i>	Greenbrier Cavesnail	S1	G1
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Gastrocopta procera</i>	Wing Snaggletooth	S2	G5
	<i>Gastrocopta tappaniana</i>	White Snaggletooth	S3	G5
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth	S2	G3G4
	<i>Gastrodonta interna</i>	Brown Bellytooth	S3	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Glyphyalinia lewisiana</i>	Pale Glyph	S2	G4

Sunday, August 30, 2015

Page 55 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Glyphyalinia picea</i>	Rust Glyph	S2	G3
	<i>Glyphyalinia praecox</i>	Brilliant Glyph	SH	G4
	<i>Glyphyalinia raderi*</i>	Maryland Glyph Snail	SH	G2
	<i>Glyphyalinia rimula</i>	Tongued Glyph	SH	G3
	<i>Glyphyalinia solida</i>	Imperforate Glyph	SH	G5
	<i>Glyphyalinia sp 1*</i>	West Virginia Glyph	S1	GNR
	<i>Glyphyalinia specus</i>	Hollow Glyph	SH	G4
	<i>Glyphyalinia virginica*</i>	Depressed Glyph	SH	G3
	<i>Hawaiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Helicodiscus shimeki</i>	Temperate Coil	S3	G5
	<i>Helicodiscus triodus*</i>	Talus Coil	SH	G2
	<i>Helicodiscus villosus*</i>	Greenbrier Coil	S1	GNR
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Leptoxis dilatata</i>	Seep Mudalia	SNR	G3
	<i>Lithasia armigera</i>	Armored Rocksnail	SNR	G3G4
	<i>Lucilla scintilla</i>	Oldfield Coil	SH	G4
	<i>Lucilla singleyana</i>	Smooth Coil	S2	G5
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe	S1	GNR
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5

Sunday, August 30, 2015

Page 56 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesodon normalis</i>	Grand Globe	S1	G5
	<i>Mesomphix capnodes</i>	Dusky Button	SH	G5
	<i>Mesomphix luisant*</i>	Glossy Button	S1	G1
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Mesomphix rugeli</i>	Wrinkled Button	S2	G4
	<i>Mesomphix sp. 1 *</i>	Pygmy Button	S1	GNR
	<i>Nesovitrea electrina</i>	Amber Glass	S3	G5
	<i>Oxyloma retusum</i>	Blunt Ambersnail	S1	G5
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Paravitrea ceres*</i>	Sidelong Supercoil	SH	G1
	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	S2	G2
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil	S2	G3
	<i>Paravitrea reesei</i>	Round Supercoil	S2	G3
	<i>Paravitrea seradens</i>	Barred Supercoil	S2	G3
	<i>Paravitrea subtilis</i>	Slender Supercoil	S1	G2
	<i>Patera laevior</i>	Smooth Bladetooth	SH	G4
	<i>Patera pennsylvanica</i>	Proud Globelet	S2	G4
	<i>Philomycus virginicus</i>	Virginia Mantleslug	S2	G3
	<i>Punctum blandianum</i>	Brown Spot	SH	G4
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4

Sunday, August 30, 2015

Page 57 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Pupoides albilabris</i>	White-lip Dagger	S3	G5
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail	SNR	G3
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth	S2	GNR
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis fallax</i>	Mimic Threetooth	S3	G5
	<i>Triodopsis hopetonensis</i>	Magnolia Threetooth	S1	G4G5
	<i>Triodopsis juxtidentis robiniae*</i>	Brush Creek Threetooth	S1	G5TNR
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis platysayoides*</i>	Flat-spined Three-toothed Landsnail	S1	G1
	<i>Triodopsis rugosa*</i>	Buttressed Threetooth	S1	G1
	<i>Triodopsis sp. 1 *</i>	Piney Creek Threetooth	S1	GNR
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia costata</i>	Costate Vallonia	S2	G5

Sunday, August 30, 2015

Page 58 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Vallonia pulchella</i>	Lovely Vallonia	S3	G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens coelaxis</i>	Bidentate Dome	S1	G3
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens lasmodon</i>	Hollow Dome	SH	G4
	<i>Ventridens lawae</i>	Rounded Dome	SH	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens theloides</i>	Copper Dome	SH	G4G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Vertigo clappi</i> *	Cupped Vertigo	SH	G1G2
	<i>Vertigo cristata</i>	Crested Vertigo	S1	G5
	<i>Vertigo elatior</i>	Tapered Vertigo	SH	G5
	<i>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Vertigo oscariana</i>	Capital Vertigo	SH	G4
	<i>Vertigo ovata</i>	Ovate Vertigo	SH	G5
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5
	<i>Vertigo ventricosa</i>	Five-tooth Vertigo	SH	G5

Sunday, August 30, 2015

Page 59 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Vitrina angelicae</i> *	Eastern Glass-snail	S1	G5
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

Sunday, August 30, 2015

Page 60 of 61

* Priority 1 species

Appendix 1: SGCN Species by Taxa and Priority

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5
	<i>Cicindela cursitans</i> *	A Tiger Beetle	S1	G4
	<i>Cicindela formosa generosa</i>	A Tiger Beetle	S1	G5T5
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle	S1	G5
	<i>Cicindela limbalis</i>	A Tiger Beetle	S1	G5
	<i>Cicindela marginipennis</i> *	Cobblestone Tiger Beetle	S1	G2
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle	S2S3	G3
	<i>Cicindela purpurea</i>	A Tiger Beetle	S3	G5
	<i>Cicindela scutellaris</i>	A Tiger Beetle	S1	G5
	<i>Cicindela splendida</i> *	A Tiger Beetle	S1	G5
	<i>Cicindela unipunctata</i>	A Tiger Beetle	S3	G4G5
	<i>Tetracha virginica</i>	Virginia Big-headed Tiger Beetle	S3	G5

Sunday, August 30, 2015

Page 61 of 61

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Acidic Rock Outcrops, Cliffs, and Talus

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Aneides aeneus</i> *	Green Salamander
Birds		
	<i>Falco peregrinus</i> *	Peregrine Falcon
Mammals		
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
Plants		
	<i>Adlumia fungosa</i>	Allegheny-vine
	<i>Asplenium septentrionale</i>	Forked Spleenwort
	<i>Betula papyrifera</i>	Paper Birch
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex aggregata</i>	Glomerate Sedge
	<i>Carex nigromarginata</i>	Black-edge Sedge
	<i>Carex novae-angliae</i>	New England Sedge
	<i>Carex tonsa var. rugosperma</i>	Parachute Sedge
	<i>Carex tonsa var. tonsa</i>	Shaved Sedge
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge
	<i>Danthonia sericea</i>	Silky Oatgrass
	<i>Dichanthelium acuminatum ssp. columbianum</i>	District Of Columbia Panicgrass
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort
	<i>Euphorbia pubentissima</i>	False Flowering Spurge
	<i>Heuchera alba</i> *	White Alumroot
	<i>Heuchera longiflora</i>	Long-flower Alumroot

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Acidic Rock Outcrops, Cliffs, and Talus

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Huperzia porophila</i> *	Rock Clubmoss
	<i>Hypericum drummondii</i>	Nits-and-lice
	<i>Juncus trifidus</i>	Highland Rush
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed
	<i>Lilium michauxii</i> *	Carolina Lily
	<i>Melanelia stygia</i>	Stygian Black-parmelia
	<i>Minuartia groenlandica</i>	Greenland Stitchwort
	<i>Paronychia argyrocoma</i>	Silvery Nailwort
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake
	<i>Pycnanthemum clinopodioides</i>	Basil Mountain-mint
	<i>Rosa acicularis ssp. sayi</i>	Bristly Rose
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage
	<i>Saxifraga caroliniana</i> *	Carolina Saxifrage
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage
	<i>Sedum nevii</i>	Nevius' Stonecrop
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil
	<i>Silene rotundifolia</i> *	Sandstone Fire-pink
	<i>Silene virginica var. robusta</i> *	Fire Pink
	<i>Solidago patula var. patula</i>	Roundleaf Goldenrod
	<i>Thalictrum clavatum</i>	Mountain Meadowrue
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Crotalus horridus</i> *	Timber Rattlesnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Acidic Rock Outcrops, Cliffs, and Talus

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Triodopsis platysayoides*</i>	Flat-spined Three-toothed Landsnail
Tiger Beetles		
	<i>Cicindela unipunctata</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Agriculture

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Anaxyrus fowleri</i>	Fowler's Toad
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad
Birds		
	<i>Chaetura pelagica</i> *	Chimney Swift
	<i>Dolichonyx oryzivorus</i> *	Bobolink
	<i>Eremophila alpestris</i>	Horned Lark
	<i>Falco sparverius</i> *	American Kestrel
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow
	<i>Tyto alba</i> *	Barn Owl
Butterflies and Moths		
	<i>Hadena ectypa</i> *	Starry Campion Moth
	<i>Lycaena hyllus</i> *	Bronze Copper
Mammals		
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Microtus ochrogaster</i>	Prairie Vole
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Ochrotomys nuttalli</i> *	Golden Mouse
	<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake
	<i>Lampropeltis getula</i> *	Eastern Kingsnake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Agriculture

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Pantherophis guttatus*</i>	Red Cornsnake
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle
Snails		
	<i>Ventridens arcellus</i>	Golden Dome
Tiger Beetles		
	<i>Cicindela cursitans*</i>	A Tiger Beetle
	<i>Cicindela formosa generosa</i>	A Tiger Beetle
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle
	<i>Cicindela purpurea</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Anthropogenic Shrubland & Grassland

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Anaxyrus fowleri</i>	Fowler's Toad
Birds		
	<i>Ammodramus henslowii</i> *	Henslow's Sparrow
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow
	<i>Asio flammeus</i>	Short-eared Owl
	<i>Bartramia longicauda</i> *	Upland Sandpiper
	<i>Bonasa umbellus</i> *	Ruffed Grouse
	<i>Chaetura pelagica</i> *	Chimney Swift
	<i>Circus cyaneus</i>	Northern Harrier
	<i>Colinus virginianus</i> *	Northern Bobwhite
	<i>Dolichonyx oryzivorus</i> *	Bobolink
	<i>Eremophila alpestris</i>	Horned Lark
	<i>Falco sparverius</i> *	American Kestrel
	<i>Icteria virens</i> *	Yellow-breasted Chat
	<i>Lanius ludovicianus</i> *	Loggerhead Shrike
	<i>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow
	<i>Pooecetes gramineus</i> *	Vesper Sparrow
	<i>Porzana carolina</i>	Sora
	<i>Scolopax minor</i> *	American Woodcock
	<i>Setophaga discolor</i> *	Prairie Warbler
	<i>Spiza americana</i>	Dickcissel
	<i>Spizella pallida</i>	Clay-colored Sparrow
	<i>Spizella pusilla</i> *	Field Sparrow
	<i>Sturnella magna</i> *	Eastern Meadowlark
	<i>Tyto alba</i> *	Barn Owl
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Anthropogenic Shrubland & Grassland

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler
Butterflies and Moths		
	<i>Atrytonopsis hianna</i> *	Dusted Skipper
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary
	<i>Callophrys irus</i> *	Frosted Elfin
	<i>Calycopis cecrops</i>	Red-banded Hairstreak
	<i>Celastrina serotina</i>	Cherry Gall Azure
	<i>Hadena ectypa</i> *	Starry Campion Moth
	<i>Lycaena hyllus</i> *	Bronze Copper
	<i>Speyeria atlantis</i>	Atlantis Fritillary
	<i>Speyeria diana</i> *	Diana Fritillary
	<i>Speyeria idalia</i> *	Regal Fritillary
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing
Mammals		
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Cryptotis parva</i>	Least Shrew
	<i>Microtus ochrogaster</i>	Prairie Vole
	<i>Ochrotomys nuttalli</i> *	Golden Mouse
	<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse
	<i>Synaptomys cooperi</i>	Southern Bog Lemming
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Reptiles		
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Lampropeltis getula</i> *	Eastern Kingsnake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Pituophis melanoleucus melanoleucus</i> *	Northern Pinesnake
	<i>Scincella lateralis</i>	Little Brown Skink

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Anthropogenic Shrubland & Grassland

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Patera pennsylvanica</i>	Proud Globelet
	<i>Vallonia costata</i>	Costate Vallonia
	<i>Vertigo elatior</i>	Tapered Vertigo
	<i>Vertigo milium</i>	Blade Vertigo
Tiger Beetles		
	<i>Cicindela cursitans</i> *	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Calcareous Cliffs and Talus

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Eurycea lucifuga</i> *	Cave Salamander
Butterflies and Moths		
	<i>Erynnis lucilius</i> *	Columbine Duskywing
	<i>Euchloe olympia</i> *	Olympia Marble
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak
Mammals		
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
Plants		
	<i>Aconitum reclinatum</i> *	White Monkshood
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress
	<i>Campanula rotundifolia</i>	Bluebell Bellflower
	<i>Carex eburnea</i>	Bristleleaf Sedge
	<i>Carex pedunculata</i>	Longstalk Sedge
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake
	<i>Heuchera alba</i> *	White Alumroot
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot
	<i>Paronychia virginica</i>	Yellow Nailwort
	<i>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliffbrake
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass
	<i>Silene virginica</i> var. <i>robusta</i> *	Fire Pink
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Calcareous Cliffs and Talus

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Thuja occidentalis</i>	Northern White-cedar
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss
	<i>Zigadenus elegans ssp. glaucus</i> *	Mountain Deathcamas
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake
	<i>Opheodrys aestivus</i>	Rough Greensnake
Snails		
	<i>Anguispira clarki</i>	Elfin Tigersnail
	<i>Anguispira stihleri</i> *	Greenbrier Tigersnail
	<i>Carychium nannodes</i>	File Thorn
	<i>Gastrocopta procera</i>	Wing Snaggletooth
	<i>Glyphyalinia lewisiana</i>	Pale Glyph
	<i>Glyphyalinia solida</i>	Imperforate Glyph
	<i>Helicodiscus villosus</i> *	Greenbrier Coil
	<i>Hendersonia occulta</i>	Cherrystone Drop
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Mesomphix luisant</i> *	Glossy Button
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Triodopsis platysayoides</i> *	Flat-spined Three-toothed Landsnail
	<i>Triodopsis tennesseensis</i>	Budded Threetooth
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia
	<i>Ventridens collisella</i>	Sculptured Dome
	<i>Ventridens virginicus</i>	Split-tooth Dome

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Caves and Karst

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Eurycea longicauda</i>	Longtail Salamander
	<i>Eurycea lucifuga</i> *	Cave Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
	<i>Gyrinophilus subterraneus</i> *	West Virginia Spring Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
Cave Invertebrates		
	<i>Anthrobia coylei</i>	Spider
	<i>Antrolana lira</i> *	Madison Cave Isopod
	<i>Apochthonius paucispinosus</i> *	Dry Fork Valley Cave Pseudoscorpion
	<i>Arrhopalites commorus</i> *	A Collembola
	<i>Arrhopalites pavo</i> *	A Cave Springtail
	<i>Arrhopalites sacer</i> *	A Collembola
	<i>Arrhopalites sp. 3</i> *	A Collembola
	<i>Bathyphantes weyeri</i>	A Cave Spider
	<i>Caecidotea cannula</i> *	An Isopod
	<i>Caecidotea franzi</i> *	Franz's Cave Isopod
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod
	<i>Caecidotea pricei</i> *	Price's Cave Isopod
	<i>Caecidotea scypha</i> *	An Isopod
	<i>Caecidotea simonini</i> *	An Isopod
	<i>Caecidotea sinuncus</i> *	An Isopod
	<i>Chitrella regina</i> *	Royal Syarinid Pseudoscorpion
	<i>Conotyla vista</i> *	A Cave Millipede
	<i>Crangonyx sp. 2</i> *	An Amphipod
	<i>Erebomaster nr. acanthina</i>	A Cave Spider
	<i>Gammarus minus tenuipes</i>	An Amphipod
	<i>Geocentrophora cavernicola</i> *	Cave Flatworm
	<i>Haplotaxis brinkhursti</i> *	An Oligochaete

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Caves and Karst

TAXA	SCIENTIFIC NAME	COMMON NAME
Cave Invertebrates		
	<i>Horologion speokites</i>	Arbuckle Cave Ground Beetle
	<i>Islandiana sp. 1*</i>	A Spider
	<i>Islandiana speophila*</i>	Cavern Sheet-web Spider
	<i>Kleptochthonius henroti*</i>	Greenbrier Valley Cave Pseudoscorpion
	<i>Kleptochthonius hetricki*</i>	Organ Cave Pseudoscorpion
	<i>Kleptochthonius orpheus*</i>	Orpheus Cave Pseudoscorpion
	<i>Kleptochthonius proserpinae*</i>	Proserpina Cave Pseudoscorpion
	<i>Litocampa fieldingi*</i>	Diplura
	<i>Litocampa sp. 1*</i>	Diplura
	<i>Macrocotyla hoffmasteri*</i>	Hoffmaster's Cave Flatworm
	<i>Nesticus tennesseensis*</i>	A Cave Spider
	<i>Onychiurus janus*</i>	A Cave Springtail
	<i>Phagocata angusta*</i>	A Cave Planarian
	<i>Phanetta subterranea</i>	A Spider
	<i>Poecilophysis extraneostella*</i>	A Cave Mite
	<i>Poecilophysis weyerensis*</i>	A Cave Mite
	<i>Poecilophysis wolmsdorfensis*</i>	A Cave Mite
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle
	<i>Pseudanophthalmus grandis elevatus*</i>	A Cave Beetle
	<i>Pseudanophthalmus grandis grandis*</i>	A Cave Beetle
	<i>Pseudanophthalmus grandis ssp. 1*</i>	A Cave Beetle
	<i>Pseudanophthalmus hadenoecus*</i>	Timber Ridge Cave Beetle
	<i>Pseudanophthalmus henroti</i>	A Cave Beetle
	<i>Pseudanophthalmus higinbothami*</i>	A Cave Beetle
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle
	<i>Pseudanophthalmus lallemanti*</i>	Lallemant's Cave Beetle
	<i>Pseudanophthalmus montanus*</i>	Dry Fork Valley Cave Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Caves and Karst

TAXA	SCIENTIFIC NAME	COMMON NAME
Cave Invertebrates		
	<i>Pseudanophthalmus orthosulcatus</i> *	A Cave Beetle
	<i>Pseudanophthalmus potomaca</i> *	South Branch Valley Cave Beetle
	<i>Pseudanophthalmus senecae</i> *	Seneca Cave Beetle
	<i>Pseudanophthalmus sp. 1</i> *	A Beetle
	<i>Pseudanophthalmus sp. 2</i> *	A Beetle
	<i>Pseudanophthalmus sp. 3</i> *	A Beetle
	<i>Pseudosinella certa</i> *	Gandy Creek Cave Springtail
	<i>Pseudosinella gisini gisini</i> *	A Cave Springtail
	<i>Pseudosinella orba</i> *	A Cave Springtail
	<i>Pseudosinella sp. 8</i> *	A Springtail
	<i>Pseudosinella testa</i> *	Shelled Cave Springtail
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede
	<i>Pseudotremia lusciosa</i> *	Germany Valley Cave Millipede
	<i>Pseudotremia princeps</i> *	South Branch Valley Cave Millipede
	<i>Pseudotremia sp. 1</i> *	General Davis Cave Millipede
	<i>Rhagidia varia</i>	A Cave Mite
	<i>Sinella agna</i> *	A Springtail
	<i>Sinella hoffmani</i>	Hoffman's Springtail
	<i>Sphalloplana culveri</i> *	Culver's Planarian
	<i>Sphalloplana percoeca</i> *	A Cave Planarian
	<i>Stygobromus allegheniensis</i> *	Allegheny Cave Amphipod
	<i>Stygobromus biggersi</i> *	Biggers' Cave Amphipod
	<i>Stygobromus cooperi</i> *	Cooper's Cave Amphipod
	<i>Stygobromus culveri</i> *	Culver's Cave Amphipod
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod
	<i>Stygobromus gracilipes</i> *	Shenandoah Valley Cave Amphipod
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Caves and Karst

TAXA	SCIENTIFIC NAME	COMMON NAME
Cave Invertebrates		
	<i>Stygobromus morrisoni</i> *	Morrison's Cave Amphipod
	<i>Stygobromus nanus</i> *	Pocahontas Cave Amphipod
	<i>Stygobromus parvus</i> *	Minute Cave Amphipod
	<i>Stygobromus pollostus</i> *	An Amphipod
	<i>Stygobromus redactus</i> *	An Amphipod
	<i>Stygobromus spinatus</i> *	Spring Cave Amphipod
	<i>Stygobromus tenuis potomacus</i> *	Potomac Groundwater Amphipod
	<i>Stylodrilus beattiei</i> *	A Cave Lumbriculid Worm
	<i>Trichodrilus culveri</i> *	An Oligochaete
	<i>Zygonopus krekeri</i> *	West Virginia Blind Cave Millipede
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede
	<i>Zygonopus weyeri</i> *	Grand Caverns Blind Cave Millipede
	<i>Zygonopus whitei</i> *	Luray Caverns Blind Cave Millipede
Mammals		
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
Snails		
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Fontigens tartarea</i>	Organ Cavesnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Caves and Karst

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Fontigens turritella*</i>	Greenbrier Cavesnail
	<i>Glyphyalinia specus</i>	Hollow Glyph
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Developed

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander
Birds		
	<i>Chaetura pelagica</i> *	Chimney Swift
	<i>Chordeiles minor</i> *	Common Nighthawk
	<i>Falco peregrinus</i> *	Peregrine Falcon
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow
	<i>Tyto alba</i> *	Barn Owl
Mammals		
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Nycticeius humeralis</i>	Evening Bat
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Carphophis amoenus</i>	Wormsnake
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake
	<i>Scincella lateralis</i>	Little Brown Skink
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Discus whitneyi</i>	Forest Disc
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Mesodon clausus</i>	Yellow Globelet
	<i>Patera laevior</i>	Smooth Bladetooth

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Developed

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Patera pennsylvanica</i>	Proud Globelet
	<i>Pupoides albilabris</i>	White-lip Dagger
	<i>Triodopsis fallax</i>	Mimic Threetooth
	<i>Triodopsis hopetonensis</i>	Magnolia Threetooth
	<i>Vallonia costata</i>	Costate Vallonia
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo ovata</i>	Ovate Vertigo
	<i>Vertigo ventricosa</i>	Five-tooth Vertigo
Tiger Beetles		
	<i>Cicindela formosa generosa</i>	A Tiger Beetle
	<i>Cicindela limbalis</i>	A Tiger Beetle
	<i>Cicindela patruela*</i>	Barrens Tiger Beetle
	<i>Cicindela purpurea</i>	A Tiger Beetle
	<i>Cicindela splendida*</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Calcareous Forests, Woodlands, and Glades

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander
Butterflies and Moths		
	<i>Atrytonopsis hianna</i> *	Dusted Skipper
	<i>Callophrys irus</i> *	Frosted Elfin
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Erynnis lucilius</i> *	Columbine Duskywing
	<i>Erynnis martialis</i> *	Mottled Duskywing
	<i>Euchloe olympia</i> *	Olympia Marble
Mammals		
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
Plants		
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur
	<i>Allium allegheniense</i> *	Allegheny Onion
	<i>Allium oxyphilum</i> *	Nodding Wild Onion
	<i>Arabis serotina</i> *	Shalebarren Rockcress
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch
	<i>Berberis canadensis</i> *	American Barberry
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed
	<i>Campanula rotundifolia</i>	Bluebell Bellflower
	<i>Carex cumberlandensis</i>	Cumberland Sedge

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Calcareous Forests, Woodlands, and Glades

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Carex eburnea</i>	Bristleleaf Sedge
	<i>Carex kraliana</i>	Kral's Sedge
	<i>Carex planispicata</i>	Flat-spiked Sedge
	<i>Carex woodii</i>	Pretty Sedge
	<i>Ceanothus herbaceus</i>	Prairie Redroot
	<i>Cornus rugosa</i>	Roundleaf Dogwood
	<i>Dasistoma macrophylla</i>	Mullein Foxglove
	<i>Delphinium exaltatum</i> *	Tall Larkspur
	<i>Erysimum capitatum</i> var. <i>capitatum</i>	Western Wallflower
	<i>Fraxinus quadrangulata</i>	Blue Ash
	<i>Galactia volubilis</i>	Downy Milkpea
	<i>Helianthus occidentalis</i> ssp. <i>occidentalis</i>	Western Sunflower
	<i>Heuchera alba</i> *	White Alumroot
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot
	<i>Juglans cinerea</i>	Butternut
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax
	<i>Linum sulcatum</i> var. <i>sulcatum</i>	Grooved Yellow Flax
	<i>Lysimachia tonsa</i>	Southern Loosestrife
	<i>Melica nitens</i>	Three-flower Melicgrass
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue
	<i>Packera plattensis</i>	Prairie Ragwort
	<i>Paronychia virginica</i>	Yellow Nailwort
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Calcareous Forests, Woodlands, and Glades

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum
	<i>Quercus shumardii</i>	Shumard Oak
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn
	<i>Ruellia humilis</i>	Low Wild Petunia
	<i>Scutellaria ovata</i> ssp. <i>virginiana</i>	Heart-leaved Skullcap
	<i>Silene virginica</i> var. <i>robusta</i> *	Fire Pink
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod
	<i>Spiranthes lacera</i> var. <i>lacera</i>	Northern Slender Ladies'-tresses
	<i>Symphoricarpos albus</i> var. <i>albus</i>	Snowberry
	<i>Taenidia montana</i> *	Mountain-pimpernel
	<i>Taxus canadensis</i>	Canada Yew
	<i>Thuja occidentalis</i>	Northern White-cedar
	<i>Trichophorum planifolium</i> *	Bashful Bulrush
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover
	<i>Trillium nivale</i>	Snowy Trillium
	<i>Vernonia glauca</i>	Broad-leaved Ironweed
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
	<i>Zigadenus elegans</i> ssp. <i>glauca</i> *	Mountain Deathcamas
Snails		
	<i>Anguispira clarki</i>	Elfin Tigersnail
	<i>Anguispira stihleri</i> *	Greenbrier Tigersnail
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Helicodiscus triodus</i> *	Talus Coil
	<i>Hendersonia occulta</i>	Cherrystone Drop

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Calcareous Forests, Woodlands, and Glades

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Mesomphix capnodes</i>	Dusky Button
	<i>Pupoides albilabris</i>	White-lip Dagger
	<i>Triodopsis anteridon</i>	Carter Threetooth
	<i>Triodopsis vulgata</i>	Dished Threetooth
	<i>Vallonia costata</i>	Costate Vallonia
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia
	<i>Vertigo cristata</i>	Crested Vertigo

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander
Birds		
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will
	<i>Haliaeetus leucocephalus</i>	Bald Eagle
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler
	<i>Hylocichla mustelina*</i>	Wood Thrush
	<i>Icteria virens*</i>	Yellow-breasted Chat
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Piranga rubra*</i>	Summer Tanager
	<i>Setophaga cerulea*</i>	Cerulean Warbler
	<i>Setophaga discolor*</i>	Prairie Warbler
Butterflies and Moths		
	<i>Acronicta dolli*</i>	Doll's Merolonche
	<i>Cyllopsis gemma</i>	Gemmed Satyr
	<i>Euchlaena milnei*</i>	Milne's Euchlaena Moth
	<i>Glauopsyche lygdamus lygdamus*</i>	Silvery Blue
	<i>Hesperia metea*</i>	Cobweb Skipper
	<i>Papilio appalachiensis*</i>	Appalachian Tiger Swallowtail
	<i>Parrhasius m-album</i>	White-m Hairstreak
	<i>Phyciodes cocyta diminutor*</i>	Summer Crescent
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing
Mammals		
	<i>Corynorhinus rafinesquii*</i>	Rafinesque's Big-eared Bat
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat
	<i>Cryptotis parva</i>	Least Shrew

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Mammals		
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Lasiurus seminolus</i>	Seminole Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
Plants		
	<i>Asplenium septentrionale</i>	Forked Spleenwort
	<i>Berberis canadensis</i> *	American Barberry
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex bushii</i>	Bush's Sedge
	<i>Carex cumberlandensis</i>	Cumberland Sedge
	<i>Carex nigromarginata</i>	Black-edge Sedge
	<i>Carex pedunculata</i>	Longstalk Sedge
	<i>Carex tosa var. rugosperma</i>	Parachute Sedge
	<i>Carex woodii</i>	Pretty Sedge
	<i>Coreopsis verticillata</i>	Whorled Tickseed
	<i>Danthonia sericea</i>	Silky Oatgrass
	<i>Desmodium lineatum</i>	Tick-trefoil
	<i>Dichanthelium acuminatum ssp. columbianum</i>	District Of Columbia Panicgrass

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Dichanthelium boreale</i>	Panicgrass
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort
	<i>Gaylussacia brachycera</i> *	Box Huckleberry
	<i>Gaylussacia dumosa</i>	Dwarf Huckleberry
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern
	<i>Heuchera alba</i> *	White Alumroot
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot
	<i>Heuchera longiflora</i>	Long-flower Alumroot
	<i>Hypericum drummondii</i>	Nits-and-lice
	<i>Isotria medeoloides</i> *	Small Whorled Pogonia
	<i>Juglans cinerea</i>	Butternut
	<i>Lechea pulchella</i> var. <i>pulchella</i>	Pinweed
	<i>Leucothoe recurva</i> *	Red-twig Doghobble
	<i>Lysimachia tonsa</i>	Southern Loosestrife
	<i>Manfreda virginica</i>	Eastern Agave
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot
	<i>Monotropsis odorata</i> *	Sweet Pinesap
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover
	<i>Phlox buckleyi</i> *	Swordleaf Phlox
	<i>Pieris floribunda</i>	Mountain Fetterbush
	<i>Scleria oligantha</i>	Little-head Nutrush
	<i>Sida hermaphrodita</i> *	Virginia Mallow
	<i>Silene caroliniana</i> ssp. <i>wherryi</i> *	Sticky Catchfly
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod
	<i>Solidago faucibus</i> *	Gorge Goldenrod
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses
	<i>Taenidia montana</i> *	Mountain-pimpernel
	<i>Trifolium reflexum</i> *	Buffalo Clover

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Trillium pusillum</i> var. <i>virginianum</i> *	Dwarf Wakerobin
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner
	<i>Carphophis amoenus</i>	Wormsnake
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Lampropeltis getula</i> *	Eastern Kingsnake
	<i>Pantherophis guttatus</i> *	Red Cornsnake
	<i>Pituophis melanoleucus melanoleucus</i> *	Northern Pinesnake
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink
	<i>Scincella lateralis</i>	Little Brown Skink
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Anguispira kochi</i>	Banded Tigersnail
	<i>Anguispira mordax</i>	Appalachian Tigersnail
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Discus catskillensis</i>	Angular Disk
	<i>Discus whitneyi</i>	Forest Disc
	<i>Euconulus polygyratus</i>	Fat Hive
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Gastrocopta tappaniana</i>	White Snaggletooth
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth
	<i>Glyphyalinia lewisiana</i>	Pale Glyph
	<i>Glyphyalinia rimula</i>	Tongued Glyph
	<i>Glyphyalinia solida</i>	Imperforate Glyph

