



DRAFT

2015 West Virginia

State Wildlife Action Plan

West Virginia Division of Natural Resources

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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" (SCGN) 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 SCGN'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 that 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
- ✓ Recover currently listed species and allow for their de-listing
- ✓ 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 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.
- ✓ Monitor performance, continue research, and adapt management techniques for better results

The 2015 SWAP recognized over 600 animal species as SGCN's, but 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 prioritized. 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
- ✓ Another proposal for collaboration between the WV Division of Highways and other state and federal agencies to simultaneously protect SGCN populations and make highway construction and maintenance faster and less expensive
- ✓ Identifying Conservation Focus Areas to concentrate conservation action where species and habitats are most heavily concentrated

Conservation Focus Areas (CFA's) 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 scales. CFA's are at a scale where more intensive investigation, collaboration, and conservation action can readily occur. Beginning this fall, conservation planning for each of 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, quality of life, for all our state's citizens, will be the ultimate outcome.

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 is composed of thousands of plant and animal species interacting with each other and the environment. The flora and fauna of this state, along with the natural 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 stresses, 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 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
2. Recover currently listed species and allow for their de-listing
3. Keep the common species common
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, resides on 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 percent of the state's 15.5 million acre 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, our natural heritage. 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 fifty 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 game fish and wildlife species. These monies have been critical to the establishment of the Division of Natural Resources' long-term conservation planning and have led to significant 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 in the state. 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 U.S. listed on the Federal Endangered and Threatened species list, and many more species in decline, the need has never been greater for a complimentary 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 program 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. 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 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 be focused on the "species of greatest conservation need," yet address the "full array of wildlife" and wildlife-related issues. The U.S. Fish and Wildlife Service and the Association of Fish and Wildlife Agencies have developed additional guidance on information needed to meet the eight elements (see Appendix 2). 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 on 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 individual at-risk species. To identify species/habitat associations, known locations of species were matched with data from habitat mapping in the state. 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), though 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 non-game 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 this comprehensive planning process, the West Virginia State Wildlife Action Plan and implementing the plan. 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 Program and State Wildlife Grants Programs have provided new funding opportunities for conservation organizations in West Virginia. The West Virginia Division of Natural Resources has made portions of these funds available to dozens of conservation organizations and universities through a competitive 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 competitive 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 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 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 unfortunately little was known at the time. In contrast to the research and management efforts that have restored populations of species that are hunted or fished, populations of nongame species have historically not received adequate attention or resources necessary for conservation planning. Despite its good intentions, the internal and external conventional wisdom regarding the 2005 West Virginia Wildlife Conservation Action Plan, subtitled *It's About Habitat*, was that it was long on identification of species, but short on real conservation action. Given that so much critical conservation information was unavailable at that time, the 2005 plan 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 occurrence surveys
- Better mapping of terrestrial and aquatic habitats
- 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 plan, the 2015 revision is in reality 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, agency and organizational plans and priorities that informed the 2015 SWAP, as well as review of the draft plan itself. In addition to the WVDNR, the Advisory Team included:

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

2.3: 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

- WV 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
- U.S. Forest Service Regional Forester's list of Sensitive Animal Species for the Eastern Region

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:

- American University (Cave invertebrates)
- West Liberty University (Crayfish)
- Marshall University (Amphibians and Reptiles)
- Copperhead Environmental Consulting (Gastropods)

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
- 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 The Nature Conservancy
- 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
- protected lands assessments developed by The Nature Conservancy

Public input to all components of the SWAP is being sought during the 45 day public review period from June 15 – July 30, 2015, including three public open houses conducted across the state on June 15-16, 2015.

The draft SWAP is being provided for external review to many individuals and organizations who could act as partners and cooperators for plan implementation, including the following:

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

Additional input from partnering agencies, NGO's and other private entities is being solicited during an intensive two-day workshop to be conducted July 23-24, 2015 as well as through presentations at multiple events during 2014 and 2015.

2.5: Species of Greatest Conservation Need – Selection and Prioritization

2.5.1: Introduction

West Virginia's 2005 Wildlife Conservation Action Plan (WVWCAP) prioritized 128 species as Species of Greatest Conservation Need (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. All 600+ animal species are recognized as SGCN's, but 319 Priority I 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:

- WV 2005 Wildlife Conservation Action Plan
- WVDNR, Natural Heritage Program
- U.S. Fish and Wildlife Service
- The World Conservation Union (IUCN list)
- Northeast State Fish and Wildlife Technical Committee
- West Virginia Partners in Flight
- National Audubon Society
- Monongahela National Forest
- Jefferson and George Washington National Forests

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 and Fall 2014
Butterflies and Moths	Fall 2014
Dragonflies and Damselflies	Fall 2014
Snails	Spring 2015

Cave Invertebrates	Spring 2015
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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
- Disjunct or otherwise genetically unique populations

A species was also included in the SGCN list if it is an S4 and S5 species, if WV is 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
- It received a Climate Change Vulnerability Index (CCVI) score of extremely or highly vulnerable (1 or 2)

Species that did not meet any of the above criteria could still be included 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 population appears to have 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. SGCN were assigned either Priority 1 status or Priority 2 status, based on an assessment of conservation urgency and opportunities for conservation action. SGCN species that were assigned Priority I status included:

- All G1-G3 species
- All S1 species
- All species with a CCVI score of 1 or 2
- 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 WWCAP, 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, cave invertebrates, and other invertebrates (spiders, stoneflies, mayflies, beetles) such that they have been prioritized in the 2015 revision.

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 MS 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
- Robert Acciavatti (USFS-retired): tiger beetles
- Rodney Bartgis (TNC-retired): plants
- Richard Bailey (WVDNR): birds
- Elizabeth Byers (WVDEP): plants
- Dan Cincotta (WVDNR): fishes
- Janet Clayton (WVDNR): mussels
- David Culver (The American University): cave invertebrates
- Dan Dourson: landsnails
- Donna Ford-Werntz (WVU): plants
- Joe Greathouse (The Wilds): amphibians
- Jeff Hajenga (WVDNR): cave invertebrates, mammals, reptiles, amphibians
- Paul Harmon (WVDNR): plants
- Paul Johnson (Alabama Dept. of Conservation & Natural Resources): landsnails
- Zachary Loughman (West Liberty University): crayfishes
- Susan Olcott (WVDNR): butterflies, dragonflies, damselflies, mammals
- Kieran O'Malley (WVDNR): reptiles, amphibians, mammals
- Thomas Pauley (Marshall University-retired): reptiles, amphibians
- Tim Pearce (Carnegie Museum of Natural History): landsnails
- Kathryn Perez (University of Alabama): landsnails
- Barbara Sargent (WVDNR): plants, mammals, reptiles, amphibians
- Craig Stihler (WVDNR): plants, mammals, reptiles, amphibians, cave invertebrates, landsnails
- Brian Streets (WVDNR): plants
- Susan Studlar (WVU): plants

- David Thorne (WVDNR): fishes
- Jim Vanderhorst (WVDNR): plants
- Virginia Dept. of Game & Inland Fisheries: birds
- Jayme Waldron (Marshall University): reptiles, amphibians
- Petra Wood (WVU): birds

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's. 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 those reasons, 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's in Section 2.5. A total of 482 plant species were selected as SGCN's and into 121 Priority 1 species 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) and data from the WVDNR's own classification and mapping efforts. WVDNR staff and WVU consultants used Esri ArcGIS Spatial Analyst tools and map algebra to extract, reclassify, and combine data from these and other sources on a 30 meter grid cell basis. Grid cells are similar to pixels in digital photography, and a 30 meter resolution is very high quality for a statewide dataset. Each 30 meter grid cell is classified with a habitat value allowing analysts to accurately quantify the location and size of 20 different habitat types across the state. Similar habitat types across ecoregion boundaries [e.g., Allegheny-Cumberland Dry Oak Forest and Woodland + Central Appalachian Dry Oak-Pine Forest = Dry Oak (-Pine) Forests] were combined. For the floodplain and riparian areas, data from The Nature Conservancy's Active River layer were used as they were deemed to be the best available statewide 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 of the Laurentian-Acadians and Piedmont types that were renamed "unknown." Shale barrens and spruce habitats were integrated into the overall classification 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, with large areas of mostly acidic bedrock reclassified to "previous calcareous." The resulting mapping and classification dataset 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), with only slight modification by WVDNR to incorporate

a few additional aquatic habitat types. 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's 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's 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's and all 482 plant SGCN's, 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. These associations were then added to the SWAPMASTER database.

2.9: Stress Identification and Prioritization

Conservation planning for SGCN's 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 habitat 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 these activities, 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's, 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, then prioritized. The identification step produced well over 600 potential conservation actions to address priority threats. WVU consultants consolidated similar actions to reduce that number to about 150 potential actions, of which about half were judged to be statewide in scope and 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 to select the highest priority actions that will be more prominently featured in the SWAP Executive Summary. All of 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's and their habitats exist in many areas of the state. To achieve the goals of the West Virginia SWAP, it will be necessary to plan, and manage, at a finer scale. As one step in that direction, the WVDNR has mapped these SGCN concentrations from its spatial databases of species occurrence, combined with additional expert input from the agency's Wildlife Diversity biologists. 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, using HUC-12 watersheds 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, conservation actions and potential partners, both public and private. Their identification and treatment in the West Virginia SWAP is at the strategic level. Subsequent to USFWS 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 MS 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

Considering there are hundreds of Species in Greatest Need of Conservation that have been identified in West Virginia, it is impractical to discuss in detail the ecological requirements and distribution and status of individual species, along with the stresses and appropriate conservation actions for each. Looking at assemblages of species by taxonomic group and the habitats in which they occur allow us to address broad patterns and trends across many species. While the West Virginia 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.

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. 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 to almost a year before the tadpoles transform into sub-adults. Adult frogs may be aquatic or semi-aquatic while adult toads are terrestrial.

Thirty four salamander species occur in West Virginia. Salamanders have a 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 they 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 scale-less bodies, salamanders occur in aquatic or semi-aquatic habitat 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 range or WV and/or adjacent states may share a limited endemic. Habitat availability, environmental conditions, and geographic barriers such as rivers and mountains restrict or delineate many SGCN species' distribution.

The Central and Southern Appalachians is the global center of endemism for salamanders in the family Plethodontidae. Many Appalachian endemics have fairly small ranges and their future existence is wholly or substantially dependent upon the condition of their habitats and populations in West Virginia.

Species Groupings

Toads and Frogs

The preferred habitat for most of these species is are floodplains along major rivers, and 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 stresses to this group.

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

Aquatic Salamanders

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

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

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 local and isolated ridgetops. Stresses include habitat fragmentation and climate change.

- Plethodon punctatus* (Cow Knob (White Spotted) Salamander) Central Appalachian endemic
- Plethodon virginia* (Shenandoah Mountain Salamander) Central Appalachian endemic
- Plethodon nettingi* (Cheat Mountain Salamander) West Virginia endemic
- Aneides aeneus* (Green Salamander) Central/Southern Appalachian endemic
- Plethodon hoffmani* (Valley and Ridge Salamander) Central Appalachian endemic
- Plethodon cylindraceus* (White-spotted Slimy Salamander)
- Ambystoma jeffersonianum* (Jefferson Salamander)
- Eurycea longicauda* (Longtail Salamander)
- Plethodon kentucki* (Cumberland Plateau Salamander) Central/Southern Appalachian endemic
- Plethodon wehrlei* (Wehrle's Salamander) Central Appalachian endemic
- Plethodon glutinosus* (Slimy Salamander)
- Ambystoma opacum* (Marbled 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 linings. 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 alters, if not eliminates, 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 many species skins support 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, 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 the 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 also are 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 35 amphibian species, with 18 considered Priority 1 species. 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 endangered.

Birds

Description

Owing to its diverse physiography and climate, West Virginia hosts over 170 breeding bird species in habitats ranging from 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

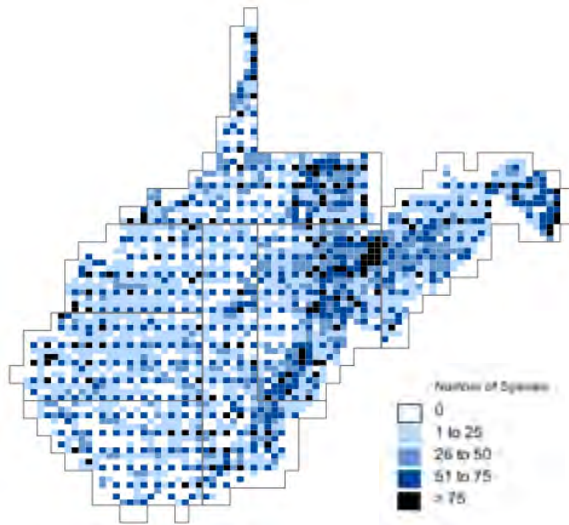
The distribution and abundance of many bird species in West Virginia is changing as habitats and mortality risks change here and elsewhere. The most pronounced changes have been in response to large-scale land-use changes. By 1920, the original extensive forest cover of West Virginia was substantially 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, having increased substantially with human land use change and then declining as land use statewide changed again. It is less clear if forest birds as a group have proportionately benefited, however, 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, while changes in haying practices are contributing to long-term declines for Eastern Meadowlark.

The initial West Virginia Wildlife Action Plan tasked staff with answering basic questions regarding SGCN species. True distribution and abundance of many species remained unknown. In 2014, 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. They will be particularly useful for still-ubiquitous but declining species such as Wood Thrush and Eastern Wood-Pewee.

Bird species richness by atlas block surveyed, 2009-2014



Additionally, WVDNR staff targeted survey efforts towards specific species that might otherwise be missed using atlas protocols. Two examples include Loggerhead Shrike and Swainson's Warbler. Each species was subject to an intensive two-year survey that targeted specific habitats. The resulting data was 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.

Species Groupings

As an initial step in implementing these, we have 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, it is because we now consider the species extirpated. Others continue to recover, as has been the case with Bald Eagle. 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 WV 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 RSGCN list
- 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, that 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, 2014). Stresses include loss of nesting/breeding habitat, loss of wintering habitat and possible decline in insect diversity and abundance.

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

Early successional forest

Early successional forest habitats in West Virginia are highly ephemeral and dependent on disturbance to forested areas, 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. Stresses include loss of breeding and wintering habitat from multiple causes, hybridization, predation and other causes of mortality, and low productivity.

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

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 and prothonotary warbler appear stable in population but occur locally, while both summer tanager and rusty blackbird are in decline (Greenberg and Droege, 1999; Sauer et al, 2014). Stresses include habitat loss and change from diverse sources.

<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
<i>Protonotaria citrea</i>	Prothonotary Warbler
<i>Piranga rubra</i>	Summer Tanager
<i>Euphagus carolinus</i>	Rusty Blackbird

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). Stresses include habitat fragmentation and alteration from historic mass-scale logging, energy development and other sources, habitat loss on wintering grounds, mortality from predation, and brood parasitism by the brown-headed cowbird. Forest fragmentation and loss of forest

interiors 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).

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

Grasslands and old field

These are primarily birds of native grasslands (such as prairie) that expanded in West Virginia as a response to increases in habitat availability from agriculture. While long-term declines in grassland bird populations have generally stabilized nationally, negative trends continue for a number of species in West Virginia. For others, habitat loss in some areas has been offset by newly-created habitats elsewhere (Bailey, 2015). General stresses include habitat loss from development and farmland abandonment, changes in agricultural practices, timing of haying fields, exposure to pesticides, and, locally, conversion of grasslands to row crops. (North American Bird Conservation Initiative, 2014; Sauer et al, (2014).

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

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 to varying degrees

to high elevation habitats. Some are increasing, while others are extremely rare and local. Stresses to these species include changes in vegetation community composition and structure and habitat loss on wintering grounds (Bailey, 2015; Byers, 2010; Byers and Norris, 2011).

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

Wetlands, waterways and waterbodies

Wetlands, water bodies 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. Stresses include habitat loss and alteration, climate change, change in farming practices, and development.

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

Other

The peregrine falcon 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.

<i>Falco peregrinus</i>	Peregrine Falcon
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Conservation issues

The 2005 plan 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 stresses across all taxa have been assessed by WVDNR staff and others. Distilled from this, there are a number of conservation concerns of particular import to birds. These include climate change, ongoing habitat fragmentation, 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 informed by listed stresses within the context of these concerns.

With this 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 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 considered priority species. Of the listed priority species, those associated with forest interior, early successional and grassland habitats will receive the greatest attention.

Butterflies and Moths

Description

West Virginia hosts 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 and crescents. The majority of butterflies (116) are resident species, the remaining eighteen occur in the state annually or periodically, but do not overwinter 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 habitat to some extent, and species of lepidoptera that utilize common forest species as larval hosts are found virtually state wide. Other species are much more specialized in 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/spruce and wetland ecosystems in the mountains, and southern coal field forests in the southern part of the state.

Species Groupings

Shale Barrens/ Eastern Oak-Pine

All of these species occur primarily in the eastern panhandle and front range of the higher Allegheny Mountains in dry oak dominated habitats. Stresses include gypsy moth control, habitat loss/degradation from development, invasive species and deer herbivory. Gypsy moth control has already decimated most of these species to the point that some may be extirpated from the state.

Calephelis borealis (Northern Metalmark)
Callophrys irus (Frosted Elfin)
Erynnis lucilius (Columbine Duskywing)
Erynnis martialis (Mottled Duskywing)
Euchloe olympia (Olympia Marble)
Glaucopsyche l. 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)
Acronicta dolli (Doll's Merolonche)
Catocala dulciola (Sweet Underwing)
Catocala herodias gerhardi (Pine Barrens Underwing)
Chaetagnia cerata (Waxed Sallow)
Zale calycanthata (Double-banded Zale)

High Elevation

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

Appalachian Wetlands and/or Red Spruce

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

Heathlands

Colias interior (Pink-edged Sulphur)

Northern Hardwood

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

Southern Coalfields

These two species are threatened by mineral extraction – specifically large-scale surface coal mines and valley fills.

Autochton cellus (Golden-banded Skipper)
Speyeria diana (Diana Fritillary)

Wet Meadows/Edges

These species require dry to wet weedy fields with a diversity of forbs including docks, campion, lambsquarters, and bluestems – habitats are often lost to successional changes or development.

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

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 typically 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)
Cyllopsis gemma (Gemmed Satyr)
Erora laeta (Early Hairstreak)
Parrhasius m-album (White-M Hairstreak)
Satyrium caryaevorus (Hickory Hairstreak)
Euchlaena milnei (Milne's Euchlaena Moth)

New Taxa – Research

These are species that have recently been split out of common taxa and need additional research to determine where they occur in West Virginia and the habitats they use.

Celastrina lucia (Northern Azure) – high elevation northern hardwoods
Papilio appalachensis (Appalachian Tiger Swallowtail) - high elevation northern hardwoods
Phyciodes cocyta diminutor (Summer Crescent) – mostly southern coalfields
Celastrina serotina (Cherry Gall Azure) – mixed mesophytic/oak with openings
Speyeria idalia (Regal Fritillary) – prairie remnant – research reintroduction

Conservation Issues

Butterflies of the families Hesperidae and Lycaenidae occur in large numbers on the regional and state SGCN lists because many species in these families 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 stresses to members of West Virginia's lepidoptera community fall into four primary categories: habitat loss from multiple sources (succession, development, energy extraction), invasive plant species, continued pesticide use for Gypsy Moth control, and excessive deer browsing of native vegetation. Other stresses include plant pathogens that effect larval host plants (such as Beech canker fungus (*Nectria ditissima*) which may cause beech declines and declines in the already rare Early Hairstreak), exotic insects that impact host species or adults directly (such as Chinese mantids which are voracious predators on butterflies at nectar plants), and management of utility right-of-ways (chemical vs. mechanical trimming).

Similar with 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 haying; 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, 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 other uses in other areas of the state has also likely had negative impacts: mountaintop

removal 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), 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 (*Microstegium vinimeium*), 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 and the larval host plant is overwhelmed and eliminated, the colony can die 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 (*Lymantria dispar*) control in the 1990s. Certain West Virginia state agencies continue to use Dimilin for gypsy moth control instead of Btk or Gypcheck, and the process to decide when and where to spray is not transparent. The gypsy moth population is now infested with the fungal pathogen *Entomophaga maimaiga*, significantly reducing the need for other control measures in many areas of the State. Shale barren species not recorded in West Virginia for at least 10 years, and which are susceptible to early spring insecticide use based on their life histories, 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 eleven) 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 although other habitats are also impacted. Lepidoptera are impacted by deer from loss of populations of larval host plants, consumption by deer while eating of eggs and larva, loss of nectar flowers, and alteration of forest structure by loss of ground covers and understories. Declines of several species can be directly tied to deer herbivory in various portions of their ranges – Mottled Duskywing, Frosted Elfin, Appalachian Azure, Dusky Azure, and Baltimore Checkerspot. Early flying species are especially vulnerable because of the lack of nectar species, and those plants palatability to deer.

The 2005 State Wildlife Action Plan 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 2 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 many species distribution in the state. Efforts have also been made to mine data from other institutions to enhance records especially for rare species (Carnegie Museum of Natural History, Smithsonian Institute – National Museum of Natural History). Historic records for butterflies and rare moths have been examined and coordinates have been either confirmed or generated if necessary – most records now have accuracies of less than 1 km. 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, efforts are planned in conservation areas. West Virginia is a partner in a northeast regional rare 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 (Monongahela National Forest), we have surveyed for rare lepidopteran species on the forest (as part of the WV Butterfly Atlas) and are working on a monitoring plan to be implemented by Service personnel.

SGCN Summary

West Virginia's list of lepidopteran Species in Greatest Need of Conservation 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.

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 exploring 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 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, 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, eleven 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 WV 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 5 phyla and 40 genera. West Virginia’s cave invertebrates include many that are known only from single-cave systems. West Virginia has one species of isopod (*Antrolana 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 most variation of caves, and the most sites that have been surveyed. Of the top 14 caves in WV that have 10 or more cave invertebrates, eleven of them are located in Greenbrier County. One cave in West Virginia (Organ Cave) has 22 species of cave invertebrate. It should be considered a 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 stresses and are as follows. 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 the West Virginia Speleological Survey Bulletin #16 by Fong, Culver, Hobbs, and Pipan.

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 strict conditions that they require. Taxa that are dependent on cave streams are as follows.

Certain species of 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 of the species 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, cave crickets) that forage outside of the cave. Protection of cave species in this category involves protection around the entrance, or protection of areas that foraging species 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 Conotyia, Pseudotremia, and Zygnopus
Beetles in the genus Pseudanophthalmus
Dipteran of the genus Spelobia

Aquatic epikarst species

Organisms that live within the water filled small crevices below the ground's surface but above the 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, redactus
Copepods of several genera.

Terrestrial Epikarst Species

These taxa live within small spaces above the 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.

One aquatic isopod species - Antrolana lira

Conservation Issues

Conservation of cave invertebrates strongly hinges upon protection of the surface habits, 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 human based impacts, especially to subterranean aquatic habitats and species. Sinkholes and sinking streams frequently act as a direct pathway to cave streams and groundwater. Karst systems typically allow inputs to flow directly, and unchanged, into the subterranean habitats.

Much 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 stresses 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 the nutrient inputs and hydrology of caves. Quarrying destroys cave invertebrate habitat directly and may have already extirpated the Rich Mountain Cave Beetle.

The Greenbrier Valley, especially north of Lewisburg is currently experiencing residential development growth. This is producing direct potential stresses to cave endemics. Similar development is occurring in the eastern panhandle, although the cave density and species numbers is not as great. Hopefully

through proper education and planning this development will be adjusted around cave resources, or proceed properly and 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 aspects of land use to follow when working in karst areas.
- Establish a landowner data base that keeps track of both cave entrance owners, and owners of land within the caves watersheds.
- Conduct stresses assessment of areas to use in site conservation and management prioritization
- Establish programs to 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 with little professional recruitment and aging and retirement of current taxonomists. Even with additional surveys, or even attempts to monitor current populations, there will soon 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.

Crayfish

Description

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).

Distribution

The southeastern United States is the global hotspot for crayfish diversity. There are many local and regional endemic species in this area, including northward through the Central Appalachians. Crayfish occur across West Virginia in a variety of aquatic and moist terrestrial habitats. While some species are widespread, others are endemic to certain watersheds or other small landscapes. .

Species Groupings

Aquatic Crayfish

Conservation stresses for these stream inhabiting species include competition from invasive non-native crayfish, increased sedimentation, channelization, conductivity point sources, and increased nutrient loading (Loughman 2014).

<i>Cambarus chasmodactylus</i>	<i>New River Crayfish (Central App. endemic)</i>
<i>Cambarus elkensis</i>	<i>Elk River Crayfish (Central App. endemic)</i>
<i>Cambarus hatfieldi</i>	<i>Tug Fork Valley Crayfish (Central App. endemic)</i>
<i>Cambarus nerterius</i>	<i>An Underground Crayfish (Central App. endemic)</i>
<i>Cambarus smilax</i>	<i>Greenbrier River Crayfish (Central App. endemic)</i>
<i>Cambarus theepiensis</i>	<i>Coalfields Crayfish (Central App. endemic)</i>
<i>Cambarus veteranus</i>	<i>Guyandotte River crayfish (Central App. endemic)</i>
<i>Cambarus callainus</i>	<i>Big Sandy Crayfish (Central App. endemic)</i>
<i>Procambarus acutus</i>	<i>White River Crayfish</i>

Burrowing Crayfish

These species burrow into moist ground in floodplain forests, wetland margins, wet fields, seeps, and similar upland habitats. Conservation stresses come from conversion of habitat to development, agriculture, or mineral development and fragmentation from roads, pipelines, and similar infrastructure.

<i>Cambarus dubius A</i>	<i>Teays Burrowing Crayfish (Central App. endemic)</i>
<i>Cambarus dubius B</i>	<i>Meadow Riv. Burrowing Crayfish (Central App. endemic)</i>
<i>Fallicambarus fodiens</i>	<i>Digger Crayfish</i>

Conservation Issues

Land use 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. Coal mining has substantially impacted aquatic crayfish habitats in the Cumberland Mountains, potentially impacting several species (Big Sandy, Coalfields, Guyandotte, and Tug Fork Crayfish). Two aggressive invasive species, *Orconectes virilis* and *Orconectes rusticus*, have spread throughout the state in recent years. In the Eastern Panhandle, *O. virilis* has invaded all major watersheds in the region, displacing a once diverse crayfish community and. 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 (1) which species occur in West Virginia, and (2) the conservation status of all species in the state. Loughman and Welsh (2013) determined which species were worthy of conservation attention. Several new species have been recently described and distribution and habitats better defined as a result of this and other work (Loughman 2013b, Loughman 2014, Loughman and Welsh 2013, Loughman *et al.* 2015, Thoma *et al.* 2014

SGCN Summary

Twelve species of crayfish are considered Species of Greatest Conservation Need. *Cambarus callainus* and *C. veteranus* are proposed for listing as federally endangered.

Dragonflies and Damselflies

Description

Dragonflies and damselflies collectively form the order Odonata, or odonates. West Virginia hosts 47 species of damselflies and 98 species of dragonflies. Eight of these (2 damselflies and 6 dragonflies) occur as vagrants in the state, so a total of 137 species of odonates occur regularly in West Virginia. With over 32,000 miles of rivers and streams and over 22,000 acres of impoundments, odonates are found statewide in a broad variety of lentic (still water) and lotic (flowing water) environments. Although the most visible stage of these taxa is the adult, the majority of life spans are spent in the larval form. Odonates are known to be indicators of water quality for a variety of aquatic habitats. The larvae are also often the dominant trophic level among benthic invertebrates in many aquatic habitats. The distribution of species is based on the environment required by the aquatic larval form: aquatic ecosystem, temperature, water quality, and benthic substrate. Forty-nine species (18 damselflies, 33 dragonflies) can be categorized as generalists and can be found in a broad variety of lentic and/or lotic environments or as utilizing very common anthropogenic environments across a large portion of West Virginia. Their larvae are adaptable to a broad spectrum of aquatic environmental conditions. The remaining 88 regularly occurring species typically occur in rare habitats or declining or potentially declining habitats, e.g., low elevation river back channels and sloughs.

Distribution

The 2005 State Wildlife Action Plan listed surveys, inventories, and data management as primary goals. West Virginia conducted a dragonfly and damselfly atlas from 2005-2010. During the atlas effort, 126 range expansions for odonates in the state were documented, reflecting the additional survey effort in under-represented areas, e.g., Cumberland Mountains. Of the 137 regularly occurring species, 119 (87%) were documented during the atlas efforts. With other efforts since 1995, 92% of West Virginia's odonate fauna has been recently confirmed to still inhabit the state. For most odonate species, occurrence and distribution in the state are generally well understood. State ranks were reassigned at the conclusion of the atlas using NatureServe's methodology. Species that weren't documented typically occur in areas difficult or dangerous to survey such as large rivers and large bogs and wetlands in the mountains. Twelve species known from West Virginia have not been documented since at least 1995, most much earlier. Most have extremely small areas of historical occurrence in the state (one or two sites), are at the periphery of their range, or may be vagrant in West Virginia. Unfortunately, the records for many of these species have vague locations associated with them (mapped to a county centroid), making finding the historic survey site very difficult.

The single current odonate project in West Virginia is a PhD student investigating the habitat associations of lepidoptera and odonates at high elevation wetlands in Tucker County. This student has so far confirmed new locations for several high elevation species (*Somatochlora elongata*, *Enallagma annexum*, *Ladonna julia* and others), new locations for one SGCN species (*Leucorrhinia gracilis*) and documented a new odonate for the state (name withheld pending publication).

Species Groupings

Occurrence of odonata species is dependent on larval habitat – aquatic habitat type (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

Mostly found on state or federal land (some private) – stresses include climate change and development pressures.

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) - fishless
Somatochlora elongata (Ski-tipped Emerald)
Somatochlora forcipata (Forcipate Emerald)
Sympetrum obtrusum (White-faced Meadowhawk)

High Elevation Streams and River Species

Mostly found on state or federal land – stresses 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 impacted river systems (Ohio, Kanawha, Potomac). Stresses include mineral extraction (mountain top removal/valley fill mining, water withdrawal and degradation from horizontal drilling activities), channelization/shore manipulation, municipal/industrial pollution).

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 illinoensis (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
Somatochlora linearis (Mocha Emerald) – August – forested, mostly dried up
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. Stresses include local impacts from timber harvesting, development, and degradation from horizontal drilling activities.

Cordulegaster erronea (Tiger Spiketail)
Cordulegaster obliqua (Arrowhead Spiketail)
Tachopteryx thoreyi (Gray Petaltail)

Well Vegetated or Marshy Pond Species

These species occur in mature ponds – those with well-developed shoreline and emergent vegetation. Stresses include gentrification (“cleaning up” ponds) and siltation.

Celithemis fasciata (Banded Pennant)
Enallagma antennatum (Rainbow Bluet)
Enallagma vesperum (Vesper Bluet)
Lestes australis (Southern Spreadwing)
Lestes forcipatus (Sweetflag Spreadwing)
Sympetrum ambiguum (Blue-faced Meadowhawk) - western
Sympetrum internum (Cherry-faced Meadowhawk) - eastern

Fishless Pond Species

Stresses include citizens introducing predatory fish to fishless ponds.

Anax longipes (Comet Darner)

Pond Species

Species using generic ponds – but some with specific requirements.

Epiaeschna heros (Swamp Darner) – with soggy wood, swamps
Ladona deplanata (Blue Corporal)
Telebasis byersi (Duckweed Firetail) –western, with duckweed
Tamea carolina (Carolina Saddlebags)
Tamea onusta (Red Saddlebags)

Conservation Issues

Although dangers occur during the adult stage (predation, inclement weather), primary stresses to odonates occur during their larval stage. Across the northeastern United States, 18% (25 species) of odonate fauna is 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 species. 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 WV in 2010, 62% were determined to be impaired. Clubtails (family *Gomphidae*), who almost as a group 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, mountain top removal 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 (*Epiaeschna heros*), Great Blue Skimmer (*Libellula vibrans*), Blue-faced Meadowhawk (*Sympetrum ambiguum*), spreadwings (family *Lestidae*), and Duckweed Firetail (*Telebasis byersi*).

High elevation wetlands provided habitat for species that often approach or reach the southern edge of their range in West Virginia (Northern Pygmy Clubtail *Lanthus parvulus*, Brown-striped Spiketail *Cordulegaster bilineata*, and 12 others). Although many of these wetlands are protected by federal, state, or private conservation, e.g., The Nature Conservancy, ownership, others are threatened by mineral extraction or unregulated recreation, and all are threatened by effects of climate change.

Future efforts should concentrate on targeted surveys for rare species inhabiting specific habitats: *Enallagma vesperum* and *Ischnura kellcotti* at older, well vegetated ponds; hanging clubtails (*Stylurus*) on large rivers (Ohio, Monongahela, Cheat, Kanawha, New), *Ophiogomphus incurvatus alleghaniensis* at its one historic site and streams in the same area, and *Dromogomphus spoliatus* at historic sites in the southern coalfields. The atlas identified the Allegheny mountain and valley ecoregions (eastern and western) as an area 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 species. 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.

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) supporting one of the richest temperate freshwater fish faunas worldwide. Species richness 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 of 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 tally. Moreover, when members of the Sucker, Catfish and Sunfish families are included, approximately 75% of the entire 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. Cold water relicts include Pearl Dace, Redside Dace, Longnose Sucker, and Checkered Sculpin. Eleven species likely have likely been extirpated from the state: Shovelnose and Lake sturgeons; Paddlefish; Bigmouth and Satinfin shiners; Hornyhead Chub; Pugnose, Eastern Silvery and Mississippi Silvery minnows; Longnose Sucker; Western Creek Chubsucker; Blue Catfish; and Buckeye Creek Cave Sculpin, which was endemic to one cave system in the Greenbrier Valley. These have been lost primarily through major habitat alterations, 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 Species in Greatest Need of Conservation (SGNC) fishes (see Tables 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, eleven of which are among the SGNC.

Although many of the SGNC 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 that 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 SGNC fishes in West Virginia.

Distribution

The 2005 State Wildlife Action Plan 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 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 special 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 main stem Ohio, Kanawha, and Little Kanawha rivers support diverse large river assemblages; and, the New River comprises ten endemic fishes (which encompasses 25% of its native fauna). On the Atlantic slope, the Potomac and upper James River drainages support much fewer species (approximately 40 taxa); however, several forms are either endemic or restricted to these Chesapeake Bay watersheds.

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, Great Falls of the Potomac River) 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 elongatus 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 (New River watershed endemic)
Exoglossum laurae Tonguetied Minnow
Phenacobius teretulus Kanawha Minnow (New River watershed endemic)
Etheostoma osburni Candy Darter (New River watershed endemic)
Percina gymnocephala Appalachia Darter (New River watershed endemic)

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 (considered extinct, WV endemic)
Cottus sp. cf. carolinae Bluestone Sculpin (New River watershed endemic)
Cottus sp. cf. cognatus Checkered Sculpin (Potomac watershed endemic)
Cottus kanawhae Kanawha Sculpin (New River watershed endemic)

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 (James River watershed endemic)
Percina notogramma Stripeback Darter (James River watershed endemic, mountain race)

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

Conservation Issues

Although fishes are usually not as vulnerable to extirpation or extinction as other taxa groups, being more mobile than many of their aquatic counterparts, chronic pollution and loss of habitat eventually restricts the continued success or reestablishment of most fishes. The Clean Water Act 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 handling the pollution from point-source offenders. However, non-point contributions are far from being managed because educating landowners in alternate land use practices, which would likely benefit both themselves and our nation’s water resources, is a slow process. Recent laws have attempted to moderate this attitude. For example, the 2014 Farm Bill offers financial incentives to landowners who implement environmental alternatives to reverse the trend of our deteriorating biological communities and waterways. In fact, the USEPA 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 reveals fish assemblages in 35% of our streams are ranked in poor condition. Invertebrate populations fared even worse, as indices suggested that up to 75% of the native taxa were missing from local streams. The main stressors identified in their study that have contributed to these poor communities were elevated levels of phosphorus and nitrogen, and poor or degraded riparian habitats. In West Virginia, due to our primary industries related to mining and timbering, the recovery of fishes may also be hindered by sedimentation (USEPA 2009).

Aquatic species will not rebound if the current water laws are not strictly enforced and the new ones related to non-point source pollution emphasized. A good example of this is the Monongahela River watershed, which has a history of acid mine drainage and poor land use 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, 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 have been eliminated or reduced, but it is far from being fully recovered; and may never do so 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 due environmental impacts and have not significantly recuperated are the Big Sandy/Tug Fork and Guyandotte river basins.

SGCN Summary

The West Virginia list of fishes includes 74 species, of which 34 are of the highest priority. 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 are known to be in decline or extirpated from our waters for one or more reasons discussed above.

Mammals

Description

Sixty-six native mammal species occur in West Virginia today, although the Gray Bat has not been observed in the state since 1991 and is considered an “accidental” resident of the state. Since the previous Wildlife Action Plan was written in 2005, the Seminole Bat has been confirmed in West Virginia and has been added to the species list. Species extirpated from the state are Bison, Elk, Gray Wolf, and Eastern 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 indigenous Eastern Cougars was of tracks observed in the 1930s. Although sightings continue, the animals may have been brought into the state and released, as was demonstrated for two cougars obtained by the WVDNR in 1976. The Beaver, Fisher, and River Otter 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, Norway Rat (Roof Rat), Black Rat, feral dog, Wild Boar, feral cat, and feral goat. The Black Rat, Norway Rat, and House Mouse all came to North America with the early settlers and traders. Dogs, cats, and goats that have 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, while other species such as the Southern Water Shrew 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 also rear their young in caves. Many caves in WV harbor regionally and/or globally significant numbers of hibernating bats. Stresses include the fungal disease White Nose Syndrome, mortalities at wind facilities, 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. Stresses 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 this forest is much less than the historic range of these forest types and efforts are underway to restore and enhance red spruce forests. The vast majority of the range of the WV Northern Flying Squirrel 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 (WV Northern Flying Squirrel) Central Appalachian endemic
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. These habitats were never common in West Virginia. Stresses 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)

Conservation Issues

The stresses to SGCN mammals are varied and include habitat loss and degradation, diseases and parasites, direct mortality at wind facilities, disturbance, and climate change.

Bats

Stresses to bats come from several sources. Many SCGN species use caves (and mines) for hibernation. Some species winter almost exclusively in caves while other species appear to use other hibernation sites in addition to caves and mines. Because bats in WV feed solely on insects, there is little to no food available in the winter, so they must survive the entire winter on fat reserves accumulated in late summer/fall. Repeated disturbance of hibernating bats by people entering caves can cause bats to arouse and deplete fat stores before winter is over. This was a factor in the US Fish and Wildlife Service's decision to list both the Indiana Bat and Virginia Big-eared Bat as endangered. As part of the recovery strategy for these species, several important hibernacula were closed to human visitation during the winter, and bat populations increased.