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Glyphyalinia sp 1*</i>	West Virginia Glyph
	<i>Glyphyalinia virginica*</i>	Depressed Glyph
	<i>Helicodiscus shimeki</i>	Temperate Coil
	<i>Helicodiscus triodus*</i>	Talus Coil
	<i>Hendersonia occulta</i>	Cherrystone Drop
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen
	<i>Mesodon normalis</i>	Grand Globe
	<i>Mesomphix perlaevis</i>	Smooth Button
	<i>Mesomphix rugeli</i>	Wrinkled Button
	<i>Oxyloma retusum</i>	Blunt Ambersnail
	<i>Paravitrea ceres*</i>	Sidelong Supercoil
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Paravitrea reesei</i>	Round Supercoil
	<i>Punctum blandianum</i>	Brown Spot
	<i>Stenotrema barbatum</i>	Bristled Slitmouth
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth
	<i>Striatura ferrea</i>	Black Striate
	<i>Triodopsis anteridon</i>	Carter Threetooth
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail
	<i>Triodopsis vulgata</i>	Dished Threetooth
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Ventridens collisella</i>	Sculptured Dome
	<i>Ventridens lawae</i>	Rounded Dome
	<i>Ventridens suppressus</i>	Flat Dome

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo clappi</i> *	Cupped Vertigo
	<i>Vertigo oscariana</i>	Capital Vertigo
	<i>Vertigo ovata</i>	Ovate Vertigo
	<i>Vertigo ventricosa</i>	Five-tooth Vertigo
Tiger Beetles		
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle
	<i>Cicindela purpurea</i>	A Tiger Beetle
	<i>Cicindela unipunctata</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Aneides aeneus</i> *	Green Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Eurycea longicauda</i>	Longtail Salamander
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander
	<i>Plethodon glutinosus</i>	Slimy Salamander
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander
	<i>Plethodon punctatus</i> *	Cow Knob (White Spotted) Salamander
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog
Birds		
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will
	<i>Aquila chrysaetos</i> *	Golden Eagle
	<i>Asio otus</i> *	Long-eared Owl
	<i>Bonasa umbellus</i> *	Ruffed Grouse
	<i>Buteo platypterus</i> *	Broad-winged Hawk
	<i>Certhia familiaris</i>	Brown Creeper
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo
	<i>Colinus virginianus</i> *	Northern Bobwhite
	<i>Empidonax minimus</i>	Least Flycatcher
	<i>Geothlypis formosa</i> *	Kentucky Warbler
	<i>Haliaeetus leucocephalus</i>	Bald Eagle
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler
	<i>Hylocichla mustelina</i> *	Wood Thrush
	<i>Icteria virens</i> *	Yellow-breasted Chat
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush
	<i>Piranga rubra</i> *	Summer Tanager
	<i>Setophaga cerulea</i> *	Cerulean Warbler
	<i>Setophaga discolor</i> *	Prairie Warbler
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler
Butterflies and Moths		
	<i>Callophrys irus</i> *	Frosted Elfin
	<i>Calycopis cecrops</i>	Red-banded Hairstreak
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Cyllopsis gemma</i>	Gemmed Satyr
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak
	<i>Speyeria diana</i> *	Diana Fritillary
Mammals		
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Lasiurus seminolus</i>	Seminole Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Nycticeius humeralis</i>	Evening Bat
	<i>Perimyotis subflavus</i> *	Tricolored Bat

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Mammals		
	<i>Sorex dispar</i>	Long-tailed Shrew
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Plants		
	<i>Adlumia fungosa</i>	Allegheny-vine
	<i>Ageratina aromatica var. aromatica</i>	Small White Snakeroot
	<i>Allium allegheniense*</i>	Allegheny Onion
	<i>Anemone quinquefolia var. minima*</i>	Dwarf Anemone
	<i>Berberis canadensis*</i>	American Barberry
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex cumberlandensis</i>	Cumberland Sedge
	<i>Carex laxiculmis var. copulata</i>	Spreading Sedge
	<i>Carex lucorum var. australucorum*</i>	Blue Ridge Sedge
	<i>Carex nigromarginata</i>	Black-edge Sedge
	<i>Carex pedunculata</i>	Longstalk Sedge
	<i>Carex planispicata</i>	Flat-spiked Sedge
	<i>Carex roanensis*</i>	Roan Mountain Sedge
	<i>Carex woodii</i>	Pretty Sedge
	<i>Chenopodium standleyanum</i>	Standley's Goosefoot
	<i>Coeloglossum viride var. virescens</i>	Long-bracted Green Orchid
	<i>Corallorhiza bentleyi*</i>	Bentley's Coralroot
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Gentiana austromontana</i> *	Appalachian Gentian
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern
	<i>Heuchera alba</i> *	White Alumroot
	<i>Isotria medeoloides</i> *	Small Whorled Pogonia
	<i>Juglans cinerea</i>	Butternut
	<i>Lilium michauxii</i> *	Carolina Lily
	<i>Lysimachia tonsa</i>	Southern Loosestrife
	<i>Malaxis bayardii</i>	Bayard Long's Adder's Mouth
	<i>Melica mutica</i>	Two-flower Melicgrass
	<i>Melothria pendula</i> var. <i>pendula</i>	Creeping Cucumber
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover
	<i>Phlox buckleyi</i> *	Swordleaf Phlox
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass
	<i>Pycnanthemum montanum</i>	Thinleaf Mountainmint
	<i>Scutellaria saxatilis</i> *	Rock Skullcap
	<i>Silene caroliniana</i> ssp. <i>wherryi</i> *	Sticky Catchfly
	<i>Stenanthium gramineum</i> var. <i>gramineum</i>	Featherbells
	<i>Thalictrum clavatum</i>	Mountain Meadowrue
	<i>Thuja occidentalis</i>	Northern White-cedar
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover
	<i>Trillium nivale</i>	Snowy Trillium
	<i>Triphora trianthophora</i> *	Threebirds
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner
	<i>Carphophis amoenus</i>	Wormsnake
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Glyptemys insculpta</i> *	Wood Turtle
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake
	<i>Lampropeltis getula</i> *	Eastern Kingsnake
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Pantherophis guttatus</i> *	Red Cornsnake
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink
	<i>Plestiodon laticeps</i> *	Broad-headed Skink
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Anguispira kochi</i>	Banded Tigersnail
	<i>Anguispira mordax</i>	Appalachian Tigersnail
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Discus catskillensis</i>	Angular Disk
	<i>Discus whitneyi</i>	Forest Disc
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Euconulus polygyratus</i>	Fat Hive
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Gastrocopta tappaniana</i>	White Snaggletooth
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth
	<i>Gastrodonta interna</i>	Brown Bellytooth
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Glyphyalinia lewisiana</i>	Pale Glyph
	<i>Glyphyalinia praecox</i>	Brilliant Glyph
	<i>Glyphyalinia rimula</i>	Tongued Glyph
	<i>Glyphyalinia solida</i>	Imperforate Glyph
	<i>Glyphyalinia sp 1*</i>	West Virginia Glyph
	<i>Glyphyalinia virginica*</i>	Depressed Glyph
	<i>Helicodiscus triodus*</i>	Talus Coil
	<i>Hendersonia occulta</i>	Cherrystone Drop
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen
	<i>Lucilla singleyana</i>	Smooth Coil
	<i>Mesodon clausus</i>	Yellow Globelet
	<i>Mesodon normalis</i>	Grand Globe
	<i>Mesomphix perlaevis</i>	Smooth Button
	<i>Mesomphix rugeli</i>	Wrinkled Button
	<i>Oxyloma retusum</i>	Blunt Ambersnail
	<i>Paravitrea ceres*</i>	Sidelong Supercoil
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Paravitrea reesei</i>	Round Supercoil
	<i>Paravitrea seradens</i>	Barred Supercoil
	<i>Paravitrea subtilis</i>	Slender Supercoil
	<i>Philomycus virginicus</i>	Virginia Mantleslug
	<i>Punctum blandianum</i>	Brown Spot
	<i>Punctum smithi</i>	Lamellate Spot
	<i>Punctum vitreum</i>	Glass Spot
	<i>Stenotrema barbatum</i>	Bristled Slitmouth
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Striatura ferrea</i>	Black Striate
	<i>Striatura milium</i>	Flat-ribbed Striate
	<i>Triodopsis anteridon</i>	Carter Threetooth
	<i>Triodopsis fallax</i>	Mimic Threetooth
	<i>Triodopsis juxtidentis robiniae*</i>	Brush Creek Threetooth
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail
	<i>Triodopsis sp. 1 *</i>	Piney Creek Threetooth
	<i>Triodopsis tennesseensis</i>	Budded Threetooth
	<i>Triodopsis vulgata</i>	Dished Threetooth
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia
	<i>Ventridens arcillus</i>	Golden Dome
	<i>Ventridens collisella</i>	Sculptured Dome
	<i>Ventridens lawae</i>	Rounded Dome
	<i>Ventridens suppressus</i>	Flat Dome
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo clappi*</i>	Cupped Vertigo
	<i>Vertigo cristata</i>	Crested Vertigo
	<i>Vertigo milium</i>	Blade Vertigo
	<i>Vertigo oscariana</i>	Capital Vertigo
	<i>Vertigo ovata</i>	Ovate Vertigo
	<i>Vertigo ventricosa</i>	Five-tooth Vertigo
	<i>Zonitoides elliotti</i>	Green Dome
Tiger Beetles		
	<i>Cicindela limbalis</i>	A Tiger Beetle
	<i>Cicindela patruela*</i>	Barrens Tiger Beetle
	<i>Cicindela purpurea</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Tiger Beetles		
	<i>Cicindela splendida*</i>	A Tiger Beetle
	<i>Cicindela unipunctata</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Heath-Grass Barrens

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Chordeiles minor</i> *	Common Nighthawk
Butterflies and Moths		
	<i>Celastrina lucia</i>	Northern Spring Azure
	<i>Chaetagnaea cerata</i> *	Waxed Sallow Moth
	<i>Colias interior</i>	Pink-edged Sulphur
Mammals		
	<i>Lepus americanus</i>	Snowshoe Hare
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
Plants		
	<i>Andropogon glomeratus var. glomeratus</i>	Bushy Broom-sedge
	<i>Carex arctata</i>	Drooping Woodland Sedge
	<i>Carex polymorpha</i> *	Variable Sedge
	<i>Clematis occidentalis var. occidentalis</i>	Purple Virgin's Bower
	<i>Cornus canadensis</i>	Canadian Bunchberry
	<i>Dichanthelium meridionale</i>	Matting Witchgrass
	<i>Heuchera alba</i> *	White Alumroot
	<i>Lilium philadelphicum var. philadelphicum</i>	Wood Lily
	<i>Melanella stygia</i>	Stygian Black-parmelia
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil
	<i>Stellaria borealis ssp. borealis</i>	Northern Stitchwort
Reptiles		
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl
	<i>Asio otus</i> *	Long-eared Owl
	<i>Botaurus lentiginosus</i> *	American Bittern
	<i>Circus cyaneus</i>	Northern Harrier
	<i>Contopus cooperi</i> *	Olive-sided Flycatcher
	<i>Empidonax alnorum</i>	Alder Flycatcher
	<i>Gallinago delicata</i>	Wilson's Snipe
	<i>Rallus limicola</i>	Virginia Rail
	<i>Scolopax minor</i> *	American Woodcock
	<i>Seiurus noveboracensis</i> *	Northern Waterthrush
	<i>Spizella pallida</i>	Clay-colored Sparrow
	<i>Vermivora ruficapilla</i>	Nashville Warbler
Butterflies and Moths		
	<i>Aplectoides condita</i>	A Noctuid Moth
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary
	<i>Celastrina lucia</i>	Northern Spring Azure
	<i>Cerastis salicarum</i>	Willow Dart Moth
	<i>Colias interior</i>	Pink-edged Sulphur
	<i>Eilema bicolor</i>	Bicolored Moth
	<i>Euchlaena effecta</i>	Effective Euchaena Moth
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot
	<i>Euphyes bimacula</i> *	Two-spotted Skipper
	<i>Euphyes conspicua</i>	Black Dash
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth
	<i>Lophocampa maculata</i> *	Spotted Tussock Moth
	<i>Lycaena epixanthe</i>	Bog Copper
	<i>Melanchra assimilis</i>	Black Arches
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Butterflies and Moths		
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth
	<i>Speyeria atlantis</i>	Atlantis Fritillary
Crayfish		
	<i>Cambarus dubius A*</i>	Teays Valley Mudbug
	<i>Cambarus dubius B*</i>	Meadow River Mudbug
Dragonflies and Damselflies		
	<i>Aeshna canadensis</i>	Canada Darner
	<i>Aeshna tuberculifera</i>	Black-tipped Darner
	<i>Aeshna verticalis*</i>	Green-striped Darner
	<i>Argia bipunctulata*</i>	Seepage Dancer
	<i>Enallagma annexum</i>	Northern Bluet
	<i>Enallagma vernale</i>	Vernal Bluet
	<i>Epitheca canis</i>	Beaverpond Baskettail
	<i>Lestes disjunctus</i>	Northern Spreadwing
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing
	<i>Lestes inaequalis</i>	Elegant Spreadwing
	<i>Leucorrhinia glacialis*</i>	Crimson-ringed Whiteface
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface
	<i>Libellula axilena</i>	Bar-winged Skimmer
	<i>Libellula flavida</i>	Yellow-sided Skimmer
	<i>Nehalennia gracilis*</i>	Sphagnum Sprite
	<i>Somatochlora elongata</i>	Ski-tipped Emerald
	<i>Somatochlora forcipata</i>	Forcipate Emerald
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk
Mammals		
	<i>Condylura cristata</i>	Star-nosed Mole
	<i>Lasiurus borealis*</i>	Eastern Red Bat
	<i>Lasiurus cinereus*</i>	Hoary Bat

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Mammals		
	<i>Lepus americanus</i>	Snowshoe Hare
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex palustris punctulatus</i> *	Southern Water Shrew
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
	<i>Synaptomys cooperi</i>	Southern Bog Lemming
Plants		
	<i>Abies balsamea</i>	Balsam Fir
	<i>Aconitum reclinatum</i> *	White Monkshood
	<i>Agrostis mertensii</i>	Northern Bentgrass
	<i>Amelanchier bartramiana</i>	Oblong-fruit Serviceberry
	<i>Andromeda polifolia var. glaucophylla</i>	Bog-rosemary
	<i>Andropogon glomeratus var. glomeratus</i>	Bushy Broom-sedge
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern
	<i>Calamagrostis stricta ssp. stricta var. stricta</i>	Reedgrass
	<i>Calopogon tuberosus var. tuberosus</i>	Tuberous Grass-pink
	<i>Campylopus flexuosus</i>	Campylopus Moss
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex aquatilis var. substricta</i>	Water Sedge
	<i>Carex atherodes</i>	Awned Sedge
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge
	<i>Carex bushii</i>	Bush's Sedge
	<i>Carex buxbaumii</i>	Brown Bog Sedge
	<i>Carex comosa</i>	Longhair Sedge
	<i>Carex deflexa</i>	Northern Sedge
	<i>Carex emoryi</i>	Emory's Sedge
	<i>Carex haydenii</i>	Cloud Sedge
	<i>Carex hirtifolia</i>	Pubescent Sedge
	<i>Carex interior</i>	Inland Sedge

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Carex lacustris</i>	Lake Sedge
	<i>Carex lasiocarpa</i> var. <i>americana</i>	Woolly-fruit Sedge
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge
	<i>Carex lupuliformis</i> *	False Hop Sedge
	<i>Carex meadii</i> *	Mead's Sedge
	<i>Carex molesta</i>	Troublesome Sedge
	<i>Carex normalis</i>	Greater Straw Sedge
	<i>Carex pauciflora</i>	Few-flower Sedge
	<i>Carex projecta</i>	Necklace Sedge
	<i>Carex suberecta</i> *	Prairie Straw Sedge
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge
	<i>Carex utriculata</i>	Beaked Sedge
	<i>Carex vesicaria</i>	Inflated Sedge
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid
	<i>Coptis trifolia</i>	Threeleaf Goldthread
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot
	<i>Corallorhiza trifida</i>	Early Coralroot
	<i>Cornus canadensis</i>	Canadian Bunchberry
	<i>Cuscuta rostrata</i>	Beaked Dodder
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper
	<i>Dalibarda repens</i>	Robin-run-away
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew
	<i>Dryopteris celsa</i>	Log Fern
	<i>Eleocharis elliptica</i>	Elliptic Spikerush
	<i>Eleocharis palustris</i>	Marsh Spikerush
	<i>Equisetum fluviatile</i>	Water Horsetail
	<i>Equisetum sylvaticum</i>	Woodland Horsetail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Eupatorium pilosum</i>	Rough Boneset
	<i>Euphorbia purpurea</i> *	Glade Spurge
	<i>Fraxinus nigra</i>	Black Ash
	<i>Gaultheria hispidula</i>	Creeping Snowberry
	<i>Gentianopsis crinita</i>	Greater Fringed Gentian
	<i>Geum aleppicum</i>	Yellow Avens
	<i>Geum rivale</i>	Purple Avens
	<i>Glyceria grandis var. grandis</i>	American Mannagrass
	<i>Glyceria laxa</i>	Mannagrass
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern
	<i>Hasteola suaveolens</i>	False Indian-plantain
	<i>Hypericum mitchellianum</i> *	Blue Ridge St. John's-wort
	<i>Ilex collina</i> *	Hill Holly
	<i>Juncus articulatus</i>	Jointleaf Rush
	<i>Juncus biflorus</i>	Bog Rush
	<i>Juncus dichotomus</i>	Forked Rush
	<i>Juncus filiformis</i>	Thread Rush
	<i>Juncus nodosus var. nodosus</i>	Knotted Rush
	<i>Larix laricina</i>	Tamarack
	<i>Lemna valdiviana</i>	Pale Duckweed
	<i>Linnaea borealis ssp. americana</i>	Twinflower
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid
	<i>Listera cordata var. cordata</i>	Heartleaf Twayblade
	<i>Listera smallii</i>	Kidneyleaf Twayblade
	<i>Lonicera canadensis</i>	Fly Honeysuckle
	<i>Luzula bulbosa</i>	Bulbous Woodrush
	<i>Lycopodiella alopecuroides</i>	Foxtail Clubmoss

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss
	<i>Lygodium palmatum</i>	American Climbing Fern
	<i>Lysimachia hybrida</i>	Lowland Loosestrife
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal
	<i>Matteuccia struthiopteris</i>	Ostrich Fern
	<i>Menyanthes trifoliata</i>	Buckbean
	<i>Najas gracillima</i>	Slender Waternymph
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops
	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus
	<i>Pedicularis lanceolata</i>	Swamp Lousewort
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid
	<i>Platanthera peramoena</i>	Pride-of-the-peak
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid
	<i>Poa paludigena</i> *	Bog Bluegrass
	<i>Pogonia ophioglossoides</i>	Rose Pogonia
	<i>Polemonium vanbruntiae</i> *	Bog Jacob's-ladder
	<i>Polygonum amphibium</i>	Water Knotweed
	<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	Balsam Poplar
	<i>Potamogeton pusillus</i> var. <i>tenuissimus</i>	Slender Pondweed
	<i>Potamogeton spirillus</i>	Spiral Pondweed
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed
	<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort
	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn
	<i>Rhododendron viscosum</i>	Swamp Azalea
	<i>Ribes lacustre</i>	Bristly Black Currant

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Ribes triste</i>	Swamp Red Currant
	<i>Rubus pubescens</i> var. <i>pubescens</i>	Dwarf Red Bramble
	<i>Sagittaria calycina</i> var. <i>calycina</i>	Long-lobe Arrowhead
	<i>Salix amygdaloides</i>	Peachleaf Willow
	<i>Salix discolor</i>	Pussy Willow
	<i>Salix lucida</i> ssp. <i>lucida</i>	Shining Willow
	<i>Sanguisorba canadensis</i>	Canada Burnet
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage
	<i>Scheuchzeria palustris</i> ssp. <i>americana</i>	Pod Grass
	<i>Schoenoplectus purshianus</i>	Clubrush
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush
	<i>Scutellaria galericulata</i>	Hooded Skullcap
	<i>Scutellaria saxatilis</i> *	Rock Skullcap
	<i>Sparganium androcladum</i>	Branched Bur-reed
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses
	<i>Stachys aspera</i> *	Gritty Hedge-nettle
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle
	<i>Stellaria borealis</i> ssp. <i>borealis</i>	Northern Stitchwort
	<i>Symphyotrichum novi-belgii</i>	New Belgium American-aster
	<i>Taxus canadensis</i>	Canada Yew
	<i>Thelypteris simulata</i> *	Bog Fern
	<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Mannagrass
	<i>Torreyochloa pallida</i> var. <i>pallida</i>	Pale False Mannagrass
	<i>Toxicodendron vernix</i>	Poison-sumac
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel
	<i>Utricularia geminiscapa</i> *	Hidden-fruit Bladderwort
	<i>Vaccinium macrocarpon</i>	Large Cranberry

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE High Allegheny Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Vaccinium oxycoccos</i>	Small Cranberry
	<i>Veronica scutellata</i>	Grassleaf Speedwell
	<i>Viburnum lentago</i>	Nannyberry
	<i>Viburnum opulus var. americanum</i>	Highbush Cranberry
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
	<i>Viola appalachensis*</i>	Appalachian Blue Violet
	<i>Viola septentrionalis</i>	Northern Blue Violet
	<i>Woodwardia areolata</i>	Netted Chainfern
	<i>Xyris torta</i>	Slender Yellow-eyed-grass
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas
Reptiles		
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
Snails		
	<i>Helicodiscus shimeki</i>	Temperate Coil
	<i>Nesovitrea electrina</i>	Amber Glass
	<i>Vitrina angelicae*</i>	Eastern Glass-snail
	<i>Webbhelix multilineata</i>	Striped Whitelip

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander
	<i>Aneides aeneus</i> *	Green Salamander
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Eurycea longicauda</i>	Longtail Salamander
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander
	<i>Plethodon glutinosus</i>	Slimy Salamander
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Birds		
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will
	<i>Bonasa umbellus</i> *	Ruffed Grouse
	<i>Buteo platypterus</i> *	Broad-winged Hawk
	<i>Catharus fuscescens</i>	Veery
	<i>Certhia familiaris</i>	Brown Creeper
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo
	<i>Colinus virginianus</i> *	Northern Bobwhite
	<i>Empidonax minimus</i>	Least Flycatcher
	<i>Euphagus carolinus</i>	Rusty Blackbird
	<i>Geothlypis formosa</i> *	Kentucky Warbler

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler
	<i>Hylocichla mustelina</i> *	Wood Thrush
	<i>Icteria virens</i> *	Yellow-breasted Chat
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush
	<i>Piranga rubra</i> *	Summer Tanager
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler
	<i>Setophaga cerulea</i> *	Cerulean Warbler
	<i>Setophaga discolor</i> *	Prairie Warbler
	<i>Setophaga fusca</i>	Blackburnian Warbler
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler
Butterflies and Moths		
	<i>Autochton cellus</i> *	Golden-banded Skipper
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary
	<i>Calycopis cecrops</i>	Red-banded Hairstreak
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Celastrina neglectamajor</i>	Appalachian Azure
	<i>Celastrina nigra</i> *	Dusky Azure
	<i>Celastrina serotina</i>	Cherry Gall Azure
	<i>Erora laeta</i>	Early Hairstreak
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth
	<i>Hadena ectypa</i> *	Starry Campion Moth
	<i>Lycaena hyllus</i> *	Bronze Copper
	<i>Parrhasius m-album</i>	White-m Hairstreak
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Butterflies and Moths		
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak
	<i>Speyeria diana</i> *	Diana Fritillary
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing
Mammals		
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Cryptotis parva</i>	Least Shrew
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Microtus chrotorrhinus carolinensis</i> *	Southern Rock Vole
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Nycticeius humeralis</i>	Evening Bat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex dispar</i>	Long-tailed Shrew
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Plants		
	<i>Aconitum reclinatum</i> *	White Monkshood
	<i>Adlumia fungosa</i>	Allegheny-vine
	<i>Anemone quinquefolia var. minima</i> *	Dwarf Anemone
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress
	<i>Arabis patens</i> *	Spreading Rockcress

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Astilbe biternata</i>	Appalachian False Goat's-beard
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex cephaloidea</i>	Thinleaf Sedge
	<i>Carex cumberlandensis</i>	Cumberland Sedge
	<i>Carex hirtifolia</i>	Pubescent Sedge
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge
	<i>Carex roanensis</i> *	Roan Mountain Sedge
	<i>Carex woodii</i>	Pretty Sedge
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot
	<i>Cuscuta rostrata</i>	Beaked Dodder
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge
	<i>Enemion biternatum</i>	Eastern False Rue-anemone
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain
	<i>Heuchera longiflora</i>	Long-flower Alumroot
	<i>Juglans cinerea</i>	Butternut
	<i>Lygodium palmatum</i>	American Climbing Fern
	<i>Lysimachia tonsa</i>	Southern Loosestrife
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass
	<i>Prosartes maculata</i> *	Yellow Mandarin
	<i>Ribes lacustre</i>	Bristly Black Currant
	<i>Scutellaria ovata</i> ssp. <i>ovata</i>	Heart-leaved Skullcap
	<i>Scutellaria saxatilis</i> *	Rock Skullcap
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle
	<i>Synandra hispidula</i> *	Guyandotte Beauty

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Taxus canadensis</i>	Canada Yew
	<i>Thalictrum clavatum</i>	Mountain Meadowrue
	<i>Thuja occidentalis</i>	Northern White-cedar
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover
	<i>Trillium cernuum</i>	Nodding Trillium
	<i>Trillium flexipes</i>	Nodding Wakerobin
	<i>Trillium nivale</i>	Snowy Trillium
	<i>Triphora trianthophora*</i>	Threebirds
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
	<i>Viola septentrionalis</i>	Northern Blue Violet
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Carphophis amoenus</i>	Wormsnake
	<i>Crotalus horridus*</i>	Timber Rattlesnake
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Glyptemys insculpta*</i>	Wood Turtle
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Anguispira kochi</i>	Banded Tigersnail
	<i>Anguispira mordax</i>	Appalachian Tigersnail
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Catinella vermeta</i>	Suboval Ambersnail
	<i>Discus catskillensis</i>	Angular Disk
	<i>Discus whitneyi</i>	Forest Disc

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth
	<i>Gastrodonta interna</i>	Brown Bellytooth
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph
	<i>Glyphyalinia lewisiana</i>	Pale Glyph
	<i>Glyphyalinia praecox</i>	Brilliant Glyph
	<i>Glyphyalinia rimula</i>	Tongued Glyph
	<i>Glyphyalinia solida</i>	Imperforate Glyph
	<i>Glyphyalinia virginica*</i>	Depressed Glyph
	<i>Helicodiscus triodus*</i>	Talus Coil
	<i>Hendersonia occulta</i>	Cherrystone Drop
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen
	<i>Lucilla singleyana</i>	Smooth Coil
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe
	<i>Mesodon mitchellianus</i>	Sealed Globelet
	<i>Mesomphix perlaevis</i>	Smooth Button
	<i>Mesomphix rugeli</i>	Wrinkled Button
	<i>Mesomphix sp. 1 *</i>	Pygmy Button
	<i>Oxyloma retusum</i>	Blunt Ambersnail
	<i>Paravitrea bellona*</i>	Club Supercoil
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Paravitrea reesei</i>	Round Supercoil
	<i>Paravitrea seradens</i>	Barred Supercoil
	<i>Paravitrea subtilis</i>	Slender Supercoil
	<i>Patera laevior</i>	Smooth Bladetooth
	<i>Patera pennsylvanica</i>	Proud Globelet

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Philomycus virginicus</i>	Virginia Mantleslug
	<i>Punctum blandianum</i>	Brown Spot
	<i>Punctum smithi</i>	Lamellate Spot
	<i>Punctum vitreum</i>	Glass Spot
	<i>Pupoides albilabris</i>	White-lip Dagger
	<i>Stenotrema barbatum</i>	Bristled Slitmouth
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth
	<i>Striatura exigua</i>	Ribbed Striate
	<i>Striatura ferrea</i>	Black Striate
	<i>Striatura milium</i>	Flat-ribbed Striate
	<i>Triodopsis anteridon</i>	Carter Threetooth
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail
	<i>Triodopsis rugosa*</i>	Buttressed Threetooth
	<i>Triodopsis tennesseensis</i>	Budded Threetooth
	<i>Triodopsis vulgata</i>	Dished Threetooth
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Ventridens acerra</i>	Glossy Dome
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Ventridens coelaxis</i>	Bidentate Dome
	<i>Ventridens collisella</i>	Sculptured Dome
	<i>Ventridens lawae</i>	Rounded Dome
	<i>Ventridens suppressus</i>	Flat Dome
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo clappi*</i>	Cupped Vertigo
	<i>Vertigo cristata</i>	Crested Vertigo
	<i>Vertigo milium</i>	Blade Vertigo
	<i>Vertigo ovata</i>	Ovate Vertigo

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Mixed Mesophytic Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Vertigo parvula</i>	Smallmouth Vertigo
	<i>Vertigo tridentata</i>	Honey Vertigo
	<i>Zonitoides elliotti</i>	Green Dome
Tiger Beetles		
	<i>Cicindela limbalis</i>	A Tiger Beetle
	<i>Cicindela patruela*</i>	Barrens Tiger Beetle
	<i>Cicindela splendida*</i>	A Tiger Beetle
	<i>Cicindela unipunctata</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Montane Red Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Ambystoma opacum</i>	Marbled Salamander
	<i>Plethodon punctatus</i> *	Cow Knob (White Spotted) Salamander
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
Mammals		
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
Plants		
	<i>Allium allegheniense</i> *	Allegheny Onion
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex normalis</i>	Greater Straw Sedge
	<i>Carex polymorpha</i> *	Variable Sedge
	<i>Carex roanensis</i> *	Roan Mountain Sedge
	<i>Clematis occidentalis var. occidentalis</i>	Purple Virgin's Bower
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern
	<i>Heuchera alba</i> *	White Alumroot
	<i>Hypericum mitchellianum</i> *	Blue Ridge St. John's-wort
	<i>Pieris floribunda</i>	Mountain Fetterbush
	<i>Scutellaria saxatilis</i> *	Rock Skullcap
	<i>Stenanthium gramineum var. gramineum</i>	Featherbells
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Montane Red Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Crotalus horridus*</i>	Timber Rattlesnake
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Plestiodon laticeps*</i>	Broad-headed Skink
Snails		
	<i>Hawaiiia alachuana</i>	Southeastern Gem
	<i>Mesodon normalis</i>	Grand Globe
	<i>Oxyloma retusum</i>	Blunt Ambersnail
	<i>Triodopsis anteridon</i>	Carter Threetooth

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Northern Hardwood Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Ambystoma opacum</i>	Marbled Salamander
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
	<i>Plethodon glutinosus</i>	Slimy Salamander
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Birds		
	<i>Accipiter gentilis*</i>	Northern Goshawk
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will
	<i>Aquila chrysaetos*</i>	Golden Eagle
	<i>Asio otus*</i>	Long-eared Owl
	<i>Bonasa umbellus*</i>	Ruffed Grouse
	<i>Buteo platypterus*</i>	Broad-winged Hawk
	<i>Cardellina canadensis*</i>	Canada Warbler
	<i>Carduelis pinus</i>	Pine Siskin
	<i>Catharus fuscescens</i>	Veery
	<i>Catharus ustulatus</i>	Swainson's Thrush
	<i>Certhia familiaris</i>	Brown Creeper
	<i>Contopus cooperi*</i>	Olive-sided Flycatcher
	<i>Empidonax minimus</i>	Least Flycatcher
	<i>Hylocichla mustelina*</i>	Wood Thrush
	<i>Loxia curvirostra</i>	Red Crossbill
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Northern Hardwood Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Seiurus noveboracensis</i> *	Northern Waterthrush
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler
	<i>Setophaga cerulea</i> *	Cerulean Warbler
	<i>Setophaga discolor</i> *	Prairie Warbler
	<i>Setophaga fusca</i>	Blackburnian Warbler
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler
	<i>Vermivora ruficapilla</i>	Nashville Warbler
Butterflies and Moths		
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary
	<i>Brachionycha borealis</i> *	Boreal Fan Moth
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Celastrina lucia</i>	Northern Spring Azure
	<i>Celastrina neglectamajor</i>	Appalachian Azure
	<i>Celastrina nigra</i> *	Dusky Azure
	<i>Erora laeta</i>	Early Hairstreak
	<i>Hadena ectypa</i> *	Starry Campion Moth
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth
	<i>Lycaena hyllus</i> *	Bronze Copper
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail
	<i>Parrhasius m-album</i>	White-m Hairstreak
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma
	<i>Polygonia progne</i>	Gray Comma
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth
	<i>Speyeria atlantis</i>	Atlantis Fritillary
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth
Mammals		
	<i>Erethizon dorsatum</i>	Porcupine