A recent threat to hibernating bats is the disease White Nose Syndrome (WNS) caused by the fungus *Pseudogymnoascus destructans*. The disease affects bats during hibernation. WNS was first observed in a cave near Albany, NY in 2006. In 2009, WNS was documented in Pendleton County, WV. By 2012 WNS had spread through the major karst regions of the state. Multiple species are affected with the greatest mortalities seen in Little Brown Bats (97% decline based on winter 2014-2015 bat surveys), Tricolored Bats (95% decline), and Indiana Bats (85% decline). Although WNS has been documented in Eastern Small-footed Bats, no mortality has been observed in West Virginia and the number seen in winter surveys increased slightly from 2013 to 2015. Virginia Big-eared Bats do not seem to be affected by WNS, and their population has increased every year since WNS was first documented in the state.

In addition to using caves for hibernation, Virginia Big-eared Bats use caves in the summer. Both maternity colonies (where females rear their young) and "bachelor" colonies (males) are known. Disturbance of these summer colonies may cause the bats to abandon these sites.



Zones of concern for "active season"
Indiana bats.



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

Another recent threat to bats came to light in the years preceding the 2005 Plan. Large bat mortalities were documented at a wind facility in Tucker County, WV in 2003. Similar mortalities have been documented at many additional sites in the East. Most bat mortalities occur on warm nights with low wind speed. The species most impacted are migratory species: Eastern Red Bat, Hoary Bat, and Silver-haired Bat. A small number of Seminole Bat carcasses have also been recovered at wind facilities in WV. Of the non-migratory bats, the greatest mortalities have been observed for Tricolored Bats, but Little Brown Bats, Northern Long-eared Bats and Indiana Bats have been impacted.

Forest dwelling bats can be impacted by a loss of summer roosts. Bats roosting in trees may be impacted by forestry practices which remove potential roost trees for some species (e.g., snags with exfoliating bark, hollow trees, etc.) or by disturbance at times of the year when non-volant young are present (mostly June and July).

Although Little Brown Bat maternity colonies were probably originally in hollow trees, most Little Brown Bat maternity colonies are now found in buildings and other structures. These colonies can 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, abandoned buildings, some of which are being demolished and replaced with newer, less bat-friendly structures.

Three of the 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 and Eastern Red Bat) and was still relatively common in the Northern Panhandle region. West Virginia harbors the 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, 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.

Talus/Boulder Field/Cliff species

There 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.

Stresses 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 early logging, considerable red spruce 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 reduce considerably from its historic distribution, there would likely be areas where spruce forest could 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 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 be 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 species. 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 plan was prepared, the West Virginia northern flying squirrel was listed as federally endangered. This species has been delisted, but remains a SGCN and a Sensitive Species on the Monongahela National Forest. The Northern Long-eared Bat was federally listed since the 2005 plan was written.

Mussels

Description

West Virginia hosts 63 extant species of freshwater mussels, one from the family Margaritiferidae and 62 from the family Unionidae. Freshwater mussels are found statewide with most species preferring lotic (flowing water) environments. A few of these species will also use, and a few other species prefer lentic (still water) environments. Freshwater mussels play a key role in the health of aquatic environments by helping to maintain water quality, cycle nutrients, stabilize substrates, remove suspended sediments, and create habitat complexity (Anderson and Kreeger, 2010). Freshwater mussels are good long-term indicators of water quality as some species live upwards of 100 years.

The lifecycle of freshwater mussels is unique. Once fertilization occurs the female broods her glochidia (larvae) within her gills. The glochidia, once released, become parasitic on a host. Most identified hosts are fish and many times maybe only one species of fish. One mussel is known to be parasitic on the mudpuppy. Hosts for several mussel species have yet to be identified. The glochidia remain encysted on the host fish for a period of time which is dependent on water temperature and may last just a few weeks to several months over winter. Once they release from the host they are juvenile mussels, first feeding with a ciliated foot prior to becoming filter feeders. Freshwater mussels feed on a variety of organic material filtered from the water column including algae, diatoms and fine particulate organic matter containing bacteria and fungi.

The 2005 State Wildlife Action Plan listed data management, surveys, monitoring, and research as primary goals. Data management consisted of standardizing data collection protocols, capturing legacy data, and providing public access to data through publication of a mussel book and providing information on the internet. To date the first two tasks have been completed. The mussel database currently contains 4012 survey events which includes over 19,500 mussel records. This includes records dating back to 1897. The state currently maintains 26 long-term monitoring sites which are surveyed on a five year basis. The only goal not reached was the publication of the mussel book and making information available to the public over the internet. Much of the book has been drafted including photographs and distribution maps but much of the material needs to be updated.

All mussels are protected in the State of West Virginia pursuant to West Virginia §20-2-4 and CSR 58-60-5.11. In addition, nine federally endangered freshwater mussel species are known to occur in the State. These species are protected by the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). As a result, anyone that plans to conduct activities that impact the stream bottom of a known mussel stream or a stream suspected of having mussels is required to conduct a mussel survey/relocation within the area. Standardized protocols were established in 2012 that provided methodologies for conducting surveys within four stream groups. These groups consist of Group 1 (small to mid-sized streams that are not expected to contain federally endangered species), Group 2 (small to mid-sized streams in which federally endangered species may be found), Group 3 (large streams that are not expected to contain federally endangered species), and Group 4 (large streams in which federally endangered species may be found). The document is updated each year to address any issues that may have arisen over the previous year's work. All data is input into the state database.

Distribution

The distribution of freshwater mussels is tied closely to the hosts which provide upstream dispersal of the 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. *Lasmigona subviridis*** occurs within the Ohio and Potomac Watershed 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. *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)
Amblema 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 (Pocketboot)
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) X
Quadrula metanevra (Monkeyface)
Quadrula pustulosa (Pimpleback)
Quadrula quadrula (Mapleleaf)
Simpsonaias ambigua (Salamander Mussel)
Strophitus undulatus (Creepers)***
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 (Creepers)***

James River Watershed

Pleurobema collina (James Spiny mussel)
Strophitus undulatus (Creepers)***

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 the EPA in WV in 2010, 62% were determined to be impaired. 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, mountain top removal mining, and the shale gas and oil extraction industry.

The 2005 West Virginia State Wildlife Action Plan 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 most overall impact to our mussel resources may be more subtle from chronic impacts such as elevated ammonia for 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 the typical aquatic organisms used to establish water quality standards (Canadian Council of Ministers of the Environment 2011, Patnode et al. In Prep.). 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. Over the next few years WVDEP incorporated regulations on water withdrawals. The limits set have yet to be validated to be protective of aquatic life. This effort needs to be conducted and has been initiated in 2015 by the USFWS for streams containing federally endangered species. During this period 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. These include coordination with our partners such as the USFWS, WVDEP, NRCS, and others and continues to be a high priority; and 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 provides for 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. *Epioblasma torulosa torulosa* documented in the 2005 State Wildlife Action Plan is now believed to be extirpated. The reasons for their decline are many, and are all related directly to human activities. Impoundments, dams, or other 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 commercial sand and gravel dredging which still occurs within the upper Ohio River. Dredging also occurs from navigation maintenance and permanent loading and unloading facilities. Other impacts occur from tow prop wash and chemical spills. Probably the most overall impact to freshwater mussels comes from sedimentation which can be 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 percent 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 a lot of juveniles which, if flows are slow enough, attach to hard surfaces including native freshwater mussels. Once attached, they grow rapidly and can cut off the food and oxygen to the native as well as inhibit the native's ability to burrow. Subsequently, Zebra Mussel densities have not reached the 2000 level and rarely survive into their second year. It is the constant influx of young, most likely from the adults attached to barges that travel the river, which maintains the population. 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 efforts should 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. 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. Encourage the State to adopt water quality standards that are more protective of aquatic life. Dams that are no longer supporting their designated use should be removed in order 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 species. One federally endangered species, *Quadrula cylindrica*, is currently believed to be extirpated in the State. 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. West Virginia has nine other extant federally endangered mussel species, the Pink Mucket Pearly Mussel (*Lampsilis abrupta*), James Spinymussel (*Pleurobema collina*), Fanshell (*Cyprogenia stegaria*), Northern Riffleshell (*Epioblasma torulosa rangiana*), Clubshell (*Pleurobema clava*), Snuffbox (*Epioblasma triquetra*), Rayed Bean (*Villosa fabalis*), Spectaclecase (*Cumberlandia monodonta*), and Sheepnose (*Plethobasus cyphyus*). As previously mentioned, *Lasmigona subviridis* 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. The USFWS has been petitioned to list several mussel species. *Lasmigona subviridis* is one of these and several others occur in West Virginia. All G1 to G3 species that occur in West Virginia are listed as Priority 1 species except for *Quadrula cylindrical*. Two G1 species occur in West Virginia (*Cyprogenia stegaria* and *Pleurobema collina*). West Virginia has two viable populations of *Cyprogenia stegaria*, 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. *Pleurobema collina* 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.

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.

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 WV 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; 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 overestimated.

About 75% of the documented vascular plants of WV 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 WV (native to North America but moved into WV after European settlement) and exotic species (species not native to North America). Almost all bryophytes known in WV are considered native to the state (S. Studlar, personal communication).

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 WV'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. 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. Shalebarren wild buckwheat (*Eriogonum allenii*) and chestnut lipfern (*Cheilanthes eatonii*), species of dry habitats in eastern WV, 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 WV 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 erythrocarpon*), and cliff saxifrage (*Saxifraga michauxii*), reach the northern limit of their range in West Virginia. A smaller number of WV 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 __. All WV 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 SGNC 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 deemphasized in SWAPs (Stein and Gravuer 2008). Although, currently, 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. WVDNR (2009) developed a list of invasive plants and threat ranks which is available on the WVDNR website. In the last thirty 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 (*Abies balsamea*) 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 Canada 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 WV was recently published (Bailey 2014) and is available on the WVDNR website.

The primary stresses 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 stresses 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 first priority and 361 are considered second priority. Six species of vascular plants are listed by the U. S. Fish & Wildlife Service as federally endangered or federally threatened: harperella (*Ptilimnium fluviatile*), shalebarren rockcress (*Arabis serotina*), northeastern bulrush (*Scirpus ancistrochaetus*), and running buffalo clover (*Trifolium stoloniferum*) are listed endangered; Virginia spiraea (*Spiraea virginiana*) and small whorled pogonia (*Isotria medeoloides*) are listed 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.

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 reproductions, but lay their eggs or give birth in terrestrial habitats. Four skink species, one lizard species, and one racerunner species occur in West Virginia. Lizards occur in woodlands with most species preferring xeric or mesic conditions or certain habitat features such rock outcrops or large woody debris.

Twenty snake species occur in West Virginia. Snakes are a diverse group with species occurring in virtually every habitat type in the state. Two species of venomous snakes occur in WV: the Northern Copperhead and Eastern Timber Rattlesnake.

Thirteen turtle species occur in West Virginia. 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 range and may be limited by geographic barriers or availability of specific habitat.

Species Groupings

Terrestrial Lizards, Skinks, and Racerunners

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

Aspidoscelis 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. Stresses vary according to the species but generally include habitat loss, degradation, and fragmentation, commercial exploitation, persecution, invasive species (cats), and urbanization.

Opheodrys aestivus (Rough Greensnake)

Regina septemvittata (Queen Snake)

Pituophis melanoleucus melanoleucus (Northern Pinesnake)

Virginia valeriae valeriae (Eastern Earthsnake)

Carphophis 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 (Eastern Kingsnake)

Virginia valeriae pulchra (Mountain Earthsnake) Central Appalachian endemic
Crotalus horridus (Timber Rattlesnake)
Liochlorophis vernalis (Smooth Greensnake)
Thamnophis sauritus (Eastern Ribbonsnake)

Terrestrial Turtles

Eastern Box Turtles occur across West Virginia in a variety of habitats including open woodlands, pastures, and wet meadows. Stresses 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 Physiographic Province. Both species depend on aquatic and terrestrial habitats for part of their life history. Stresses 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. Stresses include barriers to movement, channelization, pollution, and commercial exploitation.

Pseudemys rubriventris (Northern Red-bellied Cooter)

Graptemys ouachitensis (Ouachita Map Turtle)

Graptemys geographica (Northern Map Turtle)

Apalone mutica mutica (Midland Smooth Softshell)

Apalone spinifera spinifera (Eastern Spiny Softshell)

Pseudemys 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. It also places them at risk when their habitat is disturbed or compromised. Stresses 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 material for pet owners to keep pets indoors or contained. Problematic native species include raccoons, skunks, and opossums. When these native animals scavenge stream banks 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 land uses stresses reptile populations making them vulnerable to disease. Reptile diseases that threaten West Virginia species include ranavirus, snake fungal dermatitis, and mycoplasma sp. 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 sp.* 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 effluent 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 in to streams which that 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 involve 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, 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 wild game food events. Increased off-road motorized recreation has increased persecution in formerly remote areas, especially of 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 haying and 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 28 reptile species, with 17 considered Priority 1 species.

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 will be 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 and thus, a reduce supply of calcium for egg production. There are also snail-eating beetles specialized to feed on lands snails and even snails which feed on other snails.

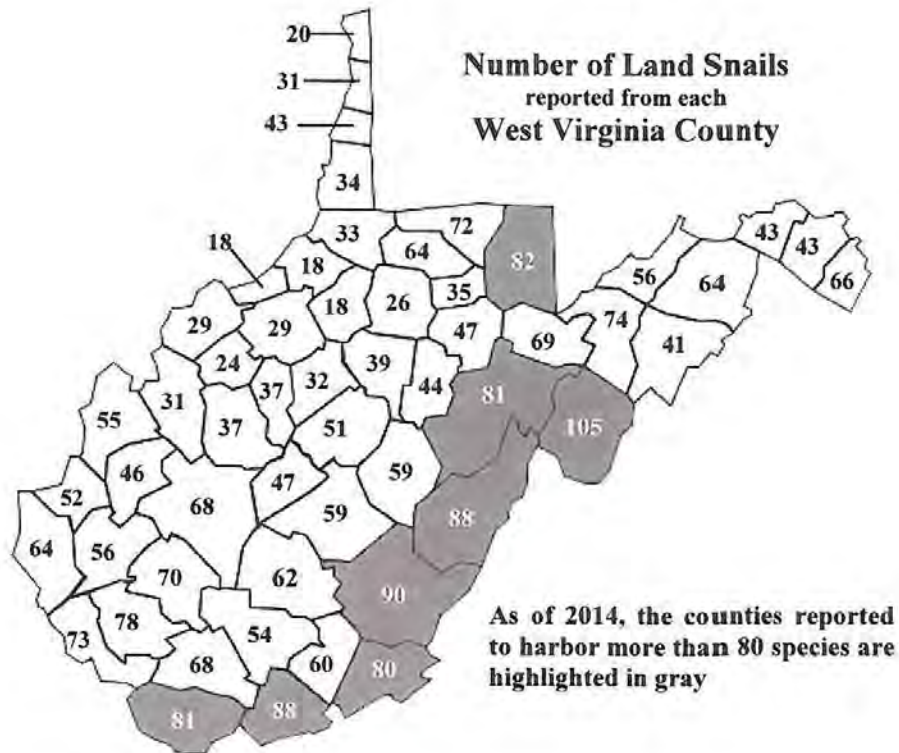
Since the 2005 Wildlife Action Plan, the WVDNR has added greatly to our knowledge of snails in the state, particularly land snails. Most of these data were compiled under two projects funded through the US Fish and Wildlife Service's State Wildlife Grants Program. The first was a project completed by 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 WV. Eleven gastropods possibly endemic to West Virginia have been identified. Four of these are described species and one is a described subspecies. Three of these 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, four 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 Program'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 WV, 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 region 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 WV Land Snail Atlas prepared by Dan Dourson, to be published 2015).

List of species endemic to the Ridge and Valley region along the Virginia/West Virginia border. Species in bold have been documented in West Virginia.

(D. Dourson, pers. comm. 2015)

- Anguispira clarki*
- Anguispira stihleri* (to be described in 2015)
- Glyphalina species*** (undescribed) (“West Virginia Glyph”)
- Glyphyalinia virginica*
- Helicodiscus diadema*
- Helicodiscus lirellus*
- Helicodiscus triodus***
- Helicodiscus villosus*** (to be described in 2015)
- Mesodon aff. andrewsae*** (new undescribed species?)
- Mesomphix luisant*** (to be described in 2015)
- Paravitrea ceres***
- Paravitrea mira*
- Paravitrea septadens*

Paravitrea subtilis*Patera* species (undescribed) (“Shale Bladetooth”)*Philomycus bisdosus**Polygyratus virginianus****Triodopsis juxtidentis robiniae******Triodopsis* species (undescribed)****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. 1Snails 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 WV, 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

(Associated with red spruce/northern hardwood forests)

Triodopsis platysayoides

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

Vertigo cristata

(In WV, known only from Ice Mountain, Hampshire County)

Webbhelix multilineata

(In WV, 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

Stresses 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-spired Three-toothed Land Snail (=Cheat Three-tooth), *Triodopsis platysayoides*, 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 Wildlife Management Area (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 stresses and conservation strategies for other terrestrial SGCN gastropods.

The *T. platysayoides* 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 stresses 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 stresses. 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 ft around potential habitat and 200 ft 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 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 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, 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 are also 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.

For the conservation of 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 species. 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, one terrestrial). One land snail (*Triodopsis platysayoides*) is listed as federally threatened.

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 enters 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, a full 65 percent (13 species) are listed as being in 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 WV DNR 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 *Cicindela splendida*. There have been a few recent records of *C. splendida* 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 *C. splendida* 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 *C. splendida* or, possibly, a new cryptic species.

SGCN Summary

West Virginia's SGCN list for tiger beetles 13 species, with 5 considered Priority 1 species. None are listed as federally threatened or endangered.

3.3: Habitats

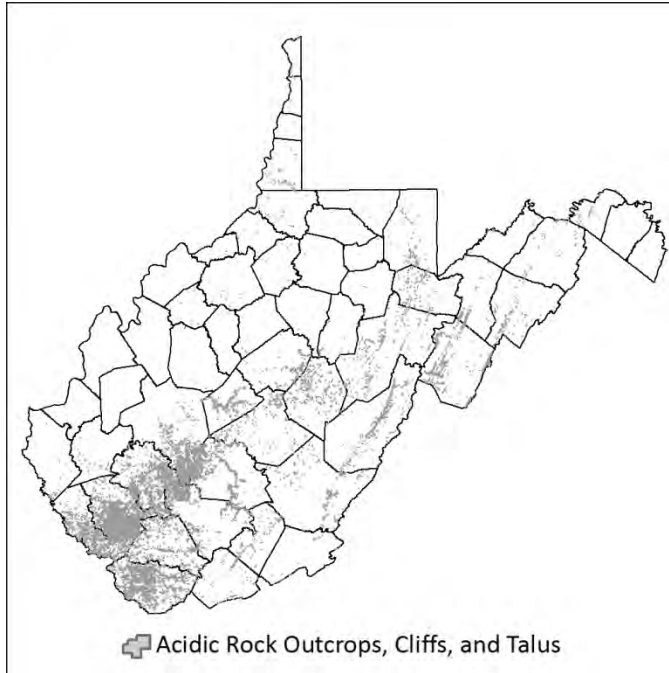
The distribution, status, and conservation issues for SGCN species also reflect patterns in the distribution, condition, and trends of their habitat. Cave invertebrates, for example, are restricted in West Virginia to those areas where limestone is at or near the surface and are often effected by those stresses which are directly tied to the cave environment, such as degradation of groundwater quality or habitat loss by quarrying. Even within a particular taxonomic group, species trends will differ depending upon trends of their associated habitat. Over the last few decades, for example, many fish populations of cool, headwater streams have declined from stream acidification while the abundance of many fish of lentic habitats have increased as more impoundments have been constructed. The following sections describe the terrestrial and aquatic habitats in West Virginia, their distribution, condition, and trends, associated SGCN species, and key conservation issues associated with those habitats.

3.3.1: Terrestrial Habitats

Acidic Rock Outcrops, Cliffs, and Talus

NatureServe Ecological Systems: North-Central Appalachian Acidic Cliff and Talus

Cumberland Acidic Cliff and Rockhouse



Habitat area exaggerated to enhance visibility.



Photo: acidic sandstone cliffs on North Fork Mountain.



Photo: sandstone “rock house” along the Buckhannon River.

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 on North Fork Mountain and in the Cumberlands in the gorges of the New and Gauley Rivers. Many rivers across the state have cliff-lined valleys where they bisect resistant sandstone formations. Boulderfields, both open and wooded, are concentrated in the Ridge and Valley. Near level peri-glacial boulderfields are restricted to the highest elevations in the Allegheny Mountains and Ridge and Valley. Rock houses are scattered in small drainages in the Cumberlands and Western Allegheny Plateau. Several USNVC associations have been identified in the state but many occurrences are not yet classified.

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 State Forest, 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 Cumberlands have been flattened and filled by mountaintop removal coal mining. Natural cliffs have been altered and augmented by construction of transportation corridors.

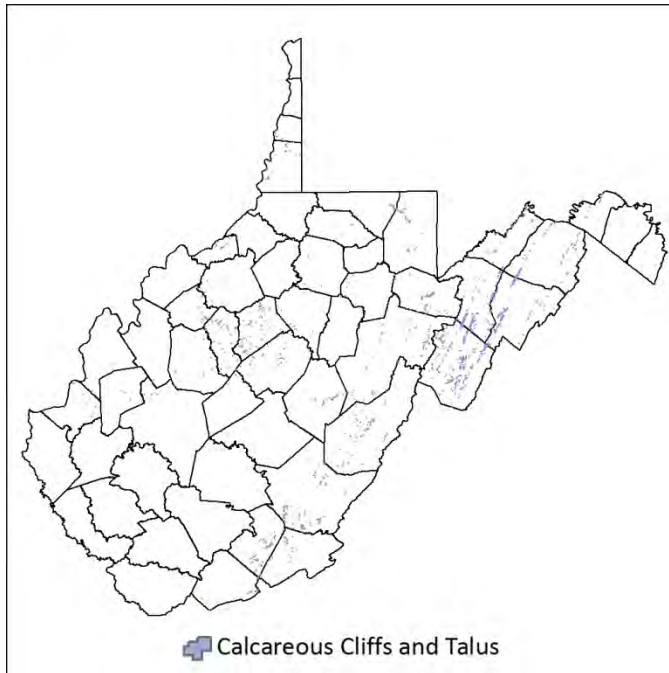
Stresses: recreational pressure at popular overlooks and climbing areas.

Current projects based on 2005 priority habitats: 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 U. S. National Vegetation Classification. Develop state-level descriptions and make information available as part of a state vegetation classification.

Calcareous Cliffs and Talus

NatureServe Ecological Systems: North-Central Appalachian Circumneutral Cliff and Talus



Habitat area exaggerated to enhance visibility.



Photo: limestone cliff in the Smokehole.

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 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 WV are restricted to the Ridge and Valley, the Allegheny Mountains, and the Greenbrier Valley. Mapping is based on Ferree and Anderson (2013); areas of Calcareous Cliffs and Talus mapped in the Western Allegheny Plateau 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.

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.

Stresses: limestone quarrying.

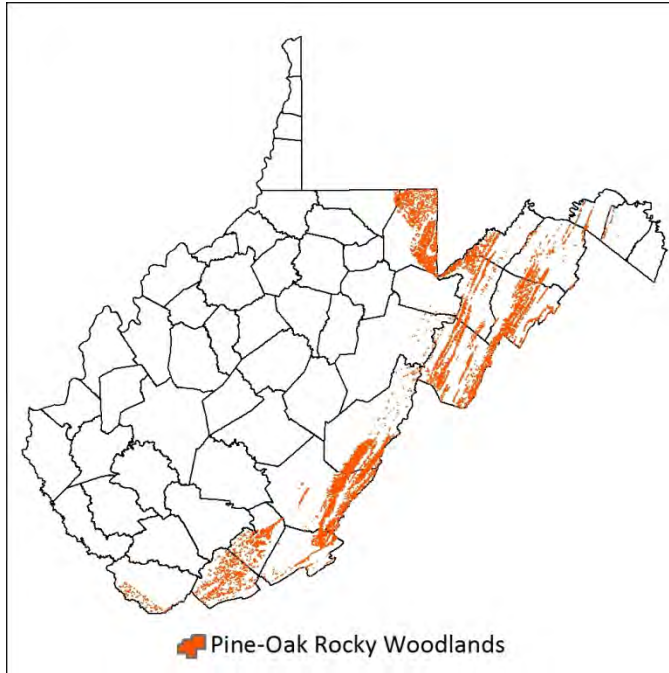
Current projects based on 2005 priority habitats: WVDNR ecologists have been working on inventory and classification of limestone habitats, including cliffs and talus, for several years. Thirteen vegetation plots of Limestone Cliff and Talus have been sampled and two USNVC associations have been identified in the state, but the USNVC associations need revision to accommodate data from West Virginia stands.

Inventory, Management, and Research Needs: Improve statewide mapping. Complete statewide classification and incorporate into the U. S. National Vegetation Classification. Develop state-level descriptions and make information available as part of a state vegetation classification.

Pine - Oak Rocky Woodlands

NatureServe Ecological Systems: Central Appalachian Pine-Oak Rocky Woodland

Southern Appalachian Montane Pine Forest and Woodland



Habitat area exaggerated to enhance visibility.



Photo: cliff-top pine at Lost River State Park.

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 5 meters 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 Cumberlands 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.

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.

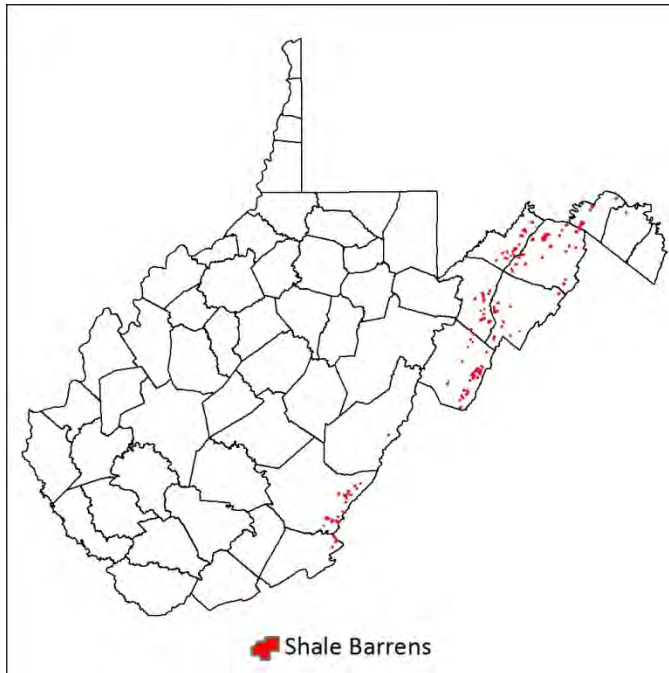
Stresses: insect pests, mesophication.

Current projects based on 2005 priority habitats: 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.

Shale Barrens

NatureServe Ecological Systems: Appalachian Shale Barrens



Habitat area exaggerated to enhance visibility.



Photo: shale barren in the foothills of Shenandoah Mountain in Pendleton County.

Description: Small patch woodlands and openings on hot, dry topographic positions on Devonian shales in the Ridge and Valley and Greenbrier Valley. 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 (*Pinus virginiana*) and chestnut oak (*Quercus prinus*), with lesser amounts of red oak (*Quercus rubra*), pignut hickory (*Carya glabra*), and eastern red cedar (*Juniperus virginiana*). 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 white pine, are included in Dry Oak (-Pine) Forest. Small patches in the Western Allegheny Plateau and Cumberlands 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 in West Virginia include four globally rare associations. Shale barrens have been intensively studied, especially sites which host the federally listed Endangered shalebarren rock cress (*Arabis serotina*), but their extent is incompletely known in remote areas and on private lands.

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.

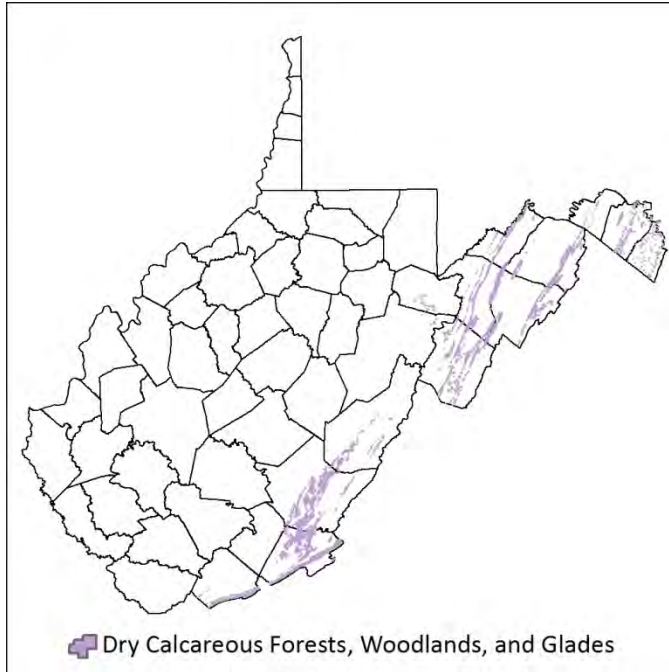
Stresses: Non-native invasive plants. Pesticide spraying for gypsy moth threatens rare native Lepidoptera.

Current projects based on 2005 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.

Dry Calcareous Forests, Woodlands, and Glades

- 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



Habitat area exaggerated to enhance visibility.



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



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

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 (*Quercus muehlenbergii*), white oak (*Quercus alba*), red oak (*Quercus rubra*), bitternut hickory (*Carya cordiformis*), and shagbark hickory (*Carya ovata*), with co-dominance 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 (*Juniperus virginiana*), chinquapin oak (*Quercus muehlenbergii*), northern red oak (*Quercus rubra*), and white ash (*Fraxinus americana*). Some of the oldest known living trees in the eastern US 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 land use. Forests in this system can occur in large patches in the Ridge and Valley and Greenbrier Valley, 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 dissected plateau regions 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 drainage, especially in the Smokehole area, with smaller areas in the Shenandoah and Greenbrier drainages. Eight USNVC associations are recognized in West Virginia but classification of all existing vegetation plots has not been completed.

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 weeds. Examples on deeper soils may be reduced from their

previous area by mesophication and lack of fire or grazing. Remote occurrences on steep topography are probably more stable.

Stresses: Non-native invasive plants, timber harvest, harvest of cedars for fence posts, mining, grazing.

Current projects based on 2005 priority habitats: WVDNR ecologists have been working on inventory and classification of limestone habitats for several years. Over 100 vegetation plots of 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 Cumberlands, where these habitats are poorly known. Develop state-level descriptions and make information available as part of a state vegetation classification.

Dry Oak (-Pine) Forests

NatureServe Ecological Systems: Allegheny-Cumberland Dry Oak Forest and Woodland
Central Appalachian Dry Oak-Pine Forest

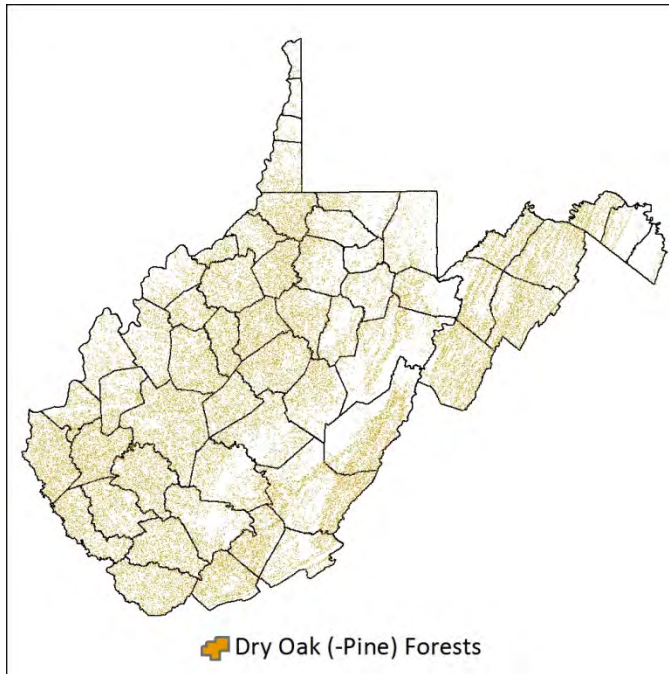


Photo: dry oak / heath forest at Mountwood Park, Wood County.

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. Soils are typically shallow, dry, and highly acidic, with low to moderate fertility. Dominant trees include chestnut oak (*Quercus prinus*), scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), white oak (*Quercus alba*), and red maple (*Acer rubrum*). Sourwood (*Oxydendrum arboreum*) is a common small tree, except in the Ridge and Valley, where it is absent. In the eastern counties there are large areas where eastern white pine (*Pinus strobus*) is codominant with oaks. Other pines are often found scattered in mostly deciduous stands. Some small patches in the Western Allegheny Plateau and Cumberlands are dominated or codominated by Virginia pine (*Pinus virginiana*) or short leaf pine (*Pinus echinata*). Understories are usually dominated by heath shrubs, including mountain laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), and blueberries (*Vaccinium* spp.). Herb layers are usually sparse and have low diversity.

Similar habitats: Very dry forests and woodlands in the Ridge and Valley dominated by Virginia pine, pitch pine (*Pinus rigida*), Table Mountain pine (*Pinus pungens*), or red pine (*Pinus resinosa*) 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), as large patches (typical in the Cumberlands and Allegheny Mountains), or as numerous small patches repeated on warmer topographic positions (as in the Western Allegheny Plateau). Globally and/or state rare associations include a few small patch or linear pine communities in the Western Allegheny Plateau and Cumberlands and an undescribed post oak – eastern red cedar woodland in the Lower Kanawha Valley.

Pinus virginiana Successional Forest	CEGL002591	GNA	SNA
Quercus (pinus, 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, creates and maintains these habitats even on relatively mesic sites.

Stresses: Pesticide spraying for gypsy moth threatens rare native Lepidoptera, overbrowsing by deer, mesophication.

Current projects based on 2005 priority habitats: These habitats were not identified as a priority in the 2005 SWAP.

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.

Dry-Mesic Oak Forests

NatureServe Ecological Systems: Northeastern Interior Dry-Mesic Oak Forest

Southern Appalachian Oak Forest

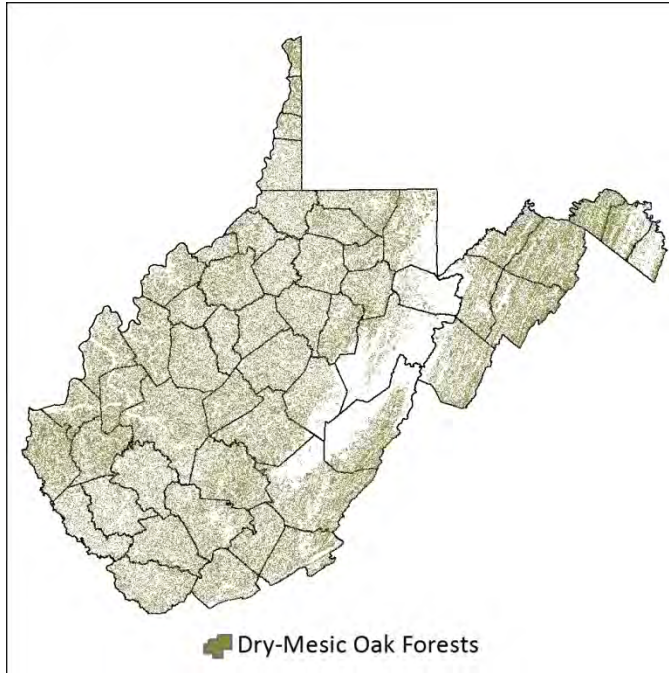


Photo: old growth oak forest at Big Ditch Wildlife Management Area, Webster County.

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 (*Quercus rubra*), chestnut oak (*Quercus prinus*), white oak (*Quercus alba*), and black oak (*Quercus velutina*). A subset can be described as oak – hickory forests with a large component of hickory species including pignut (*Carya glabra*), mockernut (*Carya alba*), and shagbark (*Carya ovata*). Other common trees include red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), tuliptree (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*), and American beech (*Fagus grandifolia*). Common small trees and shrubs include sourwood (*Oxydendrum arboretum*), witch hazel (*Hamamelis virginiana*), hop-hornbeam (*Ostrya virginiana*), serviceberry (*Amelanchier arborea*), and dogwood (*Cornus florida*). 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 (*Betula lenta*), or white pine (*Pinus strobus*). 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 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 WV is in progress and tentative. Most USNVC association descriptions will require revisions to accommodate WV 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) and soil moisture and 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.

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 / Lindera 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, 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.

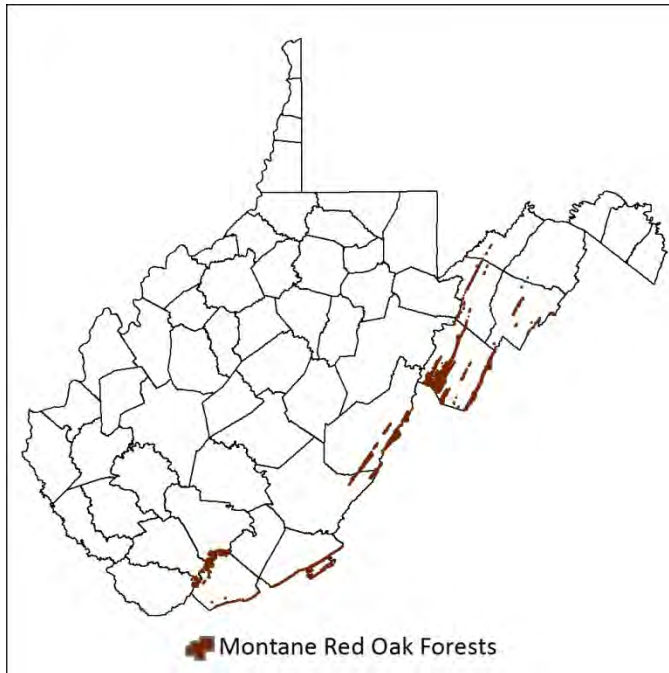
Stresses: timber harvest, mining, pipelines, deer herbivory

Current projects based on 2005 priority habitats: These habitats were not identified as a priority in the 2005 SWAP.

Inventory, Management, and Research Needs: Complete statewide classification and incorporate into the U. S. National Vegetation Classification. 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.

Montane Red Oak Forests

NatureServe Ecological Systems: Central and Southern Appalachian Montane Oak Forest



Habitat area exaggerated to enhance visibility.



Photo: red oak forest on North Fork Mountain, Pendleton County.

Description: Forests dominated by red oak (*Quercus rubra*) at high elevations in the Ridge and Valley and along the border with Virginia on Allegheny Mountain. 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 (*Acer rubrum*), sugar maple (*Acer saccharum*), black cherry (*Prunus serotina*) and sweet birch (*Betula lenta*). Common subcanopy trees and shrubs include striped maple (*Acer pensylvanicum*), witch hazel (*Hamamelis virginiana*), 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 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 are included in Dry Calcareous Oak Forest.

Distribution and Abundance of Characteristic and Rare Associations: These habitats are restricted to the highest ridges in the Ridge and Valley and on Allegheny Mountain along the border with Virginia. In these environments they occur as large or continuous linear patches which dominate the ridge tops 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.

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 ridge tops which probably supported this habitat were cleared for grazing and today remain in pasture.

Stresses: Prescribed burning.

Current projects based on 2005 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 state-wide mapping. Identify and sample additional stands of CEGL007300. 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.

Mixed Mesophytic Forests

NatureServe Ecological Systems: South-Central Interior Mesophytic Forest

Southern and Central Appalachian Cove Forest

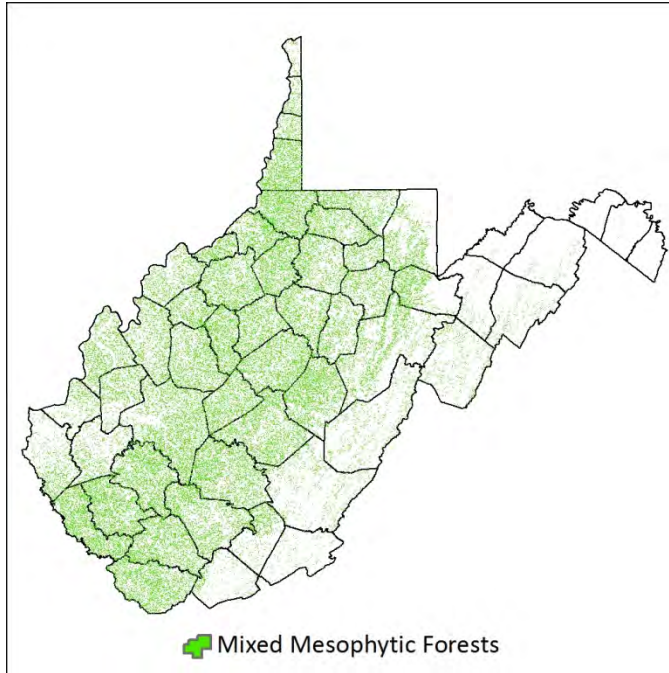


Photo: sugar maple – basswood forest at Bluestone National Scenic River, Mercer County.



Photo: hemlock hardwood forest at Greenland Gap, Grant County.

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 (*Acer saccharum*), American basswood (*Tilia americana*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), tuliptree (*Liriodendron tulipifera*), Northern red oak (*Quercus rubra*), sweet birch (*Betula lenta*), white ash (*Fraxinus americana*), and yellow buckeye (*Aesculus flava*). Some stands may include or be dominated by eastern hemlock (*Tsuga canadensis*). Common shrubs include giant rhododendron (*Rhododendron maximum*), spicebush (*Lindera benzoin*), witch hazel (*Hamamelis virginiana*), and striped maple (*Acer pensylvanicum*). 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, 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 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 and low-rainfall areas of the Ridge and Valley 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 (*Betula allegheniensis*) dominated types (CEGL006304, CEGL008407, CEGL007861) with limited distribution.

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 State Forest, Holly River State Park, Panther State Forest, 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, prevents the development of mesophytic forests. Hemlock dominated forests are currently decreasing due to infestations of hemlock woolly adelgid. 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 and elsewhere have been permanently lost to surface mining and valley fills.

Stresses: timber harvest, mining, hemlock woolly adelgid, non-native invasive plants, fire.

Current projects based on 2005 priority habitats: These habitats were not identified as a priority in the 2005 SWAP.

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.

Northern Hardwood Forests

NatureServe Ecological Systems: Appalachian (Hemlock)-Northern Hardwood Forest

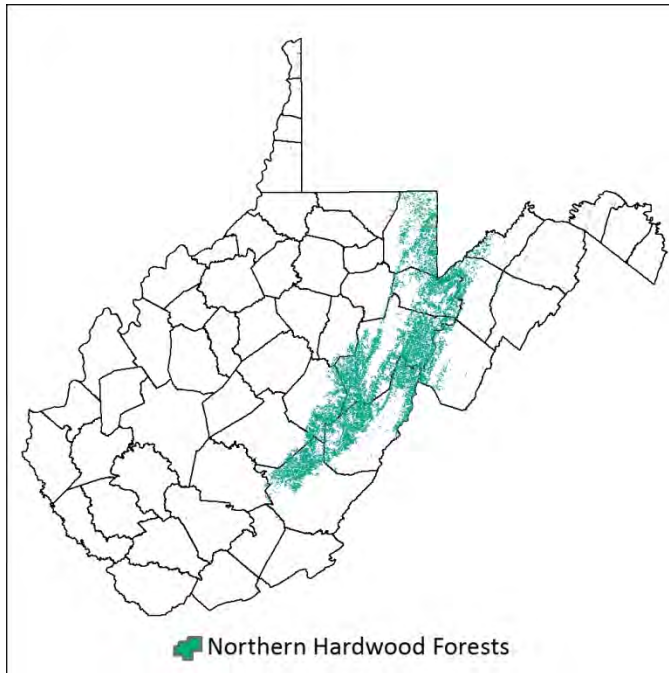


Photo: northern hardwoods on Middle Mountain, Randolph County.

Description: Upland deciduous and mixed deciduous-evergreen forests at high elevations in the Allegheny Mountains. Common deciduous tree species in natural forests include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), sweet birch (*Betula lenta*), black cherry (*Prunus serotina*), red oak (*Quercus rubra*),

cucumber-tree (*Magnolia acuminata*), and white ash (*Fraxinus americana*). Some stands may include or be dominated by eastern hemlock (*Tsuga canadensis*). Red spruce (*Picea rubens*) is often present but is not abundant in the tree canopy. Common shrubs include striped maple (*Acer pensylvanicum*) and mountain holly (*Ilex montana*). 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 habitats.

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 (*Pinus resinosa*), white pine (*Pinus strobus*), 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. Associations that are rare in WV include outliers at high elevations in the Ridge and Valley (CEGL006109), and disjunct “southern northern hardwoods” (CEGL004973) with yellow buckeye (*Aesculus flava*) in the Yew Mountains. Small areas of three forest seep associations (CEGL006193, CEGL006597, and CEGL006567) are also included.

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 (pensylvanicum, spicatum) / Dryopteris intermedia - Oclemea 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 - (Symlocarpus foetidus) / Rhizomnium appalachianum forest seep	CEGL006193	G3G5	S3
Symlocarpus 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 State Forest, 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 wooly 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.

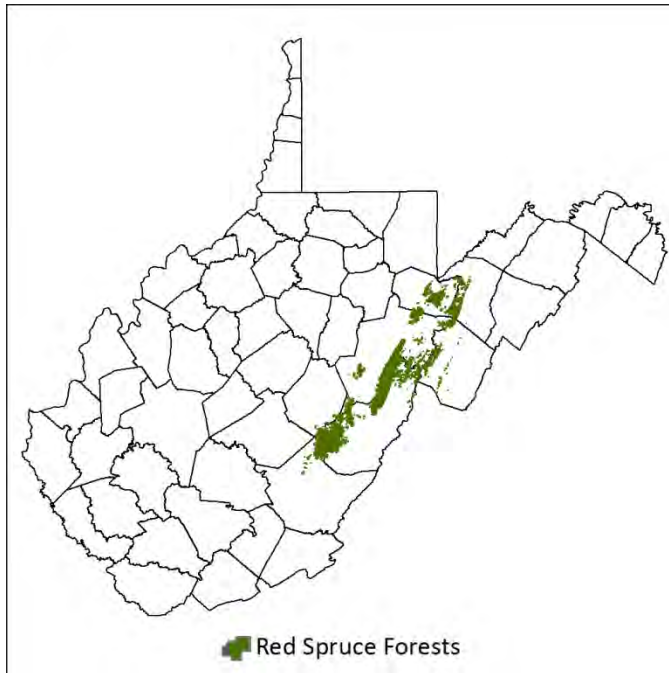
Stresses: hemlock wooly adelgid

Current projects based on 2005 priority habitats: These habitats were not identified as a priority in the 2005 SWAP.

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.

Red Spruce Forests

NatureServe Ecological Systems: Central and Southern Appalachian Spruce-Fir Forest



Habitat area exaggerated to enhance visibility.



Photo: red spruce forest on Spruce Knob, Pendleton County.

Description: Upland, mixed evergreen-deciduous forests and woodlands at high elevations dominated or codominated by red spruce (*Picea rubens*). Soils are usually rocky, highly acidic, and cold. Associated

trees may include the evergreen eastern hemlock (*Tsuga canadensis*), and deciduous yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), mountain ash (*Sorbus americana*), and black cherry (*Prunus serotina*). Common shrubs include mountain holly (*Ilex montana*), great laurel (*Rhododendron maximum*), striped maple (*Acer pensylvanicum*), highbush cranberry (*Vaccinium erythrocarpum*), and mountain laurel (*Kalmia latifolia*). The herb layer is characterized by species adapted to short, cool growing seasons, including intermediate woodfern (*Dryopteris intermedia*), mountain woodfern (*Dryopteris campyloptera*), mountain wood sorrel (*Oxalis montana*), Canada mayflower (*Maianthemum canadense*), 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 habitats.

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, with small outliers at the highest elevations on North Fork Mountain (Panther and Kile Knobs) in the Ridge and Valley. There are five globally rare upland red spruce associations classified in WV. 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.

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

Places to see and visit: Blackwater Falls State Park, Kumbrabow State Forest, 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.

Stresses: climate change, acid deposition

Current projects based on 2005 priority habitats: 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.

Heath - Grass Barrens

NatureServe Ecological Systems: Southern Appalachian Grass and Shrub Bald



Habitat area exaggerated to enhance visibility.



Photo: heath barrens on Dolly Sods, Tucker County.

Description: Open shrub and grassland communities at high elevations. Dominant shrubs include blueberries (*Vaccinium* spp.), mountain laurel (*Kalmia latifolia*), black huckleberry (*Gaylussacia baccata*), and black chokeberry (*Photinia melanocarpa*). The dominant grasses are Allegheny flyback (*Danthonia*

compressa) and hairgrass (*Deschampsia flexuosa*). Dwarfed forms of red spruce (*Picea rubens*) or pitch pine (*Pinus rigida*) 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 and a few very small patches in the Ridge and Valley 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.

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 cliff tops with scenic overlooks which are popular hiking destinations have been reduced by trampling.

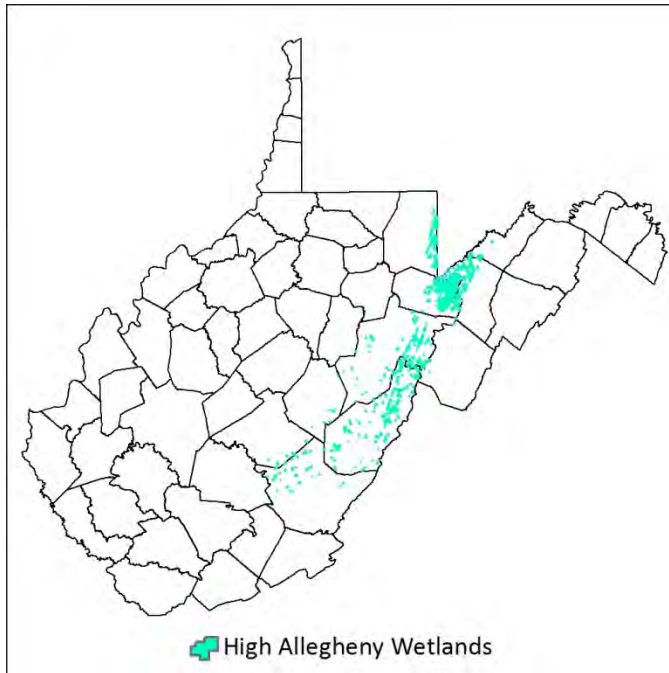
Stresses: trampling at overlooks, fire suppression.

Current projects based on 2005 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 air 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.

High Allegheny Wetlands

NatureServe Ecological Systems: High Allegheny Wetland



Habitat area exaggerated to enhance visibility.



Photo: headwater wetland up First Fork of Shavers Fork, Pocahantas County.

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 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 (*Picea rubens*), with varying cover by red maple (*Acer rubrum*), eastern hemlock (*Tsuga canadensis*), and yellow birch (*Betula alleghaniensis* var. *alleghaniensis*). Where limestone or calcareous shale influences seepage water, balsam fir (*Abies balsamea*) 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 (*Photinia melanocarpa*), 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 in the Allegheny Mountains in Preston, Mineral, Tucker, Grant, Randolph, Pendleton, Pocahontas, 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.

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.

Stresses: global warming, non-native invasive species.

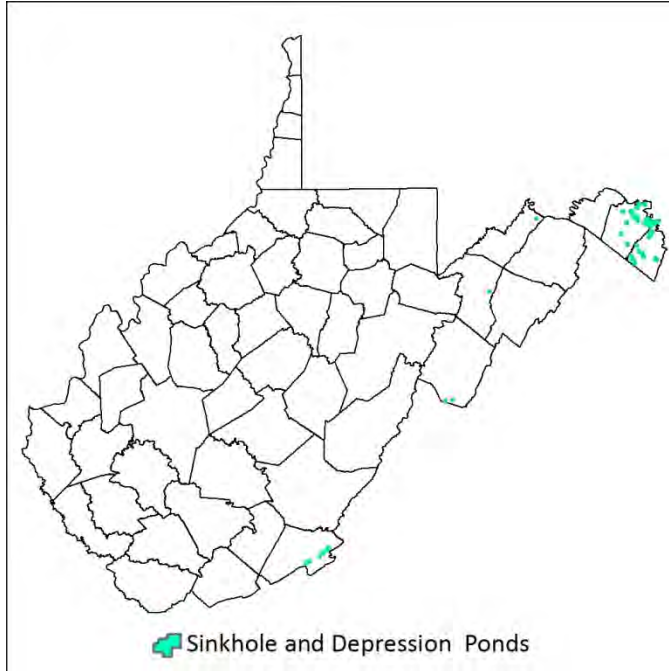
Current projects based on 2005 priority habitats: WVDNR ecologists completed a statewide classification and conservation assessment of these habitats in 2007 (Byers et al.). Most occurrences of USNVC associations and rare plants in these habitats have been entered in Biotics. WVDNR ecologists

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.

Sinkhole and Depression Ponds

NatureServe Ecological Systems: Central Interior Highlands and Appalachian Sinkhole and Depression Pond



Habitat area exaggerated to enhance visibility.



Photo: sinkhole wetland on Harper Ridge, Berkeley County.

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.

Similar Habitats:

Distribution and Abundance of Characteristic and Rare Associations:

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.

Stresses: This rare isolated wetland type is heavily impacted by ATV 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.

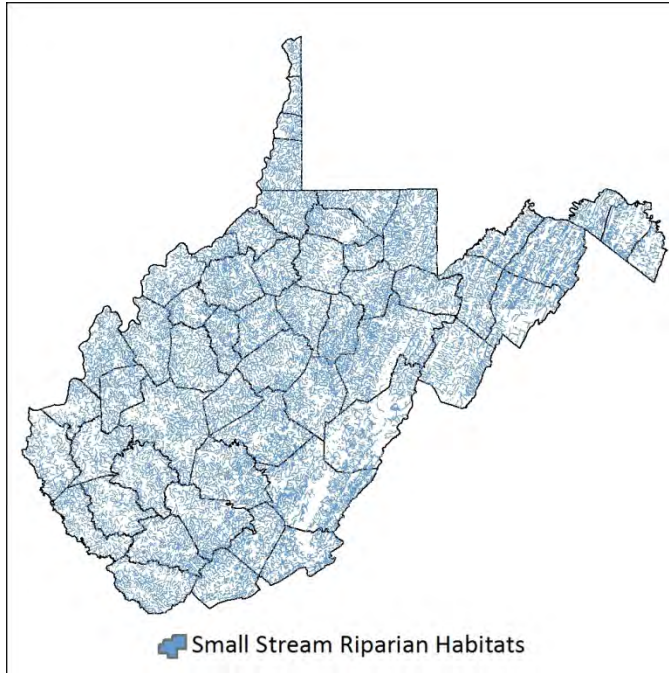
Current projects based on 2005 priority habitats: In 2014, WVDNR ecologists completed statewide classification and mapping of these habitats and a GIS layer was submitted as a revision to the Northeast Habitat Map.

Inventory, Management, and Research Needs: Identify and survey additional occurrences. Work with landowners to protect existing occurrences.

Small Stream Riparian Habitats

NatureServe Ecological Systems: Central Appalachian Stream and Riparian

South-Central Interior Small Stream and Riparian



Habitat area exaggerated to enhance visibility.



Photo: riparian zone along Bulskin Run, Jefferson County.

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 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.

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

Stresses: agriculture, logging, non-native invasive species.

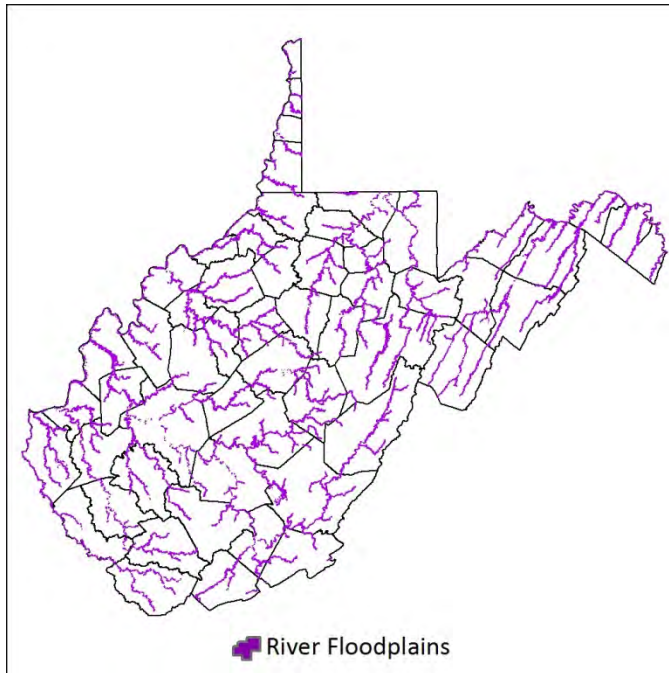
Current projects based on 2005 priority habitats: WVDNR ecologists completed a classification of these habitats in 2013.

Inventory, Management, and Research Needs: Identify and map high quality occurrences. Incorporate new associations in the U. S. National Vegetation Classification. Develop state level descriptions and make information available as part of a state vegetation classification.

River Floodplains

NatureServe Ecological Systems: Central Appalachian River Floodplain

South-Central Interior Large Floodplain



Habitat area exaggerated to enhance visibility.

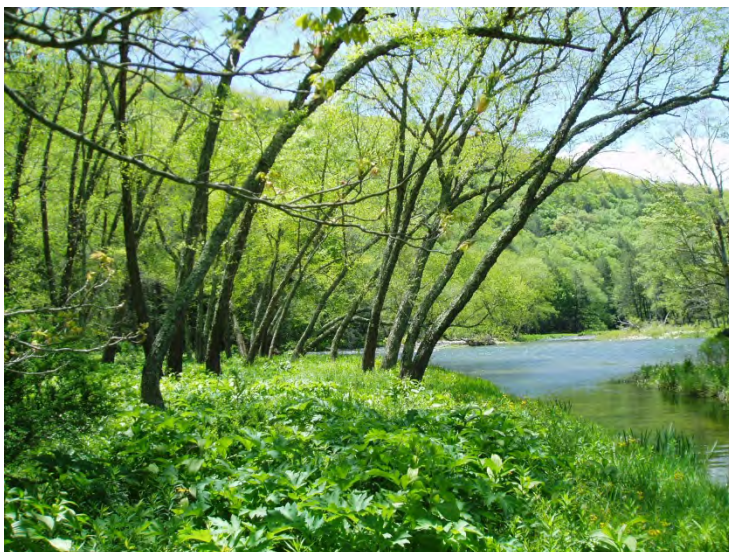


Photo: floodplain of Greenbrier River, Pocahantas County.

Description: Natural vegetation of variable physiognomy 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 (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), sugar maple (*Acer saccharum*), pin oak (*Quercus palustris*), and tuliptree (*Liriodendron tulipifera*). High elevation floodplain forests are often dominated by red spruce (*Picea rubens*), yellow birch (*Betula allegheniensis*), and/or eastern hemlock (*Tsuga canadensis*). 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*, *Schoenoplectus*), burreeds (*Sparganium*), rushes (*Juncus*), sedges (*Carex*, *Dulichium*), water lilies (*Nuphar*, *Nymphaea*) 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.

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

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 (laphathifolium, punctatum, pennsylvanicum) 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, Greenbrier River), Harper’s Ferry National Historical Park, Gauley River National Recreation Area, New River Gorge National River, Ohio River Islands NWR.

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 WV; today they are greatly diminished.

Stresses: altered flooding regimes, pollution, non-native invasive plants,

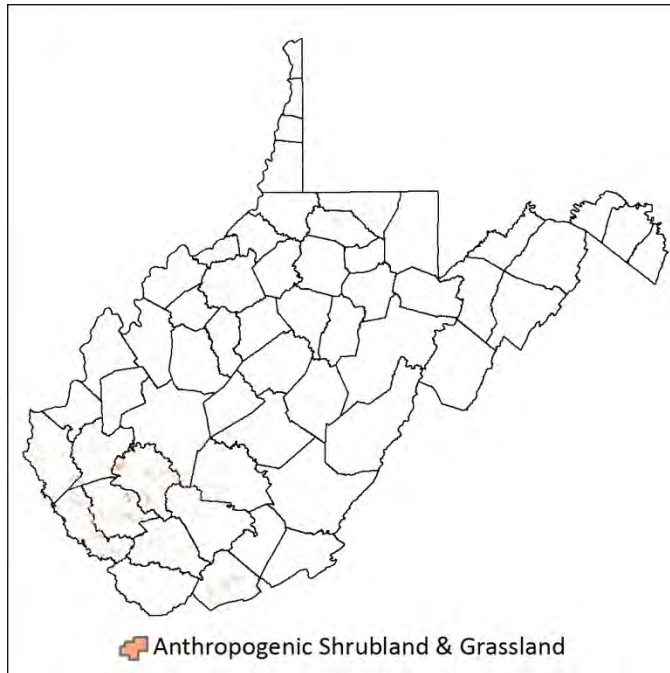
Current projects based on 2005 priority habitats: WVDNR ecologists completed a classification of these habitats in 2013.

Inventory, Management, and Research Needs: Incorporate new associations in the U. S. National Vegetation Classification. Develop state-level descriptions and make information available as part of a state vegetation classification.

Anthropogenic Shrubland and Grassland

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.

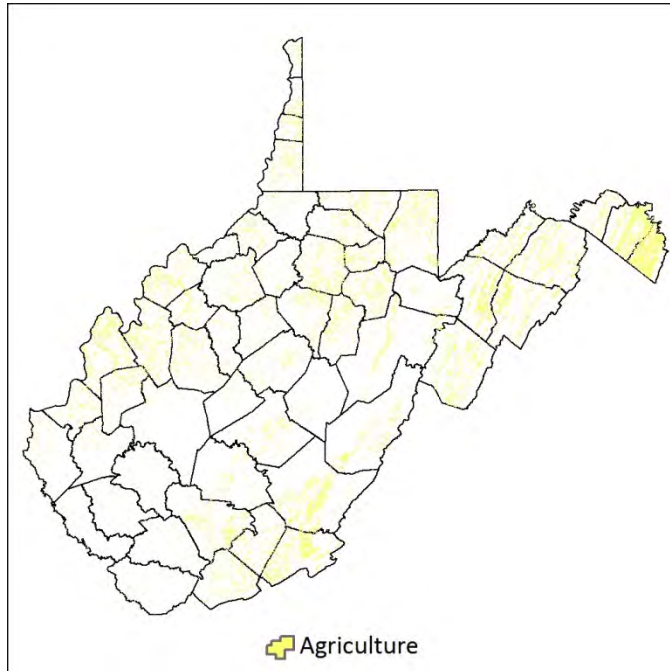
Distribution and Abundance: These habitats occur in small to large patches throughout the state at all elevations. Mapping is based on Ferree and Anderson (2013), who used National Land Cover Database classes (Homer et al. 2004) to map these habitats. Due to anomalies in the source data, these habitats 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.

Stresses: succession, agriculture, development.

Agriculture

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.

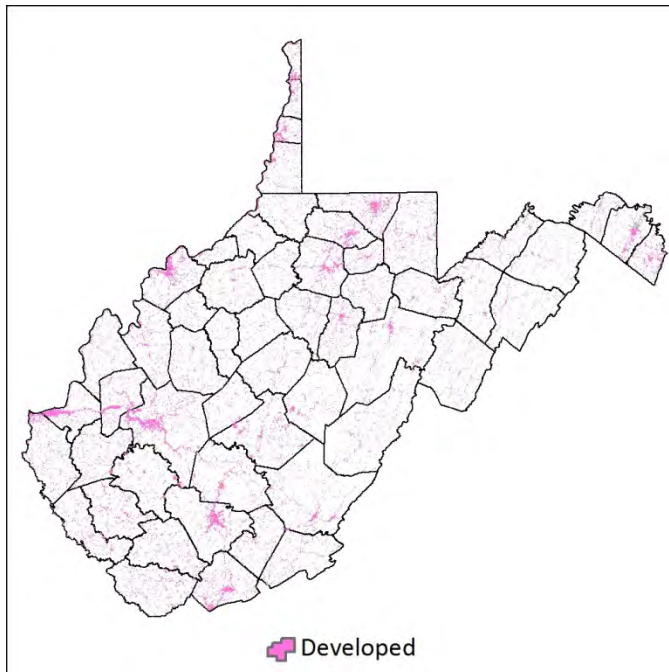
Distribution and Abundance: Agriculture is centered in valley bottoms. It is most extensive in the Greenbrier and Potomac Valleys and is mostly absent in high elevations and areas with rugged topography. Mapping is based on Ferree and Anderson (2013), who used National Land Cover Database classes (Homer 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.

Stresses: development.

Developed

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



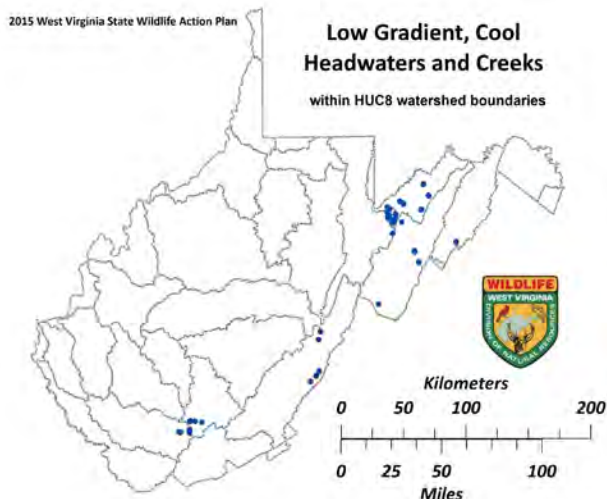
Description: Areas characterized by a high percentage of constructed materials (Homer et al. 2004) which are used for human residence and activity. Vegetation may cover significant area but is not usually natural. Developed areas range from cities to rural homesteads.

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.

3.3.2: Aquatic Habitats

Headwaters and Creeks, Low Gradient, Cool



Beaver Creek near Davis, WV

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 100 km² 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. 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:

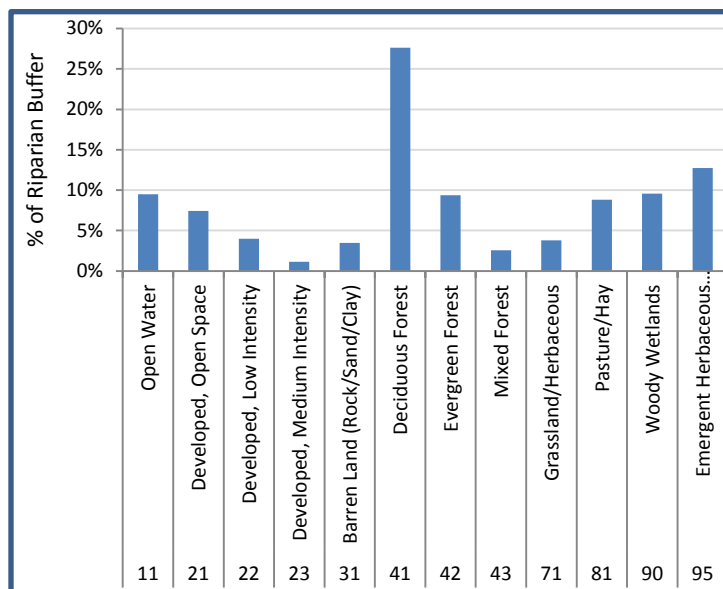
Little Blackwater River, Canaan Valley National Wildlife Refuge; Mill Run, Canaan Valley State Park

Notable Species found in Low Gradient, Cool, Headwaters and Creeks of West Virginia:

Fishes: *Clinostomus elongatus* Redside Dace, *Exoglossum laurae* Tonguetied Minnow, *Etheostoma osburni* Candy Darter, *Luxilus cornutus* Common Shiner, *Lythrurus ardens* Rosefin shiner, *Lythrurus umbratilis* Redfin Shiner, *Notropis scabriceps* New River Shiner, and *Phenacobius teretulus* Kanawha Minnow.

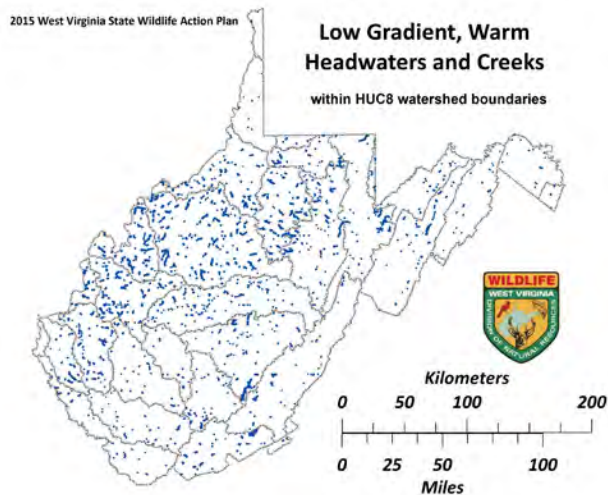
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Somatochlora forcipata* Forcipate Emerald, *Leucorhina hudsonica* Hudsonian Whiteface.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of low gradient, cool, headwater streams of West Virginia

Headwaters and Creeks, Low Gradient, Warm



Slab Creek near Berea, WV

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 100 km² 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 10 km², and have an average bankfull width of 5 m or 2) Creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of 10 m. 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 flows into low gradient warm rivers.

Places to visit this habitat:

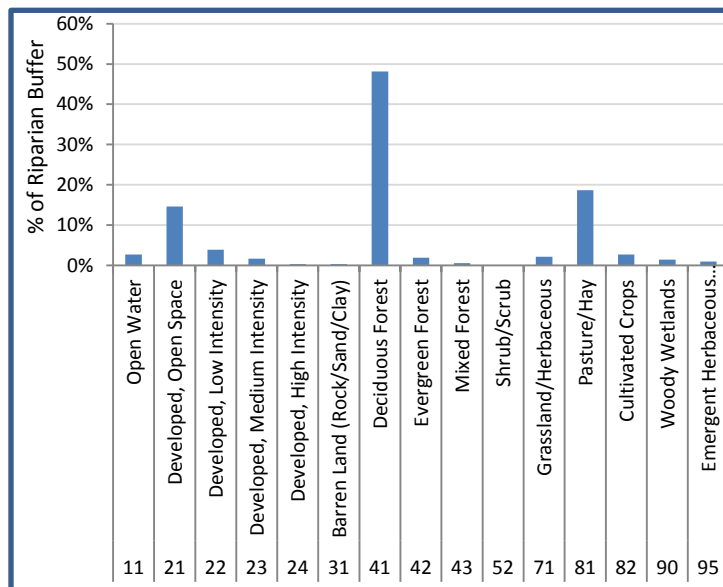
Kiah Creek, East Lynn Lake Wildlife Management Area; Meadow River, Meadow River Wildlife Management Area; Oldtown Creek, McClintic Wildlife Management Area; Saltlick Creek, Braxton County.

Notable Species found in Low gradient, Warm, Headwaters and Creeks of West Virginia:

Fishes: *Lythrurus umbratilis* Redfin Shiner, *Lepomis humilis* Orangespotted Sunfish, *Ameiurus melas* Black Bullhead.

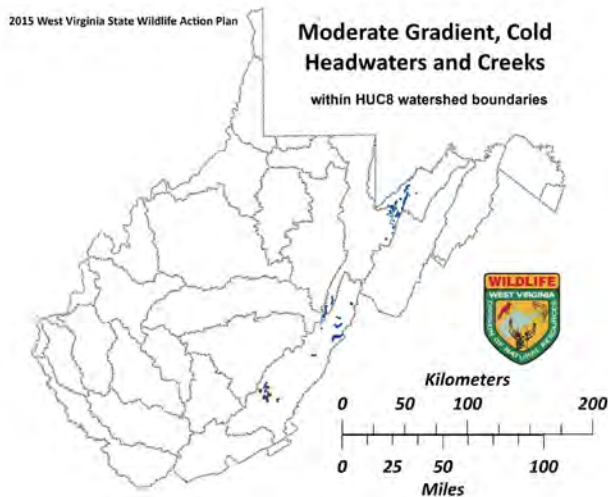
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Obovaria subrotunda* Round Hickorynut, *Pleurobema clava* Clubshell, *Necturus maculosus* Mudpuppy, *Cambarus chasmodactylus* New River Crayfish, *Cambarus theepiensis* Coalfields Crayfish, *Aeshna verticalis* Green-striped Darner.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of low gradient, warm, headwater streams of West Virginia

Headwaters and Creeks, Moderate Gradient, Cold



Gandy Creek near Osceola, WV

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 100 km² 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. 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:

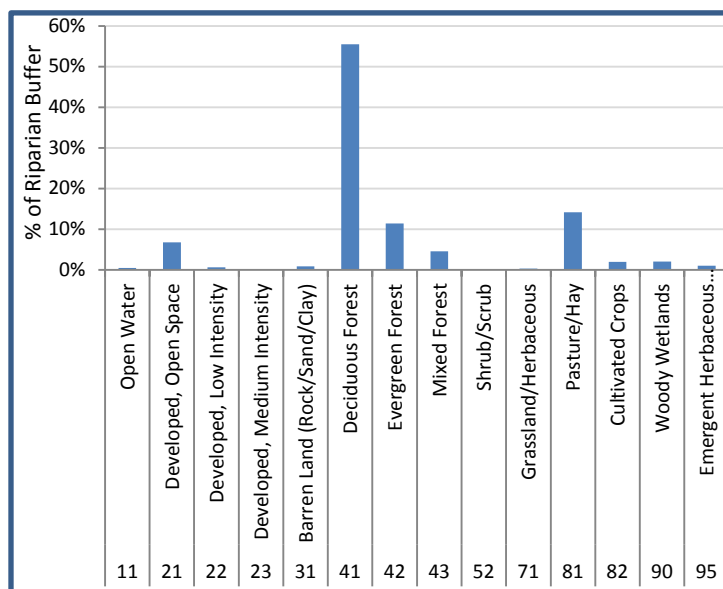
First Fork, Monongahela National Forest; Little River East Fork Greenbrier River, Monongahela National Forest; Shavers Fork, Monongahela National Forest; Knapp Creek, Monongahela National Forest

Notable Species found in Moderate Gradient, Cold, Headwaters and Creeks of West Virginia:

Fishes: *Cottus sp. cf. cognatus* Checkered Sculpin, *Salvelinus fontinalis* Brook Trout, *Notropis scabriceps* New River Shiner, *Etheostoma osburni* Candy Darter.

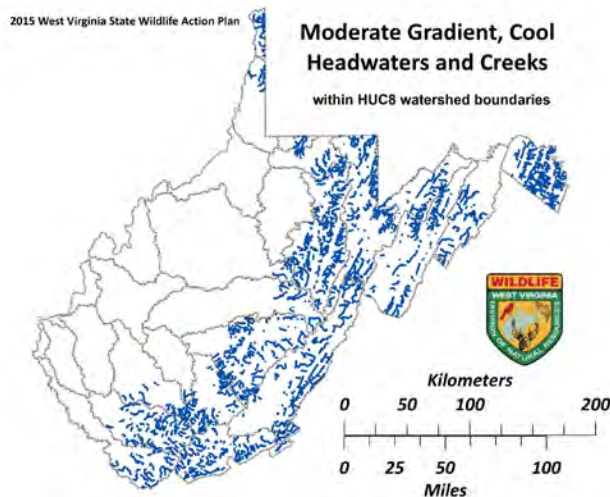
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Cambarus smilax* Greenbrier Crayfish , *Cambarus chasmodactylus* New River Crayfish, *Somatochlora forcipata* Forcipate Emerald, *Sympetrum obtrusum* White-faced Meadowhawk.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, cold, headwater streams of West Virginia

Headwaters and Creeks, Moderate Gradient, Cool



Little River, Monongahela National Forest

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 100 km² in size. They have cool 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 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. 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:

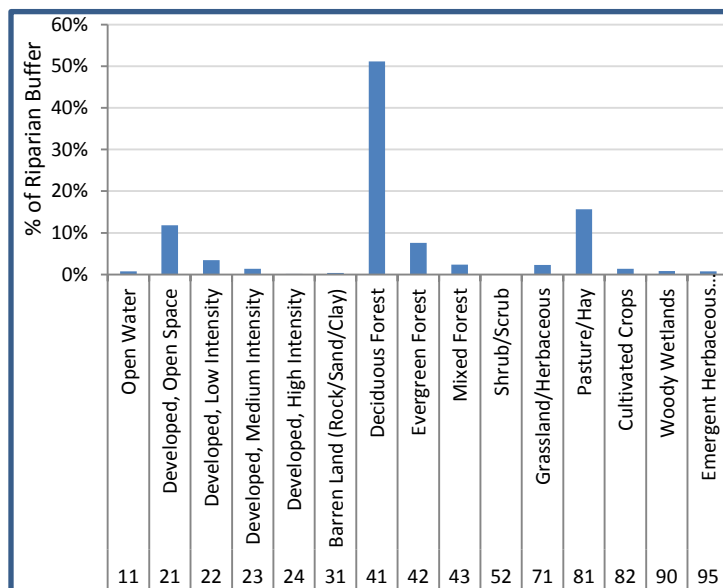
Camp Creek, Camp Creek State Forest; Potts Creek, Jefferson National Forest; Cranberry River, Monongahela National Forest; Meadow Branch, Sleepy Creek Wildlife Management Area

Notable Species found in Moderate Gradient, Cool, Headwaters and Creeks of West Virginia:

Fishes: *Salvelinus fontinalis* Brook Trout, *Cottus sp. cf. cognatus* Checkered Sculpin, *Luxilus cornutus* Common Shiner, *Clinostomus elongatus* Redside Dace, *Notropis scabriceps* New River Shiner, *Etheostoma osburni* Candy Darter, *Exoglossum laurae* Tonguetied Minnow.