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Northern Hardwood Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Mammals		
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Lepus americanus</i>	Snowshoe Hare
	<i>Microtus chrotorrhinus carolinensis</i> *	Southern Rock Vole
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex dispar</i>	Long-tailed Shrew
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew
	<i>Sorex palustris punctulatus</i> *	Southern Water Shrew
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Plants		
	<i>Aconitum reclinatum</i> *	White Monkshood
	<i>Betula papyrifera</i>	Paper Birch
	<i>Botrychium lanceolatum</i> var. <i>angustisegmentu</i>	Lanceolate Grapefern
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex cumberlandensis</i>	Cumberland Sedge
	<i>Carex manhartii</i> *	Manhart's Sedge
	<i>Carex purpurifera</i> *	Purple Sedge
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower
	<i>Cuscuta rostrata</i>	Beaked Dodder
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Northern Hardwood Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Dichanthelium meridionale</i>	Matting Witchgrass
	<i>Euphorbia purpurea</i> *	Glade Spurge
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain
	<i>Heuchera alba</i> *	White Alumroot
	<i>Lycopodium lagopus</i>	One-cone Groundpine
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid
	<i>Poa saltuensis</i>	Old-pasture Bluegrass
	<i>Schizachne purpurascens</i>	False Melicgrass
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet
Reptiles		
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Plestiodon laticeps</i> *	Broad-headed Skink
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake
Snails		
	<i>Glyphyalinia picea</i>	Rust Glyph
	<i>Mesodon aff. Andrewsae</i> *	Balsam Globe
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Stenotrema simile</i> *	Bear Creek Slitmouth
	<i>Striatura exigua</i>	Ribbed Striate
	<i>Striatura ferrea</i>	Black Striate
	<i>Triodopsis picea</i> *	Spruce Knob Threetooth
	<i>Triodopsis platysayoides</i> *	Flat-spined Three-toothed Landsnail
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Webbhelix multilineata</i>	Striped Whitelip
	<i>Zonitoides ellioti</i>	Green Dome

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Pine-Oak Rocky Woodlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Butterflies and Moths		
	<i>Acronicta dolli</i> *	Doll's Merolonche
	<i>Callophrys irus</i> *	Frosted Elfin
	<i>Calycopis cecrops</i>	Red-banded Hairstreak
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue
	<i>Hesperia metea</i> *	Cobweb Skipper
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail
	<i>Phyciodes cocyta selene</i> *	Northern Crescent
	<i>Satyrium favonius ontario</i>	Northern Hairstreak
	<i>Zale calycanthata</i> *	Double-banded Zale
Mammals		
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk
Plants		
	<i>Allium allegheniense</i> *	Allegheny Onion
	<i>Asclepias hirtella</i>	Green Milkweed
	<i>Astragalus distortus var. distortus</i>	Bent Milkvetch
	<i>Betula papyrifera</i>	Paper Birch
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex polymorpha</i> *	Variable Sedge
	<i>Carex tonsa var. tonsa</i>	Shaved Sedge

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Pine-Oak Rocky Woodlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Commelina erecta</i>	Slender Dayflower
	<i>Cornus canadensis</i>	Canadian Bunchberry
	<i>Cornus rugosa</i>	Roundleaf Dogwood
	<i>Diarrhena obovata*</i>	Twin Grass
	<i>Dichanthelium acuminatum ssp. acuminatum</i>	Hairy Panicgrass
	<i>Dichanthelium xanthophysum</i>	Panicgrass
	<i>Heuchera alba*</i>	White Alumroot
	<i>Hudsonia tomentosa var. tomentosa</i>	False Heather
	<i>Lechea minor</i>	Thymeleaf Pinweed
	<i>Lechea pulchella var. pulchella</i>	Pinweed
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine
	<i>Malaxis bayardii</i>	Bayard Long's Adder's Mouth
	<i>Minuartia groenlandica</i>	Greenland Stitchwort
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax
	<i>Oryzopsis asperifolia</i>	Roughleaf Ricegrass
	<i>Paronychia argyrocoma</i>	Silvery Nailwort
	<i>Pieris floribunda</i>	Mountain Fetterbush
	<i>Pinus resinosa</i>	Red Pine
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass
	<i>Pycnanthemum clinopodioides</i>	Basil Mountain-mint
	<i>Pyrola chlorantha</i>	Green-flower Wintergreen
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil
	<i>Silene virginica var. robusta*</i>	Fire Pink
	<i>Stenanthium gramineum var. micranthum*</i>	Tiny-flower Featherbells
	<i>Talinum teretifolium*</i>	Eastern Fameflower
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Pine-Oak Rocky Woodlands

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Pituophis melanoleucus melanoleucus</i> *	Northern Pinesnake
	<i>Scincella lateralis</i>	Little Brown Skink
Snails		
	<i>Glyphyalinia solida</i>	Imperforate Glyph

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Red Spruce Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Plethodon glutinosus</i>	Slimy Salamander
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander
	<i>Plethodon wehrlei</i>	Wehrle's Salamander
Birds		
	<i>Accipiter gentilis</i> *	Northern Goshawk
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl
	<i>Cardellina canadensis</i> *	Canada Warbler
	<i>Carduelis pinus</i>	Pine Siskin
	<i>Catharus ustulatus</i>	Swainson's Thrush
	<i>Certhia familiaris</i>	Brown Creeper
	<i>Contopus cooperi</i> *	Olive-sided Flycatcher
	<i>Empidonax flaviventris</i>	Yellow-bellied Flycatcher
	<i>Loxia curvirostra</i>	Red Crossbill
	<i>Seiurus noveboracensis</i> *	Northern Waterthrush
	<i>Setophaga fusca</i>	Blackburnian Warbler
	<i>Vermivora ruficapilla</i>	Nashville Warbler
Butterflies and Moths		
	<i>Brachionycha borealis</i> *	Boreal Fan Moth
	<i>Celastrina lucia</i>	Northern Spring Azure
	<i>Eilema bicolor</i>	Bicolored Moth
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma
	<i>Polygonia progne</i>	Gray Comma
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth
	<i>Speyeria atlantis</i>	Atlantis Fritillary
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth
Mammals		
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Red Spruce Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Mammals		
	<i>Lepus americanus</i>	Snowshoe Hare
	<i>Microtus chrotorrhinus carolinensis</i> *	Southern Rock Vole
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Sorex dispar</i>	Long-tailed Shrew
	<i>Sorex palustris punctulatus</i> *	Southern Water Shrew
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail
Plants		
	<i>Aconitum reclinatum</i> *	White Monkshood
	<i>Botrychium lanceolatum var. angustisegmentu</i>	Lanceolate Grapefern
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex cumberlandensis</i>	Cumberland Sedge
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge
	<i>Dichanthelium meridionale</i>	Matting Witchgrass
	<i>Euphorbia purpurea</i> *	Glade Spurge
	<i>Heuchera alba</i> *	White Alumroot
	<i>Lycopodium lagopus</i>	One-cone Groundpine
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet
Snails		
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Mesodon aff. Andrewsae</i> *	Balsam Globe
	<i>Striatura ferrea</i>	Black Striate
	<i>Triodopsis picea</i> *	Spruce Knob Threetooth
	<i>Ventridens arcellus</i>	Golden Dome
Tiger Beetles		
	<i>Cicindela splendida</i> *	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog
	<i>Acris crepitans</i> *	Northern Cricket Frog
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander
	<i>Ambystoma opacum</i>	Marbled Salamander
	<i>Ambystoma texanum</i> *	Smallmouth Salamander
	<i>Anaxyrus fowleri</i>	Fowler's Toad
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander
	<i>Eurycea longicauda</i>	Longtail Salamander
	<i>Lithobates pipiens</i> *	Northern Leopard Frog
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad
Birds		
	<i>Actitis macularius</i> *	Spotted Sandpiper
	<i>Ardea herodias</i>	Great Blue Heron
	<i>Botaurus lentiginosus</i> *	American Bittern
	<i>Butorides virescens</i>	Green Heron
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo
	<i>Empidonax alnorum</i>	Alder Flycatcher
	<i>Euphagus carolinus</i>	Rusty Blackbird
	<i>Gallinago delicata</i>	Wilson's Snipe
	<i>Geothlypis formosa</i> *	Kentucky Warbler
	<i>Haliaeetus leucocephalus</i>	Bald Eagle
	<i>Ixobrychus exilis</i>	Least Bittern
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler
	<i>Lophodytes cucullatus</i>	Hooded Merganser

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Mergus merganser</i>	Common Merganser
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush
	<i>Porzana carolina</i>	Sora
	<i>Protonotaria citrea</i>	Prothonotary Warbler
	<i>Rallus limicola</i>	Virginia Rail
	<i>Riparia riparia</i> *	Bank Swallow
Butterflies and Moths		
	<i>Celastrina neglectamajor</i>	Appalachian Azure
	<i>Celastrina nigra</i> *	Dusky Azure
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot
	<i>Euphyes bimacula</i> *	Two-spotted Skipper
	<i>Euphyes conspicua</i>	Black Dash
	<i>Parrhasius m-album</i>	White-m Hairstreak
	<i>Speyeria diana</i> *	Diana Fritillary
Crayfish		
	<i>Cambarus dubius B</i> *	Meadow River Mudbug
Dragonflies and Damselflies		
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg
	<i>Gomphus quadricolor</i> *	Rapids Clubtail
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Hetaerina titia</i>	Smoky Rubyspot
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser
	<i>Macromia illinoensis</i>	Illinois River Cruiser
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Neurocordulia molesta</i>	Smoky Shadowdragon
	<i>Neurocordulia obsoleta</i>	Umber Showdragon
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail
	<i>Progomphus obscurus</i> *	Common Sanddragon

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Dragonflies and Damselflies		
	<i>Stylurus notatus</i> *	Elusive Clubtail
	<i>Stylurus scudderii</i> *	Zebra Clubtail
	<i>Stylurus spiniceps</i> *	Arrow Clubtail
Mammals		
	<i>Condylura cristata</i>	Star-nosed Mole
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Neotoma magister</i> *	Allegheny Woodrat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew
	<i>Synaptomys cooperi</i>	Southern Bog Lemming
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Plants		
	<i>Agrostis mertensii</i>	Northern Bentgrass
	<i>Amorpha fruticosa</i>	Tall Indigobush
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed
	<i>Anemone quinquefolia var. minima</i> *	Dwarf Anemone
	<i>Arabis shortii</i>	Short's Rockcress
	<i>Aristida purpurascens var. purpurascens</i>	Arrowfeather Three-awn
	<i>Arundinaria gigantea ssp. gigantea</i>	Giant Cane
	<i>Baptisia australis var. australis</i> *	False Blue Indigo
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress
	<i>Carex aestivalis</i>	Summer Sedge
	<i>Carex albolutescens</i>	Greenish-white Sedge
	<i>Carex appalachica</i>	Appalachian Sedge
	<i>Carex aquatilis</i> var. <i>substricta</i>	Water Sedge
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge
	<i>Carex davisii</i> *	Davis' Sedge
	<i>Carex emoryi</i>	Emory's Sedge
	<i>Carex haydenii</i>	Cloud Sedge
	<i>Carex hirtifolia</i>	Pubescent Sedge
	<i>Carex interior</i>	Inland Sedge
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge
	<i>Carex meadii</i> *	Mead's Sedge
	<i>Carex molesta</i>	Troublesome Sedge
	<i>Carex molestiformis</i>	Frightful Sedge
	<i>Carex projecta</i>	Necklace Sedge
	<i>Carex seorsa</i>	Weak Stellate Sedge
	<i>Carex straminea</i>	Straw Sedge
	<i>Carex styloflexa</i> *	Bent Sedge
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge
	<i>Carex typhina</i>	Cattail Sedge
	<i>Carex vesicaria</i>	Inflated Sedge
	<i>Carex woodii</i>	Pretty Sedge
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort
	<i>Chamaesyce vermiculata</i>	Hairy Spurge
	<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Commelina erecta</i>	Slender Dayflower
	<i>Crataegus spathulata</i>	Littlehip Haw
	<i>Cyperus refractus</i>	Reflexed Flatsedge
	<i>Cyperus squarrosus</i>	Awned Flatsedge
	<i>Decodon verticillatus</i>	Swamp-loosestrife
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil
	<i>Diarrhena obovata*</i>	Twin Grass
	<i>Dichanthelium meridionale</i>	Matting Witchgrass
	<i>Digitaria filiformis</i>	Slender Crabgrass
	<i>Eleocharis compressa</i>	Flat-stem Spikerush
	<i>Eleocharis elliptica</i>	Elliptic Spikerush
	<i>Eleocharis engelmannii*</i>	Engelmann's Spikerush
	<i>Eleocharis intermedia</i>	Spikerush
	<i>Elodea nuttallii</i>	Western Waterweed
	<i>Enemion biternatum</i>	Eastern False Rue-anemone
	<i>Eupatorium pilosum</i>	Rough Boneset
	<i>Fimbristylis annua</i>	Annual Fimbry
	<i>Fraxinus nigra</i>	Black Ash
	<i>Geum aleppicum</i>	Yellow Avens
	<i>Glyceria grandis var. grandis</i>	American Mannagrass
	<i>Glyceria laxa</i>	Mannagrass
	<i>Gratiola viscidula*</i>	Short's Hedgehyssop
	<i>Gymnopogon ambiguus*</i>	Bearded Skeleton Grass
	<i>Hasteola suaveolens</i>	False Indian-plantain
	<i>Helianthemum bicknellii</i>	Hoary Frostweed
	<i>Helianthemum canadense</i>	Long-branch Frostweed
	<i>Helianthemum propinquum*</i>	Low Frostweed
	<i>Helianthus occidentalis ssp. occidentalis</i>	Western Sunflower

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass
	<i>Hottonia inflata*</i>	Featherfoil
	<i>Hypericum adpressum</i>	Creeping St. John's-wort
	<i>Hypericum drummondii</i>	Nits-and-lice
	<i>Hypericum mitchellianum*</i>	Blue Ridge St. John's-wort
	<i>Hypericum virgatum*</i>	Sharpleaf St. John's-wort
	<i>Ilex collina*</i>	Hill Holly
	<i>Isoetes riparia var. riparia</i>	Shore Quillwort
	<i>Isoetes valida*</i>	True Quillwort
	<i>Juglans cinerea</i>	Butternut
	<i>Juncus brachycarpus</i>	Short-fruit Rush
	<i>Juncus dichotomus</i>	Forked Rush
	<i>Lemna valdiviana</i>	Pale Duckweed
	<i>Lindernia dubia var. anagallidea</i>	Yellowseed False Pimpernel
	<i>Listera smallii</i>	Kidneyleaf Twayblade
	<i>Lonicera canadensis</i>	Fly Honeysuckle
	<i>Ludwigia leptocarpa</i>	River Seedbox
	<i>Ludwigia polycarpa*</i>	Top-pod Primrose-willow
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal
	<i>Marshallia grandiflora*</i>	Monongahela Barbara's-buttons
	<i>Matteuccia struthiopteris</i>	Ostrich Fern
	<i>Melica mutica</i>	Two-flower Melicgrass
	<i>Muhlenbergia capillaris var. capillaris</i>	Hair-awn Muhly
	<i>Myriophyllum pinnatum</i>	Cutleaf Water-milfoil
	<i>Packera paupercula</i>	Balsam Ragwort
	<i>Paronychia virginica</i>	Yellow Nailwort

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass
	<i>Peltandra virginica</i>	Green Arrow-arum
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass
	<i>Poa saltuensis</i>	Old-pasture Bluegrass
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort
	<i>Polygonum amphibium</i>	Water Knotweed
	<i>Potamogeton illinoensis</i>	Illinois Pondweed
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed
	<i>Potamogeton zosteriformis</i>	Flatstem Pondweed
	<i>Prunus pumila</i> var. <i>depressa</i>	Sand Cherry
	<i>Ptilimnium fluviatile</i> *	Harperella
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint
	<i>Quercus shumardii</i>	Shumard Oak
	<i>Ranunculus macounii</i>	Macoun's Buttercup
	<i>Ranunculus pennsylvanicus</i>	Bristly Crowfoot
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot
	<i>Ranunculus trichophyllus</i> var. <i>trichophyllus</i>	Threadleaf Water Crowfoot
	<i>Rhexia mariana</i> var. <i>mariana</i>	Maryland Meadowbeauty
	<i>Rhododendron viscosum</i>	Swamp Azalea
	<i>Rhynchospora fusca</i> *	Brown Beaksedge
	<i>Rhynchospora recognita</i>	Beaked Rush
	<i>Ribes missouriense</i>	Missouri Gooseberry
	<i>Ribes triste</i>	Swamp Red Currant
	<i>Rorippa sessiliflora</i>	Southern Yellow Cress
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	Orange Coneflower
	<i>Salix amygdaloides</i>	Peachleaf Willow
	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed
	<i>Sanguisorba canadensis</i>	Canada Burnet
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush
	<i>Scleria triglomerata</i>	Whip Nutrush
	<i>Scutellaria galericulata</i>	Hooded Skullcap
	<i>Scutellaria ovata</i> ssp. <i>ovata</i>	Heart-leaved Skullcap
	<i>Scutellaria saxatilis</i> *	Rock Skullcap
	<i>Sericocarpus linifolius</i>	Narrowleaf Whitetop Aster
	<i>Sibara virginica</i>	Virginia Cress
	<i>Sida hermaphrodita</i> *	Virginia Mallow
	<i>Silene nivea</i> *	Snowy Catchfly
	<i>Silphium perfoliatum</i> var. <i>connatum</i> *	Cup-plant
	<i>Solidago simplex</i> ssp. <i>randii</i>	Rand's Goldenrod
	<i>Sparganium androcladum</i>	Branched Bur-reed
	<i>Sparganium angustifolium</i>	Greenfruit Bur-reed
	<i>Spermacoce glabra</i> *	Buttonweed
	<i>Spiraea virginiana</i> *	Virginia Spiraea
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses
	<i>Spiranthes vernalis</i>	Spring Ladies'-tresses
	<i>Sporobolus clandestinus</i>	Secret Dropseed
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle
	<i>Stenanthium gramineum</i> var. <i>robustum</i> *	Stout Featherbells
	<i>Symphoricarpos albus</i> var. <i>albus</i>	Snowberry
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Symphyotrichum novi-belgii</i>	New Belgium American-aster
	<i>Synandra hispidula</i> *	Guyandotte Beauty
	<i>Thalictrum clavatum</i>	Mountain Meadowrue
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort
	<i>Triadenum walteri</i>	Greater Marsh-st. John's-wort
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel
	<i>Trichophorum planifolium</i> *	Bashful Bulrush
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover
	<i>Utricularia geminiscapa</i> *	Hidden-fruit Bladderwort
	<i>Utricularia macrorhiza</i>	Greater Bladderwort
	<i>Viburnum lentago</i>	Nannyberry
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet
	<i>Viola septentrionalis</i>	Northern Blue Violet
	<i>Vitis rupestris</i> *	Sand Grape
	<i>Wolffia columbiana</i>	Columbian Watermeal
	<i>Xyris torta</i>	Slender Yellow-eyed-grass
	<i>Zannichellia palustris</i>	Horned Pondweed
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Glyptemys insculpta</i> *	Wood Turtle
	<i>Graptemys geographica</i> *	Northern Map Turtle
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake
	<i>Liochlorophis vernalis</i> *	Smooth Greensnake
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Pantherophis guttatus</i> *	Red Cornsnake
	<i>Pseudemys concinna</i>	River Cooter

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter
	<i>Regina septemvittata</i>	Queen Snake
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake
Snails		
	<i>Catinella vermeta</i>	Suboval Ambersnail
	<i>Gastrocopta procera</i>	Wing Snaggletooth
	<i>Gastrocopta tappaniana</i>	White Snaggletooth
	<i>Glyphyalinia praecox</i>	Brilliant Glyph
	<i>Mesodon aff. Andrewsae</i> *	Balsam Globe
	<i>Mesodon clausus</i>	Yellow Globelet
	<i>Mesodon mitchellianus</i>	Sealed Globelet
	<i>Nesovitrea electrina</i>	Amber Glass
	<i>Stenotrema barbatum</i>	Bristled Slitmouth
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Triodopsis hopetonensis</i>	Magnolia Threetooth
	<i>Triodopsis tennesseeensis</i>	Budded Threetooth
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia
	<i>Ventridens acerra</i>	Glossy Dome
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Vertigo ovata</i>	Ovate Vertigo
	<i>Webbhelix multilineata</i>	Striped Whitelip
Tiger Beetles		
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle
	<i>Cicindela cuprascens</i>	A Tiger Beetle
	<i>Cicindela cursitans</i> *	A Tiger Beetle
	<i>Cicindela formosa generosa</i>	A Tiger Beetle
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE River Floodplains

TAXA	SCIENTIFIC NAME	COMMON NAME
Tiger Beetles		
	<i>Cicindela limbalis</i>	A Tiger Beetle
	<i>Cicindela marginipennis</i> *	Cobblestone Tiger Beetle
	<i>Cicindela scutellaris</i>	A Tiger Beetle
	<i>Tetracha virginica</i>	Virginia Big-headed Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Shale Barrens

TAXA	SCIENTIFIC NAME	COMMON NAME
Butterflies and Moths		
	<i>Acronicta dolli</i> *	Doll's Merolonche
	<i>Catocala dulciola</i> *	Sweet Underwing
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing
	<i>Chaetagnaea cerata</i> *	Waxed Sallow Moth
	<i>Erynnis lucilius</i> *	Columbine Duskywing
	<i>Erynnis martialis</i> *	Mottled Duskywing
	<i>Euchloe olympia</i> *	Olympia Marble
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue
	<i>Hesperia metea</i> *	Cobweb Skipper
	<i>Phyciodes cocyta selene</i> *	Northern Crescent
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak
	<i>Satyrium favonius ontario</i>	Northern Hairstreak
	<i>Zale calycanthata</i> *	Double-banded Zale
Plants		
	<i>Allium oxyphilum</i> *	Nodding Wild Onion
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress
	<i>Arabis serotina</i> *	Shalebarren Rockcress
	<i>Arctostaphylos uva-ursi</i>	Kinniinnick
	<i>Astragalus distortus var. distortus</i>	Bent Milkvetch
	<i>Bouteloua curtipendula var. curtipendula</i>	Sideoats Grama
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed
	<i>Carex mesochorea</i>	Midland Sedge
	<i>Carex molesta</i>	Troublesome Sedge
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern
	<i>Clematis albicoma</i>	White-hair Leatherflower
	<i>Commelina erecta</i>	Slender Dayflower
	<i>Dichanthelium boreale</i>	Panicgrass
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Shale Barrens

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Helianthemum bicknellii</i>	Hoary Frostweed
	<i>Helianthus laevigatus</i>	Smooth Sunflower
	<i>Liatris squarrulosa</i> *	Appalachian Gayfeather
	<i>Liatris turgida</i> *	Turgid Gayfeather
	<i>Malaxis bayardii</i>	Bayard Long's Adder's Mouth
	<i>Melica nitens</i>	Three-flower Melicgrass
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose
	<i>Packera antennariifolia</i>	Shalebarren Ragwort
	<i>Phlox buckleyi</i> *	Swordleaf Phlox
	<i>Pieris floribunda</i>	Mountain Fetterbush
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum
	<i>Quercus prinoides</i>	Dwarf Chinquapin Oak
	<i>Scutellaria ovata</i> ssp. <i>ovata</i>	Heart-leaved Skullcap
	<i>Silphium compositum</i> var. <i>reniforme</i> *	Rosinweed
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster
	<i>Taenidia montana</i> *	Mountain-pimpernel
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner
	<i>Crotalus horridus</i> *	Timber Rattlesnake
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink
Tiger Beetles		
	<i>Cicindela limbalis</i>	A Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Shale Barrens

TAXA	SCIENTIFIC NAME	COMMON NAME
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* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Sinkhole and Depression Ponds

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
Mammals		
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis leibii</i> *	Eastern Small-footed Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Perimyotis subflavus</i> *	Tricolored Bat
Plants		
	<i>Glyceria acutiflora</i>	Creeping Mannagrass
	<i>Sagittaria calycina</i> var. <i>calycina</i>	Long-lobe Arrowhead
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush
Snails		
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Catinella vermeta</i>	Suboval Ambersnail
	<i>Nesovitrea electrina</i>	Amber Glass

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Lentic Water Bodies

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog
	<i>Acris crepitans</i> *	Northern Cricket Frog
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander
	<i>Ambystoma opacum</i>	Marbled Salamander
	<i>Ambystoma texanum</i> *	Smallmouth Salamander
	<i>Anaxyrus fowleri</i>	Fowler's Toad
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander
	<i>Desmognathus welteri</i> *	Black Mountain Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Lithobates pipiens</i> *	Northern Leopard Frog
	<i>Necturus maculosus</i> *	Mudpuppy
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad
Birds		
	<i>Anas rubripes</i> *	American Black Duck
	<i>Haliaeetus leucocephalus</i>	Bald Eagle
	<i>Lophodytes cucullatus</i>	Hooded Merganser
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Mergus merganser</i>	Common Merganser
	<i>Pandion haliaetus</i>	Osprey
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Lentic Water Bodies

TAXA	SCIENTIFIC NAME	COMMON NAME
Birds		
	<i>Podilymbus podiceps</i>	Pied-billed Grebe
	<i>Protonotaria citrea</i>	Prothonotary Warbler
	<i>Riparia riparia</i> *	Bank Swallow
Dragonflies and Damselflies		
	<i>Aeshna tuberculifera</i>	Black-tipped Darner
	<i>Anax longipes</i> *	Comet Darner
	<i>Celithemis fasciata</i>	Banded Pennant
	<i>Cordulia shurtleffi</i>	American Emerald
	<i>Enallagma antennatum</i>	Rainbow Bluet
	<i>Enallagma vesperum</i>	Vesper Bluet
	<i>Ischnura kellicotti</i>	Lilypad Forktail
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Lestes disjunctus</i>	Northern Spreadwing
	<i>Rhionaeschna mutata</i> *	Spatterdock Darner
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
	<i>Telebasis byersi</i>	Duckweed Firetail
	<i>Tamea onusta</i>	Red Saddlebags
Mammals		
	<i>Myotis lucifugus</i> *	Little Brown Bat
Reptiles		
	<i>Apalone mutica mutica</i> *	Midland Smooth Softshell
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell
	<i>Clemmys guttata</i> *	Spotted Turtle
	<i>Glyptemys insculpta</i> *	Wood Turtle
	<i>Graptemys geographica</i> *	Northern Map Turtle
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle
	<i>Pseudemys concinna</i>	River Cooter

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Lentic Water Bodies

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia
	<i>Lithasia armigera</i>	Armored Rocksnail
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog
	<i>Acris crepitans</i> *	Northern Cricket Frog
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander
	<i>Ambystoma opacum</i>	Marbled Salamander
	<i>Anaxyrus fowleri</i>	Fowler's Toad
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Eurycea longicauda</i>	Longtail Salamander
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Birds		
	<i>Ardea herodias</i>	Great Blue Heron
	<i>Butorides virescens</i>	Green Heron
	<i>Empidonax alnorum</i>	Alder Flycatcher
	<i>Geothlypis formosa</i> *	Kentucky Warbler
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush
Butterflies and Moths		
	<i>Autochton cellus</i> *	Golden-banded Skipper
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary
	<i>Celastrina neglectamajor</i>	Appalachian Azure
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Butterflies and Moths		
	<i>Euphyes bimacula*</i>	Two-spotted Skipper
	<i>Papilio appalachiensis*</i>	Appalachian Tiger Swallowtail
	<i>Parrhasius m-album</i>	White-m Hairstreak
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma
	<i>Polygonia progne</i>	Gray Comma
	<i>Speyeria atlantis</i>	Atlantis Fritillary
	<i>Speyeria diana*</i>	Diana Fritillary
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing
Crayfish		
	<i>Cambarus dubius B*</i>	Meadow River Mudbug
Dragonflies and Damselflies		
	<i>Calopteryx amata</i>	Superb Jewelwing
	<i>Calopteryx angustipennis*</i>	Appalachian Jewelwing
	<i>Cordulegaster erronea*</i>	Tiger Spiketail
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail
	<i>Cordulia shurtleffi</i>	American Emerald
	<i>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg
	<i>Epiaeschna heros</i>	Swamp Darner
	<i>Gomphus abbreviatus*</i>	Spine-crowned Clubtail
	<i>Gomphus adelphus*</i>	Mustached Clubtail
	<i>Gomphus descriptus</i>	Harpoon Clubtail
	<i>Gomphus fraternus*</i>	Midland Clubtail
	<i>Gomphus lineatifrons</i>	Splendid Clubtail
	<i>Gomphus quadricolor*</i>	Rapids Clubtail
	<i>Gomphus rogersi*</i>	Sable Clubtail
	<i>Gomphus viridifrons*</i>	Green-faced Clubtail
	<i>Helocordulia uhleri</i>	Uhler's Sundragon
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Dragonflies and Damselflies		
	<i>Lanthus vernalis</i> *	Southern Pygmy Clubtail
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail
	<i>Ophiogomphus incurvatus alleghaniensis</i> *	Appalachian Snaketail
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail
	<i>Somatochlora linearis</i>	Mocha Emerald
	<i>Stylurus scudderi</i> *	Zebra Clubtail
	<i>Tachopteryx thoreyi</i>	Gray Petaltail
Mammals		
	<i>Condylura cristata</i>	Star-nosed Mole
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Lasiurus borealis</i> *	Eastern Red Bat
	<i>Lasiurus cinereus</i> *	Hoary Bat
	<i>Myotis lucifugus</i> *	Little Brown Bat
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat
	<i>Myotis sodalis</i> *	Indiana Bat
	<i>Nycticeius humeralis</i>	Evening Bat
	<i>Ochrotomys nuttalli</i> *	Golden Mouse
	<i>Perimyotis subflavus</i> *	Tricolored Bat
	<i>Sorex dispar</i>	Long-tailed Shrew
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew
	<i>Sorex palustris punctulatus</i> *	Southern Water Shrew
	<i>Synaptomys cooperi</i>	Southern Bog Lemming
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse
Plants		
	<i>Agrostis mertensii</i>	Northern Bentgrass
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Bartonia paniculata ssp. paniculata</i>	Twining Screwstem
	<i>Bolboschoenus fluviatilis</i>	River Bulrush
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern
	<i>Calamagrostis stricta ssp. stricta var. stricta</i>	Reedgrass
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge
	<i>Carex buxbaumii</i>	Brown Bog Sedge
	<i>Carex canescens</i>	Silvery Sedge
	<i>Carex comosa</i>	Longhair Sedge
	<i>Carex conoidea</i>	Field Sedge
	<i>Carex davisii*</i>	Davis' Sedge
	<i>Carex haydenii</i>	Cloud Sedge
	<i>Carex lasiocarpa var. americana</i>	Woolly-fruit Sedge
	<i>Carex meadii*</i>	Mead's Sedge
	<i>Carex novae-angliae</i>	New England Sedge
	<i>Carex oligosperma var. oligosperma</i>	Fewseed Sedge
	<i>Carex pedunculata</i>	Longstalk Sedge
	<i>Carex pellita</i>	Woolly Sedge
	<i>Carex prairea</i>	Prairie Sedge
	<i>Carex seorsa</i>	Weak Stellate Sedge
	<i>Carex styloflexa*</i>	Bent Sedge
	<i>Carex suberecta*</i>	Prairie Straw Sedge
	<i>Carex tetanica*</i>	Rigid Sedge
	<i>Ceratophyllum echinatum*</i>	Spineless Hornwort
	<i>Cleistes bifaria*</i>	Small Rosebud Orchid
	<i>Commelina erecta</i>	Slender Dayflower
	<i>Coreopsis verticillata</i>	Whorled Tickseed
	<i>Crataegus pringlei</i>	Pringle's Hawthorn
	<i>Cuscuta indecora var. neuropetala</i>	Dodder

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Dasistoma macrophylla</i>	Mullein Foxglove
	<i>Dichanthelium boreale</i>	Panicgrass
	<i>Dichanthelium meridionale</i>	Matting Witchgrass
	<i>Dichanthelium scoparium</i>	Broom Witchgrass
	<i>Drosera rotundifolia var. rotundifolia</i>	Roundleaf Sundew
	<i>Eleocharis compressa</i>	Flat-stem Spikerush
	<i>Eleocharis engelmannii*</i>	Engelmann's Spikerush
	<i>Eleocharis intermedia</i>	Spikerush
	<i>Eleocharis palustris</i>	Marsh Spikerush
	<i>Eleocharis quadrangulata</i>	Squarestem Spikerush
	<i>Eleocharis rostellata</i>	Beaked Spikerush
	<i>Elodea nuttallii</i>	Western Waterweed
	<i>Elymus trachycaulus ssp. trachycaulus</i>	Slender Wild Rye
	<i>Equisetum fluviatile</i>	Water Horsetail
	<i>Eupatorium maculatum var. maculatum</i>	Spotted Joe-pyeweed
	<i>Fraxinus nigra</i>	Black Ash
	<i>Gaylussacia dumosa</i>	Dwarf Huckleberry
	<i>Gentiana alba*</i>	Yellow Gentian
	<i>Geum rivale</i>	Purple Avens
	<i>Glyceria acutiflora</i>	Creeping Mannagrass
	<i>Glyceria laxa</i>	Mannagrass
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass
	<i>Hydrocotyle ranunculoides</i>	Swamp Pennywort
	<i>Hypericum adpressum</i>	Creeping St. John's-wort
	<i>Hypericum drummondii</i>	Nits-and-lice
	<i>Ilex collina*</i>	Hill Holly
	<i>Juglans cinerea</i>	Butternut
	<i>Juncus balticus var. littoralis</i>	Baltic Rush

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Juncus brachycarpus</i>	Short-fruit Rush
	<i>Juncus nodosus</i> var. <i>nodosus</i>	Knotted Rush
	<i>Juncus scirpoides</i>	Needle-pod Rush
	<i>Juncus torreyi</i>	Torrey's Rush
	<i>Lemna valdiviana</i>	Pale Duckweed
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid
	<i>Lobelia kalmii</i>	Ontario Lobelia
	<i>Lonicera canadensis</i>	Fly Honeysuckle
	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss
	<i>Lygodium palmatum</i>	American Climbing Fern
	<i>Lysimachia hybrida</i>	Lowland Loosestrife
	<i>Lysimachia quadriflora</i>	Four-flower Loosestrife
	<i>Lysimachia thysiflora</i>	Water Loosestrife
	<i>Lythrum alatum</i> var. <i>alatum</i>	Winged Loosestrife
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops
	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue
	<i>Panicum flexile</i>	Wiry Panicgrass
	<i>Panicum verrucosum</i> *	Warty Panicgrass
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus
	<i>Pedicularis lanceolata</i>	Swamp Lousewort
	<i>Peltandra virginica</i>	Green Arrow-arum
	<i>Phacelia covillei</i> *	Phacelia
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid
	<i>Platanthera peramoena</i>	Pride-of-the-peak
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid
	<i>Poa saltuensis</i>	Old-pasture Bluegrass

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Pogonia ophioglossoides</i>	Rose Pogonia
	<i>Polygonum amphibium</i>	Water Knotweed
	<i>Polygonum careyi</i>	Carey's Smartweed
	<i>Potamogeton tennesseensis*</i>	Tennessee Pondweed
	<i>Prenanthes crepidinea*</i>	Corymbed Rattlesnake-root
	<i>Ptilimnium fluviatile*</i>	Harperella
	<i>Ranunculus hispidus var. caricetorum</i>	Bristly Buttercup
	<i>Ranunculus macounii</i>	Macoun's Buttercup
	<i>Ranunculus pusillus var. pusillus*</i>	Low Spearwort
	<i>Ranunculus sceleratus var. sceleratus</i>	Cursed Crowfoot
	<i>Ranunculus trichophyllus var. trichophyllus</i>	Threadleaf Water Crowfoot
	<i>Rhododendron viscosum</i>	Swamp Azalea
	<i>Ribes hirtellum</i>	Hairy-stem Gooseberry
	<i>Ribes missouriense</i>	Missouri Gooseberry
	<i>Ribes triste</i>	Swamp Red Currant
	<i>Rubus prestonensis</i>	Blackberry
	<i>Ruellia purshiana</i>	Pursh's Wild Petunia
	<i>Salix discolor</i>	Pussy Willow
	<i>Salix lucida ssp. lucida</i>	Shining Willow
	<i>Sanguisorba canadensis</i>	Canada Burnet
	<i>Schoenoplectus acutus var. acutus</i>	Hardstem Bulrush
	<i>Schoenoplectus purshianus</i>	Clubrush
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush
	<i>Scutellaria galericulata</i>	Hooded Skullcap
	<i>Stachys eplingii</i>	Epling's Hedge-nettle
	<i>Stellaria borealis ssp. borealis</i>	Northern Stitchwort
	<i>Toxicodendron vernix</i>	Poison-sumac
	<i>Triadenum tubulosum*</i>	Lesser Marsh-st. John's-wort

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover
	<i>Utricularia gibba</i>	Humped Bladderwort
	<i>Veronica scutellata</i>	Grassleaf Speedwell
	<i>Viburnum lentago</i>	Nannyberry
	<i>Vitis rotundifolia var. rotundifolia</i>	Muscadine
	<i>Woodwardia areolata</i>	Netted Chainfern
	<i>Zannichellia palustris</i>	Horned Pondweed
Reptiles		
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead
	<i>Clemmys guttata*</i>	Spotted Turtle
	<i>Coluber constrictor constrictor</i>	Northern Black Racer
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake
	<i>Glyptemys insculpta*</i>	Wood Turtle
	<i>Liochlorophis vernalis*</i>	Smooth Greensnake
	<i>Opheodrys aestivus</i>	Rough Greensnake
	<i>Regina septemvittata</i>	Queen Snake
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake
Snails		
	<i>Catinella vermeta</i>	Suboval Ambersnail
	<i>Euchemotrema leai</i>	Lowland Pillsnail
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph
	<i>Hawaii alachuana</i>	Southeastern Gem
	<i>Helicodiscus shimeki</i>	Temperate Coil
	<i>Mesodon mitchellianus</i>	Sealed Globelet
	<i>Oxyloma retusum</i>	Blunt Ambersnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Terrestrial

HABITAT TYPE Small Stream Riparian Habitats

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Paravitrea bellona</i> *	Club Supercoil
	<i>Punctum smithi</i>	Lamellate Spot
	<i>Striatura ferrea</i>	Black Striate
	<i>Triodopsis picea</i> *	Spruce Knob Threetooth
	<i>Triodopsis rugosa</i> *	Buttressed Threetooth
	<i>Triodopsis vulgata</i>	Dished Threetooth
	<i>Ventridens acerra</i>	Glossy Dome
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Ventridens coelaxis</i>	Bidentate Dome
	<i>Ventridens suppressus</i>	Flat Dome
	<i>Vertigo parvula</i>	Smallmouth Vertigo
	<i>Webbhelix multilineata</i>	Striped Whitelip
Tiger Beetles		
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle
	<i>Cicindela limbalis</i>	A Tiger Beetle
	<i>Cicindela unipunctata</i>	A Tiger Beetle
	<i>Tetracha virginica</i>	Virginia Big-headed Tiger Beetle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Embayment,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Amblema plicata</i>	Threeridge
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Obliquaria reflexa</i>	Threehorn Wartyback
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Toxolasma parvus</i>	Lilliput

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,High Gradient,Cold

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Dragonflies and Damselflies		
	<i>Anax longipes</i> *	Comet Darner
	<i>Cordulegaster erronea</i> *	Tiger Spiketail
	<i>Gomphus adelphus</i> *	Mustached Clubtail
	<i>Gomphus fraternus</i> *	Midland Clubtail
	<i>Lestes disjunctus</i>	Northern Spreadwing
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing
	<i>Lestes inaequalis</i>	Elegant Spreadwing
	<i>Leucorrhinia glacialis</i> *	Crimson-ringed Whiteface
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface
	<i>Libellula flavida</i>	Yellow-sided Skimmer
	<i>Tamea carolina</i>	Carolina Saddlebags
Fish		
	<i>Cottus sp. 1</i> *	Bluestone Sculpin
	<i>Margariscus margarita</i> *	Pearl Dace
	<i>Salvelinus fontinalis</i> *	Brook Trout
	<i>Thoburnia rhothoeca</i>	Torrent Sucker
Mussels		
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Pleurobema collina</i> *	James Spiny mussel
	<i>Strophitus undulatus</i>	Squawfoot

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,High Gradient,Cold

TAXA	SCIENTIFIC NAME	COMMON NAME
Other Invertebrates		
	<i>Allocapnia frumi</i>	A Stonefly
	<i>Megaleuctra flinti</i>	A Stonefly
	<i>Ostrocerca complexa</i>	A Stonefly
	<i>Ostrocerca prolongata</i>	A Stonefly
	<i>Sweltsa pocahontas</i>	A Stonefly
Reptiles		
	<i>Glyptemys insculpta</i> *	Wood Turtle
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,High Gradient,Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Cambarus elkensis*</i>	Elk River Crayfish
	<i>Cambarus nerterius*</i>	Greenbrier Cave Crayfish
	<i>Cambarus theepiensis</i>	Coalfields Crayfish
Dragonflies and Damselflies		
	<i>Aeshna tuberculifera</i>	Black-tipped Darner
	<i>Anax longipes*</i>	Comet Darner
	<i>Argia bipunctulata*</i>	Seepage Dancer
	<i>Calopteryx amata</i>	Superb Jewelwing
	<i>Celithemis fasciata</i>	Banded Pennant
	<i>Cordulegaster erronea*</i>	Tiger Spiketail
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail
	<i>Enallagma annexum</i>	Northern Bluet
	<i>Enallagma vernale</i>	Vernal Bluet
	<i>Epitheca canis</i>	Beaverpond Baskettail
	<i>Gomphus viridifrons*</i>	Green-faced Clubtail
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail
	<i>Lanthus vernalis*</i>	Southern Pygmy Clubtail
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,High Gradient,Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Dragonflies and Damselflies		
	<i>Libellula axilena</i>	Bar-winged Skimmer
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Somatochlora elongata</i>	Ski-tipped Emerald
	<i>Stylurus scudderi*</i>	Zebra Clubtail
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk
	<i>Tachopteryx thoreyi</i>	Gray Petaltail
Fish		
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Salvelinus fontinalis*</i>	Brook Trout
Other Invertebrates		
	<i>Allocaonia frumi</i>	A Stonefly
	<i>Alloperla arabama</i>	A Stonefly
	<i>Alloperla biserrata</i>	A Stonefly
	<i>Megaleuctra flinti</i>	A Stonefly
	<i>Ostrocerca complexa</i>	A Stonefly
	<i>Ostrocerca prolongata</i>	A Stonefly
	<i>Sweltsa pocahontas</i>	A Stonefly
Reptiles		
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,High Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander
Crayfish		
	<i>Cambarus hatfieldi*</i>	Tug Valley Crayfish
Fish		
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace
Other Invertebrates		
	<i>Alloperla aracoma</i>	A Stonefly
	<i>Alloperla biserrata</i>	A Stonefly

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Procambarus acutus*</i>	White River Crayfish
Dragonflies and Damselflies		
	<i>Aeshna verticalis*</i>	Green-striped Darner
	<i>Enallagma antennatum</i>	Rainbow Bluet
	<i>Epitheca canis</i>	Beaverpond Baskettail
	<i>Gomphus rogersi*</i>	Sable Clubtail
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Ischnura kellicotti</i>	Lilypad Forktail
	<i>Ladona deplanata</i>	Blue Corporal
	<i>Lanthus vernalis*</i>	Southern Pygmy Clubtail
	<i>Libellula axilena</i>	Bar-winged Skimmer
	<i>Libellula flavida</i>	Yellow-sided Skimmer
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Ophiogomphus incurvatus alleghaniensis*</i>	Appalachian Snaketail
	<i>Progomphus obscurus*</i>	Common Sanddragon
	<i>Stylurus scudderi*</i>	Zebra Clubtail
Fish		
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace
	<i>Esox americanus vermiculatus</i>	Grass Pickerel
	<i>Fundulus diaphanus</i>	Banded Killifish
	<i>Lepomis gulosus</i>	Warmouth
	<i>Lepomis humilis*</i>	Orangespotted Sunfish
	<i>Lythrurus umbratilis*</i>	Redfin Shiner
	<i>Macrhybopsis storeriana</i>	Silver Chub
	<i>Notropis blennius</i>	River Shiner

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Percina gymnocephala</i>	Appalachia Darter
	<i>Umbra limi</i>	Central Mudminnow
Mussels		
	<i>Alasmidonta marginata*</i>	Elktoe
	<i>Amblema plicata</i>	Threeridge
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell
	<i>Elliptio dilatata</i>	Spike
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis*</i>	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Obovaria subrotunda*</i>	Round Hickorynut
	<i>Pleurobema clava*</i>	Clubshell
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua*</i>	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Other Invertebrates		
	<i>Hansonoperla hokolesqua</i>	A Stonefly
Plants		
	<i>Elodea nuttallii</i>	Western Waterweed

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek,Low Gradient,Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
Dragonflies and Damselflies		
	<i>Somatochlora forcipata</i>	Forcipate Emerald
Fish		
	<i>Lythrurus ardens*</i>	Rosefin Shiner
Other Invertebrates		
	<i>Megaleuctra flinti</i>	A Stonefly
	<i>Ostrocerca complexa</i>	A Stonefly
	<i>Ostrocerca prolongata</i>	A Stonefly

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Cold

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
Dragonflies and Damselflies		
	<i>Enallagma annexum</i>	Northern Bluet
	<i>Enallagma vernale</i>	Vernal Bluet
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Leucorrhinia glacialis</i> *	Crimson-ringed Whiteface
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail
	<i>Somatochlora elongata</i>	Ski-tipped Emerald
	<i>Somatochlora forcipata</i>	Forcipate Emerald
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
Fish		
	<i>Cottus sp. c.f. cognatus</i> *	Checkered Sculpin
	<i>Notropis scabriceps</i> *	New River Shiner
Other Invertebrates		
	<i>Allocapnia frumi</i>	A Stonefly
	<i>Megaleuctra flinti</i>	A Stonefly
	<i>Ostrocerca complexa</i>	A Stonefly
	<i>Ostrocerca prolongata</i>	A Stonefly
	<i>Sweltsa pocahontas</i>	A Stonefly

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Cambarus callainus*</i>	Big Sandy Crayfish
	<i>Cambarus chasmodactylus</i>	New River Crayfish
	<i>Cambarus nerterius*</i>	Greenbrier Cave Crayfish
	<i>Cambarus smilax*</i>	Greenbrier River Crayfish
	<i>Cambarus veteranus*</i>	Guyandotte River Crayfish
Dragonflies and Damselflies		
	<i>Aeshna tuberculifera</i>	Black-tipped Darner
	<i>Aeshna verticalis*</i>	Green-striped Darner
	<i>Anax longipes*</i>	Comet Darner
	<i>Cordulia shurtleffi</i>	American Emerald
	<i>Enallagma annexum</i>	Northern Bluet
	<i>Enallagma vesperum</i>	Vesper Bluet
	<i>Epiaeschna heros</i>	Swamp Darner
	<i>Epitheca canis</i>	Beaverpond Baskettail
	<i>Gomphus desertus</i>	Harpoon Clubtail
	<i>Gomphus rogersi*</i>	Sable Clubtail
	<i>Ladona deplanata</i>	Blue Corporal
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Dragonflies and Damselflies		
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Lestes disjunctus</i>	Northern Spreadwing
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing
	<i>Lestes inaequalis</i>	Elegant Spreadwing
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Nehalennia gracilis*</i>	Sphagnum Sprite
	<i>Rhionaeschna mutata*</i>	Spatterdock Darner
	<i>Somatochlora elongata</i>	Ski-tipped Emerald
	<i>Somatochlora linearis</i>	Mocha Emerald
	<i>Stylurus scudderi*</i>	Zebra Clubtail
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk
	<i>Tachopteryx thoreyi</i>	Gray Petaltail
	<i>Tramea carolina</i>	Carolina Saddlebags
Fish		
	<i>Ameiurus nebulosus</i>	Brown Bullhead
	<i>Catostomus catostomus</i>	Longnose Sucker
	<i>Clinostomus elongatus*</i>	Redside Dace
	<i>Cottus kanawhae*</i>	Kanawha Sculpin
	<i>Cottus sp. c.f. cognatus*</i>	Checkered Sculpin
	<i>Erimyzon oblongus</i>	Creek Chubsucker
	<i>Etheostoma longimanum*</i>	Longfin Darter
	<i>Etheostoma osburni*</i>	Candy Darter
	<i>Exoglossum laurae*</i>	Tonguetied Minnow
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Fundulus diaphanus</i>	Banded Killifish
	<i>Luxilus cornutus*</i>	Common Shiner

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Lythrurus ardens</i> *	Rosefin Shiner
	<i>Margariscus margarita</i> *	Pearl Dace
	<i>Percina gymnocephala</i>	Appalachia Darter
	<i>Percina notogramma</i> *	Stripeback Darter
	<i>Phenacobius teretulus</i> *	Kanawha Minnow
	<i>Thoburnia rhothoeca</i>	Torrent Sucker
Mussels		
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta undulata</i> *	Triangle Floater
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio dilatata</i>	Spike
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Pleurobema collina</i> *	James Spiny mussel
	<i>Ptychobranchus fasciolaris</i>	Kidneyshell
	<i>Strophitus undulatus</i>	Squawfoot
Other Invertebrates		
	<i>Allocapnia frumi</i>	A Stonefly
	<i>Alloperla aracoma</i>	A Stonefly
	<i>Alloperla biserrata</i>	A Stonefly
	<i>Megaleuctra flinti</i>	A Stonefly
	<i>Ostrocerca complexa</i>	A Stonefly
	<i>Ostrocerca prolongata</i>	A Stonefly
	<i>Sweltsa pocahontas</i>	A Stonefly
Plants		
	<i>Najas gracillima</i>	Slender Waternymph

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Clemmys guttata*</i>	Spotted Turtle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Ambystoma texanum</i> *	Smallmouth Salamander
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Cambarus hatfieldi</i> *	Tug Valley Crayfish
	<i>Cambarus theepiensis</i>	Coalfields Crayfish
	<i>Fallicambarus fodiens</i> *	Digger Crayfish
Dragonflies and Damselflies		
	<i>Anax longipes</i> *	Comet Darner
	<i>Celithemis fasciata</i>	Banded Pennant
	<i>Cordulegaster erronea</i> *	Tiger Spiketail
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg
	<i>Enallagma antennatum</i>	Rainbow Bluet
	<i>Enallagma vesperum</i>	Vesper Bluet
	<i>Epiaeschna heros</i>	Swamp Darner
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Helocordulia uhleri</i>	Uhler's Sundragon
	<i>Hetaerina titia</i>	Smoky Rubyspot
	<i>Libellula flavida</i>	Yellow-sided Skimmer
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Ophiogomphus incurvatus alleghaniensis</i> *	Appalachian Snaketail
	<i>Somatochlora linearis</i>	Mocha Emerald
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk
	<i>Telebasis byersi</i>	Duckweed Firetail
	<i>Tamea onusta</i>	Red Saddlebags

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Ameiurus nebulosus</i>	Brown Bullhead
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace
	<i>Clinostomus elongatus*</i>	Redside Dace
	<i>Erimyzon oblongus</i>	Creek Chubsucker
	<i>Esox americanus vermiculatus</i>	Grass Pickerel
	<i>Fundulus diaphanus</i>	Banded Killifish
	<i>Ictiobus niger</i>	Black Buffalo
	<i>Lepomis gulosus</i>	Warmouth
	<i>Lepomis humilis*</i>	Orangespotted Sunfish
	<i>Lethenteron appendix</i>	American Brook Lamprey
	<i>Lythrurus umbratilis*</i>	Redfin Shiner
	<i>Macrhybopsis storeriana</i>	Silver Chub
	<i>Notropis blennius</i>	River Shiner
	<i>Notropis boops*</i>	Bigeye Shiner
	<i>Notropis buchanani</i>	Ghost Shiner
	<i>Umbra limi</i>	Central Mudminnow
Mussels		
	<i>Amblema plicata</i>	Threeridge
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel
	<i>Lasmigona compressa*</i>	Creek Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Obovaria subrotunda*</i>	Round Hickorynut

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Headwater Creek, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Pleurobema clava*</i>	Clubshell
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Other Invertebrates		
	<i>Alloperla aracoma</i>	A Stonefly
	<i>Alloperla biserrata</i>	A Stonefly
	<i>Hansonoperla hokolesqua</i>	A Stonefly
Reptiles		
	<i>Apalone mutica mutica*</i>	Midland Smooth Softshell
	<i>Clemmys guttata*</i>	Spotted Turtle

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Ambystoma texanum</i> *	Smallmouth Salamander
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Fallicambarus fodiens</i> *	Digger Crayfish
Dragonflies and Damselflies		
	<i>Gomphus fraternus</i> *	Midland Clubtail
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail
	<i>Hetaerina titia</i>	Smoky Rubyspot
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Macromia illinoiensis</i>	Illinois River Cruiser
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Neurocordulia molesta</i>	Smoky Shadowdragon
	<i>Neurocordulia obsoleta</i>	Umber Showdragon
	<i>Stylurus plagiatus</i>	Russet-tipped Clubtail
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk
Fish		
	<i>Ameiurus melas</i> *	Black Bullhead
	<i>Ameiurus nebulosus</i>	Brown Bullhead
	<i>Ammocrypta clara</i> *	Western Sand Darter
	<i>Anguilla rostrata</i> *	American Eel
	<i>Carpionodes carpio</i>	River Carpsucker
	<i>Carpionodes velifer</i> *	Highfin Carpsucker
	<i>Crystallaria cincotta</i> *	Diamond Darter
	<i>Cycleptus elongatus</i> *	Blue Sucker
	<i>Erimystax dissimilis</i>	Streamline Chub

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Erimystax x-punctatus</i>	Gravel Chub
	<i>Etheostoma maculatum</i> *	Spotted Darter
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter
	<i>Hiodon alosoides</i>	Goldeye
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo
	<i>Ictiobus niger</i>	Black Buffalo
	<i>Lepomis gulosus</i>	Warmouth
	<i>Lethenteron appendix</i>	American Brook Lamprey
	<i>Macrhybopsis hyostoma</i>	Shoal Chub
	<i>Macrhybopsis storeriana</i>	Silver Chub
	<i>Moxostoma carinatum</i>	River Redhorse
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Notropis ariommus</i> *	Popeye Shiner
	<i>Notropis blennius</i>	River Shiner
	<i>Notropis buchanani</i>	Ghost Shiner
	<i>Notropis procne</i> *	Swallowtail Shiner
	<i>Noturus eleutherus</i>	Mountain Madtom
	<i>Noturus stigmosus</i> *	Northern Madtom
	<i>Percina copelandi</i>	Channel Darter
	<i>Percina evides</i>	Gilt Darter
	<i>Percina macrocephala</i> *	Longhead Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Percina phoxocephala</i>	Slenderhead Darter
	<i>Percina sciera</i>	Dusky Darter
	<i>Percina shumardi</i>	River Darter

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow
	<i>Pimephales vigilax</i>	Bullhead Minnow
	<i>Polyodon spathula</i>	Paddlefish
	<i>Scaphirhynchus platyrhynchus</i>	Shovelnose Sturgeon
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Amblema plicata</i>	Threeridge
	<i>Cumberlandia monodonta</i> *	Spectaclecase
	<i>Cyclonaias tuberculata</i> *	Purple Wartback
	<i>Cyprogenia stegaria</i> *	Fanshell
	<i>Ellipsaria lineolata</i>	Butterfly
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio crassidens</i> *	Elephant-ear
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell
	<i>Epioblasma triquetra</i> *	Snuffbox
	<i>Fusconaia ebena</i> *	Ebonyshell
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda</i> *	Long-solid
	<i>Lampsilis abrupta</i> *	Pink Mucket
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel
	<i>Lampsilis ovata</i>	Pocketbook
	<i>Lampsilis teres</i> *	Yellow Sandshell

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona compressa</i> *	Creek Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta</i> *	Black Sandshell
	<i>Megaloniais nervosa</i>	Washboard
	<i>Obliquaria reflexa</i>	Threehorn Wartyback
	<i>Obovaria olivaria</i>	Hickorynut
	<i>Obovaria subrotunda</i> *	Round Hickorynut
	<i>Plethobasus cyphus</i> *	Sheepnose
	<i>Pleurobema clava</i> *	Clubshell
	<i>Pleurobema cordatum</i>	Ohio Pigtoe
	<i>Pleurobema sintoxia</i> *	Round Pigtoe
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula cylindrica</i>	Rabbitsfoot
	<i>Quadrula metanevra</i>	Monkeyface
	<i>Quadrula nodulata</i>	Wartyback
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua</i> *	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla donaciformis</i>	Fawnsfoot
	<i>Truncilla truncata</i>	Deertoe

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Unio merus tetralasmus</i>	Pondhorn
	<i>Villosa fabalis</i> *	Rayed Bean
	<i>Villosa iris</i>	Rainbow
Plants		
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort
	<i>Najas gracillima</i>	Slender Waternymph
Reptiles		
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell
	<i>Graptemys geographica</i> *	Northern Map Turtle
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle
	<i>Pseudemys concinna</i>	River Cooter
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia
	<i>Lithasia armigera</i>	Armored Rocksnail
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Dragonflies and Damselflies		
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
	<i>Tramea carolina</i>	Carolina Saddlebags
Fish		
	<i>Ammocrypta clara</i> *	Western Sand Darter
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter
	<i>Anguilla rostrata</i> *	American Eel
	<i>Crystallaria cincotta</i> *	Diamond Darter
	<i>Erimystax dissimilis</i>	Streamline Chub
	<i>Ichthyomyzon fossor</i> *	Northern Brook Lamprey
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Noturus eleutherus</i>	Mountain Madtom
	<i>Percina evides</i>	Gilt Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Percina peltata</i> *	Shield Darter
	<i>Percina sciera</i>	Dusky Darter
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Amblema plicata</i>	Threeridge
	<i>Cyclonaias tuberculata</i> *	Purple Wartback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio crassidens</i> *	Elephant-ear

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Elliptio dilatata</i>	Spike
	<i>Epioblasma triquetra</i> *	Snuffbox
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda</i> *	Long-solid
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel
	<i>Lampsilis ovata</i>	Pocketbook
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta</i> *	Black Sandshell
	<i>Megalonaias nervosa</i>	Washboard
	<i>Obliquaria reflexa</i>	Threehorn Wartyback
	<i>Obovaria subrotunda</i> *	Round Hickorynut
	<i>Pleurobema sintoxia</i> *	Round Pigtoe
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla truncata</i>	Deertoe
	<i>Villosa iris</i>	Rainbow

Other Invertebrates

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Large River,Moderate Gradient,Warm

TAXA	SCIENTFIC NAME	COMMON NAME
Other Invertebrates		
	<i>Utaperla gaspesiana</i>	A Stonefly
Plants		
	<i>Najas gracillima</i>	Slender Waternymph
Snails		
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Lentic,Low Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Unio merus tetralasmus</i>	Pondhorn

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Dragonflies and Damselflies		
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail
	<i>Macromia illinoensis</i>	Illinois River Cruiser
	<i>Macromia taeniolata</i>	Royal River Cruiser
	<i>Progomphus obscurus</i> *	Common Sanddragon
Fish		
	<i>Ameiurus melas</i> *	Black Bullhead
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter
	<i>Carpionodes carpio</i>	River Carpsucker
	<i>Carpionodes velifer</i> *	Highfin Carpsucker
	<i>Cyprinella analostana</i> *	Satinfin Shiner
	<i>Erimystax dissimilis</i>	Streamline Chub
	<i>Erimyzon oblongus</i>	Creek Chubsucker
	<i>Etheostoma maculatum</i> *	Spotted Darter
	<i>Etheostoma olmstedii</i> *	Tessellated Darter
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Fundulus diaphanus</i>	Banded Killifish
	<i>Hybognathus regius</i>	Eastern Silvery Minnow
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey
	<i>Ichthyomyzon fossor</i> *	Northern Brook Lamprey
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo
	<i>Lethenteron appendix</i>	American Brook Lamprey
	<i>Macrhybopsis hyostoma</i>	Shoal Chub