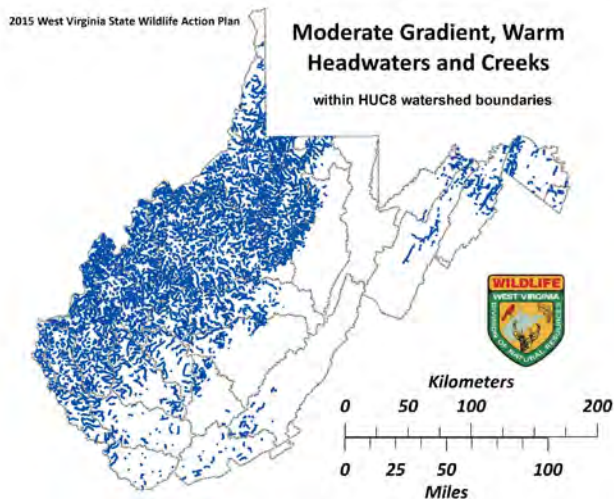
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Pleurobema collina* James Spiny mussel, *Lasmigona subviridis* Green Floater, *Alasmidonta marginata* Elktoe, *Cryptobranchus alleghaniensis* Eastern Hellbender, *Cambarus veteranus* Big Sandy Crayfish, *Cambarus smilax* Greenbrier Crayfish, *Cambarus chasmodactylus* New River Crayfish, *Sympetrum obtrusum* White-faced Meadowhawk, *Gomphus desertus* Harpoon Clubtail, *Glyptemys insculpta* Wood Turtle, *Clemmys guttata* Spotted Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, cool, headwater streams of West Virginia

Headwaters and Creeks, Moderate Gradient, Warm



Dents Run near Morgantown, WV

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 100 km² in size. They have warm, moderately fast-moving waters of 0.5 to less than 2.0 % slope with good oxygenation. Instream habitats are dominated by riffle-pool features 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 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. These stream types are most prevalent in the Western Allegheny Plateau, 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:

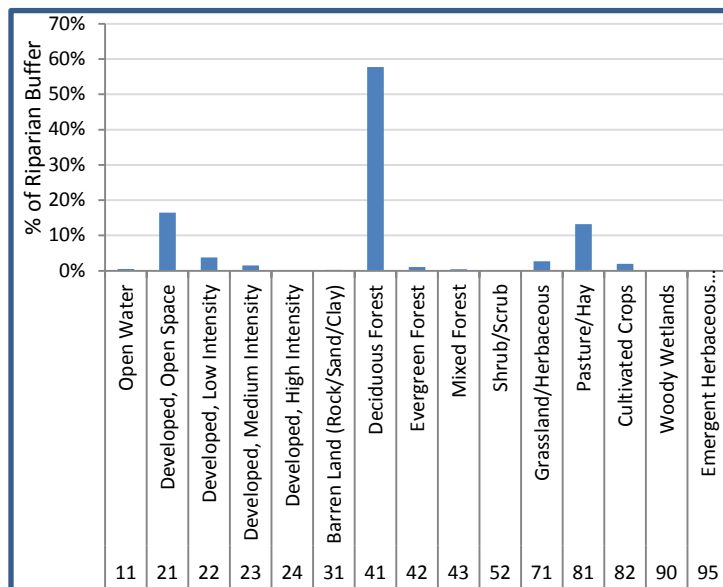
Pipestem Creek, Bluestone Lake Wildlife Management Area; Pringle Fork, Stonecoal Lake Wildlife Management Area; Panther Creek, Panther State Forest; Millers Fork, Beech Fork Lake Wildlife Management Area

Notable Species found in Moderate Gradient, Warm, Headwaters and Creeks of West Virginia:

Fishes: *Lythrurus umbratilis* Redfin Shiner, *Lepomis humilis* Orangespotted Sunfish, *Ameiurus melas* Black Bullhead, *Luxilus cornutus* Common Shiner, *Etheostoma olmstedii* Tessellated Darter, *Notropis proce* Swallowtail Shiner.

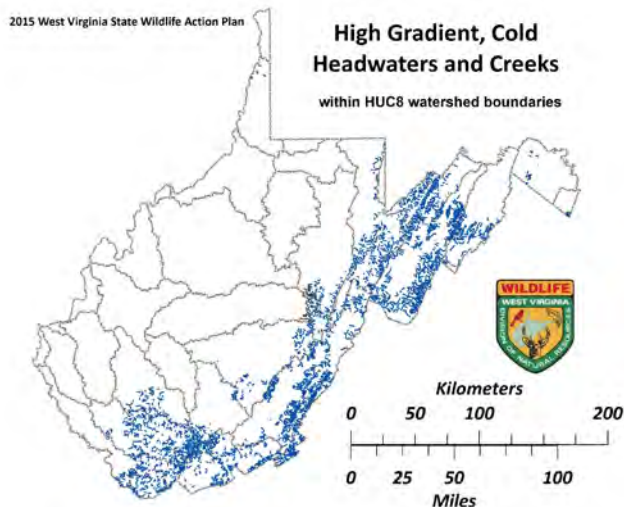
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Obovaria subrotunda* Round Hickorynut, *Pleurobem clava* Clubshell, *Lampsilis fasciola* Wavyrayed Lampmussel, *Necturus maculosus* Mudpuppy, *Cryptobranchus alleghaniensis* Eastern Hellbender, *Cambarus theepiensis* Coalfields Crayfish, *Cambarus hatfieldi* Tug Valley Crayfish, *Dromogomphus spoliatus* Flag-tailed Spinyleg, *Glyptemys insculpta* Wood Turtle, *Clemmys guttata* Spotted Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011)of moderate gradient, warm, headwater streams of West Virginia

Headwaters and Creeks, High Gradient, Cold



Odey Run, Monongahela National Forest, WV

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 100 km² in size. The cold fast-moving waters of 2.0 % slope or greater 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 angular 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. 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:

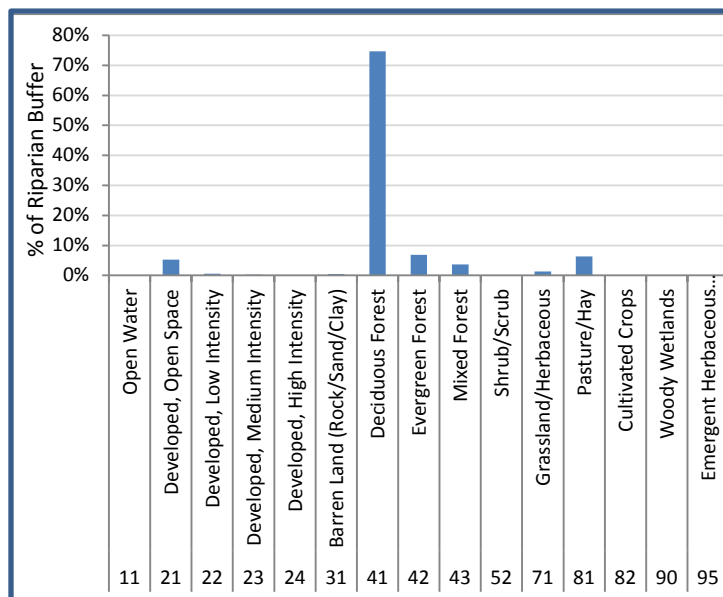
Red Creek, Dolly Sods Wilderness Area; Waites Run, George Washington National Forest; Tea Creek, Monongahela National Forest

Notable Species found in High Gradient, Cold, Headwaters and Creeks of West Virginia:

Fishes: *Anguilla rostrata* American Eel, *Cottus sp. cf. cognatus* Checkered Sculpin, *Etheostoma longimanum* Longfin Darter, *Exoglossum laurae* Tonguetied Minnow, *Luxilus cornutus* Common Shiner, *Margariscus margarita* Allegheny Pearl Dace, *Salvelinus fontinalis* Brook Trout.

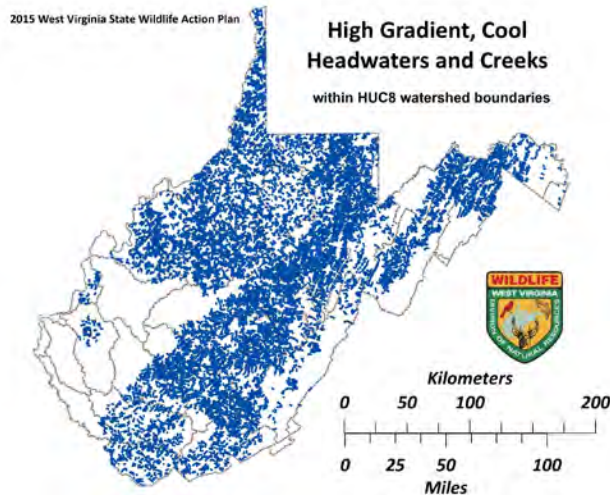
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Pleurobema collina* James Spiny mussel, *Cambarus elkensis* Elk River Crayfish, *Cambarus chasmodactylus* New River Crayfish, *Cordulia shurtleffi* American Emerald, *Cordulegaster erronea* Tiger Spiketail, *Glyptemys insculpta*, Wood Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of high gradient, cold, headwater streams of West Virginia

Headwaters and Creeks, High Gradient, Cool



Seneca Creek near Onego, WV

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 100 km² in size. They have cool fast-moving waters of 2.0 % or greater slope with 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 angular 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. These stream types are common statewide, but less prevalent in the southern portion of the Western Allegheny Plateau ecoregions 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:

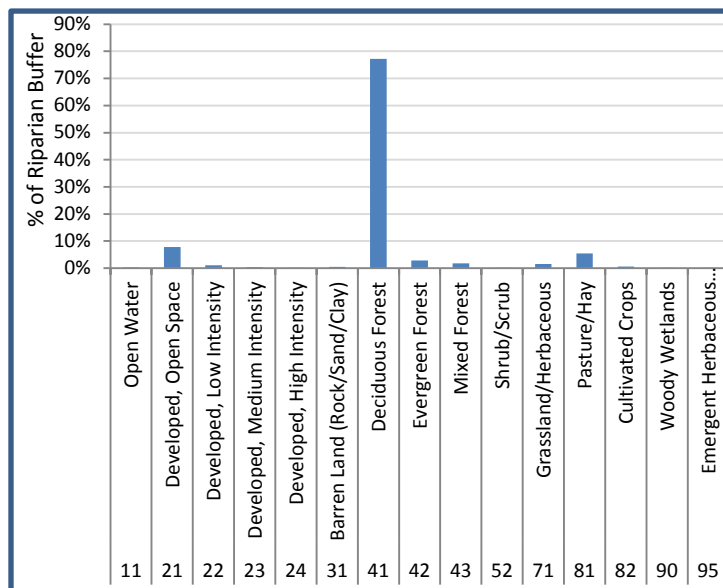
Seneca Creek, Monongahela National Forest; Meadow Creek, New River Gorge National River; Scott Run, Coopers Rock State Forest; Hawk Run, George Washington National Forest

Notable Species found in High Gradient, Cool, Headwaters and Creeks of West Virginia:

Fishes: *Salvelinus fontinalis* Brook Trout, *Notropis scabriceps* New River Shiner, *Clinostomus elongatus* Redside Dace, *Exoglossum laurae* Tonguetied Minnow, *Etheostoma osburni* Candy Darter.

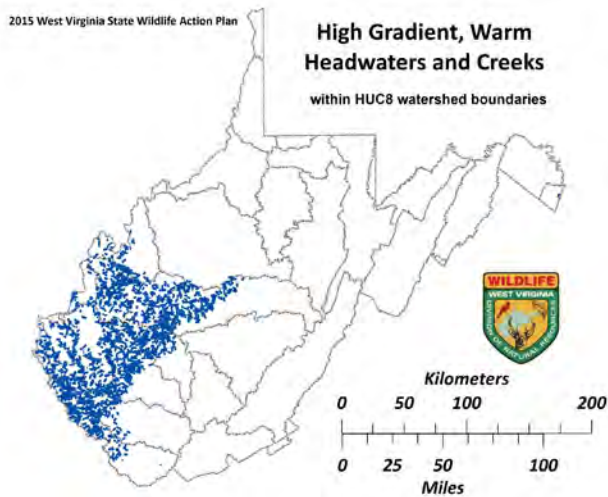
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Cryptobranchus alleghaniensis* Eastern Hellbender, *Cambarus elkenis* Elk River Crayfish, *Cambarus theepiensis* Coalfields Crayfish, *Tachopteryx thoreyi* Gray Petaltail, *Gomphus viridifrons* Green-faced Clubtail, *Lanthus parvulus* Northern Pygmy Clubtail, *Glypsemys insculpta* Wood Turtle, *Thamnophis sauritus sauritus* Common Ribbonsnake.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of high gradient, cool, headwater streams of West Virginia

Headwaters and Creeks, High Gradient, Warm



Tommy Creek near Amigo, WV

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 100 km² in size. The warm fast-moving water of 2.0 % slope or greater 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 angular 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 10 km², and have an average bankfull width of 5 m or less, or 2) creeks that include larger streams with watersheds up to 100 km² and have an average bankfull width of up to 10 m. 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:

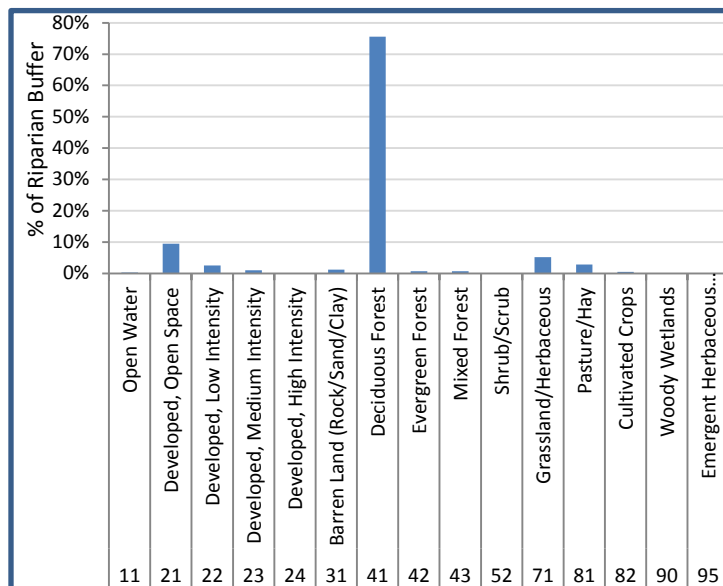
Long Branch, Cabwaylingo State Park; Davis Creek, Kanawha State Forest; Toms Branch, Laurel Lake Wildlife Management Area

Notable Species found in High Gradient, Warm, Headwaters and Creeks of West Virginia:

Fishes: *Etheostoma olmstedi* Tessellated Darter.

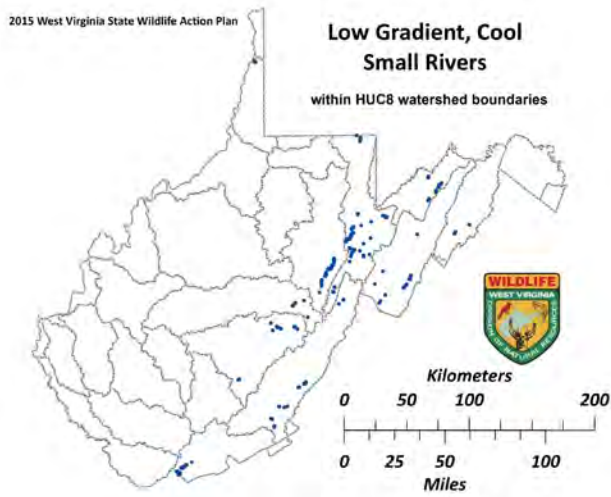
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Necturus maculosus* Mudpuppy, *Cambarus hatfieldi* Tug Valley Crayfish, *Cambarus theepiensis* Coalfields Crayfish.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of high gradient, warm, headwater streams of West Virginia

Small Rivers, Low Gradient, Cool



Blackwater River, Canaan Valley

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 518 km² in size and average bankfull width of 20 meters. The slow-moving waters of less than 0.5 % slope 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:

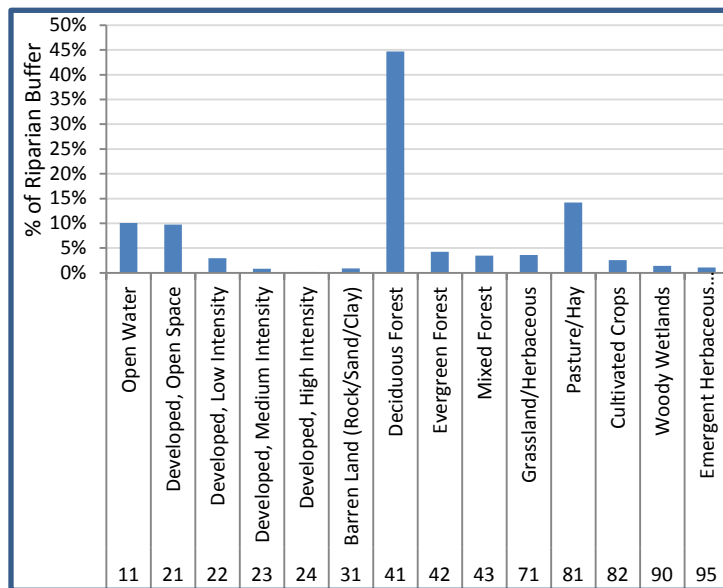
Blackwater River, Canaan Valley National Wildlife Refuge; Tygart Valley River, Huttonsville State Farm Wildlife Management Area; Bluestone River, Mercer County; Patterson Creek, Mineral County

Notable Species found in Low Gradient, Cool, Small Rivers of West Virginia:

Fishes: *Luxilus cornutus* Common Shiner, *Cyprinella analostana* Satinfin Shiner, *Etheostoma olmstedii* Tessellated Darter, *Notropis procne* Swallowtail Shiner, *Etheostoma osburni* Candy Darter.

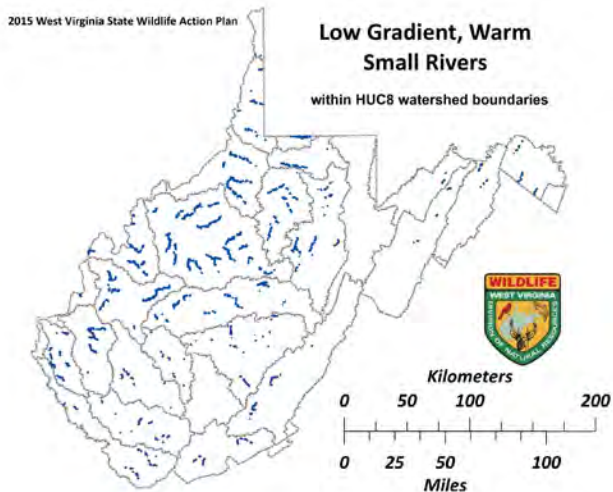
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Lampsilis cariosa* Yellow Lampmussel , *Alasmidonta varicosa* Brook Floater, *Cryptobranchus alleghaniensis* Eastern Hellbender, *Macromia illinoisiensis* Swift River Cruiser, *Leucorrhinia hudsonica* Hudsonian Whiteface.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011)of low gradient, cool, small rivers of West Virginia

Small Rivers, Low Gradient, Warm



Oldtown Creek, McClintic WMA

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 518 km² in size and average bankfull width of 20 meters. The slow-moving waters of less than 0.5 % slope 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.

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:

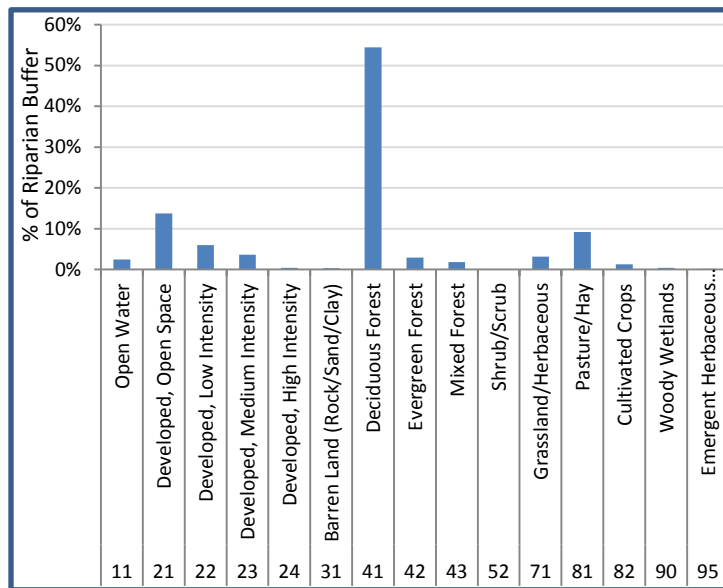
West Fork Twelvepole Creek, Cabwaylingo State Forest; Goose Creek, Hughes River Wildlife Management Area; Little Kanawha River, Burnsville Lake Wildlife Management Area; Oldtown Creek, McClintic Wildlife Management Area.

Notable Species found in Low Gradient, Warm, Small Rivers of West Virginia:

Fishes: *Lythrurus umbratilis* Redfin Shiner, *Ammocrypta pellucida* Eastern Sand Darter, *Notropis scabriceps* New River Shiner, *Luxilus cornutus* Common Shiner, *Percina macrocephala* Longhead Darter.

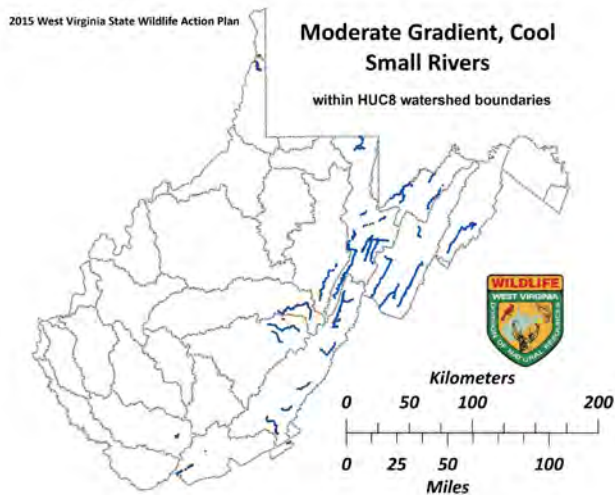
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Obovaria subrotunda* Round Hickorynut, *Epioblasma triquetra* Snuffbox, *Pleurobema sintoxia* Round Pigtoe, *Fusconaia subrotunda* Longsolid, *Simpsonias ambigua* Salamander Mussel, *Necturus maculosus* Mudpuppy, *Cryptobranchus alleganiensis* Eastern Hellbender, *Cambarus theepiensis* Coalfields Crayfish, *Macromia illinoiensis* Swift River Cruiser, *Progomphus obscurus* Common Sanddragon, *Glyptemys insculpta* Wood Turtle

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of low gradient, warm, small rivers of West Virginia

Small Rivers, Moderate Gradient, Cool



Elk River Catch and Release Area

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 518 km² in size and average bankfull width of 20 meters. The moderately fast-moving waters of 0.5 to less than 2.0 % slope are dominated by a well-defined pattern of alternating pools, riffles, and runs. Substrate is a well-homogenized mix of angular and weathered 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:

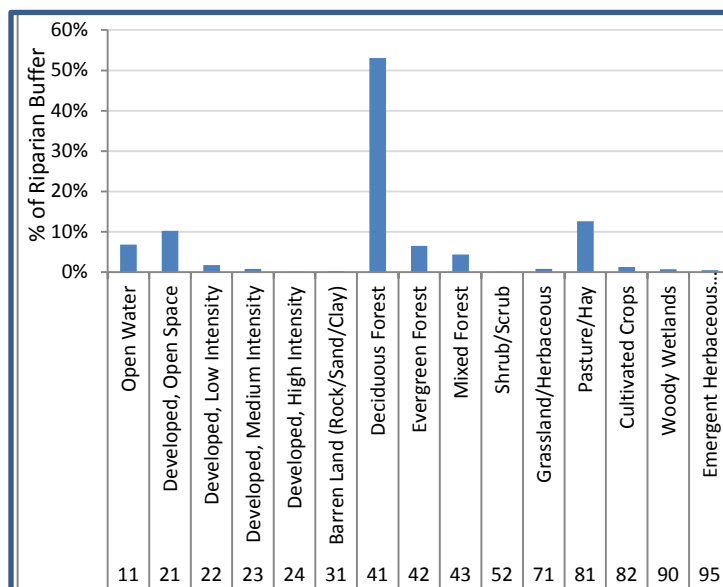
Cranberry River, Cranberry Backcountry Monongahela National Forest; West Fork Greenbrier River, Monongahela National Forest; Shavers Fork, Monongahela National Forest; Elk River Catch and Release Area, Randolph County.

Notable Species found in Moderate Gradient, Cool, Small Rivers of West Virginia:

Fishes: *Luxilus cornutus* Common Shiner, *Notropis scabriceps* New River Shiner, *Etheostoma osburni* Candy Darter, *Salvelinus fontinalis* Brook Trout, *Exoglossum laurae* Tonguetied minnow, *Phenacobius teretulus* Kanawha Minnow.

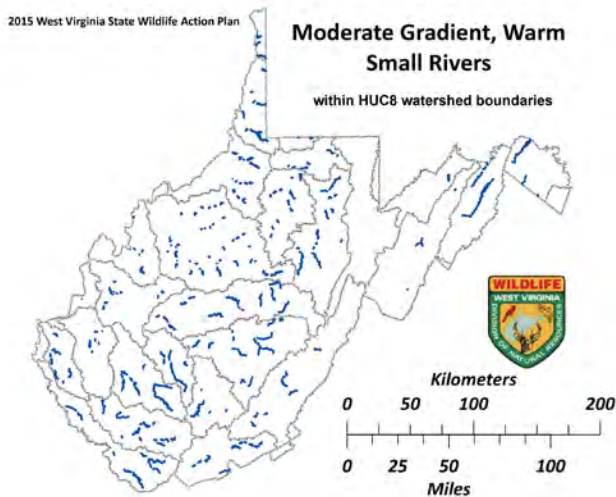
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Lampsilis cariosa* Yellow Lampmussel, *Alasmidonta varicosa* Brook Floater, *Lasmigona subviridis* Green Floater, *Alasmidonta undulata* Triangle Floater, *Alasmidonta marginata* Elktoe, *Cryptobranchus alleganiensis* Eastern Hellbender, *Cambarus chasmodactylus* New River Crayfish, *Cambarus elkensis* Elk River Crayfish, *Cambarus smilax* Greenbrier Crayfish, *Calopteryx amata* Superb Jewelwing, *Cordulia shurtleffi* American Emerald, *Glyptemys insculpta* Wood Turtle

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, cool, small rivers of West Virginia

Small Rivers, Moderate Gradient, Warm



North River, Short Mountain WMA

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 518 km² in size and average bankfull width of 20 meters. The moderately fast-moving waters of 0.5 to 2.0 % slope are dominated by a well-defined pattern of alternating pools, riffles, and runs. Substrate is a well-homogenized mix of angular and weathered 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:

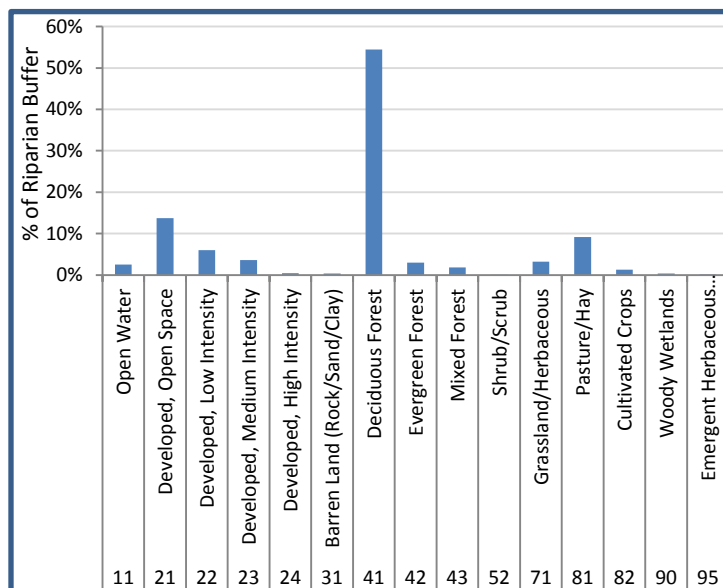
Cherry River, Monongahela National Forest; North River, Short Mountain Wildlife Management Area; Sleepy Creek, Morgan County; West Virginia Fork Fish Creek, Cecil H. Underwood Wildlife Management Area.

Notable Species found in Moderate Gradient, Warm, Small Rivers of West Virginia:

Fishes: *Luxilus cornutus* Common Shiner, *Etheostoma osburni* Candy Darter, *Lythrurus umbratilis* Redfin Shiner, *Lepomis humilis* Orangespotted Sunfish, *Notropis scabriceps* New River Shiner, *Ameiurus melas* Black Bullhead, *Ammocrypta pellucida* Eastern Sand Darter, *Lythrurus ardens* Rosefin Shiner.

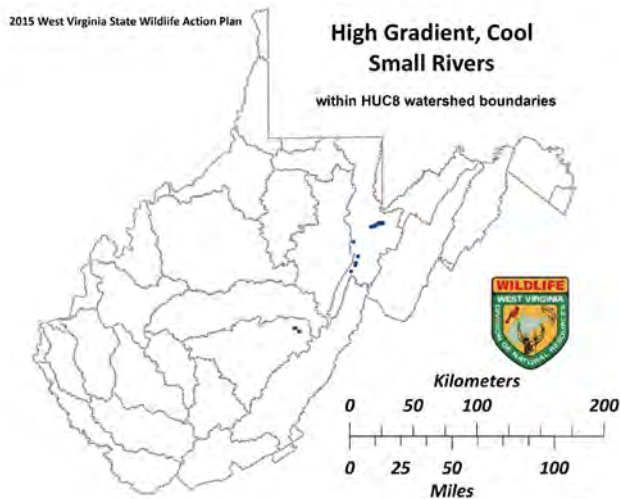
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Obovaria subrotunda* Round Hickorynut, *Lampsilis cariosa* Yellow Lampmussel, *Fusconaia subrotunda* Longsolid, *Pleurobema sintoxia* Round Pigtoe, *Epioblasma triquetra* Snuffbox, *Cryptobranchus alleganiensis* Eastern Hellbender, *Cambarus elkensis* Elk River Crayfish, *Cambarus veteranus* Big Sandy Crayfish, *Cambarus chasmodactylus* New River Crayfish, *Macromia illinoiensis* Swift River Cruiser, *Gomphus quadricolor* Rapids Clubtail, *Glyptemys insculpta* Wood Turtle

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, warm, small rivers of West Virginia

Small Rivers, High Gradient, Cool



Blackwater River canyon, Blackwater Falls SP

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 518 km² in size and average bankfull width of 20 meters. The rapidly-moving waters of 2.0 % slope or greater are dominated by a complex of deep runs and cascades and step-pool features. Substrate is dominated by large boulders embedded in angular and weathered 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:

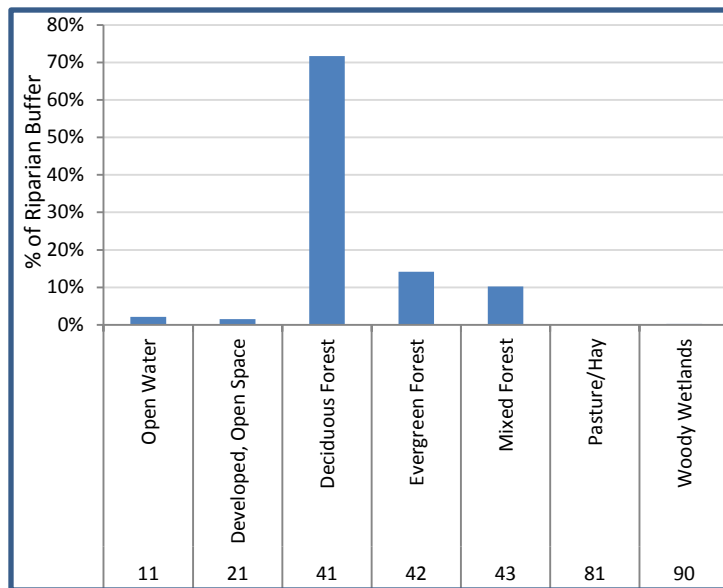
Blackwater River, Blackwater Falls State Park; Shavers Fork, Monongahela National Forest; Williams River, Monongahela National Forest.

Notable Species found in High Gradient, Cool, Small Rivers of 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 *Ambloplites rupestris* Rock Bass, *Catostomus commersonii* White Sucker, *Cottus bairdii* Mottled Sculpin, *Etheostoma flabellare* Fantail Darter, *Hypentelium nigricans* Northern Hog Sucker, *Nocomis micropogon* River Chub, *Notropis photogenis* Silver Shiner, *Noturus flavus* Stonecat, *Rhinichthys cataractae* Longnose Dace.

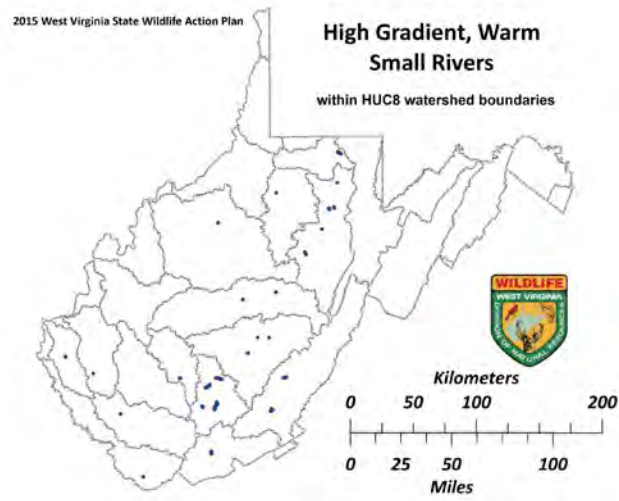
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: There are no records for Species of Greatest Conservation Need from this type of habitat. The rare nature of the habitat and difficulty of sampling have created a data gap in these small rivers.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011)of high gradient, cool, small rivers of West Virginia

Small Rivers, High Gradient, Warm



Deckers Creek near Morgantown, WV

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 518 km² in size and average bankfull width of 20 meters. The rapidly-moving waters of 2.0 % or greater slope are dominated by a complex of deep runs and cascades and step-pool features. Substrate is dominated by large boulders embedded in angular and weathered 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:

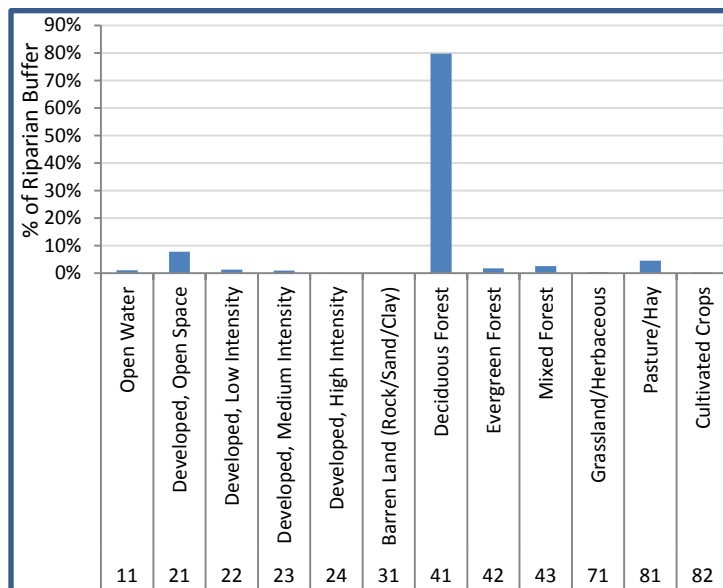
Manns Creek, Babcock State Park; Brush Creek, Brush Creek Preserve; Teter Creek, Pleasant Creek Wildlife Management Area; Dunloup Creek, New River Gorge National River.

Notable Species found in High Gradient, Warm, Small Rivers of 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 *Ambloplites rupestris* Rock Bass, *Hypentelium nigricans* Northern Hog Sucker, *Nocomis micropogon* River Chub, *Notropis photogenis* Silver Shiner, *Notropis rubellus* Rosyface Shiner, *Rhinichthys cataractae* Longnose Dace.

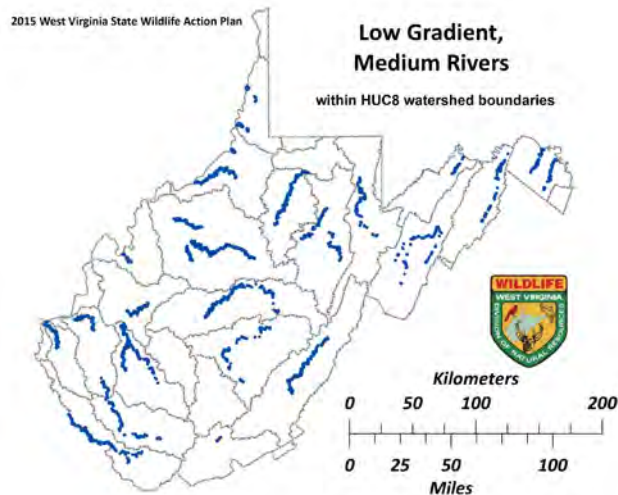
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Calopteryx amata* Superb Jewelwing, *Ophiogomphus rupinsulensis* Rusty Snaketail, *Helodordulia uhleri* Uhler’s Sundragon.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of high gradient, warm, small rivers of West Virginia

Medium Rivers, Low Gradient, Warm



Guyandotte River near Bruno, WV

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 2590 km² in size and average bankfull width of 35 meters. The slowly-moving waters of less than 0.5 % slope 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 weathered 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:

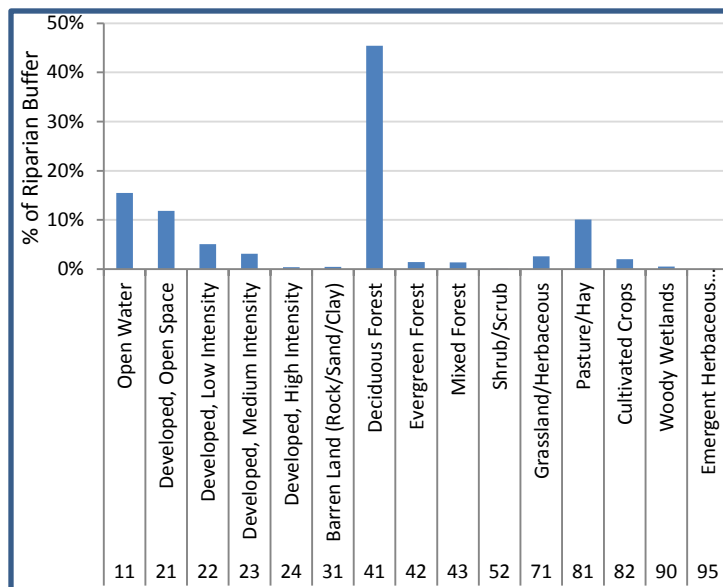
Elk River, Braxton and Clay Counties; Guyandotte River, Chief Logan State Park, Coal River, Coal River Water Trail; Greenbrier River, Greenbrier River Trail.