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Moxostoma carinatum</i>	River Redhorse
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Notropis ariommus</i> *	Popeye Shiner
	<i>Notropis procne</i> *	Swallowtail Shiner
	<i>Noturus eleutherus</i>	Mountain Madtom
	<i>Noturus stigmosus</i> *	Northern Madtom
	<i>Percina copelandi</i>	Channel Darter
	<i>Percina evides</i>	Gilt Darter
	<i>Percina gymnocephala</i>	Appalachia Darter
	<i>Percina macrocephala</i> *	Longhead Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Percina phoxocephala</i>	Slenderhead Darter
	<i>Percina sciera</i>	Dusky Darter
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow
	<i>Pimephales vigilax</i>	Bullhead Minnow
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta undulata</i> *	Triangle Floater
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Amblema plicata</i>	Threeridge
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell
	<i>Cyclonaias tuberculata</i> *	Purple Wartback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio crassidens</i> *	Elephant-ear
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Epioblasma triquetra</i> *	Snuffbox
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda</i> *	Long-solid
	<i>Lampsilis abrupta</i> *	Pink Mucket
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel
	<i>Lampsilis ovata</i>	Pocketbook
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona compressa</i> *	Creek Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta</i> *	Black Sandshell
	<i>Obliquaria reflexa</i>	Threehorn Wartyback
	<i>Obovaria subrotunda</i> *	Round Hickorynut
	<i>Pleurobema clava</i> *	Clubshell
	<i>Pleurobema sintoxia</i> *	Round Pigtoe
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula cylindrica</i>	Rabbitsfoot
	<i>Quadrula metanevra</i>	Monkeyface
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua</i> *	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla truncata</i>	Deertoe
	<i>Villosa fabalis*</i>	Rayed Bean
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Other Invertebrates		
	<i>Diploperla kanawholensis</i>	Little Kanawha Perlodid Stonefly
Reptiles		
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander
Dragonflies and Damselflies		
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail
	<i>Gomphus adelphus</i> *	Mustached Clubtail
	<i>Gomphus lineatifrons</i>	Splendid Clubtail
	<i>Gomphus quadricolor</i> *	Rapids Clubtail
	<i>Gomphus rogersi</i> *	Sable Clubtail
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail
Fish		
	<i>Carpodes velifer</i> *	Highfin Carpsucker
	<i>Erimystax dissimilis</i>	Streamline Chub
	<i>Erimyzon oblongus</i>	Creek Chubsucker
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Percina copelandi</i>	Channel Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Alasmidonta marginata*</i>	Elktoe
	<i>Alasmidonta undulata*</i>	Triangle Floater
	<i>Alasmidonta varicosa*</i>	Brook Floater
	<i>Amblema plicata</i>	Threeridge
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio crassidens*</i>	Elephant-ear
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Epioblasma triquetra*</i>	Snuffbox
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda*</i>	Long-solid
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel
	<i>Lampsilis ovata</i>	Pocketbook
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis*</i>	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta*</i>	Black Sandshell
	<i>Obliquaria reflexa</i>	Threehorn Wartyback
	<i>Obovaria subrotunda*</i>	Round Hickorynut
	<i>Pleurobema clava*</i>	Clubshell
	<i>Pleurobema sintoxia*</i>	Round Pigtoe
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Medium River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Quadrula metanevra</i>	Monkeyface
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua*</i>	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla truncata</i>	Deertoe
	<i>Villosa fabalis*</i>	Rayed Bean
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Other Invertebrates		
	<i>Diploperla kanawholensis</i>	Little Kanawha Perlodid Stonefly
	<i>Hansonoperla appalachia</i>	Hanson's Appalachian Stonefly
	<i>Utaperla gaspesiana</i>	A Stonefly
Reptiles		
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Dragonflies and Damselflies		
	<i>Enallagma vesperum</i>	Vesper Bluet
	<i>Gomphus adelphus</i> *	Mustached Clubtail
	<i>Gomphus fraternus</i> *	Midland Clubtail
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon
Fish		
	<i>Esox americanus vermiculatus</i>	Grass Pickerel
	<i>Ichthyomyzon greeleyi</i> *	Mountain Brook Lamprey
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo
	<i>Lepomis gulosus</i>	Warmouth
	<i>Lethenteron appendix</i>	American Brook Lamprey
	<i>Macrhybopsis storeriana</i>	Silver Chub
	<i>Moxostoma carinatum</i>	River Redhorse
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Notropis boops</i> *	Bigeye Shiner
	<i>Notropis buchanani</i>	Ghost Shiner
	<i>Percina copelandi</i>	Channel Darter
	<i>Percina sciera</i>	Dusky Darter
	<i>Pimephales vigilax</i>	Bullhead Minnow
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta undulata</i> *	Triangle Floater
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Amblema plicata</i>	Threeridge

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Epioblasma triquetra</i> *	Snuffbox
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda</i> *	Long-solid
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona compressa</i> *	Creek Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta</i> *	Black Sandshell
	<i>Obovaria subrotunda</i> *	Round Hickorynut
	<i>Pleurobema clava</i> *	Clubshell
	<i>Pleurobema sintoxia</i> *	Round Pigtoe
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua</i> *	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla truncata</i>	Deertoe
	<i>Villosa fabalis*</i>	Rayed Bean
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Reptiles		
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River,Low Gradient,Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Dragonflies and Damselflies		
	<i>Gomphus lineatifrons</i>	Splendid Clubtail
Fish		
	<i>Cottus sp. 1*</i>	Bluestone Sculpin
	<i>Cyprinella analostana*</i>	Satinfin Shiner
	<i>Etheostoma olmstedii*</i>	Tessellated Darter
Mussels		
	<i>Alasmidonta varicosa*</i>	Brook Floater
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel
	<i>Strophitus undulatus</i>	Squawfoot
Reptiles		
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander
	<i>Desmognathus monticola</i>	Seal Salamander
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Cambarus chasmodactylus</i>	New River Crayfish
	<i>Cambarus smilax*</i>	Greenbrier River Crayfish
Dragonflies and Damselflies		
	<i>Calopteryx amata</i>	Superb Jewelwing
	<i>Calopteryx angustipennis*</i>	Appalachian Jewelwing
	<i>Cordulia shurtleffi</i>	American Emerald
	<i>Enallagma annexum</i>	Northern Bluet
	<i>Enallagma vernale</i>	Vernal Bluet
	<i>Gomphus abbreviatus*</i>	Spine-crowned Clubtail
	<i>Gomphus adelphus*</i>	Mustached Clubtail
	<i>Gomphus descriptus</i>	Harpoon Clubtail
	<i>Gomphus fraternus*</i>	Midland Clubtail
	<i>Helocordulia uhleri</i>	Uhler's Sundragon
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail
	<i>Ophiogomphus mainensis fastigiatus*</i>	Maine Snaketail
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail
	<i>Rhionaeschna mutata*</i>	Spatterdock Darner
	<i>Tamea carolina</i>	Carolina Saddlebags
Fish		
	<i>Cottus kanawhae*</i>	Kanawha Sculpin

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Etheostoma longimanum</i> *	Longfin Darter
	<i>Etheostoma osburni</i> *	Candy Darter
	<i>Exoglossum laurae</i> *	Tonguetied Minnow
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Luxilus cornutus</i> *	Common Shiner
	<i>Notropis scabriceps</i> *	New River Shiner
	<i>Percina gymnocephala</i>	Appalachia Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Phenacobius teretulus</i> *	Kanawha Minnow
Mussels		
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta undulata</i> *	Triangle Floater
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio dilatata</i>	Spike
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Pyganodon cataracta</i>	Eastern Floater
	<i>Strophitus undulatus</i>	Squawfoot
Other Invertebrates		
	<i>Allocaonia frumi</i>	A Stonefly
	<i>Sweltsa pocahontas</i>	A Stonefly

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Amphibians		
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander
Crayfish		
	<i>Cambarus callainus*</i>	Big Sandy Crayfish
	<i>Cambarus elkensis*</i>	Elk River Crayfish
	<i>Cambarus nerterius*</i>	Greenbrier Cave Crayfish
	<i>Cambarus veteranus*</i>	Guyandotte River Crayfish
Dragonflies and Damselflies		
	<i>Gomphus lineatifrons</i>	Splendid Clubtail
	<i>Gomphus quadricolor*</i>	Rapids Clubtail
	<i>Gomphus vastus</i>	Cobra Clubtail
	<i>Lestes australis</i>	Southern Spreadwing
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser
	<i>Macromia taeniolata</i>	Royal River Cruiser
Fish		
	<i>Carpionodes carpio</i>	River Carpsucker
	<i>Carpionodes velifer*</i>	Highfin Carpsucker
	<i>Cottus kanawhae*</i>	Kanawha Sculpin
	<i>Exoglossum maxillingua</i>	Cutlip Minnow
	<i>Fundulus diaphanus</i>	Banded Killifish
	<i>Ichthyomyzon greeleyi*</i>	Mountain Brook Lamprey
	<i>Lepomis gulosus</i>	Warmouth
	<i>Macrhybopsis storeriana</i>	Silver Chub
	<i>Notropis amoenus</i>	Comely Shiner
	<i>Percina gymnocephala</i>	Appalachia Darter
	<i>Percina oxyrhynchus</i>	Sharpnose Darter
	<i>Percina sciera</i>	Dusky Darter

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River,Moderate Gradient,Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Fish		
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow
Mussels		
	<i>Actinonaias ligamentina</i>	Mucket
	<i>Alasmidonta marginata</i> *	Elktoe
	<i>Alasmidonta undulata</i> *	Triangle Floater
	<i>Alasmidonta varicosa</i> *	Brook Floater
	<i>Amblema plicata</i>	Threeridge
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell
	<i>Cyclonaias tuberculata</i> *	Purple Wartback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio dilatata</i>	Spike
	<i>Elliptio fisheriana</i>	Northern Lance
	<i>Epioblasma triquetra</i> *	Snuffbox
	<i>Fusconaia flava</i>	Wabash Pigtoe
	<i>Fusconaia subrotunda</i> *	Long-solid
	<i>Lampsilis cardium</i>	Plain Pocketbook
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel
	<i>Lampsilis radiata</i> *	Eastern Lampmussel
	<i>Lasmigona complanata</i>	White Heelsplitter
	<i>Lasmigona compressa</i> *	Creek Heelsplitter
	<i>Lasmigona costata</i>	Fluted-shell
	<i>Lasmigona subviridis</i> *	Green Floater
	<i>Leptodea fragilis</i>	Fragile Papershell
	<i>Ligumia recta</i> *	Black Sandshell
	<i>Obovaria subrotunda</i> *	Round Hickorynut
	<i>Pleurobema clava</i> *	Clubshell
	<i>Pleurobema sintoxia</i> *	Round Pigtoe

* Priority 1 species

Appendix 2: SGCN Species by Habitat - Aquatic

HABITAT TYPE Small River, Moderate Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Mussels		
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell
	<i>Pyganodon grandis</i>	Giant Floater
	<i>Quadrula pustulosa</i>	Pimpleback
	<i>Quadrula quadrula</i>	Mapleleaf
	<i>Simpsonaias ambigua*</i>	Salamander Mussel
	<i>Strophitus undulatus</i>	Squawfoot
	<i>Toxolasma parvus</i>	Lilliput
	<i>Tritogonia verrucosa</i>	Pistolgrip
	<i>Truncilla truncata</i>	Deertoe
	<i>Villosa fabalis*</i>	Rayed Bean
	<i>Villosa iris</i>	Rainbow
	<i>Villosa lienosa*</i>	Little Spectaclecase
Reptiles		
	<i>Glyptemys insculpta*</i>	Wood Turtle
Snails		
	<i>Leptoxis dilatata</i>	Seep Mudalia

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Gyrinophilus subterraneus</i> *	West Virginia Spring Salamander	S1	G1
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5

Sunday, August 30, 2015

Page 1 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus</i> *	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Accipiter gentilis</i> *	Northern Goshawk	S1B,S1N	G5
	<i>Actitis macularius</i> *	Spotted Sandpiper	S2B	G5
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Ammodramus henslowii</i> *	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes</i> *	American Black Duck	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos</i> *	Golden Eagle	S3N	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Asio otus</i> *	Long-eared Owl	S1B,S1N	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Botaurus lentiginosus</i> *	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	S3B	G5
	<i>Carduelis pinus</i>	Pine Siskin	S2B,S4N	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Catharus ustulatus</i>	Swainson's Thrush	S3B	G5

Sunday, August 30, 2015

Page 3 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Chordeiles minor</i> *	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5

Sunday, August 30, 2015

Page 4 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Lanius ludovicianus*</i>	Loggerhead Shrike	S1B,S1N	G4
	<i>Lanius ludovicianus migrans*</i>	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis*</i>	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5

Sunday, August 30, 2015

Page 5 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

Sunday, August 30, 2015

Page 6 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Aplectoides condita</i>	A Noctuid Moth	S1	G4
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Calephelis borealis*</i>	Northern Metalmark	S2	G3G4
	<i>Callophrys irus*</i>	Frosted Elfin	S1	G3
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Catocala dulciola*</i>	Sweet Underwing	SU	G3
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina nigra*</i>	Dusky Azure	S3	G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Cerastis salicarum</i>	Willow Dart Moth	S1	G5
	<i>Chlosyne harrisii*</i>	Harris's Checkerspot	S2	G4
	<i>Colias interior</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Eilema bicolor</i>	Bicolored Moth	S1	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis martialis*</i>	Mottled Duskywing	S3	G3
	<i>Euchlaena effecta</i>	Effective Euchaena Moth	S1	G5
	<i>Euchlaena milnei*</i>	Milne's Euchlaena Moth	S2	G2G4
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4

Sunday, August 30, 2015

Page 7 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Euphyes bimacula*</i>	Two-spotted Skipper	S1	G4
	<i>Euphyes conspicua</i>	Black Dash	S1	G4
	<i>Glaucopsyche lygdamus lygdamus*</i>	Silvery Blue	S3	G5T3T4
	<i>Hesperia metea*</i>	Cobweb Skipper	S2S3	G4
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Lycaena epixanthe</i>	Bog Copper	S1	G4G5
	<i>Lycaena hyllus*</i>	Bronze Copper	S2	G5
	<i>Melanchra assimilis</i>	Black Arches	S1	G5
	<i>Papilio appalachiensis*</i>	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta diminutor*</i>	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene*</i>	Northern Crescent	S2	G5TNR
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma	S1	G5T3
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth	SH	G4
	<i>Pyrgus wyandot*</i>	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5

Sunday, August 30, 2015

Page 8 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Speyeria diana</i> *	Diana Fritillary	S2S3	G3G4
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Anthrobia coylei</i>	Spider	S2	G2?
	<i>Apochthonius paucispinosus</i> *	Dry Fork Valley Cave Pseudoscorpion	S1	G1
	<i>Arrhopalites commorus</i> *	A Collembola	S1	G2G3
	<i>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G3?
	<i>Arrhopalites sacer</i> *	A Collembola	S1	G2
	<i>Bathyphantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2
	<i>Caecidotea franzi</i> *	Franz's Cave Isopod	S1	G2G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1
	<i>Chitrella regina</i> *	Royal Syarinid Pseudoscorpion	S1	G1
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<i>Horologion speakites</i>	Arbuckle Cave Ground Beetle	SH	GH
	<i>Kleptochthonius henroti</i> *	Greenbrier Valley Cave Pseudoscorpion	S1	G2
	<i>Kleptochthonius hetricki</i> *	Organ Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius proserpinae</i> *	Proserpina Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi</i> *	Diplura	S2	G2G3
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4

Sunday, August 30, 2015

Page 10 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Nesticus tennesseensis</i> *	A Cave Spider	SU	G3G4
	<i>Onychiurus janus</i> *	A Cave Springtail	S1	G2G3
	<i>Phagocata angusta</i> *	A Cave Planarian	S1	G1
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Poecilophysis weyerensis</i> *	A Cave Mite	S1	G3?
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus grandis elevatus</i> *	A Cave Beetle	S1	G3T1
	<i>Pseudanophthalmus grandis grandis</i> *	A Cave Beetle	S3	G4T4
	<i>Pseudanophthalmus hadenoecus</i> *	Timber Ridge Cave Beetle	S1	G1
	<i>Pseudanophthalmus henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus higinbothami</i> *	A Cave Beetle	S2	G2
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G3
	<i>Pseudanophthalmus lallemanti</i> *	Lallemant's Cave Beetle	S1	G1
	<i>Pseudanophthalmus montanus</i> *	Dry Fork Valley Cave Beetle	S1	G1
	<i>Pseudanophthalmus orthosulcatus</i> *	A Cave Beetle	S1	G1
	<i>Pseudosinella certa</i> *	Gandy Creek Cave Springtail	S1	G1
	<i>Pseudosinella gisini gisini</i> *	A Cave Springtail	S3	G3G4T3

Sunday, August 30, 2015

Page 11 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Pseudosinella sp. 8*</i>	A Springtail	S2	G2
	<i>Pseudosinella testa*</i>	Shelled Cave Springtail	S1	G2G3
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G3
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella agna*</i>	A Springtail	S3	G3G4
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Sphalloplana culveri*</i>	Culver's Planarian	S1	G1
	<i>Stygobromus culveri*</i>	Culver's Cave Amphipod	S1	G1G2
	<i>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod	S2	G5
	<i>Stygobromus nanus*</i>	Pocahontas Cave Amphipod	S1	G1
	<i>Stygobromus parvus*</i>	Minute Cave Amphipod	S1	G2G3
	<i>Stygobromus pollostus*</i>	An Amphipod	S1	G2G3
	<i>Stygobromus redactus*</i>	An Amphipod	S1	G1
	<i>Stygobromus spinatus*</i>	Spring Cave Amphipod	S2	G2G3
	<i>Zygonopus krekeleeri*</i>	West Virginia Blind Cave Millipede	S1	G4
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4
	<i>Zygonopus weyerienseis*</i>	Grand Caverns Blind Cave Millipede	S2	G3G4

Sunday, August 30, 2015

Page 12 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Zygonopus whitei</i> *	Luray Caverns Blind Cave Millipede	S1	G3G4

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus nerterius</i> *	Greenbrier Cave Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	G2
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Argia bipunctulata</i> *	Seepage Dancer	S1	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Enallagma vernale</i>	Vernal Bluet	S1	G4Q
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Epithea canis</i>	Beaverpond Baskettail	S3	G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4

Sunday, August 30, 2015

Page 15 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus fraternus*</i>	Midland Clubtail	S2	G5
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi*</i>	Sable Clubtail	S1	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons*</i>	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lanthus vernalis*</i>	Southern Pygmy Clubtail	S1	G4
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Lestes disjunctus</i>	Northern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Leucorrhinia glacialis*</i>	Crimson-ringed Whiteface	S1	G5
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5

Sunday, August 30, 2015

Page 16 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Nehalennia gracilis</i> *	Sphagnum Sprite	S1	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail	S2	G5
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Rhionaeschna mutata</i> *	Spatterdock Darner	S1	G4
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Somatochlora forcipata</i>	Forcipate Emerald	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus scudderi</i> *	Zebra Clubtail	SH	G4
	<i>Stylurus spiniceps</i> *	Arrow Clubtail	S2	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tramea carolina</i>	Carolina Saddlebags	S3	G5

Sunday, August 30, 2015

Page 17 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Cottus sp. 1</i> *	Bluestone Sculpin	S1	G2
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Exoglossum laurae</i> *	Tonguetied Minnow	S2	G4
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat	S2	G3G4T2
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Glaucomys sabrinus fuscus*</i>	WV Northern Flying Squirrel	S2	G5T2
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus chrotorrhinus carolinensis*</i>	Southern Rock Vole	S2	G4T3
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis*</i>	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Sorex palustris punctulatus*</i>	Southern Water Shrew	S1	G5T3
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Sunday, August 30, 2015

Page 19 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Alasmidonta marginata</i> *	Elktoe	S1	G4
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis</i> *	Green Floater	S2	G3
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2

Sunday, August 30, 2015

Page 20 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Agrostis mertensii</i>	Northern Bentgrass	S1	G5
	<i>Allium oxiphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Amelanchier bartramiana</i>	Oblong-fruit Serviceberry	S2	G5
	<i>Andromeda polifolia</i> var. <i>glaucophylla</i>	Bog-rosemary	S1	G5T5
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Botrychium lanceolatum</i> var. <i>angustisegment</i>	Lanceolate Grapefern	S1	G5T4
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4

Sunday, August 30, 2015

Page 21 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex arctata</i>	Drooping Woodland Sedge	S1	G5
	<i>Carex atherodes</i>	Awned Sedge	S1	G5
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex bushii</i>	Bush's Sedge	S2S3	G4
	<i>Carex canescens</i>	Silvery Sedge	S3	G5
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex deflexa</i>	Northern Sedge	S1	G5
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5

Sunday, August 30, 2015

Page 22 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex haydenii</i>	Cloud Sedge	S1	G5
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex interior</i>	Inland Sedge	S1	G5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex lasiocarpa var. americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex laxiculmis var. copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex lucorum var. australucorum*</i>	Blue Ridge Sedge	S1	G4T3T4
	<i>Carex manhartii*</i>	Manhart's Sedge	S1	G3G4
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex novae-angliae</i>	New England Sedge	S1	G5
	<i>Carex pauciflora</i>	Few-flower Sedge	S1	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex projecta</i>	Necklace Sedge	S3	G5
	<i>Carex roanensis*</i>	Roan Mountain Sedge	S2	G2G3
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4

Sunday, August 30, 2015

Page 23 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Carex utriculata</i>	Beaked Sedge	S3	G5
	<i>Carex vesicaria</i>	Inflated Sedge	S2	G5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Coptis trifolia</i>	Threelobed Goldthread	S2	G5
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G2
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Corallorhiza trifida</i>	Early Coralroot	S1	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5

Sunday, August 30, 2015

Page 24 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Cuscuta rostrata</i>	Beaked Dodder	S2	G4
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4
	<i>Dalibarda repens</i>	Robin-run-away	S3	G5
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Dichanthelium meridionale</i>	Matting Witchgrass	S3	G5
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis elliptica</i>	Elliptic Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Slender Wild Rye	S2	G5T5
	<i>Equisetum fluviatile</i>	Water Horsetail	S2	G5
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	S1	G5
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Eupatorium pilosum</i>	Rough Boneset	S2	G5
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	S3	G5

Sunday, August 30, 2015

Page 25 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gentianopsis crinita</i>	Greater Fringed Gentian	S1	G5
	<i>Geum aleppicum</i>	Yellow Avens	S1	G5
	<i>Geum rivale</i>	Purple Avens	S1	G5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria grandis</i> var. <i>grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Helianthus occidentalis</i> ssp. <i>occidentalis</i>	Western Sunflower	S2	G5T5
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispidula</i> *	Rough Alumroot	S2	G5T3?
	<i>Hierochloa hirta</i> ssp. <i>arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Huperzia porophila</i> *	Rock Clubmoss	S1	G4
	<i>Hypericum mitchellianum</i> *	Blue Ridge St. John's-wort	S1	G3
	<i>Ilex collina</i> *	Hill Holly	S2	G3

Sunday, August 30, 2015

Page 26 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Isotria medeoloides*</i>	Small Whorled Pogonia	S1	G2?
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus articulatus</i>	Jointleaf Rush	S2	G5
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5
	<i>Juncus nodosus var. nodosus</i>	Knotted Rush	S1S2	G5T5?
	<i>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Liatris turgida*</i>	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii*</i>	Carolina Lily	S1	G4G5
	<i>Lilium philadelphicum var. philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Linnaea borealis ssp. americana</i>	Twinflower	S1	G5T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera cordata var. cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lonicera canadensis</i>	Fly Honeysuckle	S2	G5
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5

Sunday, August 30, 2015

Page 27 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lycopodiella alopecuroides</i>	Foxtail Clubmoss	S1	G5
	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss	S2	G5
	<i>Lycopodium lagopus</i>	One-cone Groundpine	S1	G5
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Marshallia grandiflora*</i>	Monongahela Barbara's-buttons	S2	G2
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G5
	<i>Menyanthes trifoliata</i>	Buckbean	S1	G5
	<i>Monarda fistulosa ssp. brevis*</i>	Smoke Hole Bergamot	S1	G5T1T2
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera argillicola*</i>	Shalebarren Evening-primrose	S3	G3G4
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera paupercula</i>	Balsam Ragwort	S2	G5

Sunday, August 30, 2015

Page 28 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paxistima canbyi*</i>	Canby's Mountain-lover	S2	G2
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Phlox buckleyi*</i>	Swordleaf Phlox	S2	G2
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass	S1	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Platanthera peramoena</i>	Pride-of-the-peak	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Platanthera shriveri*</i>	Shriver's Frilly Orchid	S1	G1
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polemonium vanbruntiae*</i>	Bog Jacob's-ladder	S2	G3G4
	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	S1	G5T5
	<i>Potamogeton tennesseensis*</i>	Tennessee Pondweed	S2	G2G3
	<i>Prenanthes crepidinea*</i>	Corymbed Rattlesnake-root	S1	G4
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4

Sunday, August 30, 2015

Page 29 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Quercus prinoides</i>	Dwarf Chinquapin Oak	S1	G5
	<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	S1S2	G5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora fusca</i> *	Brown Beaksedge	S1	G4G5
	<i>Ribes lacustre</i>	Bristly Black Currant	S2	G5
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose	S2	G5T5
	<i>Rubus pubescens</i> var. <i>pubescens</i>	Dwarf Red Bramble	S1	G5T5
	<i>Sagittaria calycina</i> var. <i>calycina</i>	Long-lobe Arrowhead	S2	G5T5?
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Salix lucida</i> ssp. <i>lucida</i>	Shining Willow	S1	G5T5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Scheuchzeria palustris</i> ssp. <i>americana</i>	Pod Grass	SH	G5T5
	<i>Schizachne purpurascens</i>	False Melicgrass	S1	G5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5

Sunday, August 30, 2015

Page 30 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Sida hermaphrodita</i> *	Virginia Mallow	S3	G3
	<i>Silene virginica var. robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Silphium compositum var. reniforme</i> *	Rosinweed	S1	G5T3T5
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Solidago simplex ssp. randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes ovalis var. erostellata</i> *	Oval Ladies'-tresses	S1	G5?T4?
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stellaria borealis ssp. borealis</i>	Northern Stitchwort	S1	G5T5

Sunday, August 30, 2015

Page 31 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Symphotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thelypteris simulata</i> *	Bog Fern	S1	G4G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Mannagrass	S2	G5T4Q
	<i>Torreyochloa pallida</i> var. <i>pallida</i>	Pale False Mannagrass	S1	G5T5?
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1G3
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel	S1	G5
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trifolium reflexum</i> *	Buffalo Clover	S1	G3G4
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4

Sunday, August 30, 2015

Page 32 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vaccinium oxycoccos</i>	Small Cranberry	S3	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5
	<i>Viburnum lentago</i>	Nannyberry	S1S2	G5
	<i>Viburnum opulus var. americanum</i>	Highbush Cranberry	S1	G5T5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola appalachiensis*</i>	Appalachian Blue Violet	S3	G4
	<i>Viola blanda var. palustriformis</i>	Violet	SH	G4G5T4T5
	<i>Viola septentrionalis</i>	Northern Blue Violet	S2	G5
	<i>Vitis rupestris*</i>	Sand Grape	S2	G3
	<i>Vittaria appalachiana*</i>	Appalachian Shoestring Fern	S1	G4
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5
	<i>Xyris torta</i>	Slender Yellow-eyed-grass	S2	G5
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas	S2	G4Q

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata</i> *	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink	S2	G5T5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake	S2	G5T3T4

Sunday, August 30, 2015

Page 34 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Anguispira stihleri*</i>	Greenbrier Tigersnail	S1	GNR
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Discus catskillensis</i>	Angular Disk	S2	G5
	<i>Discus whitneyi</i>	Forest Disc	S2	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Fontigens turritella*</i>	Greenbrier Cavesnail	S1	G1
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Glyphyalinia picea</i>	Rust Glyph	S2	G3
	<i>Helicodiscus shimaki</i>	Temperate Coil	S3	G5
	<i>Helicodiscus villosus*</i>	Greenbrier Coil	S1	GNR
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe	S1	GNR
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesomphix luisant*</i>	Glossy Button	S1	G1
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5

Sunday, August 30, 2015

Page 35 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Nesovitrea electrina</i>	Amber Glass	S3	G5
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	S2	G2
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil	S2	G3
	<i>Philomycus virginicus</i>	Virginia Mantleslug	S2	G3
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth	S2	GNR
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis juxtidentis robiniae*</i>	Brush Creek Threetooth	S1	G5TNR
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail	S1	G1
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia costata</i>	Costate Vallonia	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5

Sunday, August 30, 2015

Page 36 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Vallonia pulchella</i>	Lovely Vallonia	S3	G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens coelaxis</i>	Bidentate Dome	S1	G3
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens lawae</i>	Rounded Dome	SH	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5
	<i>Zonitoides ellioti</i>	Green Dome	S2	G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle	S2S3	G3
	<i>Cicindela splendida</i> *	A Tiger Beetle	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans</i> *	Northern Cricket Frog	S2	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5

Sunday, August 30, 2015

Page 39 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Cardellina canadensis*</i>	Canada Warbler	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5

Sunday, August 30, 2015

Page 41 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler	S3B	G4
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5

Sunday, August 30, 2015

Page 42 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Atrytonopsis hianna*</i>	Dusted Skipper	S1	G4G5
	<i>Autochton cellus*</i>	Golden-banded Skipper	S1S2	G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina nigra*</i>	Dusky Azure	S3	G4
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Eroria laeta</i>	Early Hairstreak	S2	GU
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Glaucopsyche lygdamus lygdamus*</i>	Silvery Blue	S3	G5T3T4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta diminutor*</i>	Summer Crescent	SNR	GNR
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma	S1	G5T3
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

Sunday, August 30, 2015

Page 44 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Conotyla vista</i> *	A Cave Millipede	SH	GH

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus hatfieldi</i> *	Tug Valley Crayfish	S2	GNR
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR
	<i>Cambarus veteranus</i> *	Guyandotte River Crayfish	S1	G1
	<i>Procambarus acutus</i> *	White River Crayfish	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi</i> *	Sable Clubtail	S1	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ischnura kellicotti</i>	Lilypad Forktail	S1	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5

Sunday, August 30, 2015

Page 47 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus scudderi</i> *	Zebra Clubtail	SH	G4
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tamea carolina</i>	Carolina Saddlebags	S3	G5
	<i>Tamea onusta</i>	Red Saddlebags	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G4
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpiodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2G3
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter	S2	G3G4
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4

Sunday, August 30, 2015

Page 49 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Notropis ariommus*</i>	Popeye Shiner	S2	G3
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis burchanani</i>	Ghost Shiner	S3	G5
	<i>Notropis scabriceps*</i>	New River Shiner	S2	G4
	<i>Noturus eleutherus</i>	Mountain Madtom	S2	G4
	<i>Noturus stigmosus*</i>	Northern Madtom	S1	G3
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina evides</i>	Gilt Darter	S2	G4
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Percina macrocephala*</i>	Longhead Darter	S2	G3
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Phenacobius teretulus*</i>	Kanawha Minnow	S1	G3G4
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G3G4T2
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Ochrotomys nuttalli</i> *	Golden Mouse	S2	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S2	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Alasmidonta marginata</i> *	Elktoe	S1	G4
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lampsilis teres</i> *	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa</i> *	Creek Heelsplitter	S1	G5

Sunday, August 30, 2015

Page 52 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis</i> *	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta</i> *	Black Sandshell	S3	G4G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pleurobema clava</i> *	Clubshell	S1	G1G2
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5

Sunday, August 30, 2015

Page 53 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Aristida purpurascens</i> var. <i>purpurascens</i>	Arrowfeather Three-awn	S1	G5T5
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5

Sunday, August 30, 2015

Page 55 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex mesochorea</i>	Midland Sedge	S2	G4G5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Carex tonsa</i> var. <i>rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Commelina erecta</i>	Slender Dayflower	S2	G5T5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?

Sunday, August 30, 2015

Page 56 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Croton glandulosus var. septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cuscuta indecora var. neuropetala</i>	Dodder	S1	G5T5
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awed Flatsedge	S3	G5
	<i>Danthonia sericea</i>	Silky Oatgrass	S1?	G5?
	<i>Desmodium lineatum</i>	Tick-trefoil	S1	G5
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil	S1	G5
	<i>Dichanthelium acuminatum ssp. columbianu</i>	District Of Columbia Panicgrass	S1	G5T5
	<i>Digitaria filiformis</i>	Slender Crabgrass	S1	G5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort	S2S3	G4
	<i>Fimbristylis annua</i>	Annual Fimbry	S1	G5
	<i>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gentiana austromontana*</i>	Appalachian Gentian	S1	G3

Sunday, August 30, 2015

Page 57 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Gymnopogon ambiguus</i> *	Bearded Skeleton Grass	S1	G4
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<i>Helianthemum propinquum</i> *	Low Frostweed	S1	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Helianthus occidentalis ssp. occidentalis</i>	Western Sunflower	S2	G5T5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Heuchera americana var. hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hypericum virgatum</i> *	Sharpleaf St. John's-wort	S1	G4?
	<i>Ilex collina</i> *	Hill Holly	S2	G3
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Leucothoe recurva</i> *	Red-twig Doghobble	S1	G4G5
	<i>Liatris scariosa var. nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Liatris squarrulosa</i> *	Appalachian Gayfeather	S1	G4G5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3

Sunday, August 30, 2015

Page 58 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Lythrum alatum</i> var. <i>alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1T2
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<i>Muhlenbergia capillaris</i> var. <i>capillaris</i>	Hair-awn Muhly	S1	G5T5?
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Packera paupercula</i>	Balsam Ragwort	S2	G5
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5

Sunday, August 30, 2015

Page 59 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Platanthera peramoena</i>	Pride-of-the-peak	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Prosartes maculata</i> *	Yellow Mandarin	S1	G3G4
	<i>Prunus pumila</i> var. <i>depressa</i>	Sand Cherry	S1	G5T5
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint	S2	G4?
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Rhexia mariana</i> var. <i>mariana</i>	Maryland Meadowbeauty	S1	G5T5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora recognita</i>	Beaked Rush	S2	G5?
	<i>Rosa acicularis</i> ssp. <i>sayi</i>	Bristly Rose	S1	G5T5
	<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	Orange Coneflower	S2	G5T4?
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage	S3	G3

Sunday, August 30, 2015

Page 60 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Saxifraga caroliniana*</i>	Carolina Saxifrage	S1	G3
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Scutellaria saxatilis*</i>	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita*</i>	Virginia Mallow	S3	G3
	<i>Silene nivea*</i>	Snowy Catchfly	S1	G4?
	<i>Silphium perfoliatum var. connatum*</i>	Cup-plant	S1	G5T3T4
	<i>Solidago faucibus*</i>	Gorge Goldenrod	S1	G2G4
	<i>Solidago simplex ssp. randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiraea virginiana*</i>	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Sporobolus clandestinus</i>	Secret Dropseed	S1	G5
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Symphyotrichum laeve var. concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Synandra hispidula*</i>	Guyandotte Beauty	S1	G4

Sunday, August 30, 2015

Page 61 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G4
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5

Sunday, August 30, 2015

Page 63 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth	S2	G3G4
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Paravitrea reesei</i>	Round Supercoil	S2	G3
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth	S2	GNR
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis rugosa*</i>	Buttressed Threetooth	S1	G1
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4

Sunday, August 30, 2015

Page 64 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela unipunctata</i>	A Tiger Beetle	S3	G4G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans</i> *	Northern Cricket Frog	S2	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5

Sunday, August 30, 2015

Page 67 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon punctatus*</i>	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon virginia*</i>	Shenandoah Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot Toad	S1	G5

Sunday, August 30, 2015

Page 68 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos*</i>	Golden Eagle	S3N	G5
	<i>Asio otus*</i>	Long-eared Owl	S1B,S1N	G5
	<i>Bartramia longicauda*</i>	Upland Sandpiper	S1B,S1N	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Chordeiles minor*</i>	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5

Sunday, August 30, 2015

Page 69 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Lanius ludovicianus</i> *	Loggerhead Shrike	S1B,S1N	G4
	<i>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5

Sunday, August 30, 2015

Page 70 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga caeruleascens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Sunday, August 30, 2015

Page 71 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Acronicta dolli</i> *	Doll's Merolonche	SH	G3G4
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Brachionycha borealis</i> *	Boreal Fan Moth	S1	G4
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing	SU	G3T3
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Colias interior</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis lucilius</i> *	Columbine Duskywing	S2	G4
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4

Sunday, August 30, 2015

Page 72 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Hesperia metea*</i>	Cobweb Skipper	S2S3	G4
	<i>Papilio appalachiensis*</i>	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta diminutor*</i>	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene*</i>	Northern Crescent	S2	G5TNR
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pyrgus wyandot*</i>	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak	S2	G4
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Satyrium favonius ontario</i>	Northern Hairstreak	S1S2	G4T4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5
	<i>Zale calycanthata*</i>	Double-banded Zale	SU	G4

Sunday, August 30, 2015

Page 73 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Anthrobia coylei</i>	Spider	S2	G2?
	<i>Antrolana lira</i> *	Madison Cave Isopod	S1	G2G4
	<i>Bathypantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Caecidotea pricei</i> *	Price's Cave Isopod	S1	G5
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<i>Geocentrophora cavernicola</i> *	Cave Flatworm	SH	G1G2
	<i>Islandiana speophila</i> *	Cavern Sheet-web Spider	S1	G1
	<i>Kleptochthonius orpheus</i> *	Orpheus Cave Pseudoscorpion	S1	G1
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Onychiurus janus</i> *	A Cave Springtail	S1	G2G3
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus potomaca</i> *	South Branch Valley Cave Beetle	S1	G3G4
	<i>Pseudanophthalmus senecae</i> *	Seneca Cave Beetle	S1	G1
	<i>Pseudosinella orba</i> *	A Cave Springtail	S1	G3G4

Sunday, August 30, 2015

Page 74 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Pseudotremia lusciosa</i> *	Germany Valley Cave Millipede	S1	G1
	<i>Pseudotremia princeps</i> *	South Branch Valley Cave Millipede	S1	G1
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Sphalloplana percoeca</i> *	A Cave Planarian	S1	G5
	<i>Stygobromus allegheniensis</i> *	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus biggersi</i> *	Biggers' Cave Amphipod	S1	G2G4
	<i>Stygobromus cooperi</i> *	Cooper's Cave Amphipod	S1	G1G2
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus gracilipes</i> *	Shenandoah Valley Cave Amphipod	S1	G3G4
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod	S2	G5
	<i>Stygobromus morrisoni</i> *	Morrison's Cave Amphipod	S1	G2G3
	<i>Stygobromus redactus</i> *	An Amphipod	S1	G1
	<i>Stygobromus spinatus</i> *	Spring Cave Amphipod	S2	G2G3
	<i>Stygobromus tenuis potomacus</i> *	Potomac Groundwater Amphipod	S1	G4T4
	<i>Zygonopus krekeleri</i> *	West Virginia Blind Cave Millipede	S1	G4
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4
	<i>Zygonopus weyeri</i> ensis*	Grand Caverns Blind Cave Millipede	S2	G3G4

Sunday, August 30, 2015

Page 75 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Zygonopus whitei</i> *	Luray Caverns Blind Cave Millipede	S1	G3G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi</i> *	Sable Clubtail	S1	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5

Sunday, August 30, 2015

Page 78 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus incurvatus alleghaniensis*</i>	Appalachian Snaketail	SH	G3T2T3
	<i>Ophiogomphus mainensis fastigiatus*</i>	Maine Snaketail	S3	G4TU
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Stylurus plagiatus</i>	Russet-tipped Clubtail	SH	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5

Sunday, August 30, 2015

Page 79 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Cottus sp. 1</i> *	Bluestone Sculpin	S1	G2
	<i>Cottus sp. c.f. cognatus</i> *	Checkered Sculpin	S1	G1*
	<i>Cyprinella analostana</i> *	Satinfin Shiner	S1	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma longimanum</i> *	Longfin Darter	S1	G4
	<i>Etheostoma olmstedii</i> *	Tessellated Darter	S1S2	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	S1	G5
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Margariscus margarita</i> *	Pearl Dace	S2S3	G4
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Notropis procne</i> *	Swallowtail Shiner	S1	G5
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Percina notogramma</i> *	Stripeback Darter	S1	G4

Sunday, August 30, 2015

Page 81 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Percina peltata*</i>	Shield Darter	S1	G5
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat	S2	G3G4T2
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis*</i>	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Alasmidonta undulata*</i>	Triangle Floater	S1	G4
	<i>Alasmidonta varicosa*</i>	Brook Floater	S2	G3
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma triquetra*</i>	Snuffbox	S2	G3
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

Sunday, August 30, 2015

Page 84 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Asplenium septentrionale</i>	Forked Spleenwort	S2	G4G5
	<i>Astragalus distortus</i> var. <i>distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Bartonia paniculata</i> ssp. <i>paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Bolboschoenus fluviatilis</i>	River Bulrush	S1	G5
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4

Sunday, August 30, 2015

Page 85 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex bushii</i>	Bush's Sedge	S2S3	G4
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex conoidea</i>	Field Sedge	S1	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex lasiocarpa var. americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex lupuliformis*</i>	False Hop Sedge	S1	G4
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5

Sunday, August 30, 2015

Page 86 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex polymorpha</i> *	Variable Sedge	S1	G3
	<i>Carex prairea</i>	Prairie Sedge	S1	G5
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Carex tetanica</i> *	Rigid Sedge	S1	G4G5
	<i>Carex tonsa</i> var. <i>rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex tonsa</i> var. <i>tonsa</i>	Shaved Sedge	S1	G5T5
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Chenopodium standleyanum</i>	Standley's Goosefoot	S2	G5
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G2
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5

Sunday, August 30, 2015

Page 87 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5
	<i>Cuscuta indecora</i> var. <i>neuropetala</i>	Dodder	S1	G5T5
	<i>Cyperus squarrosus</i>	Awed Flatsedge	S3	G5
	<i>Dasistoma macrophylla</i>	Mullein Foxglove	S2	G4
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Dichanthelium acuminatum</i> ssp. <i>acuminatum</i>	Hairy Panicgrass	S1	G5T5
	<i>Dichanthelium boreale</i>	Panicgrass	S1	G5
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Eleocharis rostellata</i>	Beaked Spikerush	S1	G5
	<i>Equisetum fluviatile</i>	Water Horsetail	S2	G5
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Erysimum capitatum</i> var. <i>capitatum</i>	Western Wallflower	S1	G5T5
	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i> *	Hyssopleaf Thoroughwort	S1	G5T4T5

Sunday, August 30, 2015

Page 88 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Eupatorium maculatum</i> var. <i>maculatum</i>	Spotted Joe-pyeweed	S1	G5T5
	<i>Euphorbia pubentissima</i>	False Flowering Spurge	S1	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispidula</i> *	Rough Alumroot	S2	G5T3?
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hierochloa hirta</i> ssp. <i>arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Hudsonia tomentosa</i> var. <i>tomentosa</i>	False Heather	S1	G5T5

Sunday, August 30, 2015

Page 89 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Hydrocotyle ranunculoides</i>	Swamp Pennywort	S2	G5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus balticus</i> var. <i>littoralis</i>	Baltic Rush	S1	G5T5
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Juncus nodosus</i> var. <i>nodosus</i>	Knotted Rush	S1S2	G5T5?
	<i>Juncus scirpoides</i>	Needle-pod Rush	S2	G5
	<i>Juncus torreyi</i>	Torrey's Rush	S2	G5
	<i>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Lilium philadelphicum</i> var. <i>philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Lindernia dubia</i> var. <i>anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Linnaea borealis</i> ssp. <i>americana</i>	Twinflower	S1	G5T5
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax	S2	G5T5
	<i>Linum sulcatum</i> var. <i>sulcatum</i>	Grooved Yellow Flax	S1	G5T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5

Sunday, August 30, 2015

Page 90 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lobelia kalmii</i>	Ontario Lobelia	S1	G5
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Lysimachia quadriflora</i>	Four-flower Loosestrife	S1	G5?
	<i>Lysimachia thysiflora</i>	Water Loosestrife	S1	G5
	<i>Lythrum alatum var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G5
	<i>Melica nitens</i>	Three-flower Melicgrass	S1	G5
	<i>Minuartia groenlandica</i>	Greenland Stitchwort	S1	G5
	<i>Monarda fistulosa ssp. brevis*</i>	Smoke Hole Bergamot	S1	G5T1T2
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Oenothera argillicola*</i>	Shalebarren Evening-primrose	S3	G3G4
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Oryzopsis asperifolia</i>	Roughleaf Ricegrass	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera plattensis</i>	Prairie Ragwort	S1	G5

Sunday, August 30, 2015

Page 91 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Panicum flexile</i>	Wiry Panicgrass	S1	G5
	<i>Panicum verrucosum</i> *	Warty Panicgrass	S1	G4
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus	S1	G3
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paronychia virginica</i>	Yellow Nailwort	S2	G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Phlox buckleyi</i> *	Swordleaf Phlox	S2	G2
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Pinus resinosa</i>	Red Pine	S1	G5
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass	S1	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Potamogeton pulcher</i>	Spotted Pondweed	S1	G5

Sunday, August 30, 2015

Page 92 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Potamogeton spirillus</i>	Spiral Pondweed	S2	G5
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Rosa acicularis</i> ssp. <i>sayi</i>	Bristly Rose	S1	G5T5
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose	S2	G5T5
	<i>Ruellia humilis</i>	Low Wild Petunia	S1	G5
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed	S2	G5T5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hardstem Bulrush	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush	S1	G3

Sunday, August 30, 2015

Page 93 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Scutellaria galericulata</i>	Hooded Skullcap	S1	G5
	<i>Scutellaria ovata ssp. virginiana</i>	Heart-leaved Skullcap	S1?	G5TNR
	<i>Scutellaria saxatilis*</i>	Rock Skullcap	S2	G3
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Silene nivea*</i>	Snowy Catchfly	S1	G4?
	<i>Silene virginica var. robusta*</i>	Fire Pink	S1	G5T1Q
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiraea virginiana*</i>	Virginia Spiraea	S1	G2
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stenanthium gramineum var. gramineum</i>	Featherbells	S2S3	G4G5T3T5
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<i>Taenidia montana*</i>	Mountain-pimpernel	S3	G3
	<i>Talinum teretifolium*</i>	Eastern Fameflower	S1	G4
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Trichophorum planifolium*</i>	Bashful Bulrush	S1	G4G5

Sunday, August 30, 2015

Page 94 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Trillium pusillum</i> var. <i>virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Utricularia macrorhiza</i>	Greater Bladderwort	S1	G5
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vernonia glauca</i>	Broad-leaved Ironweed	S1	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Vitis rotundifolia</i> var. <i>rotundifolia</i>	Muscadine	SH	G5T5
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4
	<i>Zannichellia palustris</i>	Horned Pondweed	S1	G5

Sunday, August 30, 2015

Page 95 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants	<i>Zigadenus elegans ssp. glaucus*</i>	Mountain Deathcamas	S1	G5T4T5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner	S1	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata</i> *	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G3
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula</i> *	Eastern Kingsnake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Pantherophis guttatus</i> *	Red Cornsnake	S1	G5
	<i>Pituophis melanoleucus melanoleucus</i> *	Northern Pinesnake	SH	G4T4
	<i>Plestiodon laticeps</i> *	Broad-headed Skink	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5

Sunday, August 30, 2015

Page 97 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira clarki</i>	Elfin Tigersnail	S1	GNR
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Anguispira stihleri*</i>	Greenbrier Tigersnail	S1	GNR
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail	S2	G5
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Discus whitneyi</i>	Forest Disc	S2	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Euconulus polygyratus</i>	Fat Hive	S1	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Gastrocopta tappaniana</i>	White Snaggletooth	S3	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Glyphyalinia specus</i>	Hollow Glyph	SH	G4
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesodon normalis</i>	Grand Globe	S1	G5

Sunday, August 30, 2015

Page 99 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Paravitrea seradens</i>	Barred Supercoil	S2	G3
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Pupoides albilabris</i>	White-lip Dagger	S3	G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis fallax</i>	Mimic Threetooth	S3	G5
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Sunday, August 30, 2015

Page 100 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle	S2S3	G3
	<i>Cicindela purpurea</i>	A Tiger Beetle	S3	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog	SH	G5
	<i>Ambystoma barbouri</i> *	Streamside Salamander	S1	G4
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Ambystoma texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5

Sunday, August 30, 2015

Page 103 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot Toad	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Botaurus lentiginosus*</i>	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Chordeiles minor*</i>	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5

Sunday, August 30, 2015

Page 105 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5

Sunday, August 30, 2015

Page 106 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis*</i>	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Sunday, August 30, 2015

Page 107 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Atrytonopsis hianna</i> *	Dusted Skipper	S1	G4G5
	<i>Autochton cellus</i> *	Golden-banded Skipper	S1S2	G4
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Chaetagnaea cerata</i> *	Waxed Sallow Moth	S1	G3G4
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hadena ectypa</i> *	Starry Campion Moth	S1	G3G4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5TNR
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak	S2	G4
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5

Sunday, August 30, 2015

Page 108 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus elkensis*</i>	Elk River Crayfish	S1	G2
	<i>Cambarus hatfieldi*</i>	Tug Valley Crayfish	S2	GNR
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR
	<i>Fallicambarus fodiens*</i>	Digger Crayfish	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5

Sunday, August 30, 2015

Page 111 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Hetaerina titia</i>	Smoky Rubyspot	S1	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Neurocordulia molesta</i>	Smoky Shadowdragon	S2	G4
	<i>Neurocordulia obsoleta</i>	Umber Showdragon	S1	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus notatus</i> *	Elusive Clubtail	S1S2	G3
	<i>Stylurus scudderi</i> *	Zebra Clubtail	SH	G4
	<i>Stylurus spiniceps</i> *	Arrow Clubtail	S2	G5
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Telebasis byersi</i>	Duckweed Firetail	S1	G5

Sunday, August 30, 2015

Page 112 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Tamea onusta</i>	Red Saddlebags	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta clara</i> *	Western Sand Darter	S1	G3
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G4
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpionodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpionodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Crystallaria cincotta</i> *	Diamond Darter	S1	G1
	<i>Esox americanus vermiculatus</i>	Grass Pickerel	S1S2	G5T5
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2G3
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter	S2	G3G4
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon fossor</i> *	Northern Brook Lamprey	S1	G4
	<i>Ichthyomyzon greeleyi</i> *	Mountain Brook Lamprey	S1	G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	S1	G5

Sunday, August 30, 2015

Page 114 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lepomis humilis*</i>	Orangespotted Sunfish	S1	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Lythrurus umbratilis*</i>	Redfin Shiner	S3	G5
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis ariommus*</i>	Popeye Shiner	S2	G3
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis boops*</i>	Bigeye Shiner	S1	G5
	<i>Notropis burchanani</i>	Ghost Shiner	S3	G5
	<i>Noturus eleutherus</i>	Mountain Madtom	S2	G4
	<i>Noturus stigmosus*</i>	Northern Madtom	S1	G3
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina evides</i>	Gilt Darter	S2	G4
	<i>Percina macrocephala*</i>	Longhead Darter	S2	G3
	<i>Percina phoxocephala</i>	Slenderhead Darter	S1	G5
	<i>Percina sciera</i>	Dusky Darter	S3	G5

Sunday, August 30, 2015

Page 115 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Percina shumardi</i>	River Darter	S1	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5
	<i>Polyodon spathula</i>	Paddlefish	S1	G4
	<i>Umbra limi</i>	Central Mudminnow	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat	S1	G3G4
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus ochrogaster</i>	Prairie Vole	S3	G5
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Nycticeius humeralis</i>	Evening Bat	S1	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Ellipsaria lineolata</i>	Butterfly	S2	G4G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell	S1	G2T2
	<i>Epioblasma triquetra</i> *	Snuffbox	S2	G3
	<i>Fusconaia ebena</i> *	Ebonyshell	S3	G4G5
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5

Sunday, August 30, 2015

Page 118 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa*</i>	Creek Heelsplitter	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5
	<i>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G1G2
	<i>Pleurobema cordatum</i>	Ohio Pigtoe	S2	G4
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula nodulata</i>	Wartyback	S1	G4

Sunday, August 30, 2015

Page 119 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Uniomerus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Amorpha fruticosa</i>	Tall Indigobush	S2S3	G5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arundinaria gigantea ssp. gigantea</i>	Giant Cane	S2	G5T5?
	<i>Asclepias hirtella</i>	Green Milkweed	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Calycanthus floridus var. glaucus</i>	Eastern Sweetshrub	SH	G5T5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis var. copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex projecta</i>	Necklace Sedge	S3	G5

Sunday, August 30, 2015

Page 121 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort	S1	G4?
	<i>Chamaesyce vermiculata</i>	Hairy Spurge	S2	G5
	<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock	S1	G5
	<i>Cleistis bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Croton glandulosus var. septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cuscuta indecora var. neuropetala</i>	Dodder	S1	G5T5
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Eleocharis elliptica</i>	Elliptic Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Elodea nuttallii</i>	Western Waterweed	S3	G5
	<i>Elymus trachycaulus ssp. trachycaulus</i>	Slender Wild Rye	S2	G5T5
	<i>Enemion biternatum</i>	Eastern False Rue-anemone	S1	G5

Sunday, August 30, 2015

Page 122 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	S1	G5
	<i>Fraxinus quadrangulata</i>	Blue Ash	S1	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gratiola viscidula*</i>	Short's Hedgehyssop	S1	G4G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hottonia inflata*</i>	Featherfoil	S1	G4
	<i>Huperzia porophila*</i>	Rock Clubmoss	S1	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5
	<i>Lechea minor</i>	Thymeleaf Pinweed	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Liatris scariosa var. nieuwlandii*</i>	Devil's-bite	S1	G5?T3T5
	<i>Lindernia dubia var. anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Ludwigia leptocarpa</i>	River Seedbox	S2	G5
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5

Sunday, August 30, 2015

Page 123 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lythrum alatum</i> var. <i>alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Manfreda virginica</i>	Eastern Agave	S1	G5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass	S1	G5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Phacelia covillei</i> *	Phacelia	S1	G3
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus pennsylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Rorippa sessiliflora</i>	Southern Yellow Cress	S1	G5
	<i>Salix discolor</i>	Pussy Willow	S2	G5

Sunday, August 30, 2015

Page 124 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scleria oligantha</i>	Little-head Nutrush	S1	G5
	<i>Scutellaria ovata ssp. ovata</i>	Heart-leaved Skullcap	S1	G5T5
	<i>Scutellaria saxatilis*</i>	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita*</i>	Virginia Mallow	S3	G3
	<i>Silene rotundifolia*</i>	Sandstone Fire-pink	S1	G4
	<i>Solidago patula var. patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spermacoce glabra*</i>	Buttonweed	S1	G4G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Synandra hispidula*</i>	Guyandotte Beauty	S1	G4
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Triadenum tubulosum*</i>	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Trichomanes boschianum*</i>	Appalachian Bristle Fern	S1	G4
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover	S3	G3
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5

Sunday, August 30, 2015

Page 125 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Wolffia columbiana</i>	Columbian Watermeal	S1	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone mutica mutica*</i>	Midland Smooth Softshell	S1	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Aspidoscelis sexlineata*</i>	Eastern Six-lined Racerunner	S1	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Liochlorophis vernalis*</i>	Smooth Greensnake	S5	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5

Sunday, August 30, 2015

Page 127 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira kochi</i>	Banded Tigersnail	S1	G5
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Gastrocopta procera</i>	Wing Snaggletooth	S2	G5
	<i>Gastrodonta interna</i>	Brown Bellytooth	S3	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Helicodiscus shimaki</i>	Temperate Coil	S3	G5
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Lucilla singleyana</i>	Smooth Coil	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5

Sunday, August 30, 2015

Page 129 of 131

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis platysayoides*</i>	Flat-spined Three-toothed Landsnail	S1	G1
	<i>Triodopsis rugosa*</i>	Buttressed Threetooth	S1	G1
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

* Priority 1 species

Appendix 3: SGCN Species by Ecoregion, Taxa and Priority

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5
	<i>Cicindela formosa generosa</i>	A Tiger Beetle	S1	G5T5
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle	S1	G5
	<i>Cicindela marginipennis</i> *	Cobblestone Tiger Beetle	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Sunday, August 30, 2015

Page 1 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5

Sunday, August 30, 2015

Page 2 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calephelis borealis*</i>	Northern Metalmark	S2	G3G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis martialis*</i>	Mottled Duskywing	S3	G3
	<i>Glauopsyche lygdamus lygdamus*</i>	Silvery Blue	S3	G5T3T4
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Bathypantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis weyerensis*</i>	A Cave Mite	S1	G3?
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus orthosulcatus*</i>	A Cave Beetle	S1	G1
	<i>Pseudosinella gisini gisini*</i>	A Cave Springtail	S3	G3G4T3
	<i>Pseudosinella testa*</i>	Shelled Cave Springtail	S1	G2G3
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod	S2	G5
	<i>Stygobromus spinatus*</i>	Spring Cave Amphipod	S2	G2G3
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4

Sunday, August 30, 2015

Page 5 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus veteranus</i> *	Guyandotte River Crayfish	S1	G1

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Ophiogomphus incurvatus alleghaniensis*</i>	Appalachian Snaketail	SH	G3T2T3
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Cottus sp. 1</i> *	Bluestone Sculpin	S1	G2
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Alasmidonta marginata</i> *	Elktoe	S1	G4
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Allium oxiphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex typhina</i>	Cattail Sedge	S2	G5

Sunday, August 30, 2015

Page 11 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Heuchera americana var. hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Lonicera canadensis</i>	Fly Honeysuckle	S2	G5
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Monarda fistulosa ssp. brevis</i> *	Smoke Hole Bergamot	S1	G5T1T2
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5

Sunday, August 30, 2015

Page 12 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Ranunculus sceleratus var. sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Ribes lacustre</i>	Bristly Black Currant	S2	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stenanthium gramineum var. gramineum</i>	Featherbells	S2S3	G4G5T3T5
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1G3
	<i>Trifolium reflexum</i> *	Buffalo Clover	S1	G3G4
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

Sunday, August 30, 2015

Page 13 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Glyphyalinia specus</i>	Hollow Glyph	SH	G4
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Mesodon normalis</i>	Grand Globe	S1	G5
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth	S2	GNR
	<i>Triodopsis juxtidentis robiniae*</i>	Brush Creek Threetooth	S1	G5TNR
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens lawae</i>	Rounded Dome	SH	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

Sunday, August 30, 2015

Page 15 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans*</i>	Northern Cricket Frog	S2	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon punctatus*</i>	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon virginia*</i>	Shenandoah Mountain Salamander	S2	G2G3
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot Toad	S1	G5

Sunday, August 30, 2015

Page 17 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos*</i>	Golden Eagle	S3N	G5
	<i>Asio otus*</i>	Long-eared Owl	S1B,S1N	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5

Sunday, August 30, 2015

Page 18 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Riparia riparia</i> *	Bank Swallow	S2B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5

Sunday, August 30, 2015

Page 19 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba</i> *	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Acronicta dolli</i> *	Doll's Merolonche	SH	G3G4
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Pyrgus wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Zale calycanthata</i> *	Double-banded Zale	SU	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Onychiurus janus*</i>	A Cave Springtail	S1	G2G3
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Stygobromus allegheniensis*</i>	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus morrisoni*</i>	Morrison's Cave Amphipod	S1	G2G3
	<i>Zygonopus krekeleri*</i>	West Virginia Blind Cave Millipede	S1	G4
	<i>Zygonopus whitei*</i>	Luray Caverns Blind Cave Millipede	S1	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi</i> *	Sable Clubtail	S1	G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5

Sunday, August 30, 2015

Page 23 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Cottus sp. c.f. cognatus</i> *	Checkered Sculpin	S1	G1*
	<i>Cyprinella analostana</i> *	Satinfin Shiner	S1	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma olmstedii</i> *	Tessellated Darter	S1S2	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Notropis procne</i> *	Swallowtail Shiner	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Alasmidonta undulata*</i>	Triangle Floater	S1	G4
	<i>Alasmidonta varicosa*</i>	Brook Floater	S2	G3
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Astragalus distortus</i> var. <i>distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex tosa</i> var. <i>tosa</i>	Shaved Sedge	S1	G5T5
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5

Sunday, August 30, 2015

Page 28 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5
	<i>Cuscuta indecora</i> var. <i>neuropetala</i>	Dodder	S1	G5T5
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Dichanthelium boreale</i>	Panicgrass	S1	G5
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Euphorbia pubentissima</i>	False Flowering Spurge	S1	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Hierochloa hirta</i> ssp. <i>arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5

Sunday, August 30, 2015

Page 29 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Linnaea borealis ssp. americana</i>	Twinflower	S1	G5T5
	<i>Linum lewisii var. lewisii</i>	Prairie Flax	S2	G5T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Melica nitens</i>	Three-flower Melicgrass	S1	G5
	<i>Minuartia groenlandica</i>	Greenland Stitchwort	S1	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Oenothera argillicola*</i>	Shalebarren Evening-primrose	S3	G3G4
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paxistima canbyi*</i>	Canby's Mountain-lover	S2	G2
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Potamogeton spirillus</i>	Spiral Pondweed	S2	G5
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Ptilimnium fluviatile*</i>	Harperella	S1	G2

Sunday, August 30, 2015

Page 30 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Rosa acicularis ssp. sayi</i>	Bristly Rose	S1	G5T5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Scirpus ancistrochaetus*</i>	Barbed-bristle Bulrush	S1	G3
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<i>Taenidia montana*</i>	Mountain-pimpernel	S3	G3
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trifolium virginicum*</i>	Kate's Mountain Clover	S3	G3
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5
	<i>Xerophyllum asphodeloides*</i>	Eastern Turkeybeard	S1	G4

Sunday, August 30, 2015

Page 31 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G3
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Triodopsis fallax</i>	Mimic Threetooth	S3	G5
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5

Sunday, August 30, 2015

Page 36 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Atrytonopsis hianna*</i>	Dusted Skipper	S1	G4G5
	<i>Calephelis borealis*</i>	Northern Metalmark	S2	G3G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Hesperia metea*</i>	Cobweb Skipper	S2S3	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta selene*</i>	Northern Crescent	S2	G5TNR

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg	SH	G4G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2G3
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Percina sciera</i>	Dusky Darter	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

Sunday, August 30, 2015

Page 43 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Phacelia covillei</i> *	Phacelia	S1	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens coelaxis</i>	Bidentate Dome	S1	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus*</i>	Mudpuppy	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5

Sunday, August 30, 2015

Page 49 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Plethobasus cyphyus*</i>	Sheepnose	S2	G3
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose	S2	G5T5
	<i>Solidago simplex</i> ssp. <i>randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G4
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica</i> *	Northern Map Turtle	S1	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Discus whitneyi</i>	Forest Disc	S2	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Helicodiscus shimeki</i>	Temperate Coil	S3	G5
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis platysayoides*</i>	Flat-spined Three-toothed Landsnail	S1	G1
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Sunday, August 30, 2015

Page 60 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Cardellina canadensis*</i>	Canada Warbler	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5

Sunday, August 30, 2015

Page 61 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Autochton cellus*</i>	Golden-banded Skipper	S1S2	G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Phyciodes cocyta diminutor*</i>	Summer Crescent	SNR	GNR
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus hatfieldi</i> *	Tug Valley Crayfish	S2	GNR
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR
	<i>Cambarus veteranus</i> *	Guyandotte River Crayfish	S1	G1

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpionodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S2	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Leucothoe recurva</i> *	Red-twig Doghobble	S1	G4G5
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4

Sunday, August 30, 2015

Page 69 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Prosartes maculata</i> *	Yellow Mandarin	S1	G3G4
	<i>Saxifraga caroliniana</i> *	Carolina Saxifrage	S1	G3
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Gastrodonta fonticula</i>	Appalachia Bellytooth	S2	G3G4
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Paravitrea reesei</i>	Round Supercoil	S2	G3
	<i>Stenotrema macgregori</i>	Fraudulent Slitmouth	S2	GNR
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela unipunctata</i>	A Tiger Beetle	S3	G4G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus welteri*</i>	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus*</i>	Mudpuppy	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot Toad	S1	G5

Sunday, August 30, 2015

Page 74 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5

Sunday, August 30, 2015

Page 75 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hadena ectypa</i> *	Starry Campion Moth	S1	G3G4
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus hatfieldi</i> *	Tug Valley Crayfish	S2	GNR
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tamea carolina</i>	Carolina Saddlebags	S3	G5
	<i>Tamea onusta</i>	Red Saddlebags	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas*</i>	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G4
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpiodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus*</i>	Redside Dace	S1S2	G3G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Noturus eleutherus</i>	Mountain Madtom	S2	G4
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina evides</i>	Gilt Darter	S2	G4
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5

Sunday, August 30, 2015

Page 80 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat	S1	G3G4
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5

Sunday, August 30, 2015

Page 82 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Croton glandulosus</i> var. <i>septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil	S1	G5
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5