Notable Species found in Low Gradient, Warm, Medium Rivers of West Virginia:

Fishes: *Luxilus cornutus* Common Shiner, *Etheostoma tippecanoe* Tippecanoe Darter, *Notropis ariommus* Popeye Shiner, *Ammocrypta pellucida* Eastern Sand Darter, *Ameiurus melas* Black Bullhead, *Percina macrocephala* Longhead Darter, *Etheostoma maculatum* Spotted Darter.

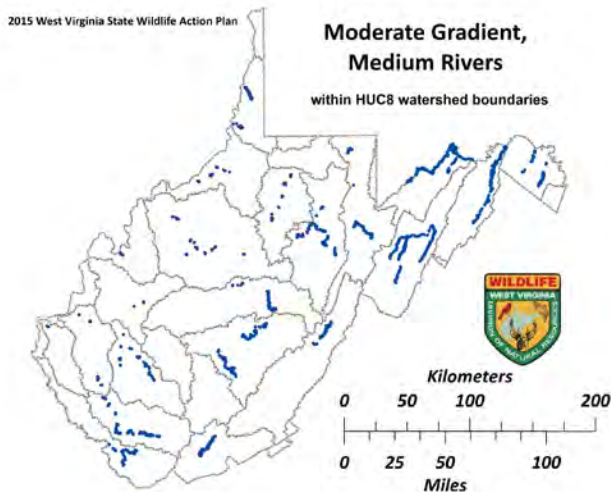
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Fusconaia subrotunda* Longsolid, *Lampsilis fasciola* Wavyrayed Lampmussel, *Ligumia recta* Black Sandshell, *Elliptio crassidens* Elephantear, *Pleurobema clava* Clubshell, *Obovaria subrotunda* Round Hickorynut, *Necturus maculosus*, Mudpuppy, *Orconectes limosus* Spinycheek Crayfish, *Cambarus chasmodactylus* New River Crayfish, *Cambarus theepiensis* Coalfields Crayfish, *Macromia illinoiensis* Swift River Cruiser, *Progomphus obscurus* Common Sanddragon, *Glyptemys insculpta* Wood Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of low gradient, warm, medium rivers of West Virginia

Medium Rivers, Moderate Gradient, Warm



Cacapon River near Capon Springs, WV

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 2590 km² in size and average bankfull width of 35 meters. The moderately fast-moving waters of 0.5 to less than 2.0% slope 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 weathered gravel, cobble, and boulders over smooth bedrock outcrops. These moderate-gradient river types are typically 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 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:

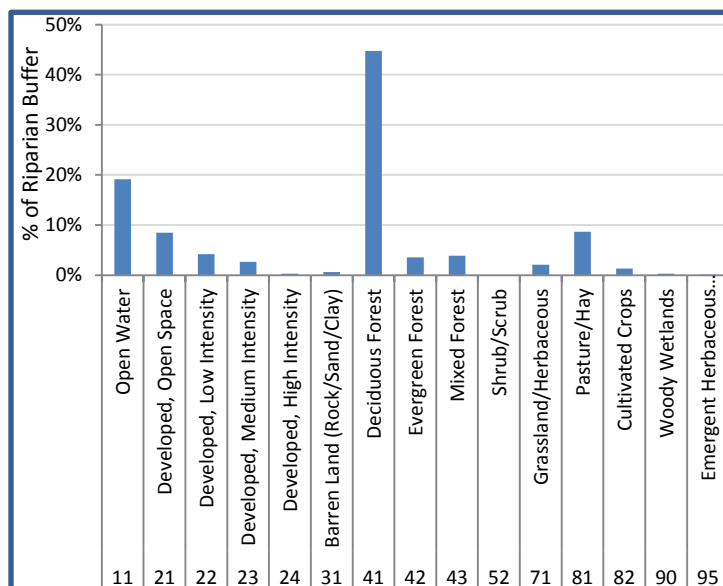
North Fork South Branch Potomac River, Monongahela National Forest; Meadow River, Gauley River National Recreation Area; Wheeling Creek, Ohio County; Cacapon River, Hampshire County.

Notable Species found in Moderate Gradient, Warm, Medium Rivers of West Virginia:

Fishes: *Luxilus cornutus* Common Shiner, *Notropis scabriceps* New River Shiner, *Etheostoma osburni* Candy Darter, *Notropis ariommus* Popeye Shiner, *Anguilla rostrata* American Eel, *Ammocrypta pellucida* Eastern Sand Darter, *Percina macrocephala* Longhead Darter.

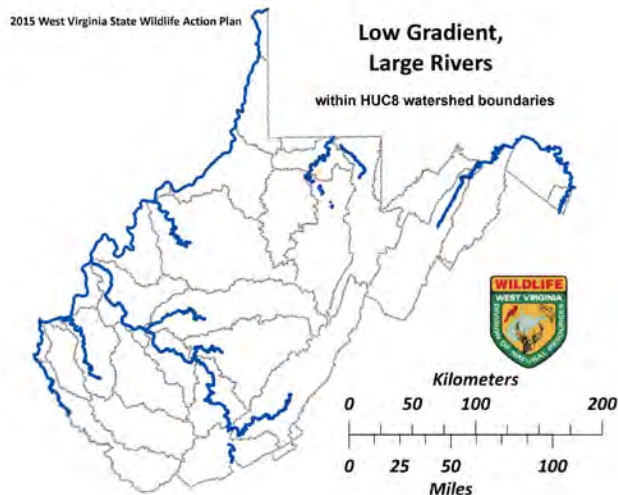
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Lampsilis fasciola* Wavyrayed Lampmussel, *Lampsilis cariosa* Yellow Lampmussel, *Lasmigona subviridis* Green Floater, *Fusconaia subrotunda* Longsolid, *Alasmidonta varicosa* Brook Floater *Ligumia recta* Black Sandshell, *Necturus maculosus*, Mudpuppy, *Cambarus chasmodactylus* New River Crayfish, *Cambarus elkensis* Elk River Crayfish, *Gomphus viridifrons* Green-faced Clubtail, *Glyptemys insculpta* Wood Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, warm, medium rivers of West Virginia

Large Rivers, Low Gradient, Warm



Little Kanawha River near Newark, WV

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 2590 km² in size and have an average bankfull width of 75 meters or greater. The slower moving low gradient waters of less than 0.5 % slope 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 weathered 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 modified, 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:

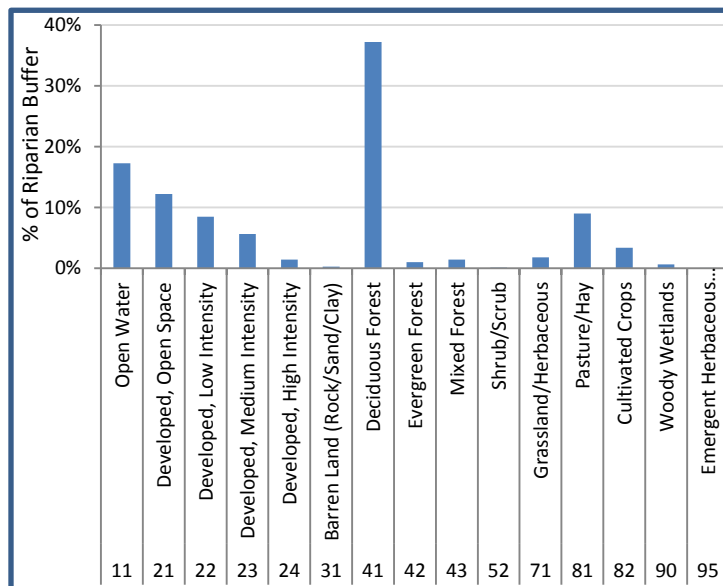
Shenandoah River, Jefferson County; South Branch Potomac River, Hampshire County; Little Kanawha River, Wirt and Wood Counties; Greenbrier River, Summers County.

Notable Species found in Low Gradient, Large Rivers of West Virginia:

Fishes: *Ameiurus melas* Black Bullhead, *Etheostoma tippecanoe* Tippecanoe Darter, *Ammocrypta pellucida* Eastern Sand Darter, *Notropis ariommus* Popeye Shiner, *Percina macrocephala* Longhead Darter, *Crystallaria cincotta* Diamond darter.

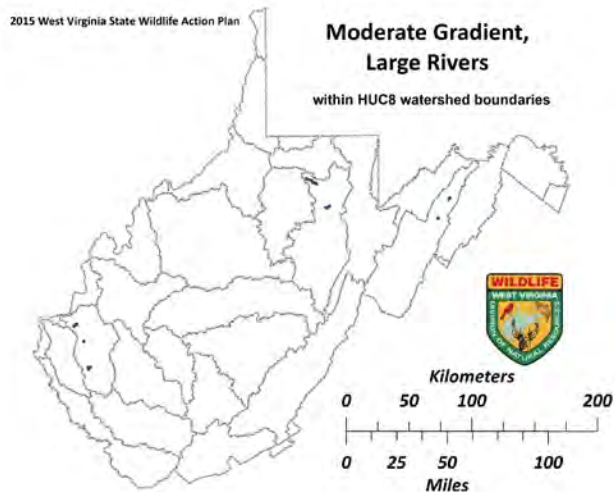
Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Ligumia recta* Black Sandshell, *Elliptio crassidens* Elephantear, *Fusconaia subrotunda* Longsolid *Lampsilis fasciola* Wavyrayed Lampmussel, *Necturus maculosus*, Mudpuppy, *Cambarus chasmodactylus* New River Crayfish, *Neurocordulia molesta* Smoky Shadowdragon, *Macromia illinoiensis* Swift River Cruiser, *Gomphus viridifrons* Green-faced Clubtail, *Pseudmys rubriventris* Northern Red-bellied Cooter, *Graptemys geographica* Northern Map Turtle.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of low gradient, large rivers of West Virginia

Large Rivers, Moderate Gradient, Warm



Tygart Valley River at Valley Falls SP

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 2590 km² in size and have an average bankfull width of 75 meters or greater. These moderately fast-moving waters of 0.5 to less than 2.0 % slope 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 weathered gravel, cobble, and boulders over smooth 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:

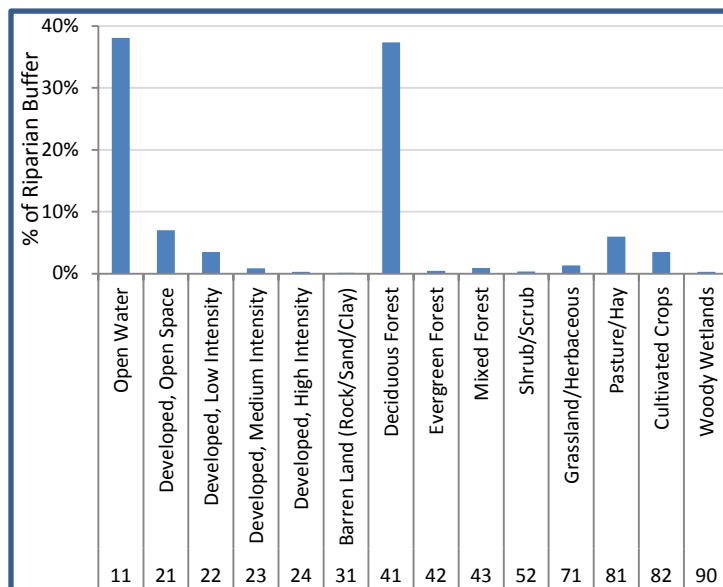
Tygart Valley River, Valley Falls State Park; New River, New River Gorge National River; Shenandoah River, Harpers Ferry National Historical Park; Elk River, Coonskin Park near Charleston.

Notable Species found in Moderate Gradient, Large Rivers of West Virginia:

Fishes: *Ammocrypta pellucida* Eastern Sand Darter, *Etheostoma tippecanoe* Tippecanoe Darter, *Notropis ariommus* Popeye Shiner, *Ammocrypta clara* Western Sand Darter, *Moxostoma macrolepidotum* Shorthead Redhorse, *Percina macrocephala* Longhead Darter, *Crystallaria cincotta* Diamond darter.

Mussels, Crayfish, Amphibians, Reptiles, and Invertebrates: *Cyclonaias tuberculata* Purple wartyback, *Lampsilis fasciola* Wavyrayed Lampmussel, *Ligumia recta* Black Sandshell, *Fusconaia subrotunda* Longsolid, *Elliptio crassidens* Elephantear, *Cambarus chasmodactylus* New River Crayfish, *Macromia illinoensis* Swift River Cruiser.

Figures and Tables:



200m (100m each bank) Riparian Land Cover (NLCD 2011) of moderate gradient, large rivers of West Virginia

3.4: SWAPMASTER Summary Tables of Species, Habitats and Associations

The remainder of this chapter contains tables generated from the SWAPMASTER database that provide summary data as follows:

- Species count by taxa and priority
- Terrestrial habitat extent
- Aquatic habitat extent
- Species counts by terrestrial habitat type
- Species counts by aquatic habitat type

The West Virginia SWAP Appendix document provides more detailed output from the SWAPMASTER database, including lists of SGCN species by taxa and habitat.

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

STATEWIDE TERRESTRIAL HABITAT TYPE EXTENT

HABITAT TYPE	ACRES	PERCENT OF 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%

STATEWIDE AQUATIC HABITAT EXTENT

HABITAT TYPE	MILES	PERCENT OF TOTAL 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 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	2	
Plants	2	1
Reptiles	1	2
Snails	1	
Tiger Beetles		1
Totals	7	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	2	
Birds	1	2
Butterflies and Moths		1
Mammals	1	2
Reptiles	2	2
Snails		1
Tiger Beetles	1	2
Totals	7	10

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	2	2
Butterflies and Moths	2	2
Mammals	2	1
Reptiles	2	2
Snails	1	1
Tiger Beetles	1	
Totals	11	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: Calcareous Cliffs and Talus

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Butterflies and Moths		2
Mammals	1	1
Plants	2	1
Reptiles	1	2
Snails	2	2
Totals	7	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: Caves and Karst

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Cave Invertebrates	2	
Mammals	1	2
Snails	2	1
Totals	6	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: Developed

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Birds	2	
Mammals	1	2
Reptiles	2	1
Snails	1	1
Tiger Beetles	2	2
Totals	9	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 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	1
Mammals		1
Plants	2	1
Snails	2	1
Totals	6	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: Dry Oak (-Pine) Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Birds	1	2
Butterflies and Moths	2	2
Mammals	2	2
Plants	2	1
Reptiles	2	2
Snails	2	2
Tiger Beetles		2
Totals	12	14

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	2	2
Birds	2	2
Butterflies and Moths	2	1
Mammals	2	2
Plants	2	2
Reptiles	2	2
Snails	2	2
Tiger Beetles	1	2
Totals	15	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: Heath-Grass Barrens

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Birds		1
Butterflies and Moths	1	1
Mammals	1	1
Plants	2	
Reptiles	1	1
Totals	5	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	2	2
Butterflies and Moths	2	1
Crayfish	1	1
Dragonflies and Damselflies	2	
Mammals	1	2
Plants	2	1
Reptiles	1	
Snails	2	1
Totals	13	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: Mixed Mesophytic Forests

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

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	2	1
Mammals	1	1
Plants	2	
Reptiles	2	1
Snails	1	1
Totals	8	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: Northern Hardwood Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	2	1
Birds	2	2
Butterflies and Moths	2	2
Mammals	2	2
Plants	2	1
Reptiles	1	1
Snails	2	2
Totals	13	11

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	2	2
Mammals	1	1
Plants	2	
Reptiles	1	2
Snails	1	
Totals	7	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: Red Spruce Forests

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		2
Birds	2	2
Butterflies and Moths	2	1
Mammals	2	2
Plants	2	1
Snails	2	1
Tiger Beetles		1
Totals	10	10

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	2	2
Birds	2	2
Butterflies and Moths	2	2
Crayfish	1	
Dragonflies and Damselflies	2	
Mammals	2	2
Plants	2	1
Reptiles	2	2
Snails	2	1
Tiger Beetles	2	1
Totals	19	13

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	2	1
Plants	2	2
Reptiles	1	1
Tiger Beetles		1
Totals	5	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: Sinkhole and Depression Ponds

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	
Mammals		1
Plants	2	
Snails	1	1
Totals	4	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 TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Small Lentic Water Bodies

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	2	2
Birds	2	2
Dragonflies and Damselflies	2	
Mammals	1	
Reptiles		2
Snails	1	
Totals	8	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 TERRESTRIAL HABITAT TYPE

HABITAT TYPE: Small Stream Riparian Habitats

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	2	2
Birds	2	2
Butterflies and Moths	2	2
Crayfish	1	
Dragonflies and Damselflies	2	
Mammals	2	2
Plants	2	1
Reptiles	2	2
Snails	1	2
Tiger Beetles	1	2
Totals	17	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: Embayment,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Mussels	1	1
Totals	1	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: Headwater Creek,High Gradient,Cold

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels		1
Other Invertebrates	1	
Reptiles	1	
Totals	5	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 AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek,High Gradient,Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Crayfish	1	1
Dragonflies and Damselflies	1	1
Fish	1	1
Other Invertebrates	1	
Reptiles		1
Totals	5	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,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Crayfish		1
Fish		1
Other Invertebrates	1	
Totals	1	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	1	1
Fish		1
Mussels	1	1
Other Invertebrates	1	
Plants	1	
Reptiles	1	
Totals	6	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 AQUATIC HABITAT TYPE

HABITAT TYPE: Headwater Creek,Low Gradient,Cool

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

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Crayfish	1	1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Plants	1	
Reptiles		1
Totals	7	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, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Crayfish	1	
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Reptiles	1	
Totals	7	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 AQUATIC HABITAT TYPE

HABITAT TYPE: Large River,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Crayfish		1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Plants	1	1
Reptiles	1	
Snails	1	
Totals	7	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: Large River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Plants		1
Snails	1	
Totals	5	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: Lentic,Low Gradient,Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Mussels	1	1
Totals	1	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		1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Reptiles	1	1
Snails	1	
Totals	6	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: Medium River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Reptiles	1	
Snails	1	
Totals	6	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 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	1
Fish	1	1
Mussels	1	1
Reptiles	1	
Snails	1	
Totals	5	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 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		1
Mussels		1
Reptiles	1	1
Totals	1	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 AQUATIC HABITAT TYPE

HABITAT TYPE: Small River, Moderate Gradient, Cool

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians	1	1
Crayfish	1	1
Dragonflies and Damselflies	1	1
Fish	1	1
Mussels	1	1
Other Invertebrates	1	
Totals	6	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: Small River, Moderate Gradient, Warm

TAXA	PRIMARY HABITAT ¹ SPECIES COUNT	SECONDARY HABITAT ² SPECIES COUNT
Amphibians		1
Crayfish		1
Dragonflies and Damselflies		1
Fish	1	1
Mussels	1	1
Reptiles		1
Snails	1	
Totals	3	6

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 SGCN populations and habitats from a number of sources can reduce species populations directly, as 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 are 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 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 and the Appalachian LCC, climate change vulnerability assessments, NETHCS, NEAHCS, and permit data from the West Virginia Division of Environmental Protection (WVDEP).

In developing this component of SWAP's, the USFWS has encouraged states to use a standard threat classification system developed by the IUCN. This approach will facilitate the integration of state SWAPS into regional plans. The WVDNR followed this guidance for the West Virginia SWAP. The IUCN classification system used lists 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.
2.1	Annual and Perennial Non-timber crops	Crops planted for food, fodder, fiber, fuel, or other uses	agricultural crops.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
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, etc.
4.4	Flight Paths	Air and space transport	flight paths, jets impacting birds, etc.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
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.
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	

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
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 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.	

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
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	
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.

STRESS CODE	STRESS NAME	STRESS DEFINITION	STRESS EXAMPLES
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. The impacts of aquatic stresses are rarely limited to a specific habitat, i.e., they tend to ripple downstream, they were assessed at the HUC-8 watershed level within ecoregion. The assessments 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

- 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 Action

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 "WV 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 or WVDA, 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 for significant populations of aquatic SGCN's.
- 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 DHHR and DEP to improve waste water standards and/or enforcement.
- Partner with others to increase public awareness of impacts from harmful industrial effluents to aquatic habitats and species, especially SGCN's, and to encourage reductions in discharge of those effluents.
- In cooperation with WV Dept. 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's 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 habitat planting with beneficial native nectar plants in areas identified as critical, targeted for benefits to specific SGCN species and implemented to reduce the attractiveness of these areas to deer.
- 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 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.

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 and 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's.
- Increase coordination among government agencies and private entities to develop industry and PSC protocols encouraging the creation of pipeline corridors which can be utilized by multiple companies.
- 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 AML restoration to reduce impacts on SGCN populations and habitats.
- Collaboratively develop and communicate information to the US Fish and Wildlife Service and others for the purpose of informing decisions about wildlife impacts at wind energy facilities.
- 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's with specific management recommendations for the most vulnerable SGCN species.

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 ATV and other motorized recreation, including habitat degradation, introduction and spread of invasives, and disturbance of species, and develop responsible use guidelines on responsible recreation.

- Collaborate with managers of public and private recreational facilities 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's 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 WV, 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 BMP's 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's, 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 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 WV Division of Forestry to promote inclusion of shade strips in forestry operations.
- Collaborate with the WV Division of Forestry to elevate protection of habitat for SGCN's 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's.
- 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 SGCNs and sensitive habitats.
- Coordinate with government agencies to consolidate and make available the most recent information on pesticide impacts to SGCN in WV.

4.3.2.11: Conservation Actions that Address Impacts from Take of SGCN's

- Partner with others to strengthen state law relating to take of SGCN's.
- Collaborate with others to increase public awareness of the detrimental effects from unregulated harvest and transport of SGCN's.

- Coordinate with public agencies and private entities to increase effective enforcement of existing laws and regulations relating to take of SGCN's.

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's.
- Partner with others to develop and disseminate information about appropriate conservation practices to benefit SGCN populations and habitats.

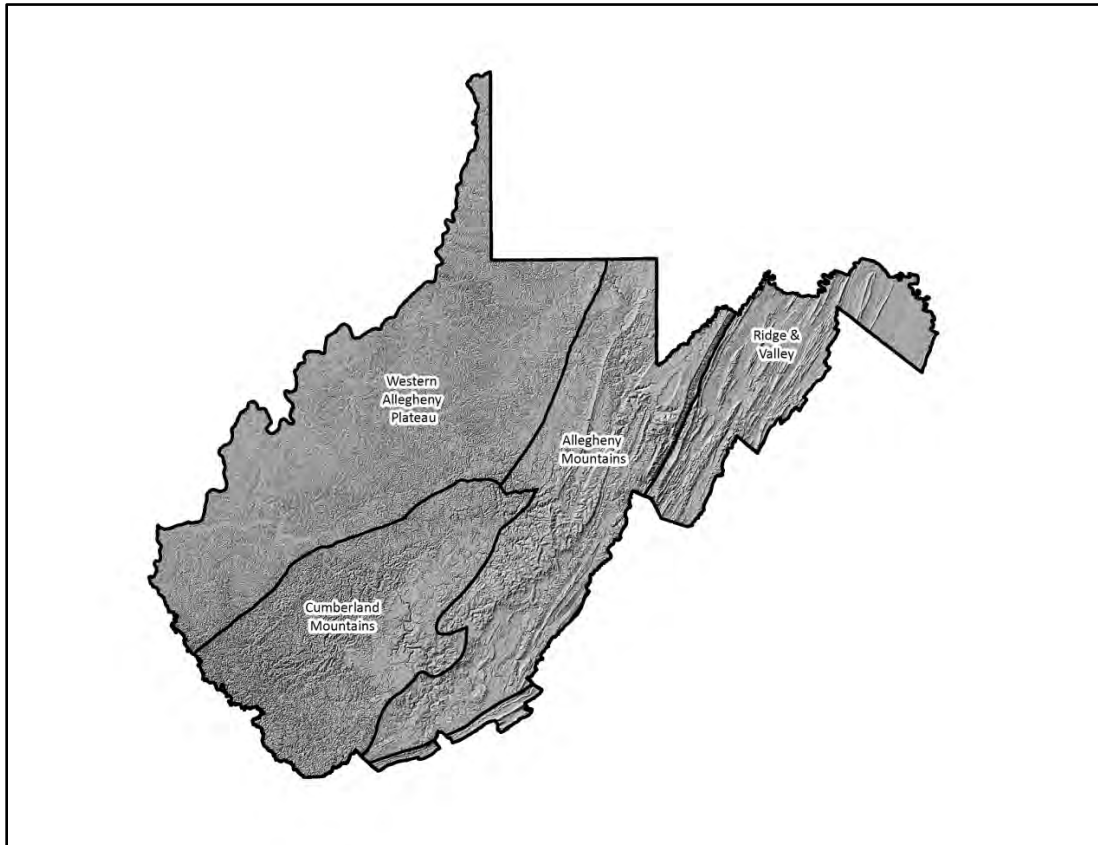
Chapter 5: The West Virginia Landscape – An Ecoregional Perspective

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 through an ecoregional lens.

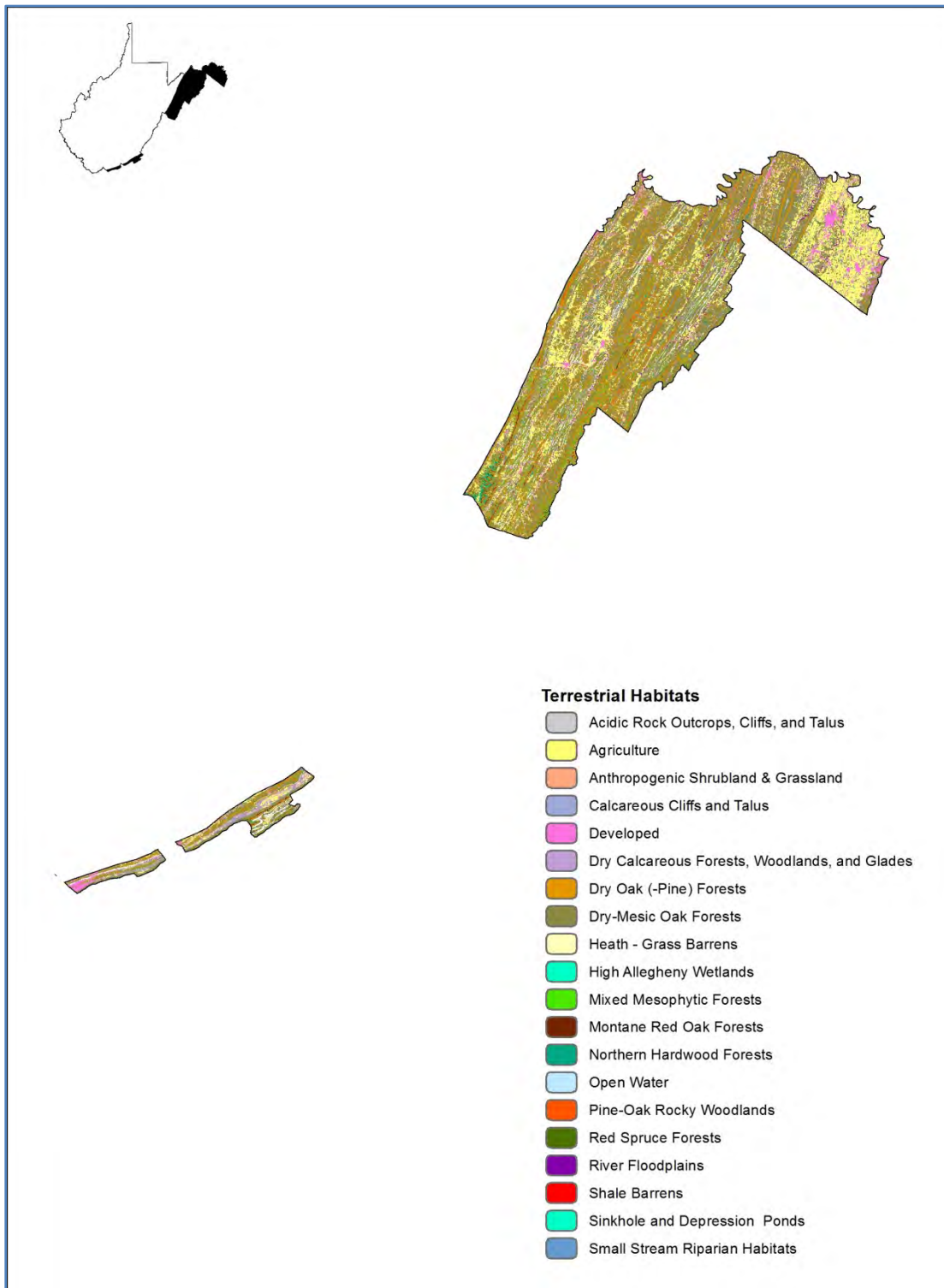
The physical and ecological variations that exist across the West Virginia landscape defy characterization at a statewide scale. The lowest point in the state, on the Potomac River, lies at 240 feet above sea level. The highest point, Spruce Knob, reaches an elevation of 4,861 feet. To understand West Virginia, one must understand its variation. Viewing the state from an ecoregional perspective is a good way of understanding its physical and ecological diversity.

For the West Virginia SWAP, the WVDNR adopted a modified version of Bailey’s ecoregions that divided 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 Ridge and Valley, Allegheny Mountains, Cumberland Mountains and Western Allegheny Plateau.



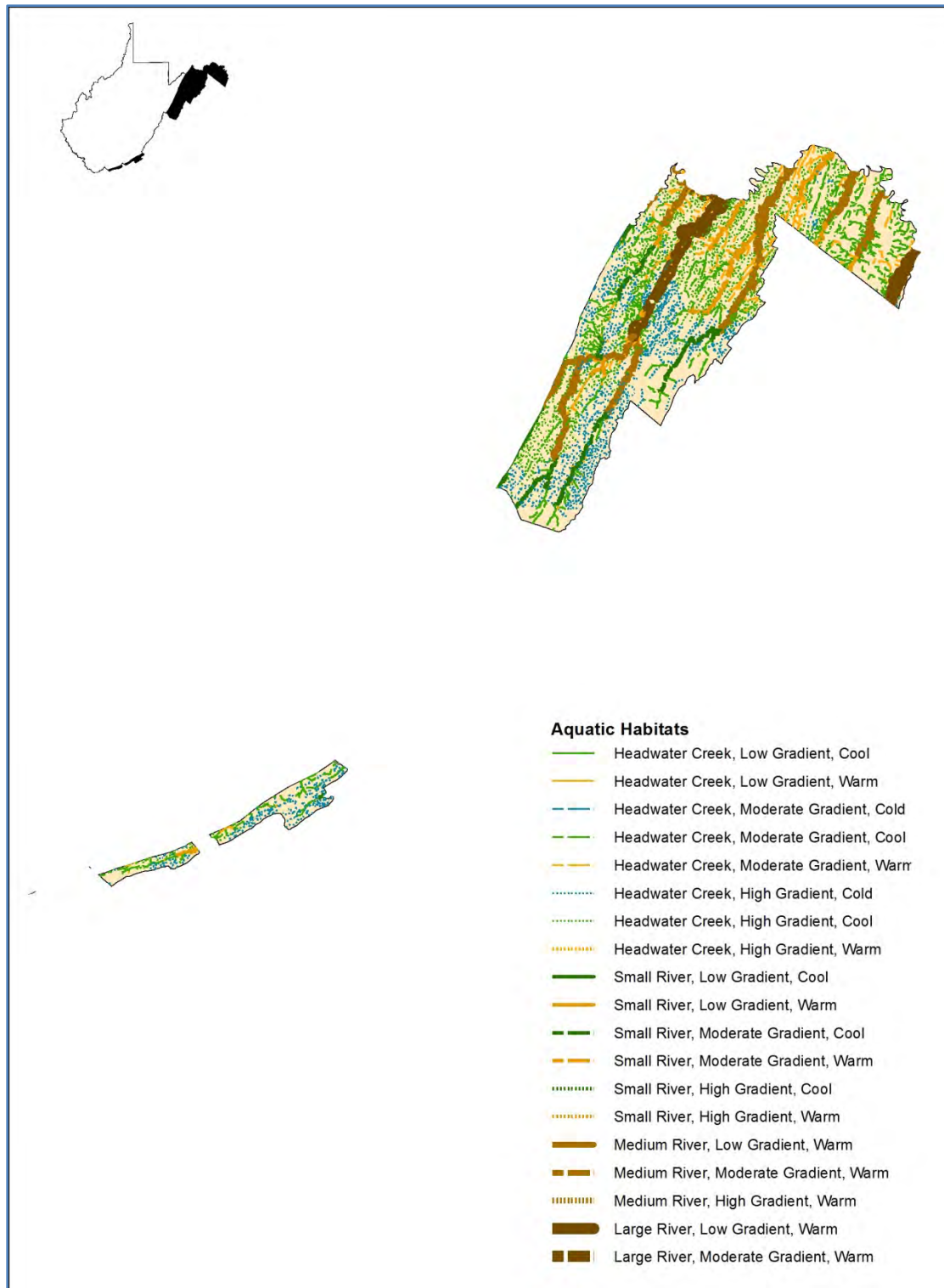
5.2: The Ridge and Valley Ecoregion

Terrestrial Habitats – Ridge and Valley Ecoregion



The Ridge and Valley Ecoregion (cont.)

Aquatic Habitats – Ridge and Valley Ecoregion



The Ridge and Valley Ecoregion (cont.)

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 also significant outcrops of limestone and dolomite which form higher pH soils and underground caves. The crystalline rocks of the Blue Ridge are older than the sedimentary rocks found in the rest of West Virginia.

The Ridge and Valley 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 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. Its age and form contribute to high endemism in 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 region of 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. Tourism is economically important. Coal mining and natural gas development are

The Ridge and Valley Ecoregion (cont.)

5.2.1: Description (cont.)

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, but large corporate ownerships are 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 agreement.

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	7	2
Birds	33	24
Butterflies and Moths	19	16
Cave Invertebrates	9	6
Crayfish		1
Dragonflies and Damselflies	13	26
Fish	15	6
Mammals	6	7
Mussels	10	7
Plants	49	161
Reptiles	7	1
Snails	2	24
Tiger Beetles	2	1
Totals	172	282

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Ridge and Valley

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT
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	80.80%	

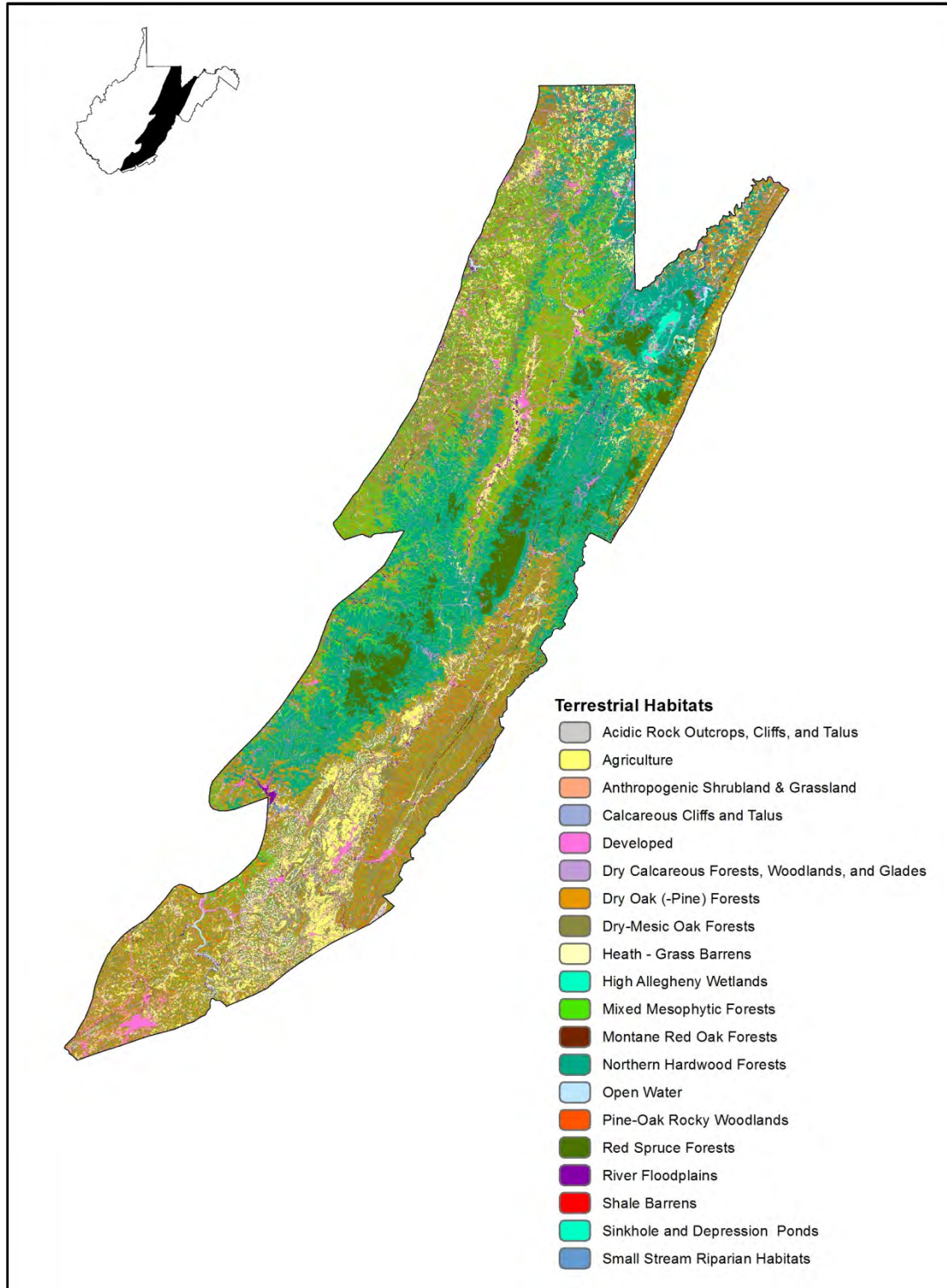
AQUATIC HABITAT SUMMARY

ECOREGION = Ridge and Valley

HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT 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		

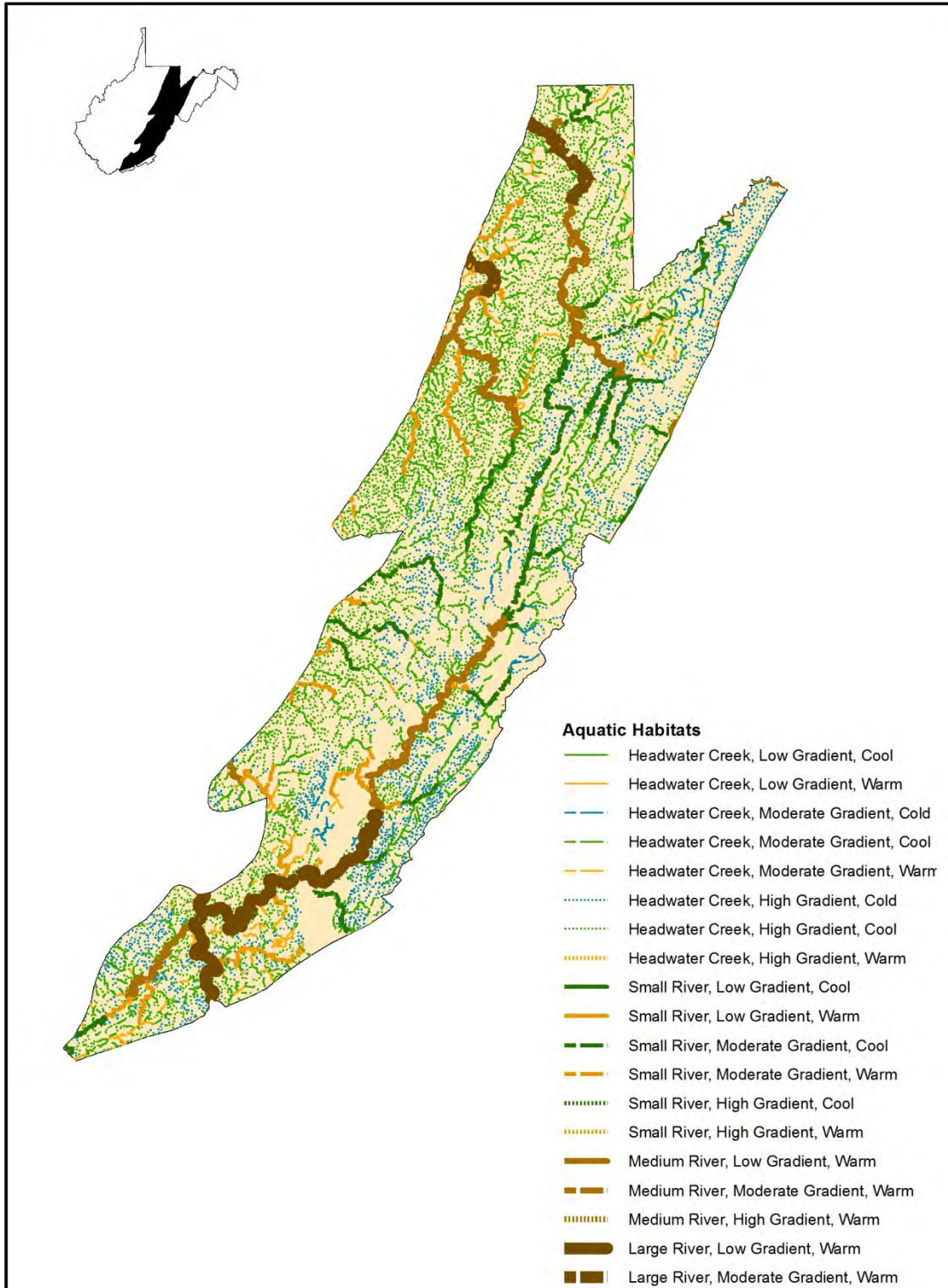
5.3: The Allegheny Mountains Ecoregion

Terrestrial Habitats – Allegheny Mountains Ecoregion



The Allegheny Mountains Ecoregion (cont.)

Aquatic Habitats - Allegheny Mountains Ecoregion



The Allegheny Mountains Ecoregion (cont.)

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 underground 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 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 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 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, many are also Species of Greatest Conservation Need.

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: depauperate 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 regarded as the second oldest river in the world, predating the formation of the Appalachian Mountains. The New River basin is home to ten endemic fishes, of which 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. 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.

The Allegheny Mountains Ecoregion (cont.)

5.3.1: Description (cont.)

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. 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	9	2
Birds	38	31
Butterflies and Moths	18	22
Cave Invertebrates	27	12
Crayfish	3	2
Dragonflies and Damselflies	22	34
Fish	12	3
Mammals	9	8
Mussels	7	11
Plants	65	178
Reptiles	4	2
Snails	4	30
Tiger Beetles	3	
Totals	221	335

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Allegheny Mountains

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT 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		

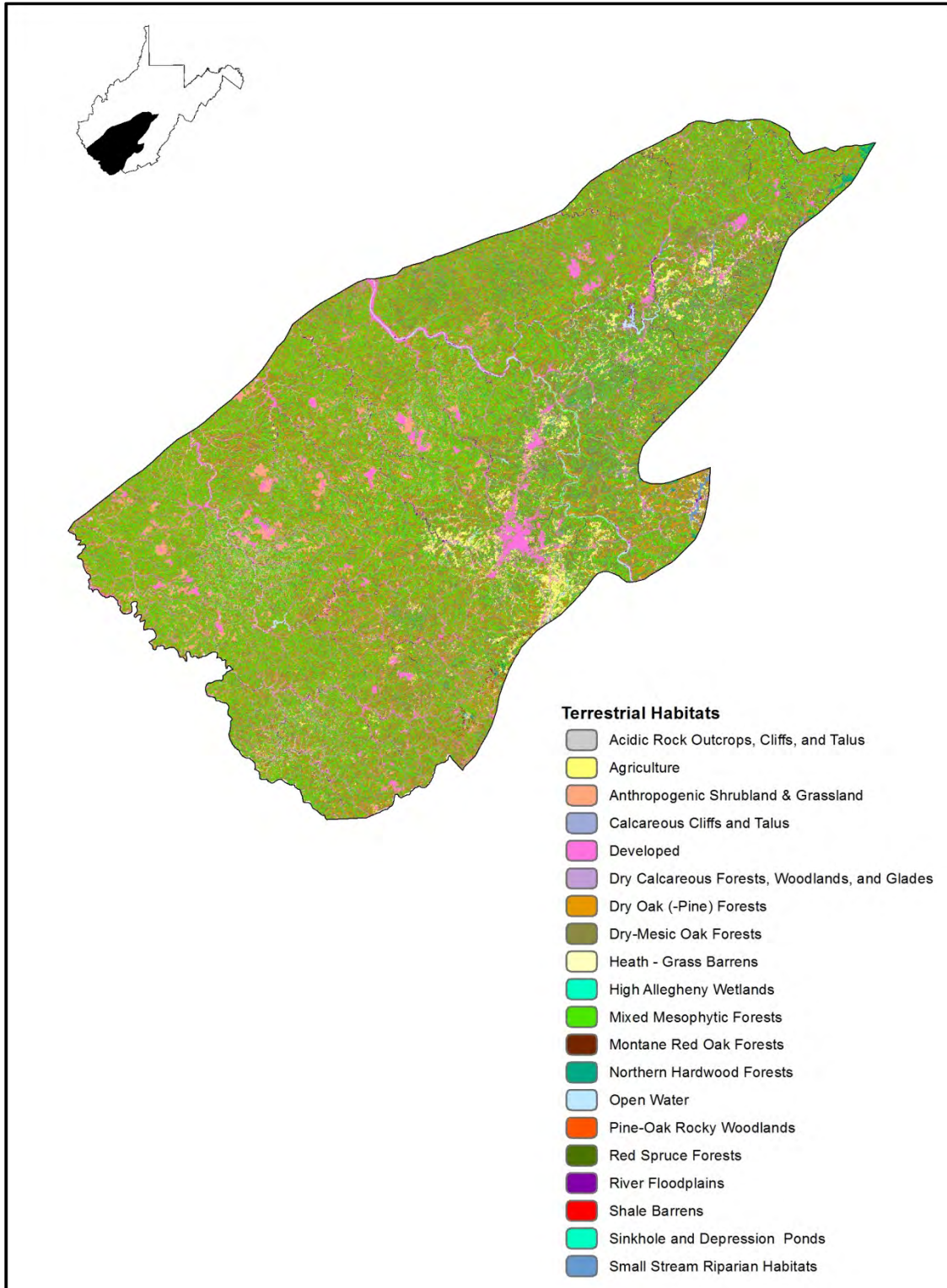
AQUATIC HABITAT SUMMARY

ECOREGION = Allegheny Mountains

HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT 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		

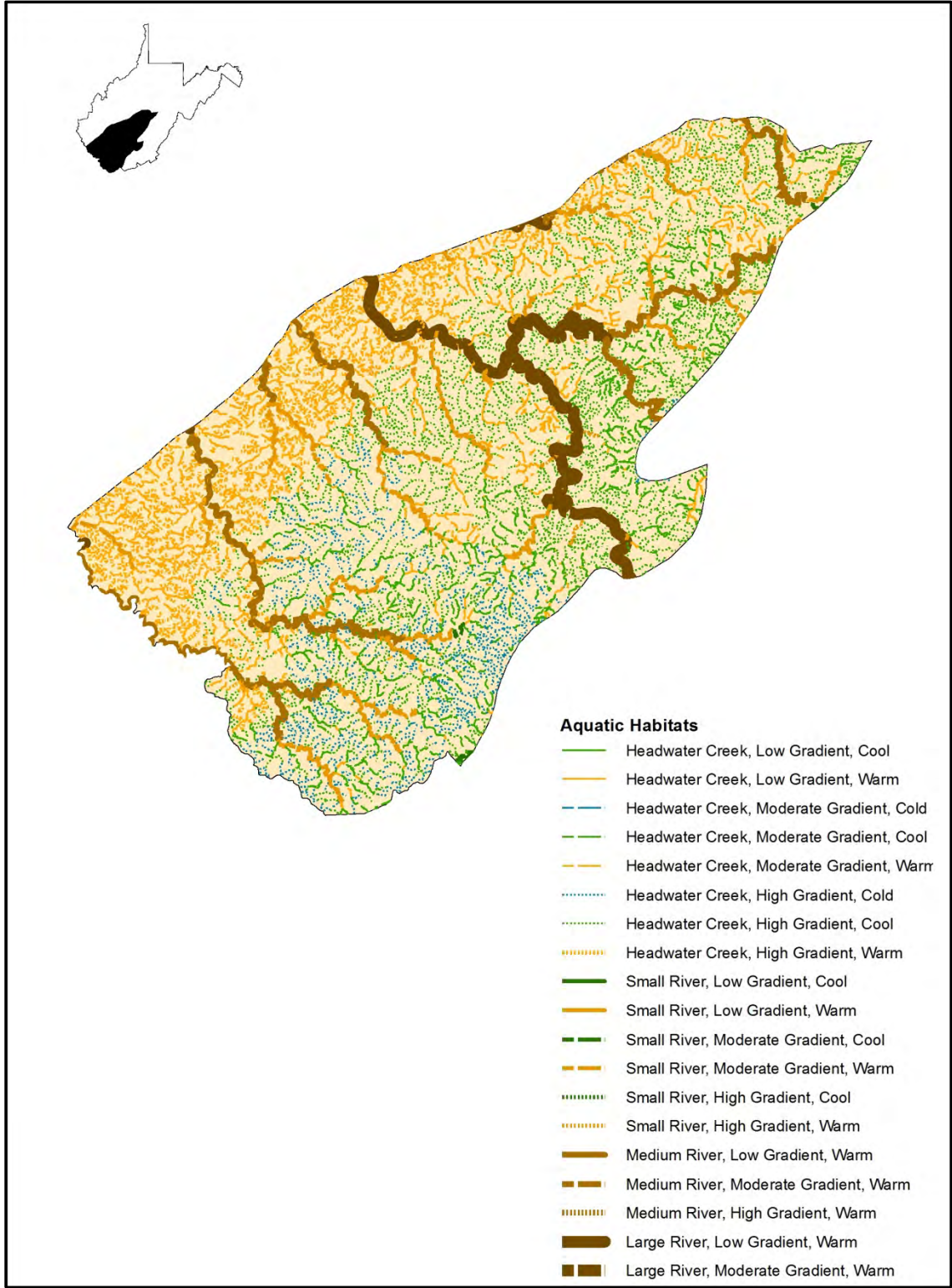
5.4: The Cumberland Mountains Ecoregion

Terrestrial Habitats – Cumberland Mountains Ecoregion



The Cumberland Mountains Ecoregion (cont.)

Aquatic Habitats - Cumberland Mountains Ecoregion



The Cumberland Mountains Ecoregion (cont.)

5.4.1: Description

The Cumberland Mountains ecoregion comprises about 22% of the state's area. Climate is rather 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. Soils are mostly acidic, but some localized neutral soils were formed by influence of shallow calcareous deposits. Terrestrial habitat patterns in the Cumberland Mountains 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 riverscour 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 Kanawha Falls. There are ten species above the falls, however, that are not found downstream, and are considered endemic to the New River. Six of those 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, the 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 mountain top 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 of 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.

The Cumberland Mountains Ecoregion (cont.)

5.4.1: Description (cont.)

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	7	2
Birds	25	15
Butterflies and Moths	8	7
Crayfish	4	1
Dragonflies and Damselflies	11	19
Fish	15	18
Mammals	8	3
Mussels	19	23
Plants	39	104
Reptiles	4	2
Snails	1	12
Tiger Beetles	1	1
Totals	142	207

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Cumberland Mountains

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT
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		

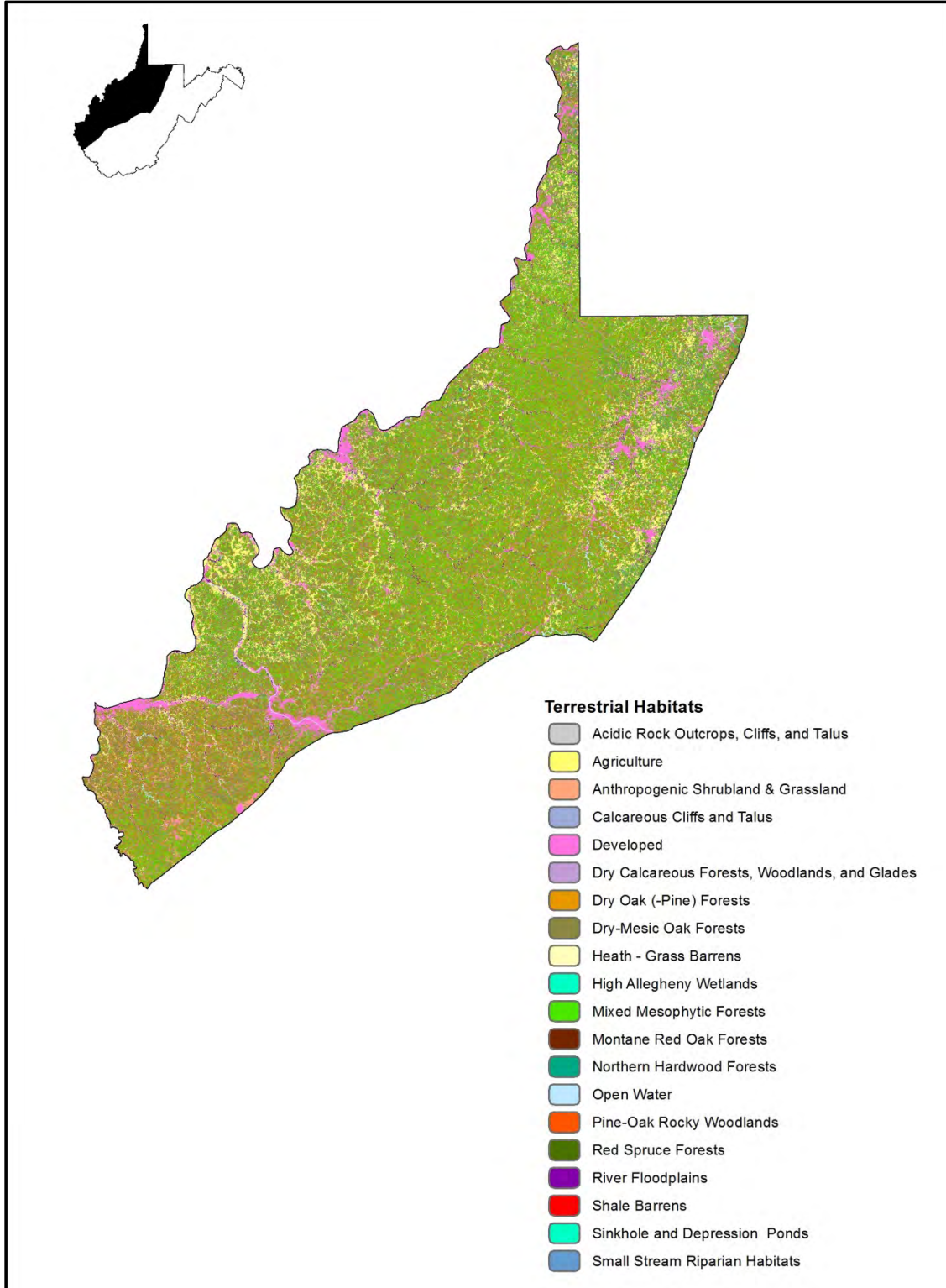
AQUATIC HABITAT SUMMARY

ECOREGION = Cumberland Mountains

HABITAT TYPE	MILES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT 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		

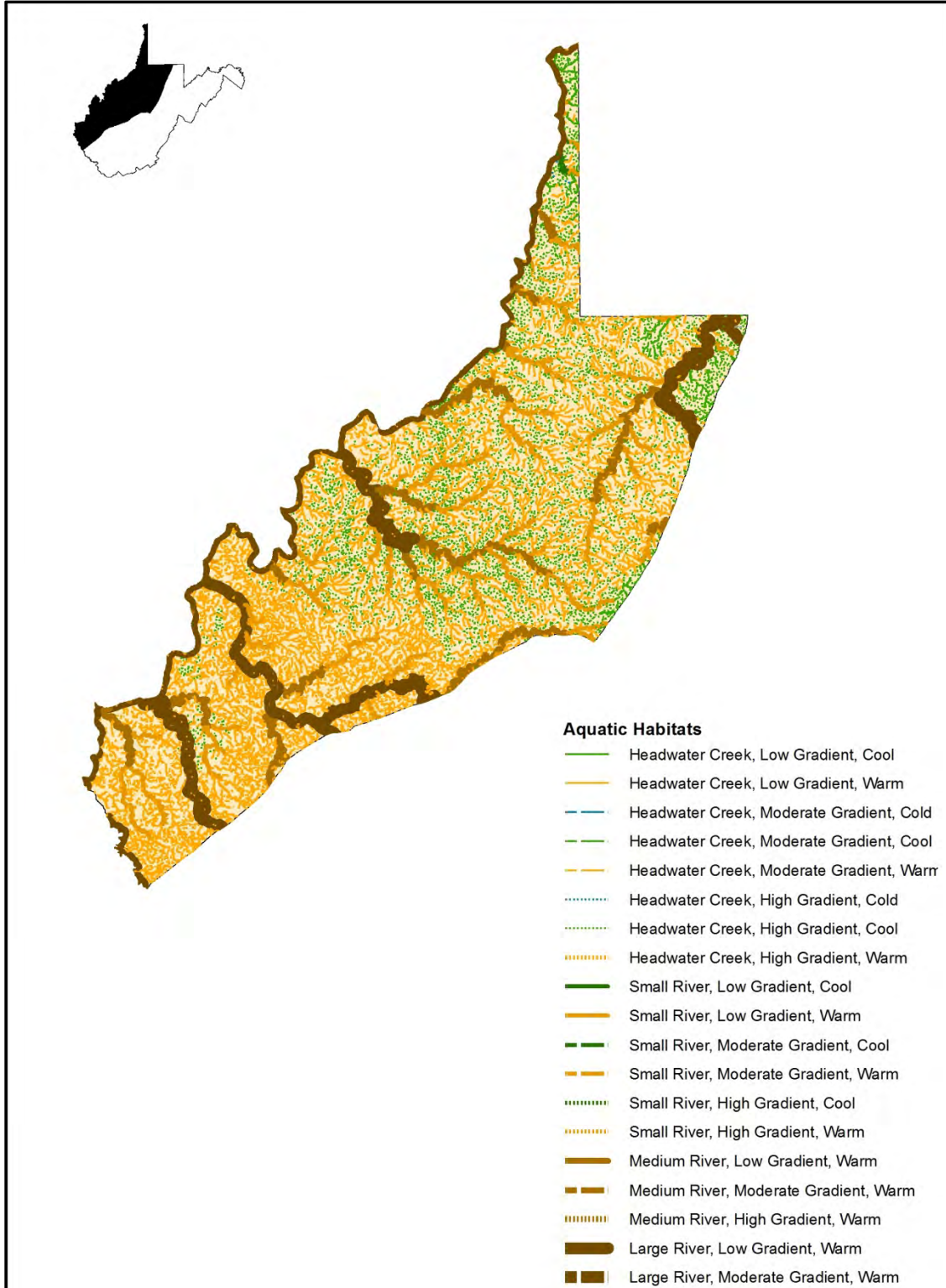
5.5: The Western Allegheny Plateau Ecoregion

Terrestrial Habitats – Western Allegheny Plateau Ecoregion



The Western Allegheny Plateau Ecoregion (cont.)

Aquatic Habitats – Western Allegheny Plateau Ecoregion



The Western Allegheny Plateau Ecoregion (cont.)

5.5.1: Description

The Western Allegheny Plateau comprises about 39% of the state's area and ranges from the foothills of the Allegheny Mountains west to the Ohio River, including 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 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, formed as Pleistocene glaciers advanced southward about 2 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 common than not the aquatic diversity and productivity never return to historic levels. Riparian and upland areas consist of a considerable proportion of colloidal materials, adding to elevated turbidity at all flow levels and increased risk of sedimentation with the least watershed 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).

The Western Allegheny Plateau Ecoregion (cont.)

5.5.1: Description (cont.)

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 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 predevelopment planning by the industry could avoid and minimize many potential impacts on wildlife and wildlife habitat. There are some local watershed groups and existing and developing programs to maintain and improve water quality through mitigation, abandoned mine land remediation, and addressing residential wastewater. 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	7	4
Birds	31	24
Butterflies and Moths	12	7
Cave Invertebrates	1	
Crayfish	3	1
Dragonflies and Damselflies	13	26
Fish	18	25
Mammals	5	7
Mussels	23	29
Plants	17	82
Reptiles	4	3
Snails	2	24
Tiger Beetles	1	3
Totals	137	235

TERRESTRIAL HABITAT SUMMARY

ECOREGION = Western Allegheny Plateau

HABITAT TYPE	ACRES IN ECOREGION	PERCENT OF ECOREGION	PERCENT OF HABITAT
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	PERCENT OF HABITAT 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. Certain of those stresses are so closely associated with specific ecoregions in West Virginia that they are worthy of mention at this scale. Note that specific conservation actions are not presented here to address these ecoregional stresses. 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

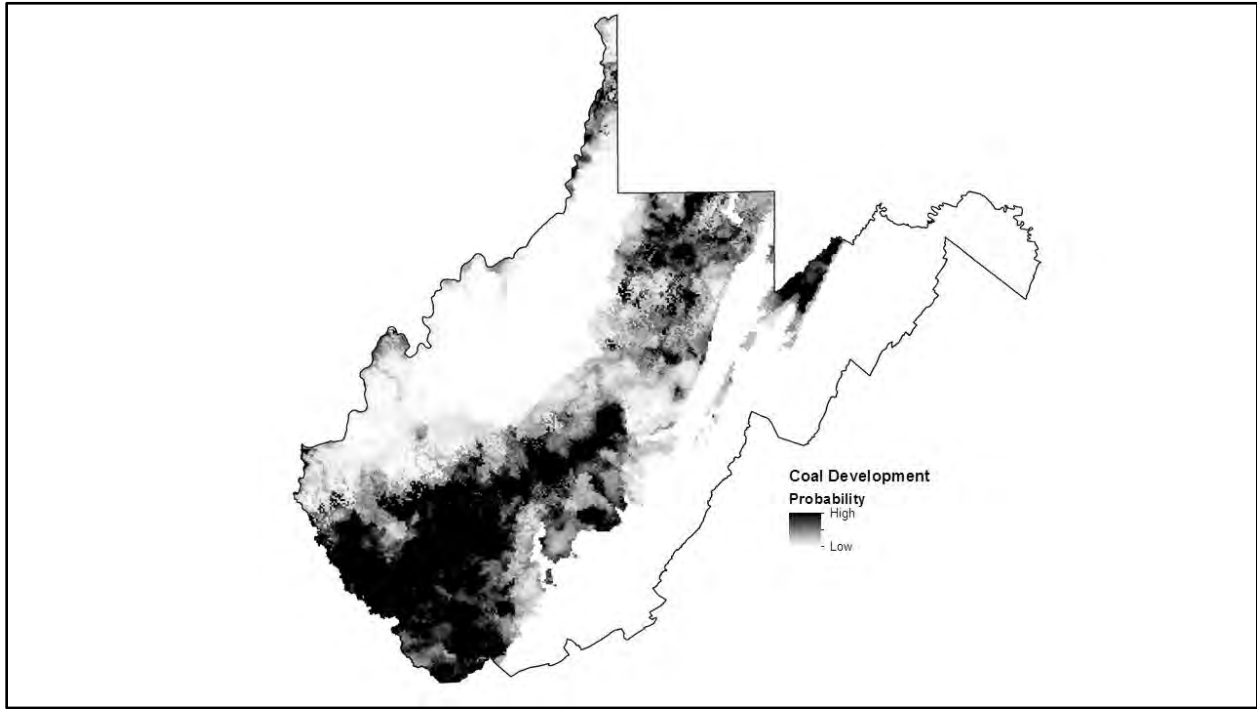
Energy development has long been, and continues to be, a dominant industry in West Virginia. Looking forward, the probability of further energy development varies geographically across and with industry segments, i.e., coal vs. shale gas vs. windpower. Energy development probabilities were modeled for The Appalachian Landscape Conservation Cooperative by The Nature Conservancy specifically for use by states preparing their State Wildlife Action Plans. 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 sulphur coal seams, especially through deep mining.

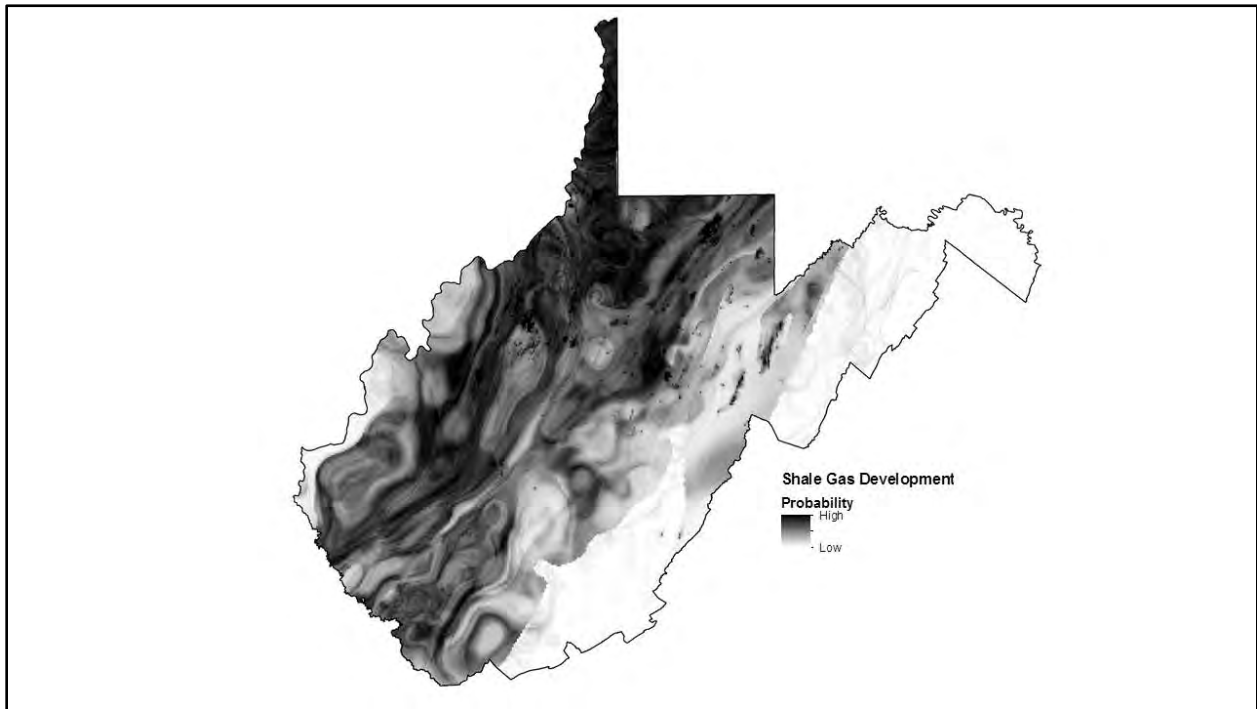
Shale gas development is increasing most rapidly in the Western Allegheny Plateau, especially in the northwestern portion of the State. There may be some shale development in the Cumberland Mountains and northern Allegheny Mountains as well.

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.)

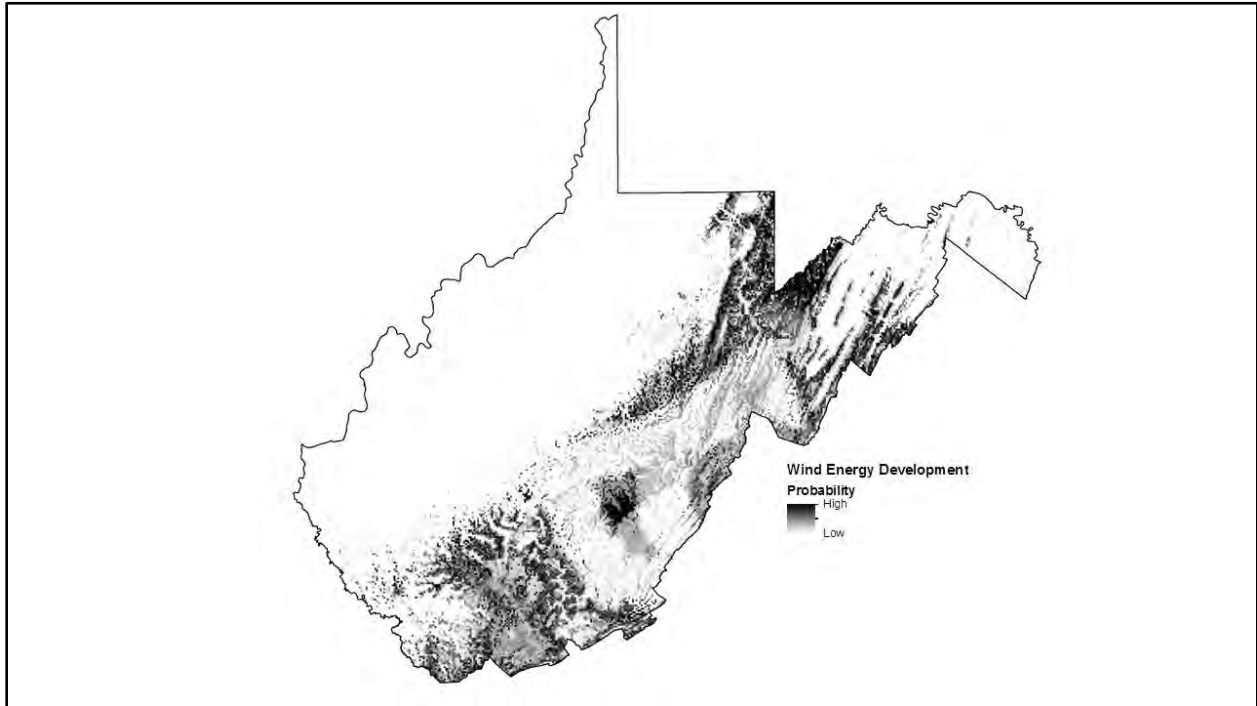
Future Coal Development Probability in West Virginia



Future Shale Gas Development Probability in West Virginia



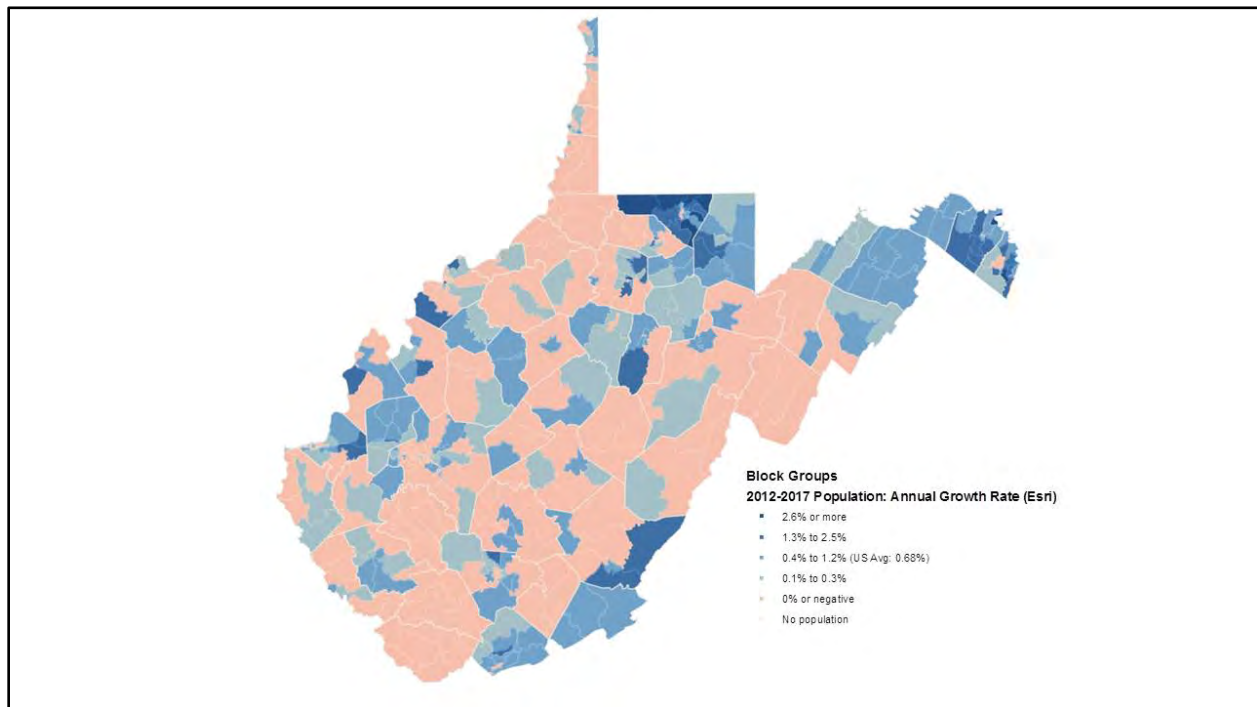
Future Windpower Development Probability in West Virginia



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 U.S. 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.