Sunday, August 30, 2015

Page 83 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia tosa</i>	Southern Loosestrife	SH	G4
	<i>Manfreda virginica</i>	Eastern Agave	S1	G5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Rorippa sessiliflora</i>	Southern Yellow Cress	S1	G5
	<i>Rosa acicularis ssp. sayi</i>	Bristly Rose	S1	G5T5
	<i>Scleria oligantha</i>	Little-head Nutrush	S1	G5
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Scutellaria ovata ssp. ovata</i>	Heart-leaved Skullcap	S1	G5T5
	<i>Silene rotundifolia</i> *	Sandstone Fire-pink	S1	G4
	<i>Synandra hispidula</i> *	Guyandotte Beauty	S1	G4
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

Sunday, August 30, 2015

Page 84 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Sunday, August 30, 2015

Page 87 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Anthrobia coylei</i>	Spider	S2	G2?
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Pseudosinella orba*</i>	A Cave Springtail	S1	G3G4
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus mackini</i>	Southwestern Virginia Cave Amphipod	S2	G5
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Cottus sp. 1</i> *	Bluestone Sculpin	S1	G2
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = East River Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Anguispira strongylodes</i>	Southeaster Tigersnail	S2	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Paravitrea seradens</i>	Barred Supercoil	S2	G3
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus*</i>	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4

Sunday, August 30, 2015

Page 96 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5

Sunday, August 30, 2015

Page 98 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Atrytonopsis hianna*</i>	Dusted Skipper	S1	G4G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Eroria laeta</i>	Early Hairstreak	S2	GU
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma	S1	G5T3
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Conotyla vista</i> *	A Cave Millipede	SH	GH

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Rafinesque's Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G3G4T2
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Ochrotomys nuttalli</i> *	Golden Mouse	S2	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Aristida purpurascens</i> var. <i>purpurascens</i>	Arrowfeather Three-awn	S1	G5T5
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex mesochorea</i>	Midland Sedge	S2	G4G5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4

Sunday, August 30, 2015

Page 106 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex styloflexa*</i>	Bent Sedge	S1	G4G5
	<i>Carex suberecta*</i>	Prairie Straw Sedge	S1	G4
	<i>Carex tonsa var. rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Commelina erecta</i>	Slender Dayflower	S2	G5T5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Croton glandulosus var. septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cuscuta indecora var. neuropetala</i>	Dodder	S1	G5T5
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5
	<i>Danthonia sericea</i>	Silky Oatgrass	S1?	G5?
	<i>Desmodium lineatum</i>	Tick-trefoil	S1	G5

Sunday, August 30, 2015

Page 107 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil	S1	G5
	<i>Dichanthelium acuminatum ssp. columbianu</i>	District Of Columbia Panicgrass	S1	G5T5
	<i>Digitaria filiformis</i>	Slender Crabgrass	S1	G5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort	S2S3	G4
	<i>Fimbristylis annua</i>	Annual Fimbry	S1	G5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gentiana austromontana*</i>	Appalachian Gentian	S1	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Gymnopogon ambiguus*</i>	Bearded Skeleton Grass	S1	G4
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<i>Helianthemum propinquum*</i>	Low Frostweed	S1	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Helianthus occidentalis ssp. occidentalis</i>	Western Sunflower	S2	G5T5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hypericum virgatum*</i>	Sharpleaf St. John's-wort	S1	G4?
	<i>Juglans cinerea</i>	Butternut	S3	G4

Sunday, August 30, 2015

Page 108 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Liatris squarrulosa</i> *	Appalachian Gayfeather	S1	G4G5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lythrum alatum</i> var. <i>alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1T2
	<i>Muhlenbergia capillaris</i> var. <i>capillaris</i>	Hair-awn Muhly	S1	G5T5?
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Packera paupercula</i>	Balsam Ragwort	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5

Sunday, August 30, 2015

Page 109 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Prunus pumila</i> var. <i>depressa</i>	Sand Cherry	S1	G5T5
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint	S2	G4?
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Rhexia mariana</i> var. <i>mariana</i>	Maryland Meadowbeauty	S1	G5T5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora recognita</i>	Beaked Rush	S2	G5?
	<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	Orange Coneflower	S2	G5T4?
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage	S3	G3
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita</i> *	Virginia Mallow	S3	G3
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Silphium perfoliatum</i> var. <i>connatum</i> *	Cup-plant	S1	G5T3T4
	<i>Solidago simplex</i> ssp. <i>randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5

Sunday, August 30, 2015

Page 110 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Spiraea virginiana*</i>	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Sporobolus clandestinus</i>	Secret Dropseed	S1	G5
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Symphyotrichum laeve var. concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover	S3	G3
	<i>Triphora trianthophora*</i>	Threebirds	S2	G3G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Viola appalachiensis*</i>	Appalachian Blue Violet	S3	G4
	<i>Vitis rupestris*</i>	Sand Grape	S2	G3
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

Sunday, August 30, 2015

Page 111 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica</i> *	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle	S1	G5
	<i>Lampropeltis getula</i> *	Eastern Kingsnake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps</i> *	Broad-headed Skink	S2	G5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Gyrinophilus subterraneus*</i>	West Virginia Spring Salamander	S1	G1
	<i>Necturus maculosus*</i>	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4

Sunday, August 30, 2015

Page 115 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Ammodramus henslowii</i> *	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos</i> *	Golden Eagle	S3N	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	S3B	G5
	<i>Carduelis pinus</i>	Pine Siskin	S2B,S4N	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4

Sunday, August 30, 2015

Page 117 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Lanius ludovicianus*</i>	Loggerhead Shrike	S1B,S1N	G4
	<i>Lanius ludovicianus migrans*</i>	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5

Sunday, August 30, 2015

Page 118 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis*</i>	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Sunday, August 30, 2015

Page 119 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma	S1	G5T3
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pyrgus wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5

Sunday, August 30, 2015

Page 120 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Anthrobia coylei</i>	Spider	S2	G2?
	<i>Arrhopalites commorus*</i>	A Collembola	S1	G2G3
	<i>Arrhopalites pavo*</i>	A Cave Springtail	S1S2	G3?
	<i>Arrhopalites sacer*</i>	A Collembola	S1	G2
	<i>Bathypantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Chitrella regina*</i>	Royal Syarinid Pseudoscorpion	S1	G1
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<i>Horologion speakites</i>	Arbuckle Cave Ground Beetle	SH	GH
	<i>Kleptochthonius henroti*</i>	Greenbrier Valley Cave Pseudoscorpion	S1	G2
	<i>Kleptochthonius hetricki*</i>	Organ Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius orpheus*</i>	Orpheus Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius proserpinae*</i>	Proserpina Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi*</i>	Diplura	S2	G2G3
	<i>Macrocotyla hoffmasteri*</i>	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Onychiurus janus*</i>	A Cave Springtail	S1	G2G3
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis extraneostella*</i>	A Cave Mite	S2	G2?
	<i>Poecilophysis weyerensis*</i>	A Cave Mite	S1	G3?

Sunday, August 30, 2015

Page 121 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus grandis elevatus*</i>	A Cave Beetle	S1	G3T1
	<i>Pseudanophthalmus grandis grandis*</i>	A Cave Beetle	S3	G4T4
	<i>Pseudanophthalmus henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus higinbothami*</i>	A Cave Beetle	S2	G2
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G3
	<i>Pseudanophthalmus lallemanti*</i>	Lallemant's Cave Beetle	S1	G1
	<i>Pseudosinella gisini gisini*</i>	A Cave Springtail	S3	G3G4T3
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G3
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella agna*</i>	A Springtail	S3	G3G4
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus nanus*</i>	Pocahontas Cave Amphipod	S1	G1
	<i>Stygobromus parvus*</i>	Minute Cave Amphipod	S1	G2G3
	<i>Stygobromus pollostus*</i>	An Amphipod	S1	G2G3
	<i>Stygobromus redactus*</i>	An Amphipod	S1	G1
	<i>Stygobromus spinatus*</i>	Spring Cave Amphipod	S2	G2G3

Sunday, August 30, 2015

Page 122 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Trichodrilus culveri*</i>	An Oligochaete	S1	G1
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4
	<i>Zygonopus weyerienses*</i>	Grand Caverns Blind Cave Millipede	S2	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus nerterius</i> *	Greenbrier Cave Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Enallagma vernale</i>	Vernal Bluet	S1	G4Q
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus rogersi</i> *	Sable Clubtail	S1	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5

Sunday, August 30, 2015

Page 125 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lestes disjunctus</i>	Northern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Nehalennia gracilis*</i>	Sphagnum Sprite	S1	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus carolus*</i>	Riffle Snaketail	S2	G5
	<i>Ophiogomphus mainensis fastigiatus*</i>	Maine Snaketail	S3	G4TU
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus scudderii*</i>	Zebra Clubtail	SH	G4
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tamea carolina</i>	Carolina Saddlebags	S3	G5

Sunday, August 30, 2015

Page 126 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Exoglossum laurae</i> *	Tonguetied Minnow	S2	G4
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Glaucomys sabrinus fuscus*</i>	WV Northern Flying Squirrel	S2	G5T2
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus chrotorrhinus carolinensis*</i>	Southern Rock Vole	S2	G4T3
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis*</i>	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Sorex palustris punctulatus*</i>	Southern Water Shrew	S1	G5T3
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Alasmidonta marginata</i> *	Elktoe	S1	G4
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lasmigona subviridis</i> *	Green Floater	S2	G3
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Truncilla truncata</i>	Deertoe	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Baptisia australis var. australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Bouteloua curtipendula var. curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass	S3	G4T4
	<i>Calopogon tuberosus var. tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5

Sunday, August 30, 2015

Page 130 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G2G3
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis var. occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Cuscuta rostrata</i>	Beaked Dodder	S2	G4
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Drosera rotundifolia var. rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3

Sunday, August 30, 2015

Page 131 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gymnocarpium appalachianum*</i>	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Helianthus occidentalis ssp. occidentalis</i>	Western Sunflower	S2	G5T5
	<i>Heuchera alba*</i>	White Alumroot	S2	G2Q
	<i>Huperzia porophila*</i>	Rock Clubmoss	S1	G4
	<i>Ilex collina*</i>	Hill Holly	S2	G3
	<i>Isotria medeoloides*</i>	Small Whorled Pogonia	S1	G2?
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Liatris turgida*</i>	Turgid Gayfeather	S2	G3
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera cordata var. cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4

Sunday, August 30, 2015

Page 132 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera paupercula</i>	Balsam Ragwort	S2	G5
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Phlox buckleyi</i> *	Swordleaf Phlox	S2	G2
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2G3
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5

Sunday, August 30, 2015

Page 133 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Quercus prinoides</i>	Dwarf Chinquapin Oak	S1	G5
	<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose	S2	G5T5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Silphium compositum</i> var. <i>reniforme</i> *	Rosinweed	S1	G5T3T5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes ovalis</i> var. <i>erostellata</i> *	Oval Ladies'-tresses	S1	G5?T4?
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1G3
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5

Sunday, August 30, 2015

Page 134 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vaccinium oxycoccos</i>	Small Cranberry	S3	G5
	<i>Viburnum lentago</i>	Nannyberry	S1S2	G5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G4
	<i>Viola septentrionalis</i>	Northern Blue Violet	S2	G5
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern	S1	G4
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas	S2	G4Q

Sunday, August 30, 2015

Page 135 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake	S2	G5T3T4

Sunday, August 30, 2015

Page 136 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira stihleri*</i>	Greenbrier Tigersnail	S1	GNR
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Fontigens turritella*</i>	Greenbrier Cavesnail	S1	G1
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Helicodiscus shimaki</i>	Temperate Coil	S3	G5
	<i>Helicodiscus villosus*</i>	Greenbrier Coil	S1	GNR
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesomphix luisant*</i>	Glossy Button	S1	G1
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5

Sunday, August 30, 2015

Page 137 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Vallonia pulchella</i>	Lovely Vallonia	S3	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans</i> *	Northern Cricket Frog	S2	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ammodramus henslowii</i> *	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Chordeiles minor</i> *	Common Nighthawk	S2B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Lanius ludovicianus</i> *	Loggerhead Shrike	S1B,S1N	G4

Sunday, August 30, 2015

Page 141 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Lanius ludovicianus migrans*</i>	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Sunday, August 30, 2015

Page 142 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Erynnis lucilius*</i>	Columbine Duskywing	S2	G4
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Antrolana lira*</i>	Madison Cave Isopod	S1	G2G4
	<i>Caecidotea pricei*</i>	Price's Cave Isopod	S1	G5
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Stygobromus allegheniensis*</i>	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus biggersi*</i>	Biggers' Cave Amphipod	S1	G2G4
	<i>Stygobromus gracilipes*</i>	Shenandoah Valley Cave Amphipod	S1	G3G4
	<i>Stygobromus tenuis potomacus*</i>	Potomac Groundwater Amphipod	S1	G4T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Stylurus plagiatus</i>	Russet-tipped Clubtail	SH	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Cottus sp. c.f. cognatus</i> *	Checkered Sculpin	S1	G1*
	<i>Cyprinella analostana</i> *	Satinfin Shiner	S1	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma olmstedi</i> *	Tessellated Darter	S1S2	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	S1	G5
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Margariscus margarita</i> *	Pearl Dace	S2S3	G4
	<i>Moxostoma macrolepidotum</i> *	Shorthead Redhorse	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Notropis procne</i> *	Swallowtail Shiner	S1	G5
	<i>Percina peltata</i> *	Shield Darter	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Alasmidonta undulata*</i>	Triangle Floater	S1	G4
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis patens*</i>	Spreading Rockcress	S2	G3
	<i>Arabis serotina*</i>	Shalebarren Rockcress	S2	G2
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arundinaria gigantea ssp. gigantea</i>	Giant Cane	S2	G5T5?
	<i>Baptisia australis var. australis*</i>	False Blue Indigo	S3	G5T3T4
	<i>Bolboschoenus fluviatilis</i>	River Bulrush	S1	G5
	<i>Bouteloua curtipendula var. curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex bushii</i>	Bush's Sedge	S2S3	G4
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex conoidea</i>	Field Sedge	S1	G5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex lasiocarpa var. americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5

Sunday, August 30, 2015

Page 148 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex prairea</i>	Prairie Sedge	S1	G5
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Carex tetanica</i> *	Rigid Sedge	S1	G4G5
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Cyperus squarrosus</i>	Awed Flatsedge	S3	G5
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Eleocharis rostellata</i>	Beaked Spikerush	S1	G5
	<i>Equisetum fluviatile</i>	Water Horsetail	S2	G5
	<i>Eupatorium maculatum</i> var. <i>maculatum</i>	Spotted Joe-pyeweed	S1	G5T5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5

Sunday, August 30, 2015

Page 149 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Hydrocotyle ranunculoides</i>	Swamp Pennywort	S2	G5
	<i>Juncus balticus var. littoralis</i>	Baltic Rush	S1	G5T5
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Juncus nodosus var. nodosus</i>	Knotted Rush	S1S2	G5T5?
	<i>Juncus scirpoides</i>	Needle-pod Rush	S2	G5
	<i>Juncus torreyi</i>	Torrey's Rush	S2	G5
	<i>Lindernia dubia var. anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Linum sulcatum var. sulcatum</i>	Grooved Yellow Flax	S1	G5T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Lobelia kalmii</i>	Ontario Lobelia	S1	G5
	<i>Lysimachia quadriflora</i>	Four-flower Loosestrife	S1	G5?
	<i>Lysimachia thyrsoiflora</i>	Water Loosestrife	S1	G5
	<i>Lythrum alatum var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Melica nitens</i>	Three-flower Melicgrass	S1	G5
	<i>Panicum flexile</i>	Wiry Panicgrass	S1	G5
	<i>Parnassia grandifolia*</i>	Largeleaf Grass-of-parnassus	S1	G3

Sunday, August 30, 2015

Page 150 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Paronychia virginica</i>	Yellow Nailwort	S2	G4
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Ruellia humilis</i>	Low Wild Petunia	S1	G5
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed	S2	G5T5
	<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hardstem Bulrush	S2	G5T5
	<i>Scutellaria galericulata</i>	Hooded Skullcap	S1	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5

Sunday, August 30, 2015

Page 151 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Utricularia macrorhiza</i>	Greater Bladderwort	S1	G5
	<i>Vernonia glauca</i>	Broad-leaved Ironweed	S1	G5
	<i>Vitis rotundifolia</i> var. <i>rotundifolia</i>	Muscadine	SH	G5T5
	<i>Zannichellia palustris</i>	Horned Pondweed	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G3
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5

Sunday, August 30, 2015

Page 153 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Euconulus polygyratus</i>	Fat Hive	S1	G5
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Vertigo tridentata</i>	Honey Vertigo	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5

Sunday, August 30, 2015

Page 155 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Accipiter gentilis*</i>	Northern Goshawk	S1B,S1N	G5
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Anas rubripes*</i>	American Black Duck	S2B,S2N	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Aquila chrysaetos*</i>	Golden Eagle	S3N	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Asio otus*</i>	Long-eared Owl	S1B,S1N	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Botaurus lentiginosus*</i>	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Cardellina canadensis*</i>	Canada Warbler	S3B	G5
	<i>Carduelis pinus</i>	Pine Siskin	S2B,S4N	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Catharus ustulatus</i>	Swainson's Thrush	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5

Sunday, August 30, 2015

Page 157 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Chordeiles minor</i> *	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler	S3B	G4
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5

Sunday, August 30, 2015

Page 158 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis*</i>	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5

Sunday, August 30, 2015

Page 159 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Tyto alba</i> *	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Catocala dulciola</i> *	Sweet Underwing	SU	G3
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Colias interior</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Eilema bicolor</i>	Bicolored Moth	S1	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Melanchnra assimilis</i>	Black Arches	S1	G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5TNR

Sunday, August 30, 2015

Page 161 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma	S1	G5T3
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Apochthonius paucispinosus</i> *	Dry Fork Valley Cave Pseudoscorpion	S1	G1
	<i>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G3?
	<i>Bathypantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Nesticus tennesseensis</i> *	A Cave Spider	SU	G3G4
	<i>Phagocata angusta</i> *	A Cave Planarian	S1	G1
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G3
	<i>Pseudanophthalmus montanus</i> *	Dry Fork Valley Cave Beetle	S1	G1
	<i>Pseudosinella certa</i> *	Gandy Creek Cave Springtail	S1	G1
	<i>Pseudosinella gisini gisini</i> *	A Cave Springtail	S3	G3G4T3
	<i>Pseudosinella sp. 8</i> *	A Springtail	S2	G2
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G3
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5

Sunday, August 30, 2015

Page 163 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Sinella agna</i> *	A Springtail	S3	G3G4
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Sphalloplana culveri</i> *	Culver's Planarian	S1	G1
	<i>Stygobromus culveri</i> *	Culver's Cave Amphipod	S1	G1G2
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus nanus</i> *	Pocahontas Cave Amphipod	S1	G1
	<i>Stygobromus parvus</i> *	Minute Cave Amphipod	S1	G2G3
	<i>Zygonopus krekeleri</i> *	West Virginia Blind Cave Millipede	S1	G4
	<i>Zygonopus weyeri</i> *	Grand Caverns Blind Cave Millipede	S2	G3G4
	<i>Zygonopus whitei</i> *	Luray Caverns Blind Cave Millipede	S1	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus nerterius</i> *	Greenbrier Cave Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Argia bipunctulata</i> *	Seepage Dancer	S1	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma vernale</i>	Vernal Bluet	S1	G4Q
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Epitheca canis</i>	Beaverpond Baskettail	S3	G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4

Sunday, August 30, 2015

Page 166 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Lanthus parvulus*</i>	Northern Pygmy Clubtail	S3	G4
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Lestes disjunctus</i>	Northern Spreadwing	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Leucorrhinia glacialis*</i>	Crimson-ringed Whiteface	S1	G5
	<i>Leucorrhinia hudsonica</i>	Hudsonian Whiteface	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Ophiogomphus mainensis fastigiatus*</i>	Maine Snaketail	S3	G4TU
	<i>Rhionaeschna mutata*</i>	Spatterdock Darner	S1	G4
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Somatochlora forcipata</i>	Forcipate Emerald	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5

Sunday, August 30, 2015

Page 167 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas</i> *	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Exoglossum laurae</i> *	Tonguetied Minnow	S2	G4
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

Sunday, August 30, 2015

Page 168 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat	S2	G3G4T2
	<i>Glaucomys sabrinus fuscus*</i>	WV Northern Flying Squirrel	S2	G5T2
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus chrotorrhinus carolinensis*</i>	Southern Rock Vole	S2	G4T3
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis*</i>	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Sorex palustris punctulatus*</i>	Southern Water Shrew	S1	G5T3
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Sunday, August 30, 2015

Page 169 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Agrostis mertensii</i>	Northern Bentgrass	S1	G5
	<i>Amelanchier bartramiana</i>	Oblong-fruit Serviceberry	S2	G5
	<i>Andromeda polifolia</i> var. <i>glaucophylla</i>	Bog-rosemary	S1	G5T5
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Botrychium lanceolatum</i> var. <i>angustisegment</i>	Lanceolate Grapefern	S1	G5T4
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex arctata</i>	Drooping Woodland Sedge	S1	G5

Sunday, August 30, 2015

Page 171 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex atherodes</i>	Awned Sedge	S1	G5
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex bushii</i>	Bush's Sedge	S2S3	G4
	<i>Carex canescens</i>	Silvery Sedge	S3	G5
	<i>Carex careyana*</i>	Carey's Sedge	S1	G4G5
	<i>Carex comosa</i>	Longhair Sedge	S2	G5
	<i>Carex deflexa</i>	Northern Sedge	S1	G5
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex haydenii</i>	Cloud Sedge	S1	G5
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex interior</i>	Inland Sedge	S1	G5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex lasiocarpa var. americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex lucorum var. australucorum*</i>	Blue Ridge Sedge	S1	G4T3T4
	<i>Carex manhartii*</i>	Manhart's Sedge	S1	G3G4
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex novae-angliae</i>	New England Sedge	S1	G5

Sunday, August 30, 2015

Page 172 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex pauciflora</i>	Few-flower Sedge	S1	G5
	<i>Carex pedunculata</i>	Longstalk Sedge	S2	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex projecta</i>	Necklace Sedge	S3	G5
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G2G3
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Carex utriculata</i>	Beaked Sedge	S3	G5
	<i>Carex vesicaria</i>	Inflated Sedge	S2	G5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Coptis trifolia</i>	Threeleaf Goldthread	S2	G5
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G2
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Corallorhiza trifida</i>	Early Coralroot	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5

Sunday, August 30, 2015

Page 173 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5
	<i>Cuscuta rostrata</i>	Beaked Dodder	S2	G4
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Cypripedium reginae*</i>	Showy Lady's-slipper	S1	G4
	<i>Dalibarda repens</i>	Robin-run-away	S3	G5
	<i>Dichanthelium meridionale</i>	Matting Witchgrass	S3	G5
	<i>Drosera rotundifolia var. rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Eleocharis elliptica</i>	Elliptic Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Elymus trachycaulus ssp. trachycaulus</i>	Slender Wild Rye	S2	G5T5
	<i>Equisetum fluviatile</i>	Water Horsetail	S2	G5
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	S1	G5
	<i>Eupatorium pilosum</i>	Rough Boneset	S2	G5
	<i>Euphorbia purpurea*</i>	Glade Spurge	S2	G3
	<i>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	S3	G5
	<i>Gentianopsis crinita</i>	Greater Fringed Gentian	S1	G5
	<i>Geum aleppicum</i>	Yellow Avens	S1	G5
	<i>Geum rivale</i>	Purple Avens	S1	G5

Sunday, August 30, 2015

Page 174 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria grandis</i> var. <i>grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Hypericum mitchellianum</i> *	Blue Ridge St. John's-wort	S1	G3
	<i>Ilex collina</i> *	Hill Holly	S2	G3
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus articulatus</i>	Jointleaf Rush	S2	G5
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5
	<i>Juncus nodosus</i> var. <i>nodosus</i>	Knotted Rush	S1S2	G5T5?
	<i>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Lilium philadelphicum</i> var. <i>philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Linnaea borealis</i> ssp. <i>americana</i>	Twinflower	S1	G5T5

Sunday, August 30, 2015

Page 175 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Listera cordata</i> var. <i>cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lonicera canadensis</i>	Fly Honeysuckle	S2	G5
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5
	<i>Lycopodiella alopecuroides</i>	Foxtail Clubmoss	S1	G5
	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss	S2	G5
	<i>Lycopodium lagopus</i>	One-cone Groundpine	S1	G5
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G5
	<i>Menyanthes trifoliata</i>	Buckbean	S1	G5
	<i>Najas gracillima</i>	Slender Waternymph	S2	G5?
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4

Sunday, August 30, 2015

Page 176 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass	S1	G5
	<i>Platanthera peramoena</i>	Pride-of-the-peak	S3	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Platanthera shriveri*</i>	Shriver's Frilly Orchid	S1	G1
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polemonium vanbruntiae*</i>	Bog Jacob's-ladder	S2	G3G4
	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	S1	G5T5
	<i>Potamogeton tennesseensis*</i>	Tennessee Pondweed	S2	G2G3
	<i>Prenanthes crepidinea*</i>	Corymbed Rattlesnake-root	S1	G4
	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	S1S2	G5
	<i>Ribes lacustre</i>	Bristly Black Currant	S2	G5
	<i>Rubus pubescens var. pubescens</i>	Dwarf Red Bramble	S1	G5T5
	<i>Sagittaria calycina var. calycina</i>	Long-lobe Arrowhead	S2	G5T5?
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Salix lucida ssp. lucida</i>	Shining Willow	S1	G5T5

Sunday, August 30, 2015

Page 177 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Saxifraga pennsylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Scheuchzeria palustris ssp. americana</i>	Pod Grass	SH	G5T5
	<i>Schizachne purpurascens</i>	False Melicgrass	S1	G5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stellaria borealis ssp. borealis</i>	Northern Stitchwort	S1	G5T5
	<i>Symphyotrichum laeve var. concinnum</i>	Smooth Blue American-aster	S2	G5T4

Sunday, August 30, 2015

Page 178 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Taenidia montana*</i>	Mountain-pimpernel	S3	G3
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thelypteris simulata*</i>	Bog Fern	S1	G4G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Mannagrass	S2	G5T4Q
	<i>Torreyochloa pallida</i> var. <i>pallida</i>	Pale False Mannagrass	S1	G5T5?
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Triantha glutinosa*</i>	Sticky Bog-asphodel	S1	G5
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover	S3	G3
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Triphora trianthophora*</i>	Threebirds	S2	G3G4
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vaccinium oxycoccos</i>	Small Cranberry	S3	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5
	<i>Viburnum lentago</i>	Nannyberry	S1S2	G5
	<i>Viburnum opulus</i> var. <i>americanum</i>	Highbush Cranberry	S1	G5T5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola appalachensis*</i>	Appalachian Blue Violet	S3	G4

Sunday, August 30, 2015

Page 179 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Viola blanda</i> var. <i>palustriformis</i>	Violet	SH	G4G5T4T5
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern	S1	G4
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Xyris torta</i>	Slender Yellow-eyed-grass	S2	G5
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas	S2	G4Q

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G3
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Plestiodon anthracinus anthracinus</i> *	Northern Coal Skink	S2	G5T5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake	S2	G5T3T4

Sunday, August 30, 2015

Page 181 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Discus catskillensis</i>	Angular Disk	S2	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Glyphyalinia picea</i>	Rust Glyph	S2	G3
	<i>Helicodiscus shimeki</i>	Temperate Coil	S3	G5
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe	S1	GNR
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Nesovitrea electrina</i>	Amber Glass	S3	G5
	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	S2	G2
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil	S2	G3
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis platysayoides*</i>	Flat-spined Three-toothed Landsnail	S1	G1

Sunday, August 30, 2015

Page 182 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia costata</i>	Costate Vallonia	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens coelaxis</i>	Bidentate Dome	S1	G3
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela splendida</i> *	A Tiger Beetle	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4

Sunday, August 30, 2015

Page 186 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Speyeria diana</i> *	Diana Fritillary	S2S3	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Etheostoma longimanum</i> *	Longfin Darter	S1	G4
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5
	<i>Lythrurus ardens</i> *	Rosefin Shiner	S1	G5
	<i>Percina notogramma</i> *	Stripeback Darter	S1	G4
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2
	<i>Asplenium septentrionale</i>	Forked Spleenwort	S2	G4G5
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G2
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Heuchera americana var. hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5

Sunday, August 30, 2015

Page 190 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Pituophis melanoleucus melanoleucus*</i>	Northern Pinesnake	SH	G4T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon normalis</i>	Grand Globe	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis burchanani</i>	Ghost Shiner	S3	G5
	<i>Noturus stigmosus*</i>	Northern Madtom	S1	G3
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis teres</i> *	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa</i> *	Creek Heelsplitter	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis</i> *	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5

Sunday, August 30, 2015

Page 197 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

Sunday, August 30, 2015

Page 198 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica</i> *	Northern Map Turtle	S1	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot Toad	S1	G5

Sunday, August 30, 2015

Page 201 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Chordeiles minor*</i>	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5

Sunday, August 30, 2015

Page 202 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Glaucopsyche lygdamus lygdamus*</i>	Silvery Blue	S3	G5T3T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5

Sunday, August 30, 2015

Page 205 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus spiniceps*</i>	Arrow Clubtail	S2	G5
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas*</i>	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G4
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpiodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Etheostoma tippecanoe*</i>	Tippecanoe Darter	S2	G3G4
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon greeleyi*</i>	Mountain Brook Lamprey	S1	G4
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	S1	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Lythrurus umbratilis*</i>	Redfin Shiner	S3	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis boops*</i>	Bigeye Shiner	S1	G5
	<i>Notropis buchmanani</i>	Ghost Shiner	S3	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4

Sunday, August 30, 2015

Page 207 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Percina phoxocephala</i>	Slenderhead Darter	S1	G5
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Percina shumardi</i>	River Darter	S1	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cyprogenia stegaria*</i>	Fanshell	S1	G1Q
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma triquetra*</i>	Snuffbox	S2	G3
	<i>Fusconaia ebena*</i>	Ebonyshell	S3	G4G5
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis abrupta*</i>	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa*</i>	Creek Heelsplitter	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5

Sunday, August 30, 2015

Page 210 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Megaloniaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G1G2
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5

Sunday, August 30, 2015

Page 211 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Calycanthus floridus var. glaucus</i>	Eastern Sweetshrub	SH	G5T5
	<i>Carex buxbaumii</i>	Brown Bog Sedge	S2	G5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex projecta</i>	Necklace Sedge	S3	G5
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Huperzia porophila*</i>	Rock Clubmoss	S1	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Liatris scariosa var. nieuwlandii*</i>	Devil's-bite	S1	G5?T3T5
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<i>Oenothera pilosella ssp. pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass	S1	G5
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5

Sunday, August 30, 2015

Page 213 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Liochlorophis vernalis*</i>	Smooth Greensnake	S5	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Sunday, August 30, 2015

Page 214 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Gastrocopta procera</i>	Wing Snaggletooth	S2	G5
	<i>Gastrodonta interna</i>	Brown Bellytooth	S3	G5
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Lucilla singleyana</i>	Smooth Coil	S2	G5
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

Sunday, August 30, 2015

Page 215 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans</i> *	Northern Cricket Frog	S2	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler	S3B	G4
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5

Sunday, August 30, 2015

Page 217 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus elkensis*</i>	Elk River Crayfish	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ammocrypta clara</i> *	Western Sand Darter	S1	G3
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G4
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Crystallaria cincotta</i> *	Diamond Darter	S1	G1
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2G3
	<i>Etheostoma tippecanoe</i> *	Tippecanoe Darter	S2	G3G4
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon fossor</i> *	Northern Brook Lamprey	S1	G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	S1	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Noturus eleutherus</i>	Mountain Madtom	S2	G4