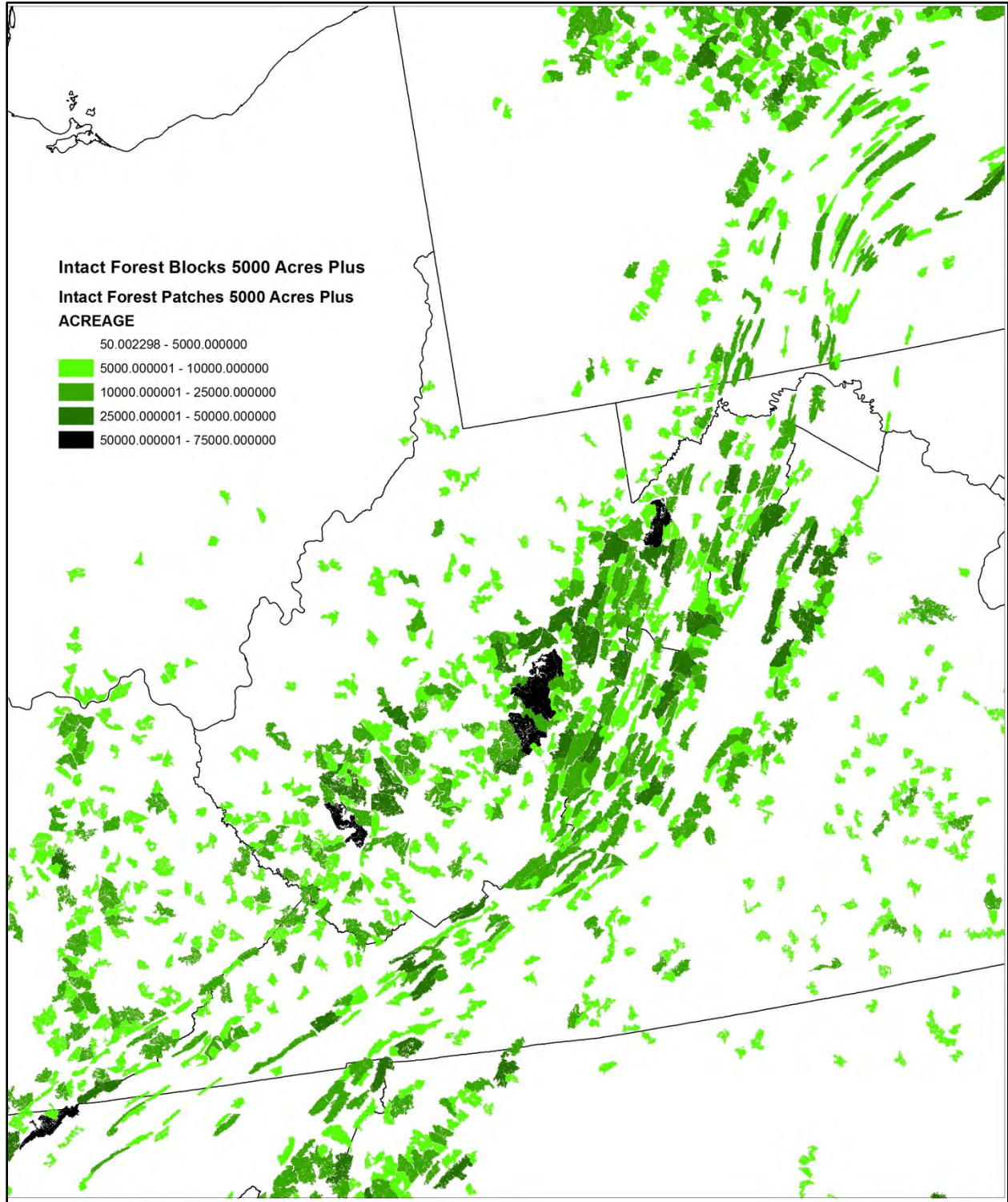
Projected Population Change (%) for West Virginia



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 become smaller and further fragmented. This is both a regional and state concern. The Nature Conservancy has mapped these large forest blocks at a regional scale and for West Virginia. Once again, these large forest blocks are unevenly distributed across West Virginia ecoregions. 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 “clump” 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 most abundant where public lands provide extensive, unfragmented forest cover. These places also have geographically linked stresses and conservation actions. Conservation Focus Areas (CFA’s) are a set of these geographies which have been identified across West Virginia. Investing conservation resources in the CFA’s can potentially be more efficient, effective, and provide more opportunities for leveraging successful outcomes. This chapter describes the conservation contexts of each CFA, along with stresses, conservation actions, and conservation opportunities unique or distinctive to it. In addition, CFA’s 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 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

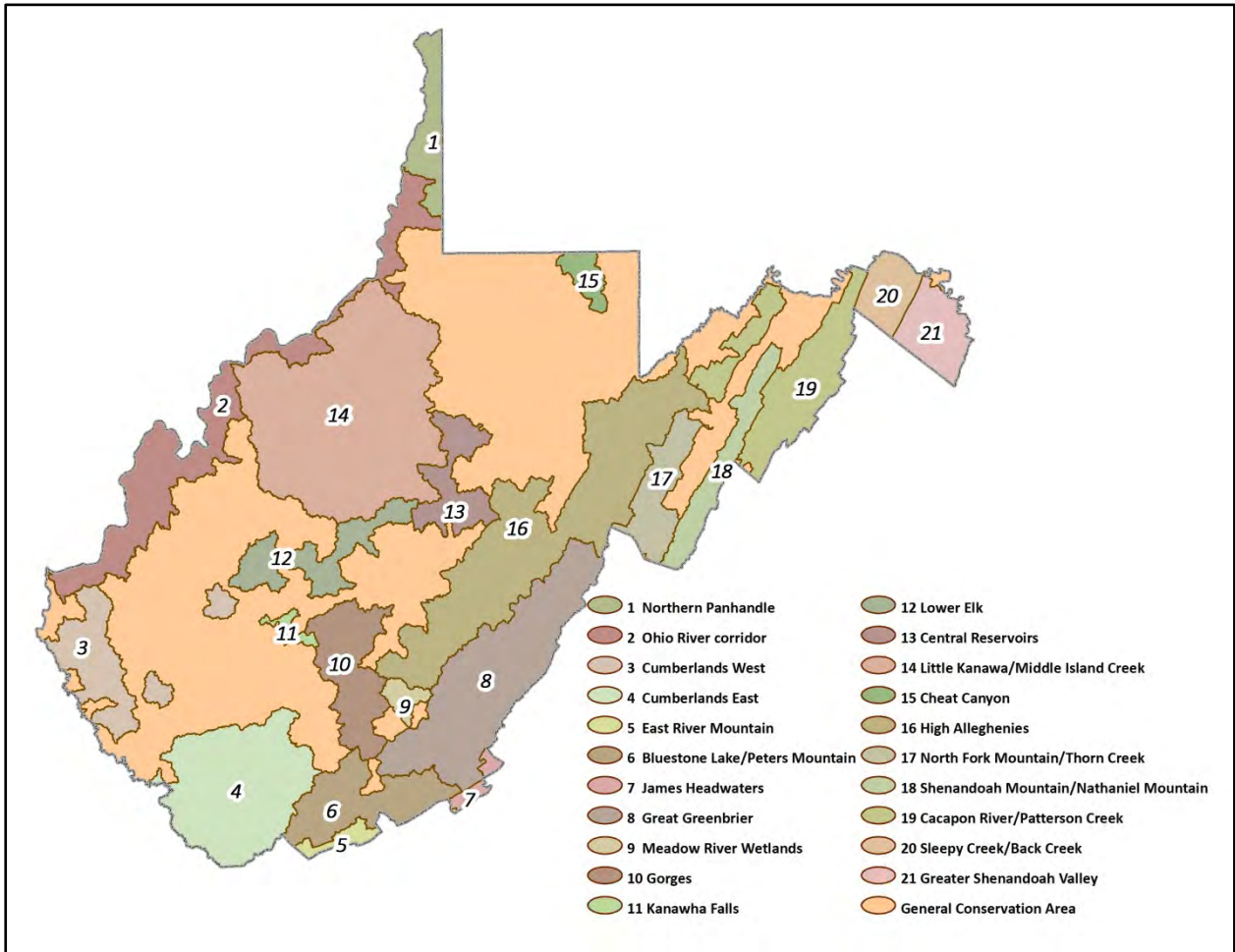
Not all Species of Greatest Conservation Need are found within CFA’s. Animals and plants of conservation concern occur throughout West Virginia. Some of West Virginia’s most important wildlife habitats, such as Cranesville Swamp and Dunkard Creek, occur outside of CFA’s. The protection and restoration of some species will require that certain conservation actions will need to be undertaken outside of CFA’s. 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 CFA’s.

6.1.2: Notes on CFA Maps in this Chapter

Maps of terrestrial habitats presented in this chapter for individual CFA’s show all mapped and classified terrestrial habitats within the boundaries of each CFA. The WVDNR has conducted some preliminary mapping of high-priority habitats within CFA’s. Because that process is incomplete, that mapping is not presented here. It will be completed as part of the planning process for each CFA and will be presented in as part of the CFA plans that will follow the West Virginia SWAP.

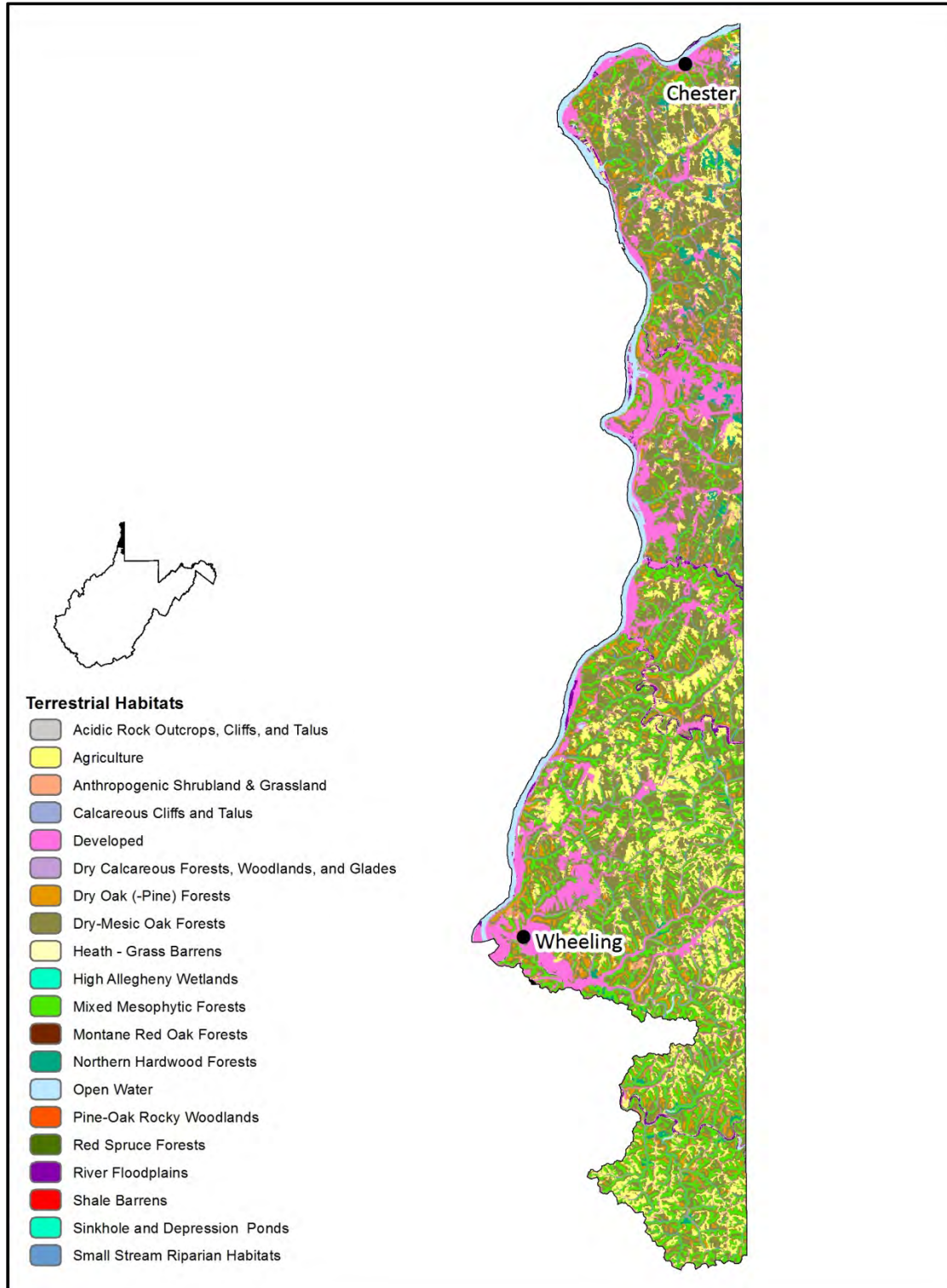
On an additional note, the separate processes that generated the terrestrial and aquatic habitat mapping for the West Virginia SWAP have produced an effect that is particularly apparent at the CFA level and merits some explanation. One will note that aquatic habitat maps in this chapter and elsewhere do not include a classification for lakes and reservoirs. The NEAHCS classification 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



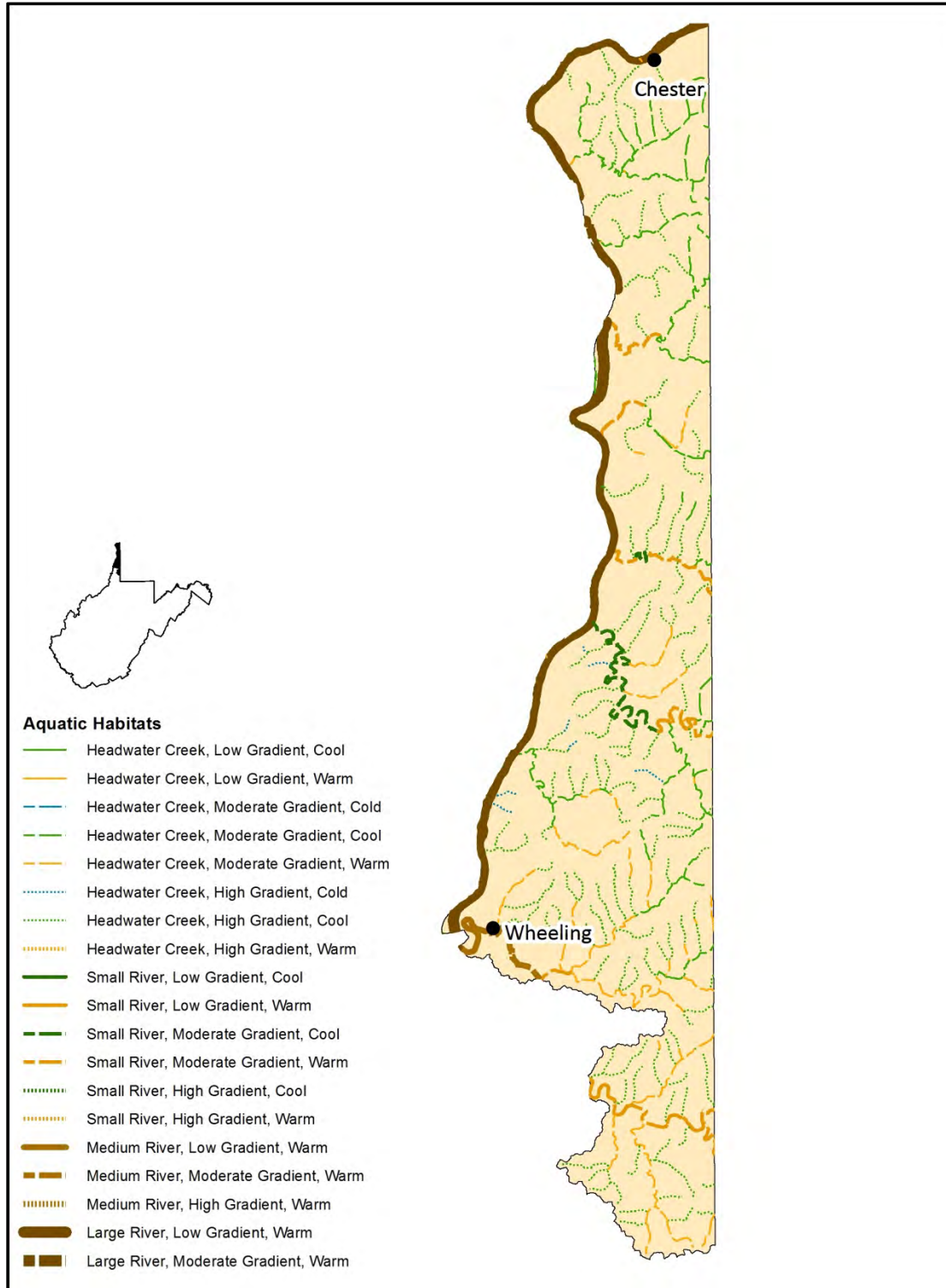
6.2: Northern Panhandle CFA

Northern Panhandle CFA – Terrestrial Habitats



Northern Panhandle CFA (cont.)

Northern Panhandle CFA- Aquatic Habitats



Northern Panhandle CFA (cont.)

6.2.1: Description

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 originate in Pennsylvania. The original matrix of deciduous forests has been significantly fragmented into smaller forest patches by mostly 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, with large cities at 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 Myotis (*Myotis septentrionalis*), which has not declined here from White-Nose Syndrome as it has elsewhere. Anthropogenic grassland areas predominantly found on bluffs and ridges are among the most extensive in the Western Allegheny Plateau portion 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 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, US Army Corps of Engineers, Oglebay Good Zoo, gas companies, U.S. Fish and Wildlife Service, ORSANCO.

Northern Panhandle CFA (cont.)

6.2.5: Conservation Opportunities (cont.)

- Public Lands: Hillcrest, Cross Creek, Castleman Run, Burches Run, Bear Rocks, and Dunkard Fork Wildlife Management Areas, Tomlinson Run State Park, Ohio River Islands National Wildlife Refuge.

This section of the mainstem Ohio River has great potential for mussel restoration in those areas which 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	1	
Birds	20	12
Butterflies and Moths	1	1
Dragonflies and Damselflies		4
Fish	5	12
Mammals	2	
Mussels	11	19
Plants	1	12
Snails		1
Totals	41	61

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Northern Panhandle

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

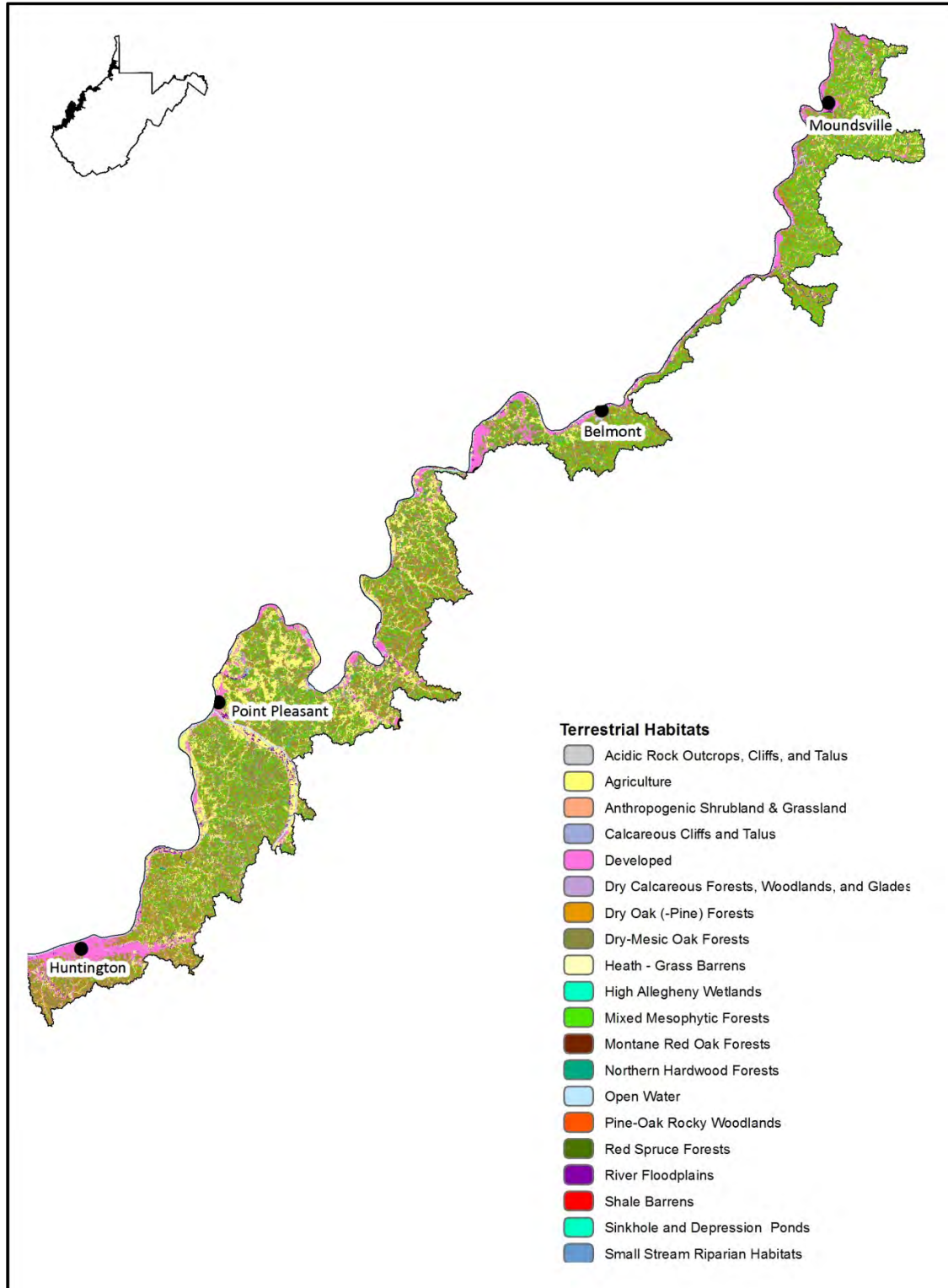
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Northern Panhandle

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

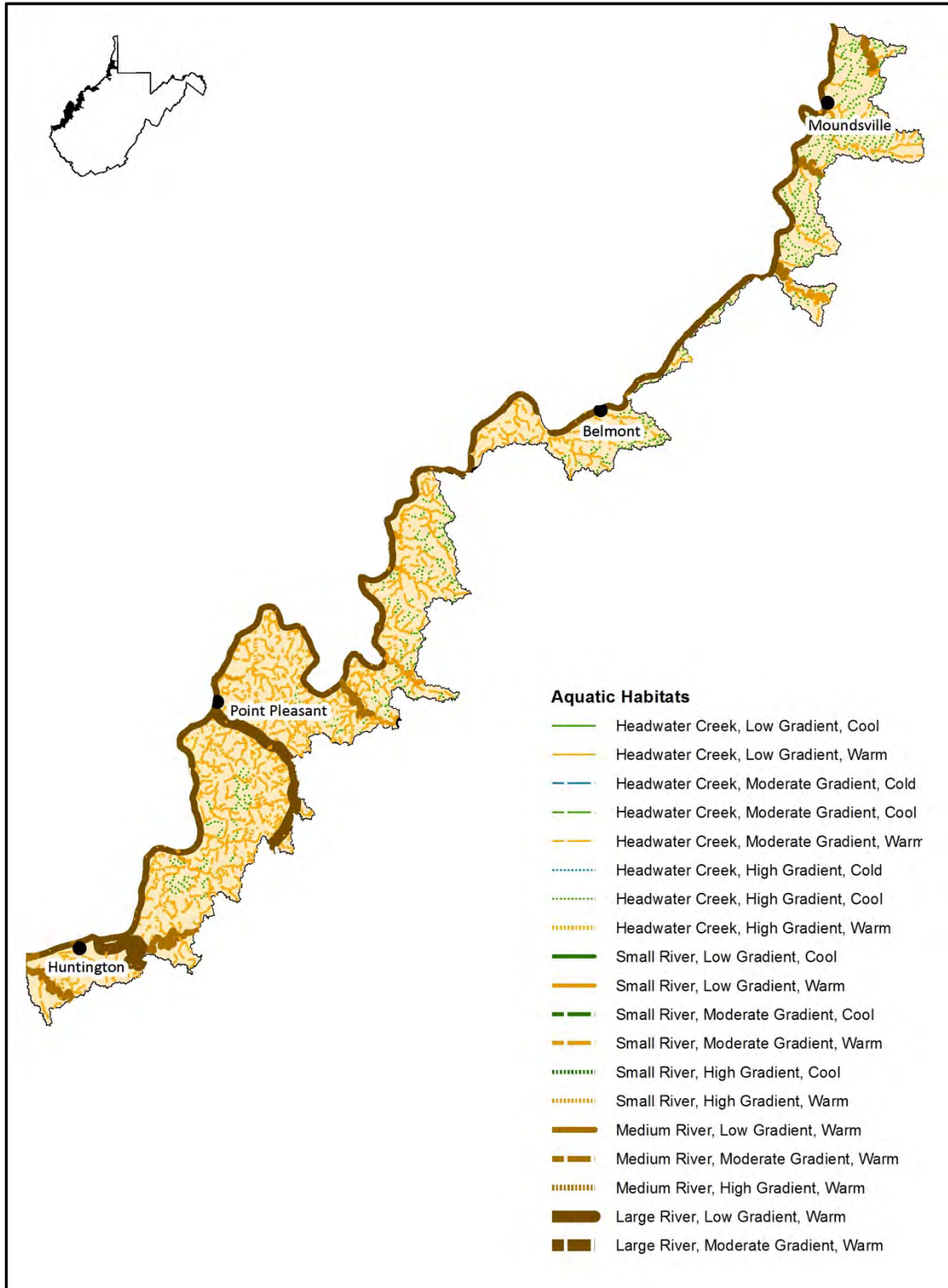
6.3: Ohio River Corridor CFA

Ohio River Corridor CFA - Terrestrial Habitats



Ohio River Corridor CFA (cont.)

Ohio River Corridor CFA - Aquatic Habitats



Ohio River Corridor CFA (cont.)

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. The Ohio River is West Virginia's largest river. Although forming the State's border with Ohio, the river is within West Virginia. Historically consisting of complex habitats of riffle, runs and pools, the Ohio is now fully constrained by six lock 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 matrix 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 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-Clean Water Act 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 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.

Ohio River Corridor CFA (cont.)

6.3.4: Conservation Actions (cont.)

- Limit disturbances to the river bottom.
- Key wetland, slough and backwater habitats need to be protected and restored.

6.3.5: Conservation Opportunities

- Key WVDNR Partners: West Virginia Department of Environmental Protection, U.S. Fish and Wildlife Service, US Army Corps of Engineers, ORSANCO, Ohio River Basin Fish Habitat Partnership, Marshall University, West Virginia Land Trust.
- Public Lands: Chief Cornstalk, Greenbottom, and McClintic Wildlife Management Areas, Ohio River Islands National Wildlife Refuge, 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	5	1
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		3
Snails		4
Tiger Beetles	1	1
Totals	78	145

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Ohio River Corridor

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

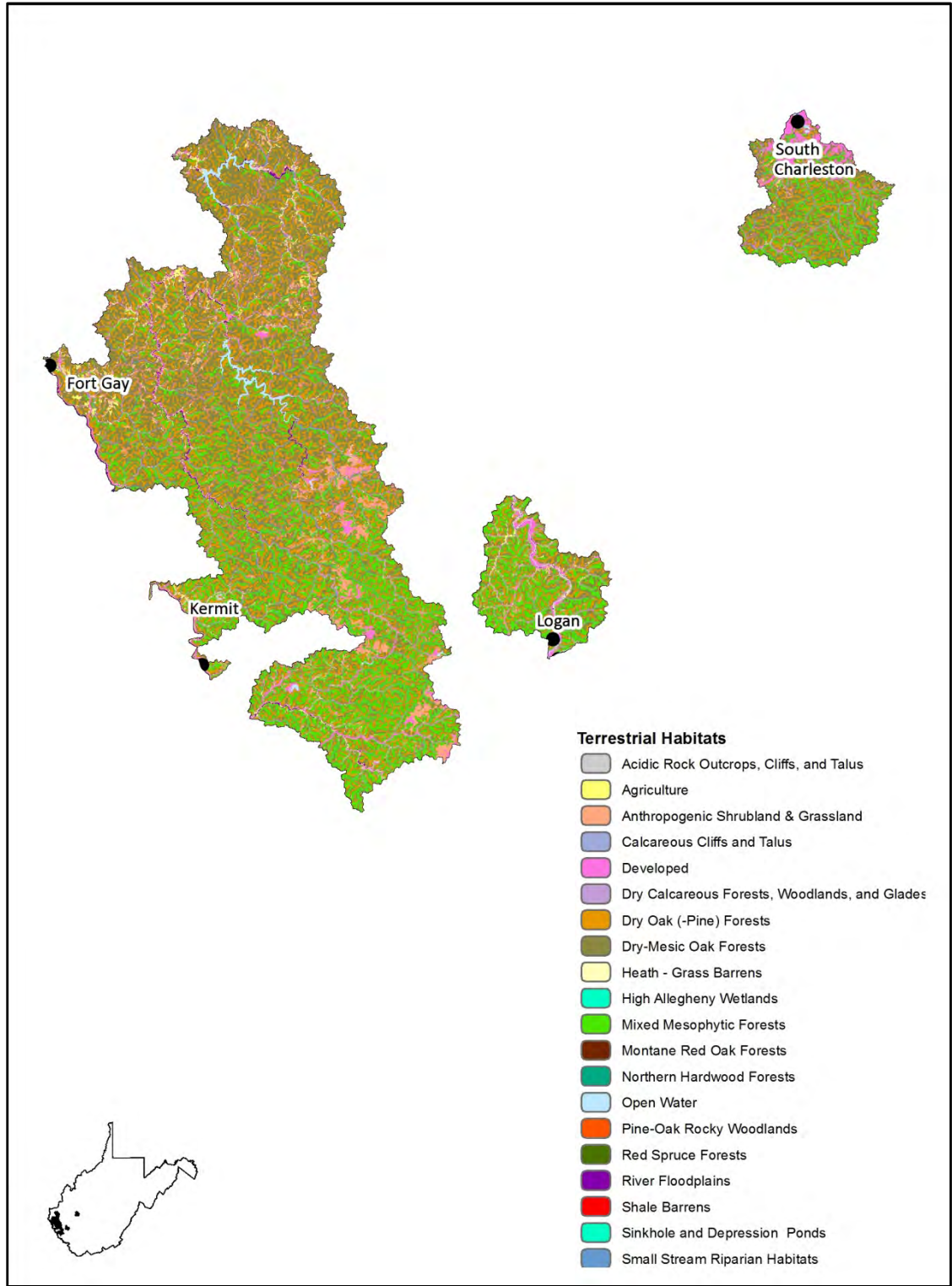
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Ohio River Corridor

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

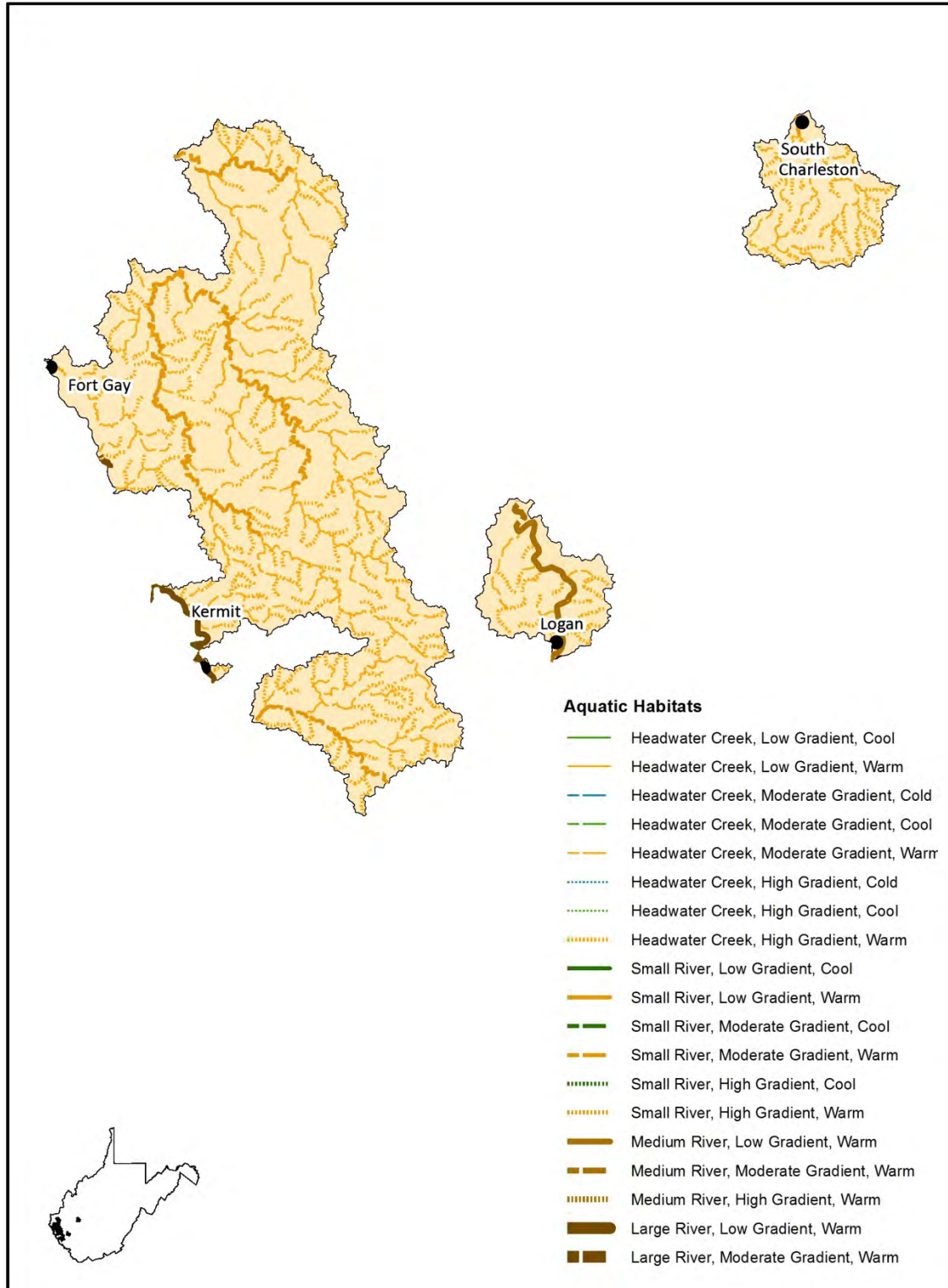
6.4: Cumberlands West CFA

Cumberlands West CFA – Terrestrial Habitats



Cumberlands West CFA (cont.)

Cumberlands West CFA – Aquatic Habitats



Cumberlands West CFA (cont.)

6.4.1: Description

Located in the westernmost part of the state, 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 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, including federal Army Corps of Engineers 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 Eastern Big-eared Bat (*Corynorhinus rafinesquii*) in the state. Kanawha and Cabwaylingo state forests notably support 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 motorized off-road 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.

Cumberlands West CFA (cont.)

6.4.4: Conservation Actions (cont.)

- 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: WV Department of Environmental Protection, WV Division of Forestry, U.S. Fish and Wildlife Service, US Army Corps of Engineers, Appalachian Mountains Joint Venture, motorized recreational trail groups, corporate landowners.
- Public Lands: Beech Fork Lake Wildlife Management Area and State Park, East Lynn Lake Wildlife Management Area, Laurel Lake Wildlife Management Area, Cabwaylingo State Forest, 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	2	3
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	4	1
Snails		2
Totals	51	81

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cumberlands West

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

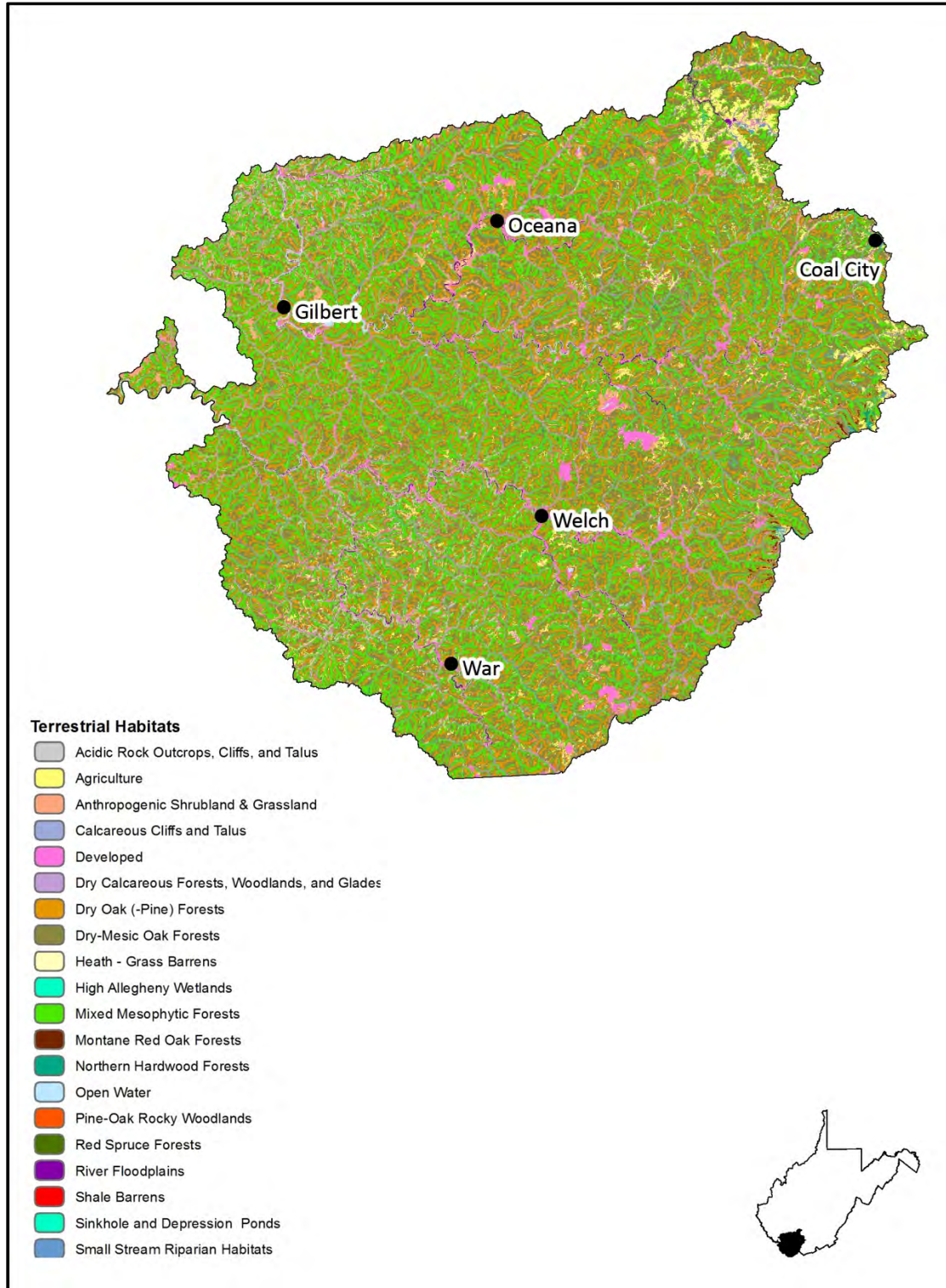
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Cumberlands West**

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

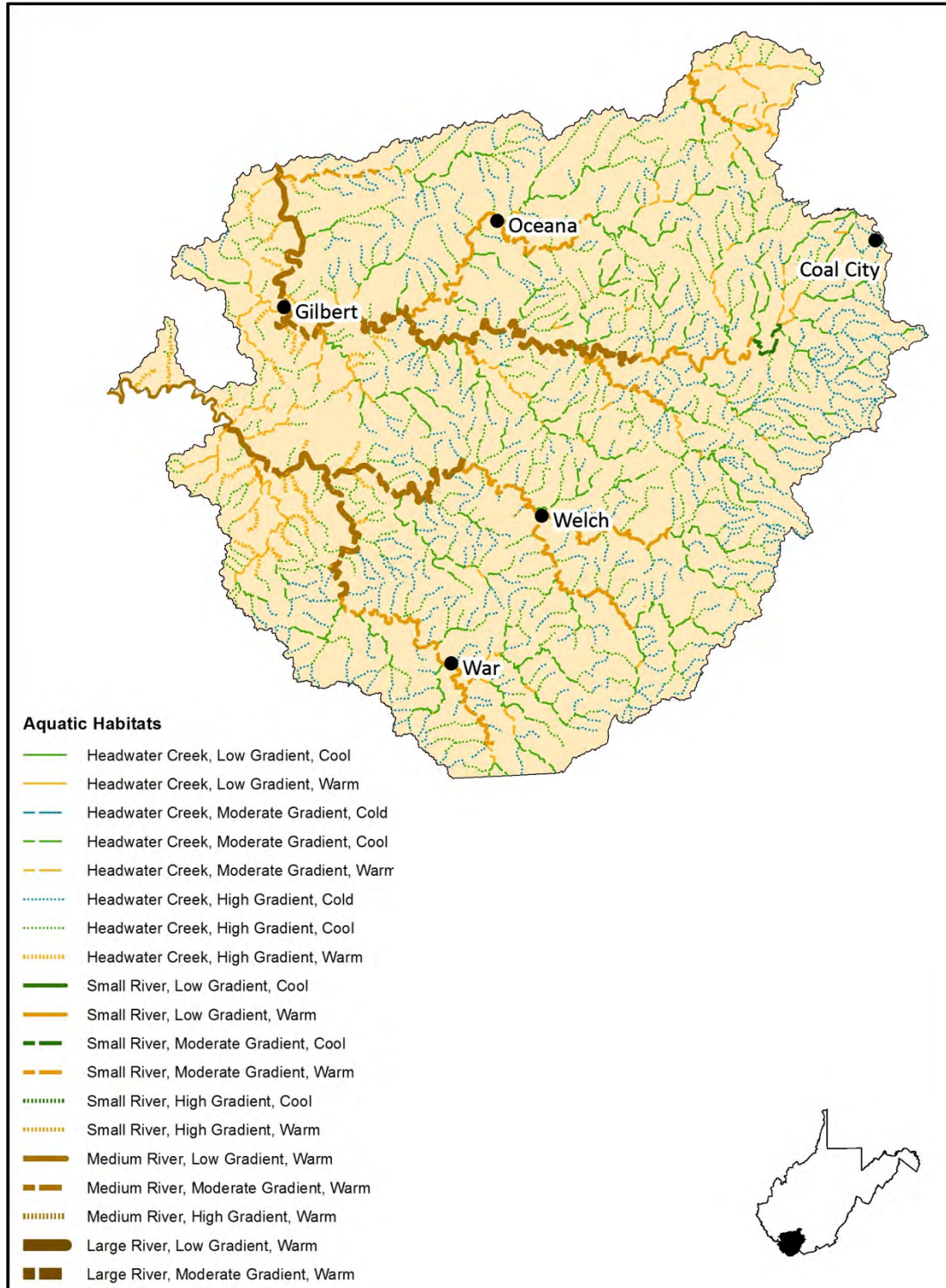
6.5: Cumberlands East CFA

Cumberlands East CFA – Terrestrial Habitats



Cumberlands East CFA (cont.)