Sunday, August 30, 2015

Page 222 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Noturus stigmosus</i> *	Northern Madtom	S1	G3
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina evides</i>	Gilt Darter	S2	G4
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Percina sciera</i>	Dusky Darter	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria*</i>	Fanshell	S1	G1Q
	<i>Ellipsaria lineolata</i>	Butterfly	S2	G4G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma torulosa rangiana*</i>	Northern Riffleshell	S1	G2T2
	<i>Epioblasma triquetra*</i>	Snuffbox	S2	G3
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis abrupta*</i>	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5

Sunday, August 30, 2015

Page 225 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G1G2
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

Sunday, August 30, 2015

Page 226 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4
	<i>Calycanthus floridus var. glaucus</i>	Eastern Sweetshrub	SH	G5T5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Inflectarius rugeli</i>	Deep-tooth Shagreen	S2	G5
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora chrysoptera</i> *	Golden-winged Warbler	S1B	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish	<i>Procambarus acutus*</i>	White River Crayfish	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Lestes inaequalis</i>	Elegant Spreadwing	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish	<i>Ameiurus melas*</i>	Black Bullhead	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex lacustris</i>	Lake Sedge	S2	G5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Hierochloa hirta</i> ssp. <i>arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera peramoena</i>	Pride-of-the-peak	S3	G5
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2G3
	<i>Rhynchospora fusca</i> *	Brown Beaksedge	S1	G4G5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5

Sunday, August 30, 2015

Page 235 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Meadow River Wetlands

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus</i> *	Eastern Ribbonsnake	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus</i> *	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Sunday, August 30, 2015

Page 238 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Accipiter gentilis</i> *	Northern Goshawk	S1B,S1N	G5
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Anrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Chordeiles minor</i> *	Common Nighthawk	S2B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Lanius ludovicianus</i> *	Loggerhead Shrike	S1B,S1N	G4

Sunday, August 30, 2015

Page 239 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Lanius ludovicianus migrans*</i>	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Seiurus noveboracensis*</i>	Northern Waterthrush	S2B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4

Sunday, August 30, 2015

Page 240 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Brachionycha borealis</i> *	Boreal Fan Moth	S1	G4
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Colias interior</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Erynnis lucilius</i> *	Columbine Duskywing	S2	G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma	S1	G5T3
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

Sunday, August 30, 2015

Page 241 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Bathyphantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1
	<i>Geocentrophora cavernicola</i> *	Cave Flatworm	SH	G1G2
	<i>Islandiana speophila</i> *	Cavern Sheet-web Spider	S1	G1
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus hadenoecus</i> *	Timber Ridge Cave Beetle	S1	G1
	<i>Pseudanophthalmus potomaca</i> *	South Branch Valley Cave Beetle	S1	G3G4
	<i>Pseudanophthalmus senecae</i> *	Seneca Cave Beetle	S1	G1
	<i>Pseudotremia lusciosa</i> *	Germany Valley Cave Millipede	S1	G1
	<i>Pseudotremia princeps</i> *	South Branch Valley Cave Millipede	S1	G1
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5
	<i>Sphalloplana percoeca</i> *	A Cave Planarian	S1	G5
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus morrisoni</i> *	Morrison's Cave Amphipod	S1	G2G3

Sunday, August 30, 2015

Page 242 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Zygonopus weyeriensis</i> *	Grand Caverns Blind Cave Millipede	S2	G3G4
	<i>Zygonopus whitei</i> *	Luray Caverns Blind Cave Millipede	S1	G3G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Gomphus descryptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Cottus sp. c.f. cognatus*</i>	Checkered Sculpin	S1	G1*
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma olmstedii*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Thoburnia rathoeca</i>	Torrent Sucker	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G3G4T2
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel	S2	G5T2
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S2	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Astragalus distortus var. distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Bouteloua curtipendula var. curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Carex laxiculmis var. copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5

Sunday, August 30, 2015

Page 248 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Carex polymorpha</i> *	Variable Sedge	S1	G3
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G2G3
	<i>Carex tonsa</i> var. <i>rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid	S1	G5T5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5
	<i>Dalibarda repens</i>	Robin-run-away	S3	G5
	<i>Dasistoma macrophylla</i>	Mullein Foxglove	S2	G4
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Erysimum capitatum</i> var. <i>capitatum</i>	Western Wallflower	S1	G5T5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	S3	G5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5

Sunday, August 30, 2015

Page 249 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Gymnocarpium appalachianum*</i>	Appalachian Oak Fern	S2	G3
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<i>Heuchera alba*</i>	White Alumroot	S2	G2Q
	<i>Hexalectris spicata var. spicata*</i>	Spiked Crested Coralroot	S1	G5T4T5
	<i>Hudsonia tomentosa var. tomentosa</i>	False Heather	S1	G5T5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus torreyi</i>	Torrey's Rush	S2	G5
	<i>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Lilium philadelphicum var. philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Linum lewisii var. lewisii</i>	Prairie Flax	S2	G5T5
	<i>Linum sulcatum var. sulcatum</i>	Grooved Yellow Flax	S1	G5T5
	<i>Listera cordata var. cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lupinus perennis ssp. perennis*</i>	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G5

Sunday, August 30, 2015

Page 250 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1T2
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Oryzopsis asperifolia</i>	Roughleaf Ricegrass	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera plattensis</i>	Prairie Ragwort	S1	G5
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paronychia virginica</i>	Yellow Nailwort	S2	G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Pinus resinosa</i>	Red Pine	S1	G5
	<i>Piptatherum canadense</i>	Canada Mountain Ricegrass	S1	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Rosa acicularis</i> ssp. <i>sayi</i>	Bristly Rose	S1	G5T5
	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth Rose	S2	G5T5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5

Sunday, August 30, 2015

Page 251 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Scutellaria ovata ssp. virginiana</i>	Heart-leaved Skullcap	S1?	G5TNR
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Silene virginica var. robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Vaccinium oxycoccos</i>	Small Cranberry	S3	G5
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5
	<i>Zigadenus elegans ssp. glaucus</i> *	Mountain Deathcamas	S1	G5T4T5

Sunday, August 30, 2015

Page 252 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner	S1	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata</i> *	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G3
	<i>Graptemys ouachitensis</i> *	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5
	<i>Virginia valeriae pulchra</i> *	Mountain Earthsnake	S2	G5T3T4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira clarki</i>	Elfin Tigersnail	S1	GNR
	<i>Anguispira stihleri</i> *	Greenbrier Tigersnail	S1	GNR
	<i>Discus whitneyi</i>	Forest Disc	S2	G5
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<i>Triodopsis anteridon</i>	Carter Threetooth	S3	G3
	<i>Triodopsis picea</i> *	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Sunday, August 30, 2015

Page 254 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle	S2S3	G3

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Necturus maculosus*</i>	Mudpuppy	S4	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B,S4N	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5

Sunday, August 30, 2015

Page 257 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Riparia riparia</i> *	Bank Swallow	S2B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor</i> *	Prairie Warbler	S3B	G5
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Sturnella magna</i> *	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba</i> *	Barn Owl	S2B,S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Enallagma annexum</i>	Northern Bluet	S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Hetaerina titia</i>	Smoky Rubyspot	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpiodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lepomis humilis</i> *	Orangespotted Sunfish	S1	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis buchanaui</i>	Ghost Shiner	S3	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina shumardi</i>	River Darter	S1	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Polyodon spathula</i>	Paddlefish	S1	G4

Sunday, August 30, 2015

Page 262 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis teres</i> *	Yellow Sandshell	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Lasmigona subviridis</i> *	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Pleurobema clava</i> *	Clubshell	S1	G1G2
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4

Sunday, August 30, 2015

Page 264 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Uniomerus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex normalis</i>	Greater Straw Sedge	S3	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	S1	G5
	<i>Lechea minor</i>	Thymeleaf Pinweed	S1	G5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Salix discolor</i>	Pussy Willow	S2	G5
	<i>Solidago patula</i> var. <i>patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira kochi</i>	Banded Tigersnail	S1	G5
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<i>Inflectarius inflectus</i>	Shagreen	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Stenotrema barbatum</i>	Bristled Slitmouth	S3	G5
	<i>Striatura milium</i>	Flat-ribbed Striate	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris blanchardi</i> *	Blanchard's Cricket Frog	SH	G5
	<i>Ambystoma barbouri</i> *	Streamside Salamander	S1	G4
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Ambystoma texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4

Sunday, August 30, 2015

Page 269 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot Toad	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Actitis macularius*</i>	Spotted Sandpiper	S2B	G5
	<i>Ammodramus henslowii*</i>	Henslow's Sparrow	S1B	G4
	<i>Ammodramus savannarum*</i>	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Botaurus lentiginosus*</i>	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Chordeiles minor*</i>	Common Nighthawk	S2B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Colinus virginianus*</i>	Northern Bobwhite	S1B, S1N	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	S3B,S3N	G5

Sunday, August 30, 2015

Page 271 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum*</i>	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4

Sunday, August 30, 2015

Page 272 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calycopsis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Glaucopsyche lygdamus lygdamus*</i>	Silvery Blue	S3	G5T3T4
	<i>Lycaena hyllus*</i>	Bronze Copper	S2	G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR
	<i>Fallicambarus fodiens</i> *	Digger Crayfish	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg	SH	G4G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Macromia taeniolata</i>	Royal River Cruiser	S3	G5
	<i>Neurocordulia molesta</i>	Smoky Shadowdragon	S2	G4
	<i>Neurocordulia obsoleta</i>	Umber Showdragon	S1	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Stylurus notatus*</i>	Elusive Clubtail	S1S2	G3
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Telebasis byersi</i>	Duckweed Firetail	S1	G5

Sunday, August 30, 2015

Page 276 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus melas*</i>	Black Bullhead	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G4
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Carpionodes carpio</i>	River Carpsucker	S3	G5
	<i>Carpionodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Clinostomus elongatus*</i>	Redside Dace	S1S2	G3G4
	<i>Esox americanus vermiculatus</i>	Grass Pickerel	S1S2	G5T5
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5
	<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	S1	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	S1	G5
	<i>Lepomis humilis*</i>	Orangespotted Sunfish	S1	G5
	<i>Lythrurus umbratilis*</i>	Redfin Shiner	S3	G5
	<i>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5

Sunday, August 30, 2015

Page 277 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis blennioides</i>	River Shiner	S2	G5
	<i>Notropis buchanani</i>	Ghost Shiner	S3	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina phoxocephala</i>	Slenderhead Darter	S1	G5
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Percina shumardi</i>	River Darter	S1	G5
	<i>Phenacobius mirabilis</i>	Suckermouth Minnow	S3	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5
	<i>Polyodon spathula</i>	Paddlefish	S1	G4
	<i>Umbra limi</i>	Central Mudminnow	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus ochrogaster</i>	Prairie Vole	S3	G5
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Long-eared Bat	S1S2	G1G2
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell	S1	G2T2
	<i>Fusconaia ebena</i> *	Ebonyshell	S3	G4G5
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis cariosa</i> *	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Lampsilis teres</i> *	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa</i> *	Creek Heelsplitter	S1	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5

Sunday, August 30, 2015

Page 280 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Leptodea fragilis</i>	Fragile Papershell	S3	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G4G5
	<i>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G1G2
	<i>Pleurobema cordatum</i>	Ohio Pigtoe	S2	G4
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot	SX	G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula nodulata</i>	Wartyback	S1	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

Sunday, August 30, 2015

Page 281 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla donaciformis</i>	Fawnsfoot	S1	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Amorpha fruticosa</i>	Tall Indigobush	S2S3	G5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arundinaria gigantea ssp. gigantea</i>	Giant Cane	S2	G5T5?
	<i>Asclepias hirtella</i>	Green Milkweed	S2	G5
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<i>Carex nigromarginata</i>	Black-edge Sedge	S3	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex tuckermanii*</i>	Tuckerman's Sedge	S1	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5
	<i>Ceratophyllum echinatum*</i>	Spineless Hornwort	S1	G4?
	<i>Chamaesyce vermiculata</i>	Hairy Spurge	S2	G5
	<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock	S1	G5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot	S2	G5
	<i>Cuscuta indecora var. neuropetala</i>	Dodder	S1	G5T5
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5

Sunday, August 30, 2015

Page 283 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Eleocharis elliptica</i>	Elliptic Spikerush	S1	G5
	<i>Eleocharis palustris</i>	Marsh Spikerush	S3	G5
	<i>Elodea nuttallii</i>	Western Waterweed	S3	G5
	<i>Elymus trachycaulus ssp. trachycaulus</i>	Slender Wild Rye	S2	G5T5
	<i>Enemion biternatum</i>	Eastern False Rue-anemone	S1	G5
	<i>Fraxinus quadrangulata</i>	Blue Ash	S1	G5
	<i>Gratiola viscidula*</i>	Short's Hedgehyssop	S1	G4G5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hottonia inflata*</i>	Featherfoil	S1	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Lindernia dubia var. anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Ludwigia leptocarpa</i>	River Seedbox	S2	G5
	<i>Lythrum alatum var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5

Sunday, August 30, 2015

Page 284 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass	S1	G5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita</i> *	Virginia Mallow	S3	G3
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spermacoce glabra</i> *	Buttonweed	S1	G4G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5

Sunday, August 30, 2015

Page 285 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Wolffia columbiana</i>	Columbian Watermeal	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Apalone mutica mutica*</i>	Midland Smooth Softshell	S1	G5T5
	<i>Apalone spinifera spinifera</i>	Eastern Spiny Softshell	S4	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Pseudemys concinna</i>	River Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Sunday, August 30, 2015

Page 287 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Punctum smithi</i>	Lamellate Spot	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5
	<i>Cicindela marginipennis</i> *	Cobblestone Tiger Beetle	S1	G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon punctatus*</i>	Cow Knob (White Spotted) Salamander	S2	G3
	<i>Plethodon virginia*</i>	Shenandoah Mountain Salamander	S2	G2G3
	<i>Plethodon wehrlei</i>	Wehrle's Salamander	S4	G4
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus</i> *	Black-billed Cuckoo	S2B	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Lophodytes cucullatus</i>	Hooded Merganser	S1B,S4N	G5
	<i>Loxia curvirostra</i>	Red Crossbill	S2B,S2N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Riparia riparia</i> *	Bank Swallow	S2B	G5

Sunday, August 30, 2015

Page 291 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Tyto alba*</i>	Barn Owl	S2B,S2N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Acronicta dolli</i> *	Doll's Merolonche	SH	G3G4
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glauopsyche lygdamus lygdamus</i> *	Silvery Blue	S3	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5TNR
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pyrgus wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Satyrium caryaevorus</i>	Hickory Hairstreak	S2	G4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

Sunday, August 30, 2015

Page 293 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma olmstedii</i> *	Tessellated Darter	S1S2	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Luxilus cornutus</i> *	Common Shiner	S1S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat	S2	G3G4T2
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S2	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Alasmidonta undulata*</i>	Triangle Floater	S1	G4
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Arabis serotina*</i>	Shalebarren Rockcress	S2	G2
	<i>Asplenium septentrionale</i>	Forked Spleenwort	S2	G4G5
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Virgin's Bower	S2	G5T5
	<i>Delphinium exaltatum*</i>	Tall Larkspur	S2	G3
	<i>Dichanthelium acuminatum</i> ssp. <i>acuminatum</i>	Hairy Panicgrass	S1	G5T5
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Gymnocarpium appalachianum*</i>	Appalachian Oak Fern	S2	G3
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Heuchera alba*</i>	White Alumroot	S2	G2Q

Sunday, August 30, 2015

Page 298 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot	S2	G5T3?
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax	S2	G5T5
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Packera plattensis</i>	Prairie Ragwort	S1	G5
	<i>Panicum flexile</i>	Wiry Panicgrass	S1	G5
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<i>Paronychia virginica</i>	Yellow Nailwort	S2	G4
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Pinus resinosa</i>	Red Pine	S1	G5
	<i>Piptatherum racemosum</i>	Black-seed Mountain Ricegrass	S2	G5
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Stenanthium gramineum</i> var. <i>gramineum</i>	Featherbells	S2S3	G4G5T3T5

Sunday, August 30, 2015

Page 299 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Talinum teretifolium</i> *	Eastern Fameflower	S1	G4
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Trillium pusillum var. virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G3
	<i>Graptemys ouachitensis*</i>	Ouachita Map Turtle	S1	G5
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina*</i>	Eastern Box Turtle	S5	G5T5
	<i>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira clarki</i>	Elfin Tigersnail	S1	GNR
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Vallonia excentrica</i>	Iroquois Vallonia	S3	G5
	<i>Vallonia perspectiva</i>	Thin-lip Vallonia	S3	G4G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Acris crepitans*</i>	Northern Cricket Frog	S2	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Ambystoma opacum</i>	Marbled Salamander	S4	G5
	<i>Anaxyrus fowleri</i>	Fowler's Toad	S5	G5
	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	S5	G5
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salamander	S4	G5
	<i>Eurycea bislineata</i>	Northern Two-lined Salamander	S5	G5
	<i>Eurycea longicauda</i>	Longtail Salamander	S5	G5
	<i>Gyrinophilus porphyriticus porphyriticus</i>	Northern Spring Salamander	S5	G5T5
	<i>Lithobates pipiens*</i>	Northern Leopard Frog	S1	G5
	<i>Plethodon cylindraceus</i>	White-spotted Slimy Salamander	S5	G5
	<i>Plethodon glutinosus</i>	Slimy Salamander	S5	G5
	<i>Plethodon hoffmani</i>	Valley And Ridge Salamander	S4	G5
	<i>Plethodon virginia*</i>	Shenandoah Mountain Salamander	S2	G2G3
	<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	S4	G5
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	Northern Red Salamander	S3	G5T5

Sunday, August 30, 2015

Page 303 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ammodramus savannarum</i> *	Grasshopper Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Colinus virginianus</i> *	Northern Bobwhite	S1B, S1N	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5
	<i>Hylocichla mustelina</i> *	Wood Thrush	S3B	G5
	<i>Icteria virens</i> *	Yellow-breasted Chat	S3B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5

Sunday, August 30, 2015

Page 304 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Setophaga discolor*</i>	Prairie Warbler	S3B	G5
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing	SU	G3T3
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5TNR

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Stygobromus cooperi</i> *	Cooper's Cave Amphipod	S1	G1G2

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Celithemis fasciata</i>	Banded Pennant	S3	G5
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Somatochlora elongata</i>	Ski-tipped Emerald	S3	G5
	<i>Sympetrum internum</i>	Cherry-faced Meadowhawk	S2	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Cyprinella analostana*</i>	Satinfin Shiner	S1	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Etheostoma olmstedii*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Lythrurus ardens*</i>	Rosefin Shiner	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Notropis procne*</i>	Swallowtail Shiner	S1	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Alasmidonta undulata*</i>	Triangle Floater	S1	G4
	<i>Epioblasma triquetra*</i>	Snuffbox	S2	G3
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell	S2	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Baptisia australis var. australis*</i>	False Blue Indigo	S3	G5T3T4
	<i>Bartonia paniculata ssp. paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass	S3	G4T4
	<i>Carex lupuliformis*</i>	False Hop Sedge	S1	G4
	<i>Chenopodium standleyanum</i>	Standley's Goosefoot	S2	G5
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Drosera rotundifolia var. rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<i>Eupatorium hyssopifolium var. laciniatum*</i>	Hyssopleaf Thoroughwort	S1	G5T4T5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Oenothera argillicola*</i>	Shalebarren Evening-primrose	S3	G3G4
	<i>Panicum verrucosum*</i>	Warty Panicgrass	S1	G4
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5

Sunday, August 30, 2015

Page 312 of 315

* Priority 1 species

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Potamogeton pulcher</i>	Spotted Pondweed	S1	G5
	<i>Ptilimnium fluviatile*</i>	Harperella	S1	G2
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Samolus valerandi ssp. parviflorus</i>	Seaside Brookweed	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush	S3	G4G5
	<i>Scirpus ancistrochaetus*</i>	Barbed-bristle Bulrush	S1	G3
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Trifolium virginicum*</i>	Kate's Mountain Clover	S3	G3
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Vitis rotundifolia var. rotundifolia</i>	Muscadine	SH	G5T5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead	S5	G5T5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Coluber constrictor constrictor</i>	Northern Black Racer	S5	G5T5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G3
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5
	<i>Regina septemvittata</i>	Queen Snake	S4	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5
	<i>Terrapene carolina carolina</i> *	Eastern Box Turtle	S5	G5T5

Appendix 4: SGCN Species by Conservation Focus Area, Taxa and Priority

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Gastrocopta tappaniana</i>	White Snaggletooth	S3	G5
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

Appendix 5: West Virginia SWAP Partner Workshop Notes, June 23-24, 2015

ATTENDEES – WHY ARE YOU HERE?

WV Land Trust (WVLT)

- Interested in role within the State Wildlife Action Plan (SWAP)
- Where does the Land Trust fit in to advance the plan?

George Washington-Jefferson National Forest (GW-Jeff)

- Concerned about rare species as well, and wants to continue cooperating on species and habitat management.

Monongahela National Forest (MNF)

- Interested and involved with state conservation actions.

Natural Resources Conservation Service (NRCS)

- The NRCS is a federal agency that provides the nexus to work on private land, and can bridge the gap between the public and DNR, and assuage some of the fear the public may have of rare or endangered species issues
- Help public landowners who want to be involved with the DNR and conservation

WVU Extension Service

- Works mainly with private landowners who don't know what wildlife exists on their lands
- Many landowners are interested in rare species, conservation, etc.-- they want to know what occurs on their lands

The Nature Conservancy (TNC)

- Interested in seeing a collective conservation vision in the state.

Canaan Valley National Wildlife Refuge (CVNWR)

- The Refuge is looking at landscape-level conservation.

Ohio River Islands National Wildlife Refuge (ORINWR)

- Would like to dovetail their habitat management plan (which is in process) with the SWAP
- Promote landscape-level conservation.

The Wilds

- Wants to continue collaboration between the DNR and The Wilds

The Conservation Fund (TCF)

- Wants to facilitate the conservation mission

WV Wildlife Federation (WVWF)

- The WVWF's members are hunters/anglers, as well as naturalists-- the Federation would like to awaken the conservation mission in the members

SWAP OVERVIEW

The elephant in the room is "corporate"-- many corporate entities are in the process of liquidating land, and the WV Forestry Association should be a major player.

Make the SWAP Summary available to others.

The SWAP has good structure; it is similar to the GW-Jeff Forest Plan.

Utilize citizen science for monitoring, especially considering the rate of retirement within the DNR.

Public involvement (Requirement #8) should include social media.

- could use the existing "Wild & Wonderful" tagline in PR

Need basic communication to landowners regarding management tools and techniques.

Include Wildlife Management Institute and Wildlife Habitat Council as partners; the latter could provide a link to corporations that hold large tracts of lands, such as Bayer or DuPont

COMMENTS FROM THE LAND CONSERVATION COMMUNITY

1. Excited about the incorporation of cutting edge science, such as climate change; the groups have limited resources to invest, so conservation activities must have focus.
2. Existence of Conservation Focus Areas (CFA) is a good approach; each land conservation group has a specific geographical area of focus, so they need to know what is important on the landscape within their areas of interest to better protect species/habitats.
3. The SWAP and CFA's give them a foundation to show the importance of conservation areas, which gives them the ability to elevate the importance of conservation and helps funding efforts.
4. The SWAP is statewide initiative that can provide funding for conservation; it prioritizes conservation needs which aids in making a case to the legislature or governor.
5. The need for pre-planning for development to avoid impacts is recognized.
6. The conservation community is in support of the WVDNR-- they agree that the CFA's are important to protect the Natural Heritage of WV, and that the SWAP belongs to the people of WV. It creates a long-term conservation vision for the state, and can bring together many types of communities to promote conservation.

SWAP ALIGNMENT WITH PARTNERS - HOW CAN THE SWAP HELP YOU MEET YOUR GOALS?

TCF

- Working with Farmland Protection Boards and agriculture groups
- Have a grant to focus on improving water quality on farmland
- NRCS focuses on species ("species" is scary word to the farmland community), so start a conversation with the farmland community regarding species protection
- Farmland gets credit for rare species, but there is nothing to afford protection for the species and monitoring efforts
- The expertise is lacking to move forward with species protection or management
- Focus on habitats as opposed to species to perhaps ease the pain in some cases (or habitat with an indicator species)
- Resulting Action: engage Farmland Protection Boards

MNF

- Important to MNF: restoration, climate change, fire, early successional habitat
- Preparing for a workshop on early successional habitat, gap openings, etc.
 - will talk about suites of species
 - describe funding opportunities

- teach landowners how to improve habitat
- Monitoring is important to USFS because they are land managers; rely on DNR for majority of monitoring
- In support of partnerships because of funding issues
- Databasing important

GW-Jeff

- In support of CFA's because they give focus and can show importance of areas-- helps with competitive grant process
- The Forest deals with climate change and non-native invasive species on every level with all projects
- Align the GW-Jeff with the SWAP; the GW-Jeff plan is already based on habitat types
- The Forest has a listing of management indicator species

NRCS

- Cerulean warbler and golden-winged warbler projects successful
- Wetland Reserve Easement Program
 - Identified Ohio River Basin as a priority (but not the top priority)
 - Drinking water supply areas and riparian corridors between wetlands are priorities
 - Also focusing on invasive species
 - Many new positions coming, and could easily link activities with the SWAP

National Wildlife Refuges

- Landscape-level planning
- Partnerships are needed for applying for grants
- Focusing on endangered species, working with private landowners, engaging youth, PR, invasive species
- Monarch butterfly work must be provided to Congress

WVLT

- Historic populations should be taken into consideration-- should system be forced?
- Landscape-level conservation
- Would like to partner for restoration projects, and then place the properties under easements
- Water quality is a priority
 - Use properties with good water quality as tools to demonstrate proper land management-- link land to water

- Divide state in geographical regions, and then do a couple on conservation projects in each region

WVU Extension Service

- Communicates with landowners to determine their interests, and educates them regarding management techniques
- Can serve as a conduit between DNR and public to get information out
- Some landowners do have species-specific interests

WVWF

- Hunters run hot and cold-- get influential people to present data
- Educate youth about conservation at National Hunting and Fishing Days
- 30+ clubs are affiliated with the WVWF, but they are not necessarily committed to the same issues as the WVWF; the WVWF could facilitate involving the clubs. For instance, the WV Bowhunters Association is the largest group, and they watch everything in the woods while they are hunting/scouting; untapped potential.

TNC

- Maintain a resilient and connected network of forests and streams
- Climate resilience
- Forest restoration
- Non-native invasive species
- Protection of forest and streams
- Energy development and avoiding, minimizing, and compensating for impacts
- Partnerships

The Wilds

- Would like to train students to assist with monitoring
- Their zoo and aquarium program protects species from extinction (hellbenders, wood turtles)
- Promote citizen science
- Outreach and education
- Raise species for reintroductions

CONSERVATION FOCUS AREAS

Initiating

- Start with areas that are doable, cover public and private lands, include terrestrial and aquatic projects, and have existing partnerships
- Mesh CFA plans with management plans of other agencies, and start with CFA's whose partners are currently working on plans
- Spread out the first CFA's geographically
- Remember that CFA's with a lot of public land "aren't going anywhere"; therefore, place more focus on private tracts

Challenges

- Obtainability of conservation action within CFA's looks very difficult
- Habitat mapping varies-- may have to use a lot of crosswalks
- Will learn that one stress may negatively impact one species, while positively impacting another

General

- NRCS funding focus will be changing, and the SWAP is more in line with that focus
- DNR Game Management has funding for land acquisition, and will target areas within CFA's
- If there is a planning group for each CFA, then perhaps a partner can be a member of that planning group
- Will there be a "clickable map" available for the CFA's?
- When developing habitat goals within a CFA, determine what is already protected, and in what way
- Identify existing capacity and tie targets to that capacity
- Look at habitat units to determine the current condition and the desired condition
 - Monitoring!
 - Consider security and quantity/quality

Prioritizing

Little Kanawha River / Middle Island Creek

- The cerulean warbler initiative is "hot" within the NRCS, especially in Clay, Gilmer and Braxton counties
- Almost entirely private ownership
- Marcellus industry provides an opportunity to engage exploration companies and would give an "in" on the planning stages of pipelines, etc.

- Exploration companies have environmental sections within the companies that will provide dollars for conservation-based activities

Ohio River Corridor

- Ohio River Islands NWR is currently working on habitat management plan, with a 10-15 year planning horizon with focus on habitats and species
- On-going work on the eastern hellbender in the northern panhandle (The Wilds)
- Would involve terrestrial and aquatic aspects

High Alleghenies

- USFS would like to be in early in the CFA planning process
- Large corporate landowner (Plum Creek) is interested in conservation work

Appendix 6: Roadmap to Required Elements in This Plan

Required Element	Where The Element Is Addressed in This Plan
1	3.2, Appendix 1, Appendix 3, Appendix 4
2	3.3, Appendix 2
3	4.1, 4.2, 5.6, 6 (CFA Sections 6.2 - 6.22), 7.4
4	4.3, 5 (Ecoregion Sections 5.2 – 5.5), 6 (CFA Sections 6.2 – 6.22)
5	7.2, 7.2.3.3, 7.3
6	7.6
7	2.2, 2.4, 2.5, 2.11, 6 (CFA Sections 6.2 – 6.22), 7.3
8	2.4.2, 6 (CFA Sections 6.2 – 6.22)

Appendix 7: Significant Changes from the 2005 SWAP to the 2015 SWAP

There have been many significant changes since the first West Virginia State Wildlife Action Plan was published in 2005. Much additional survey data for plant and animal species has been collected by the WVDNR and its partners. Analysis of that data has provided a much clearer picture of species status and location. Improvements in technology have simultaneously yielded valuable information on habitat location and extent, providing biologists with better opportunities to understand species/habitat relationships and concentrations. Finally, stresses on species and habitats are much better understood today than they were a decade ago, providing better opportunities for conservation action to address those stresses. As a consequence of these changes, the 2015 West Virginia differs from its predecessor in some very fundamental ways:

- The number of animal SGCN's has increased from 517 species in the 2005 SWAP to 661 species in the 2015 plan
- Plant SGCN's were not addressed in the 2005 SWAP; the 2015 plan includes 482 plant SGCN's
- The terrestrial habitat classification system used in the 2005 WV SWAP was not regionally standardized; the 2015 plan uses a modification of a regionally standardized classification system
- Terrestrial habitat extent was not estimated in the 2005 SWAP; it is estimated at three different geographic scales in the 2015 plan
- There was no aquatic habitat classification system in the 2005 SWAP; the 2015 plan not only utilizes a regionally standardized aquatic habitat classification system, it provides estimates of aquatic habitat extent at three different scales
- The 2005 SWAP did not include habitat maps; the 2015 plan is well informed by both terrestrial and aquatic habitat mapping
- Because species/habitat associations were not well understood, the 2005 plan could not adequately describe those associations; the 2015 plan more thoroughly describes them
- Beyond the WVDNR's Biotics database, the 2005 SWAP did not utilize database software to house information used to develop the plan, making it difficult to update; the 2015 plan utilized a new SWAPMASTER database built expressly for the purpose of plan development and subsequent revision
- The 2005 SWAP included few follow-on paths for plan implementation beyond strategies for additional surveys and inventories; the 2015 plan will catalyze subsequent planning and management at a more local level through its recognition of 21 Conservation Focus Areas (CFA) across the state and the establishment of a CFA planning process
- The 2005 SWAP did not provide an institutional process for plan revision; the 2015 plan provides for a Continuous SWAP Planning federal aid project that will ensure annual updates are made to the plan, including the addition of CFA plans developed to implement the 2015 SWAP