Cumberlands East CFA – Aquatic Habitats



Cumberlands East CFA (cont.)

6.5.1: Description

This CFA 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. Deciduous forests dominate the landscape. Mixed mesophytic forests, while still common in the CFA, have been significantly displaced 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 listed as endangered 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 Cumberlands 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*) 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 and from coal mining, private roads, gas wells, and pipelines are widespread. Water pollution and sedimentation from mining, other resource development, residential use, and motorized off-road 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.

Cumberlands East CFA (cont.)

6.5.4: Conservation Actions (cont.)

- 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: WV Department of Environmental Protection, WV Division of Forestry, U.S. Fish and Wildlife Service, US Army Corps of Engineers, Appalachian Mountains Joint Venture, motorized recreational trail groups, corporate landowners, West Virginia Land Trust.
- Public Lands: Panther, Berwind Lake, RD Bailey Lake, Tug Fork, and Anawalt Wildlife Management Areas, 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	3	
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		1
Snails	1	5
Tiger Beetles	1	1
Totals	55	50

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cumberlands East

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

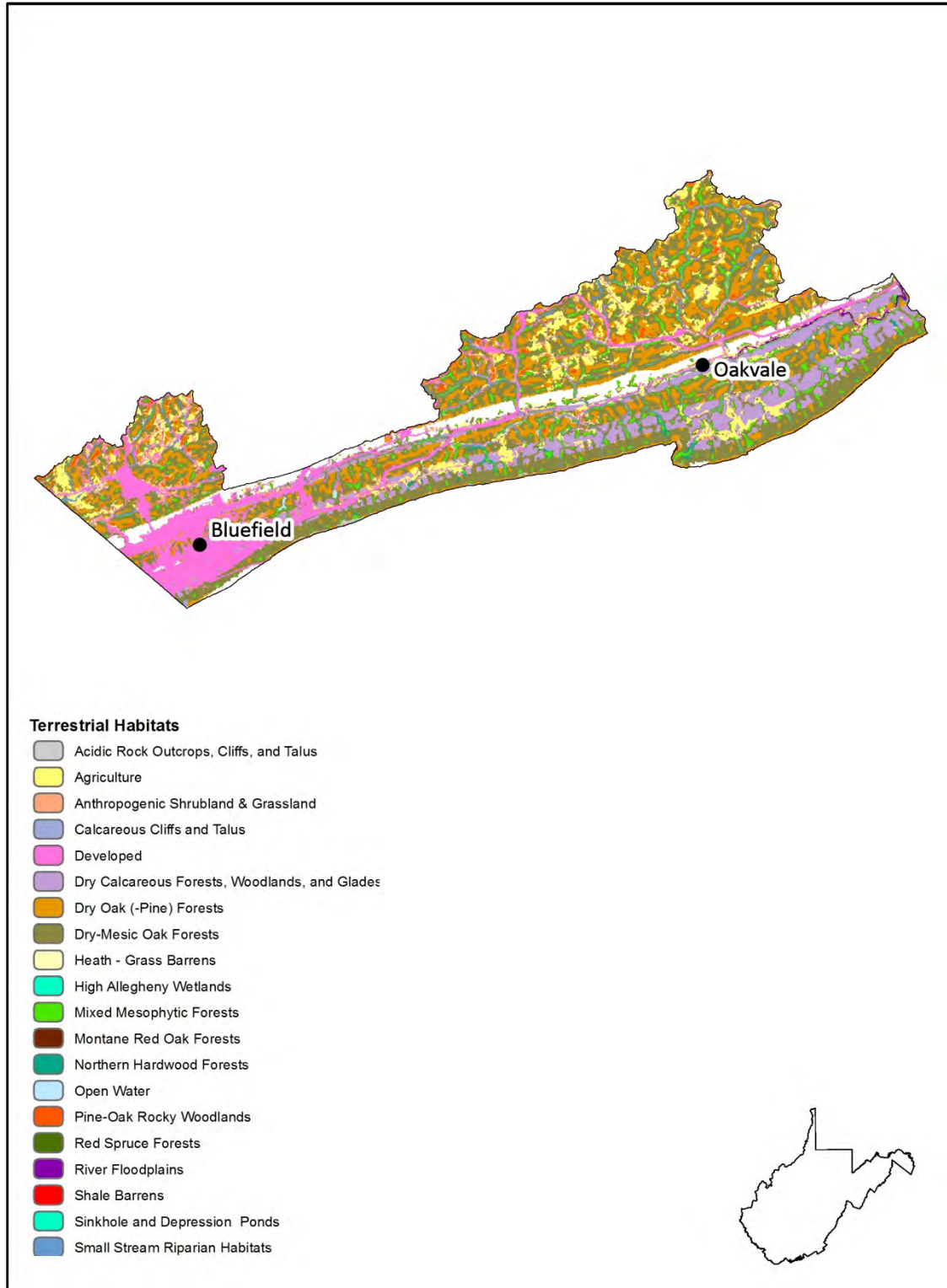
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = **Cumberlands East**

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

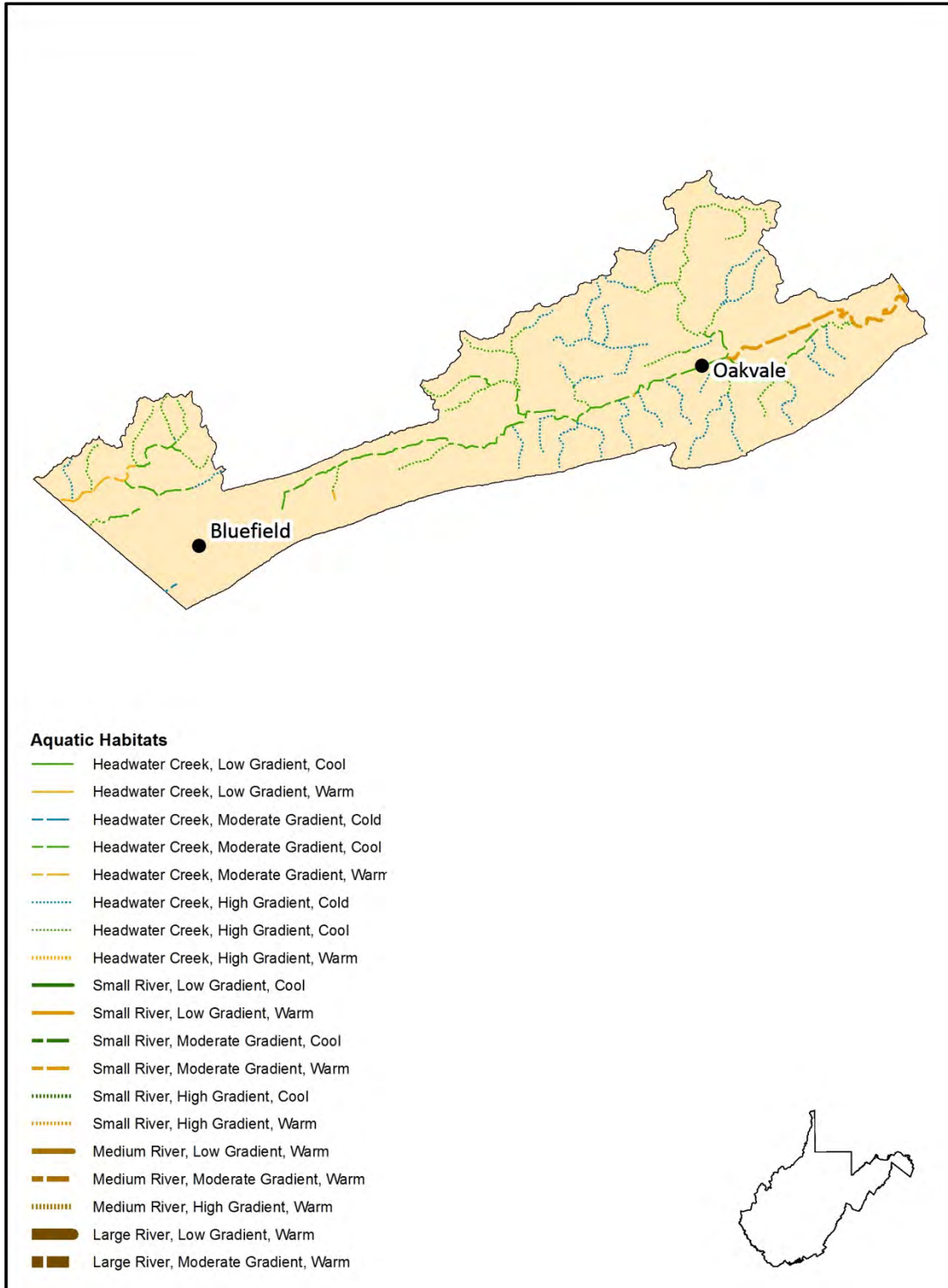
6.6: East River Mountain CFA

East River Mountain CFA – Terrestrial Habitats



East River Mountain CFA (cont.)

East River Mountain CFA – Aquatic Habitats



East River Mountain CFA (cont.)

6.6.1: Description

This CFA includes the southwestern edge of the Northern 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 relatively cold, high 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 two SGCN cave invertebrates, as well as Indiana Bat 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.

6.6.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, WV Cave Conservancy.
- Public Lands: Tate Lohr Wildlife Management Area.

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	3	1
Birds	6	2
Cave Invertebrates		2
Dragonflies and Damselflies	1	
Fish	3	
Mammals	4	2
Plants	5	5
Snails		8
Totals	22	20

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = East River Mountain

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

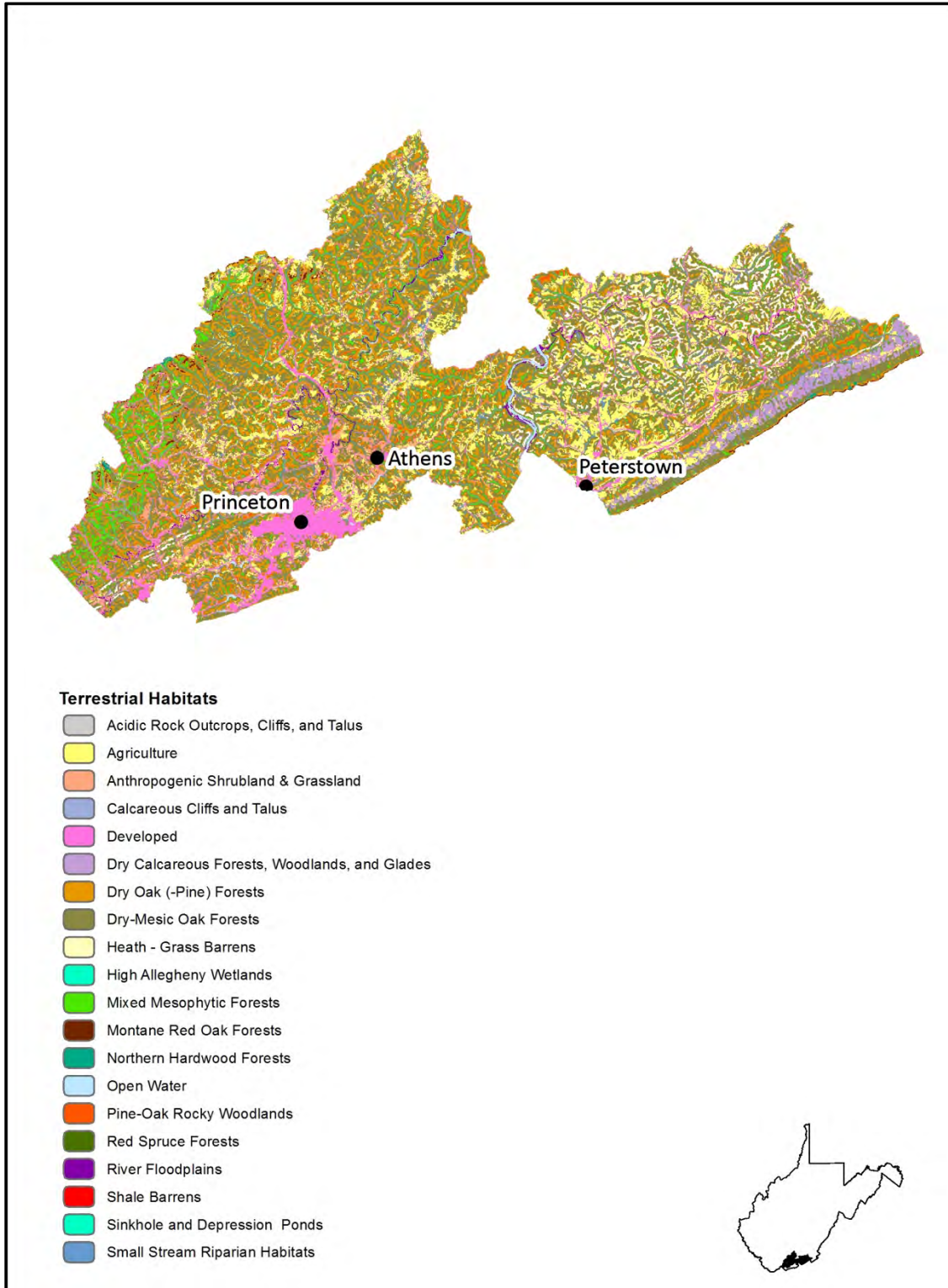
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = East River Mountain

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

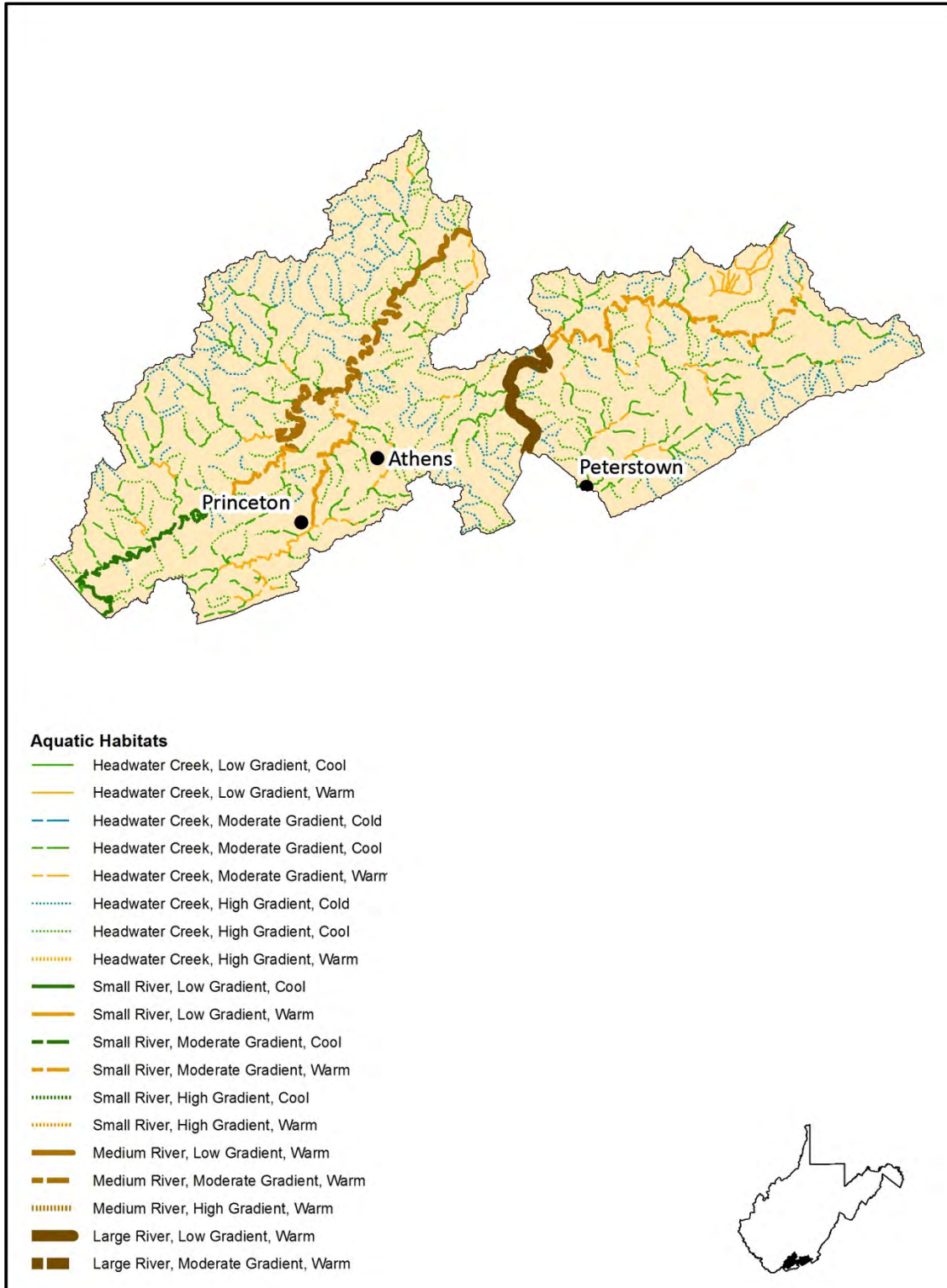
6.7: Bluestone Lake/Peters Mountain CFA

Bluestone Lake/Peters Mountain CFA – Terrestrial Habitats



Bluestone Lake/Peters Mountain CFA (cont.)

Bluestone Lake/Peters Mountain CFA – Aquatic Habitats



Bluestone Lake/Peters Mountain CFA (cont.)

6.7.1: Description

This diverse landscape 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 after 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. Land use changes substantially across the landscape due to the broad variety of habitats and landforms. Forested areas characterize the Bluestone Gorge and on 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 10 endemic fishes, of which at least seven (5 SGCN) have been documented in this CFA. This CFA contains the West Virginia portion of the range of Bluestone Sculpin (*Cottus* sp.), endemic to the Bluestone watershed. Although limited surveys have been conducted here, 13 SGCN mussel species also have been documented and riparian areas support the federally threatened Virginia Spiraea (*Spiraea virginiana*). Extensive farmland (continuous with that of the Greenbrier River CFA) supports anthropogenic grass and shrublands 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 and several rare plants, including West Virginia's only known Carolina Lily (*Lilium michauxii*) populations. This CFA has a significant amount of the State's calcareous forest, woodland, and glade habitat, which supports a rich diversity of snails (14 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 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.

Bluestone Lake/Peters Mountain CFA (cont.)

6.7.4: Conservation Actions (cont.)

- Secure conservation lands, through ownership or easement, to protect significant terrestrial and subterranean habitats.
- Provide assistance and incentives to landowners for maintain grassland and shrubland habitats for birds.

6.7.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, WV Cave Conservancy, Institute for Earth Education, National Park Service, Natural Resources Conservation Service, county farmland protection programs.
- Public Lands: Pipestem State Park, Bluestone Lake State Park and Bluestone Wildlife Management Area, 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	4	2
Birds	19	9
Butterflies and Moths	4	2
Cave Invertebrates	1	4
Crayfish	1	1
Dragonflies and Damselflies	1	7
Fish	5	
Mammals	4	3
Mussels	5	8
Plants	15	42
Snails		14
Tiger Beetles	1	
Totals	60	92

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Bluestone Lake/Peters Mountain

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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	PERCENT OF HABITAT 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%	

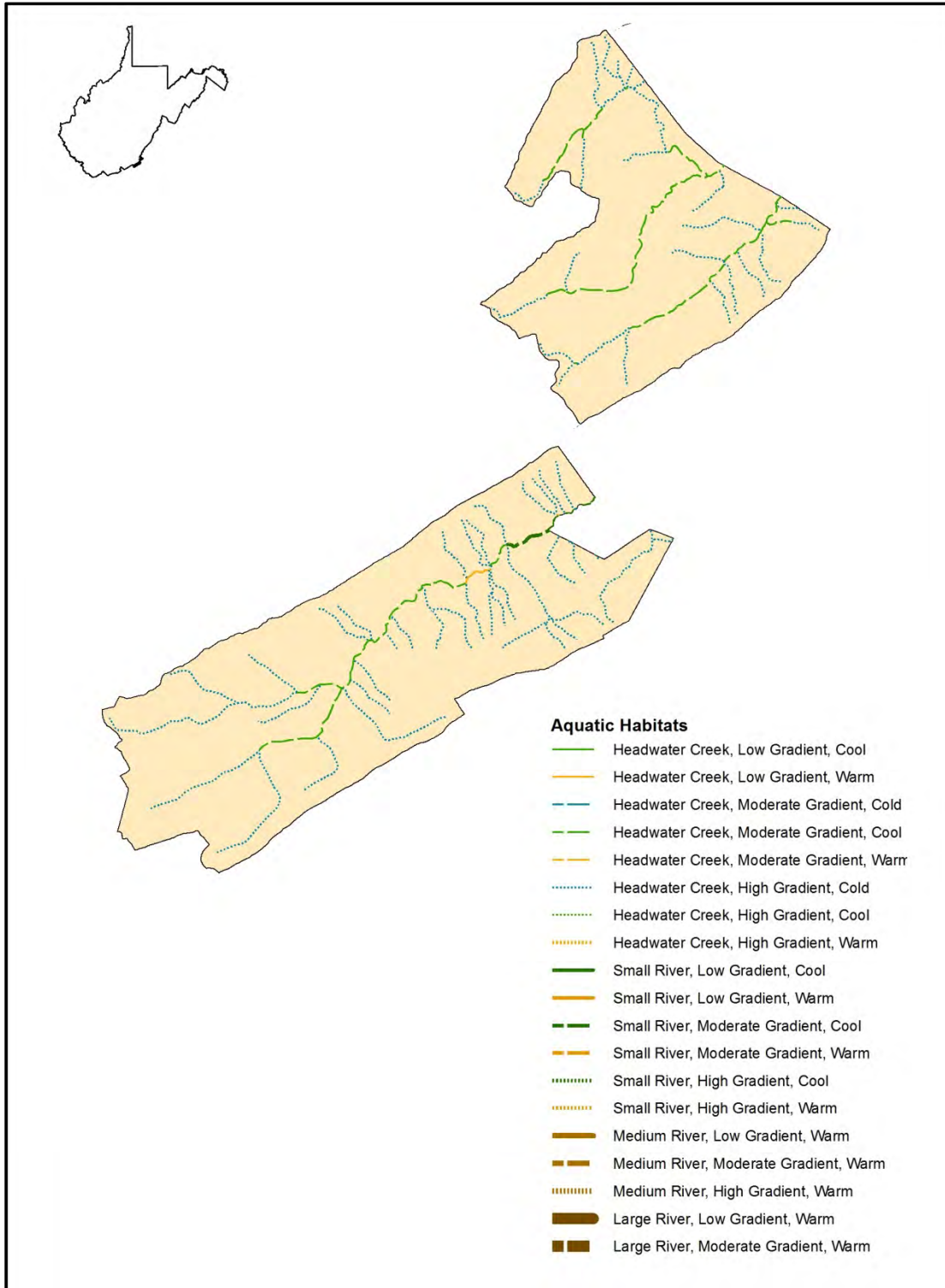
6.8: James Headwaters CFA

James Headwaters CFA – Terrestrial Habitats



James Headwaters CFA (cont.)

James Headwaters CFA – Aquatic Habitats



James Headwaters CFA (cont.)

6.8.1: Description

The Potts Creek and Dunlap Creek watersheds 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 headwaters lie east of the 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 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 longimamum*) 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 on 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 Potts Creek watershed can impact the aquatic resources by increasing sediment loads, direct crushing of mussels, and increased nutrient loading. Any wind energy development could impact migrating birds.

6.8.4: Conservation Actions

- Promote riparian restoration activities including streamside fencing, riparian buffer establishment, and farming best management practices.
- Public land provides an outstanding opportunity for maintaining large, intact forest blocks and protecting many other special habitats.

6.8.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, U.S. Fish and Wildlife Service Partners Program, US Forest Service, Natural Resources Conservation Service, Monroe County Farmland Protection Program.
- Public Lands: George Washington-Jefferson National Forest, Andrew Rowan Wildlife Management Area.

James Headwaters CFA (cont.)

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	
Birds	10	1
Butterflies and Moths	1	4
Fish	4	1
Mussels	1	2
Plants	8	11
Snails		1
Totals	25	20

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = James Headwaters

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

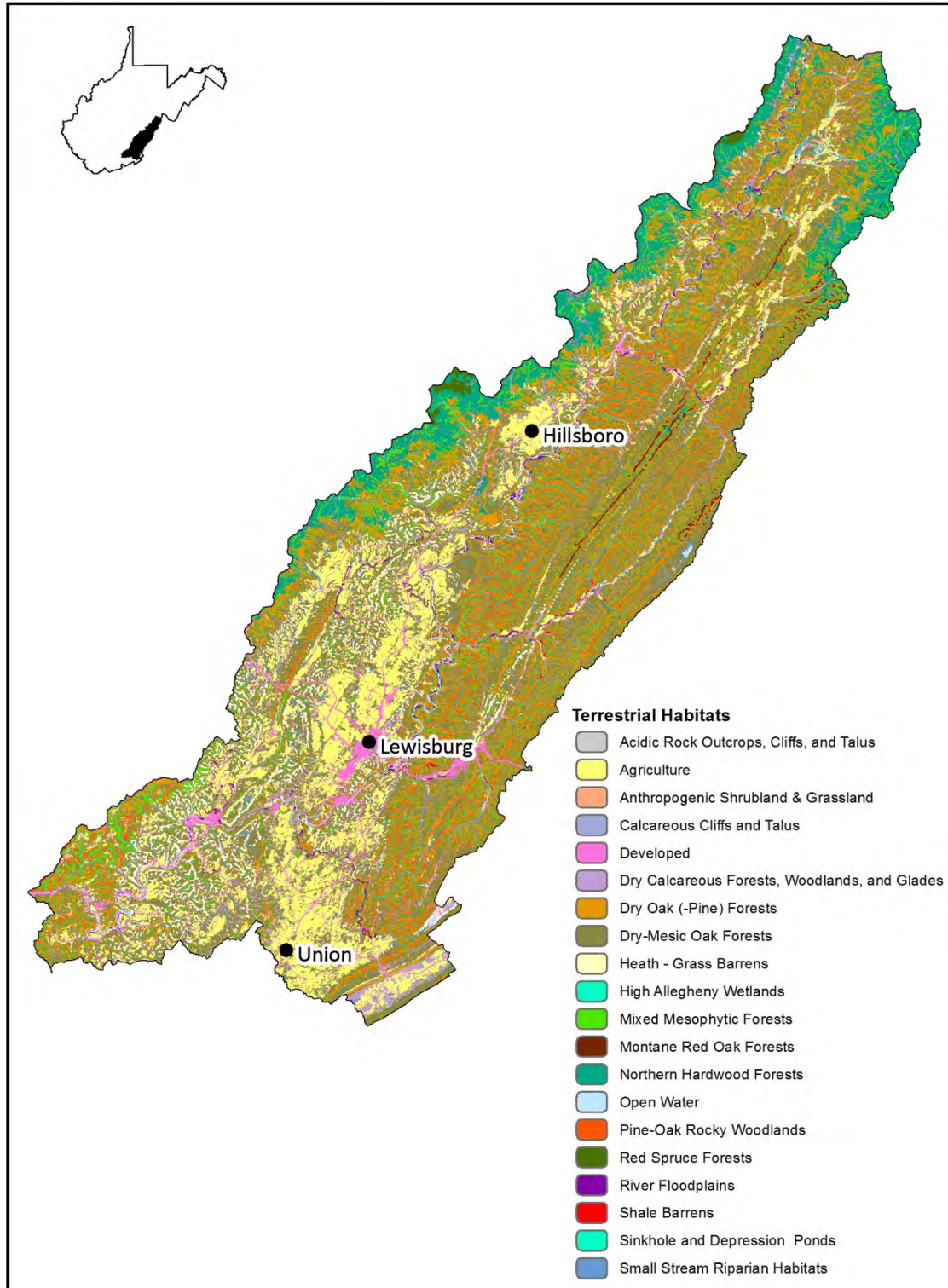
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = James Headwaters

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

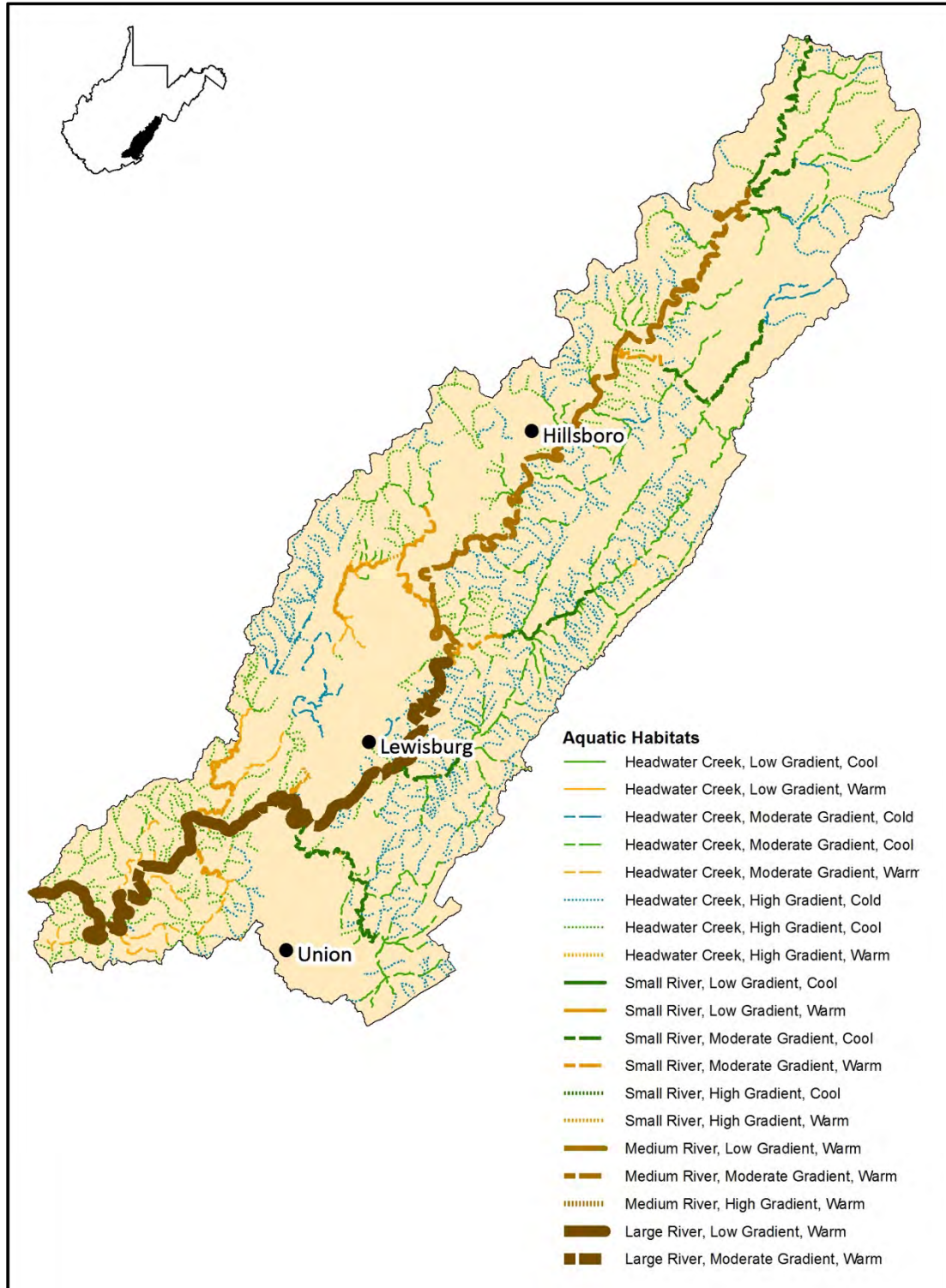
6.9: Greater Greenbrier CFA

Greater Greenbrier CFA – Terrestrial Habitats



Greater Greenbrier CFA (cont.)

Greater Greenbrier CFA – Aquatic Habitats



Greater Greenbrier CFA (cont.)

6.9.1: Description

The Greater Greenbrier CFA is 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. 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, 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's 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 east of the rain shadow and has lower precipitation than most portions of West Virginia. The karst region was originally forested by a matrix of 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 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 occur in this eastern portion, where the largest land owner is the US Forest Service. Most private forestland is held as small to medium-sized, non-industrial holdings. A few large, corporate-held 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 28 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 kanawhae* ssp.) 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 subviridus*) 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 10 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 Spiraea 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 global assemblages of the regionally endemic shale barren flora, including the federally listed Shale Barren Rock-cress (*Arabis serotina*) and

Greater Greenbrier CFA (cont.)

6.9.2: Significant Wildlife Values (cont.)

globally rare Nodding Wild Onion (*Allium oxyphilum*), the critically imperiled Appalachian population of Grizzled Skipper (*Pyrgus centaureae wyandot*, which may survive in West Virginia only here), globally significant populations of Box Huckleberry (*Gaylussacia brachycera*) and Swordlead 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 landsnails, 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 remaining densities of Golden-winged Warbler in the State 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 critically-imperiled 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 in the Greenbrier River observed in recent years is 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 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.
- 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 for maintain grassland, shrubland, and early forest successional habitats for birds.
- Augmentation of Green Floater mussels through propagation to maintain and expand populations.
- Cooperative efforts with public land owners 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.

Greater Greenbrier CFA (cont.)

6.9.5: Conservation Opportunities

- Key WVDNR Partners: WV Division of Forestry, WV Department of Environmental Protection, WV Cave Conservancy, Monongahela National Forest, Greenbrier Watershed Association, Natural Resources Conservation Service, USFWS Partners Program, West Virginia Land Trust, New River Conservancy, The Nature Conservancy, county farmland protection boards, Wild Turkey Federation, Appalachian Mountains Joint Venture.
- Public Lands: Monongahela National Forest; Calvin Price, Greenbrier, and Seneca State Forests; Greenbrier River Trail; Beartown; Droop Mountain Battlefield; Cass Scenic Railroad, and Watoga State Parks; Moncove Lake State Park and Wildlife Management Area.

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 = Great Greenbrier

TAXA	PRIORITY 1 SPECIES	PRIORITY 2 SPECIES
Amphibians	4	1
Birds	30	21
Butterflies and Moths	11	6
Cave Invertebrates	16	12
Crayfish	2	1
Dragonflies and Damselflies	12	23
Fish	6	2
Mammals	8	2
Mussels	5	5
Plants	39	72
Reptiles	3	2
Snails		9
Tiger Beetles	1	
Totals	137	156

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Great Greenbrier

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

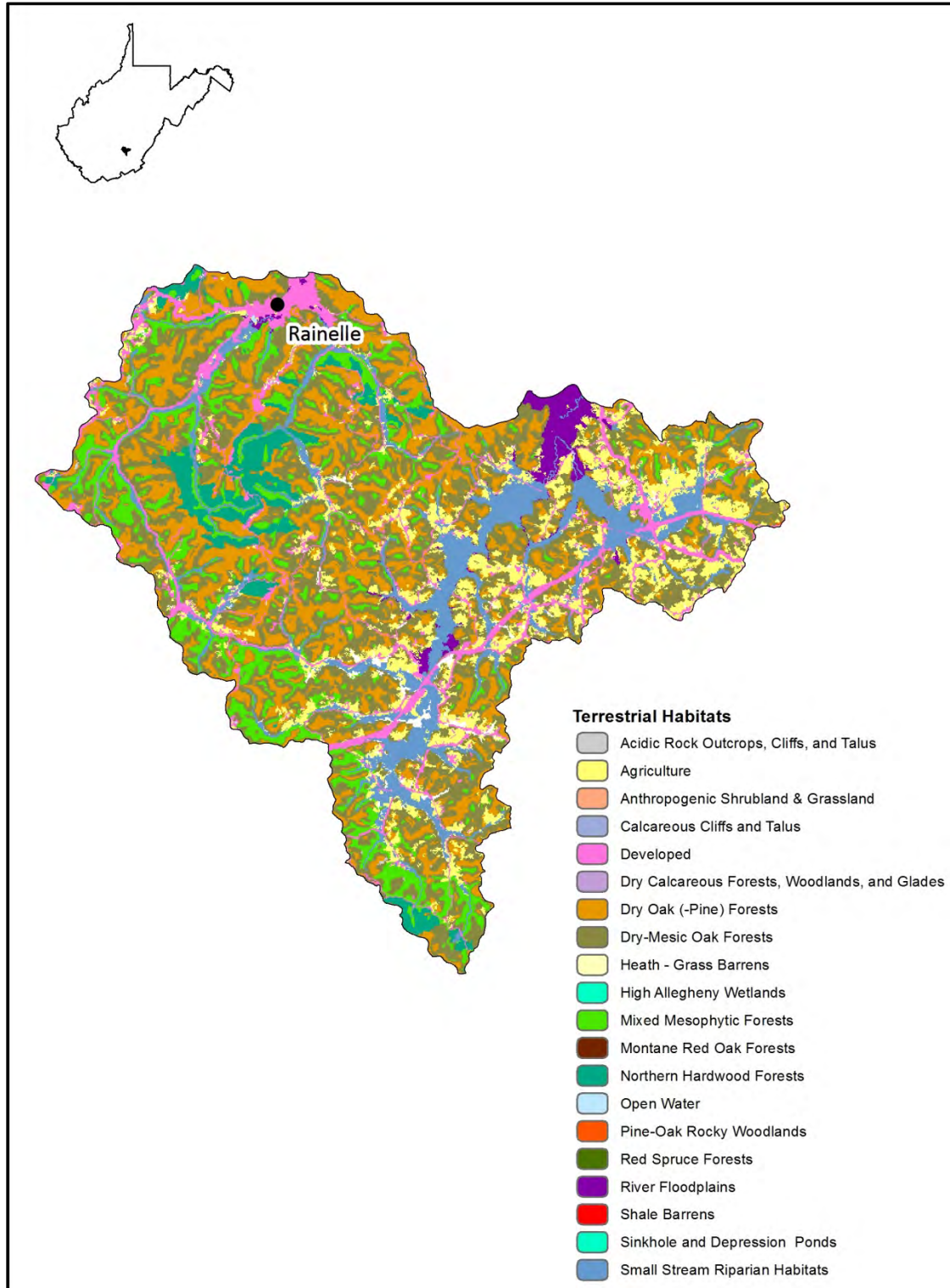
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Great Greenbrier

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

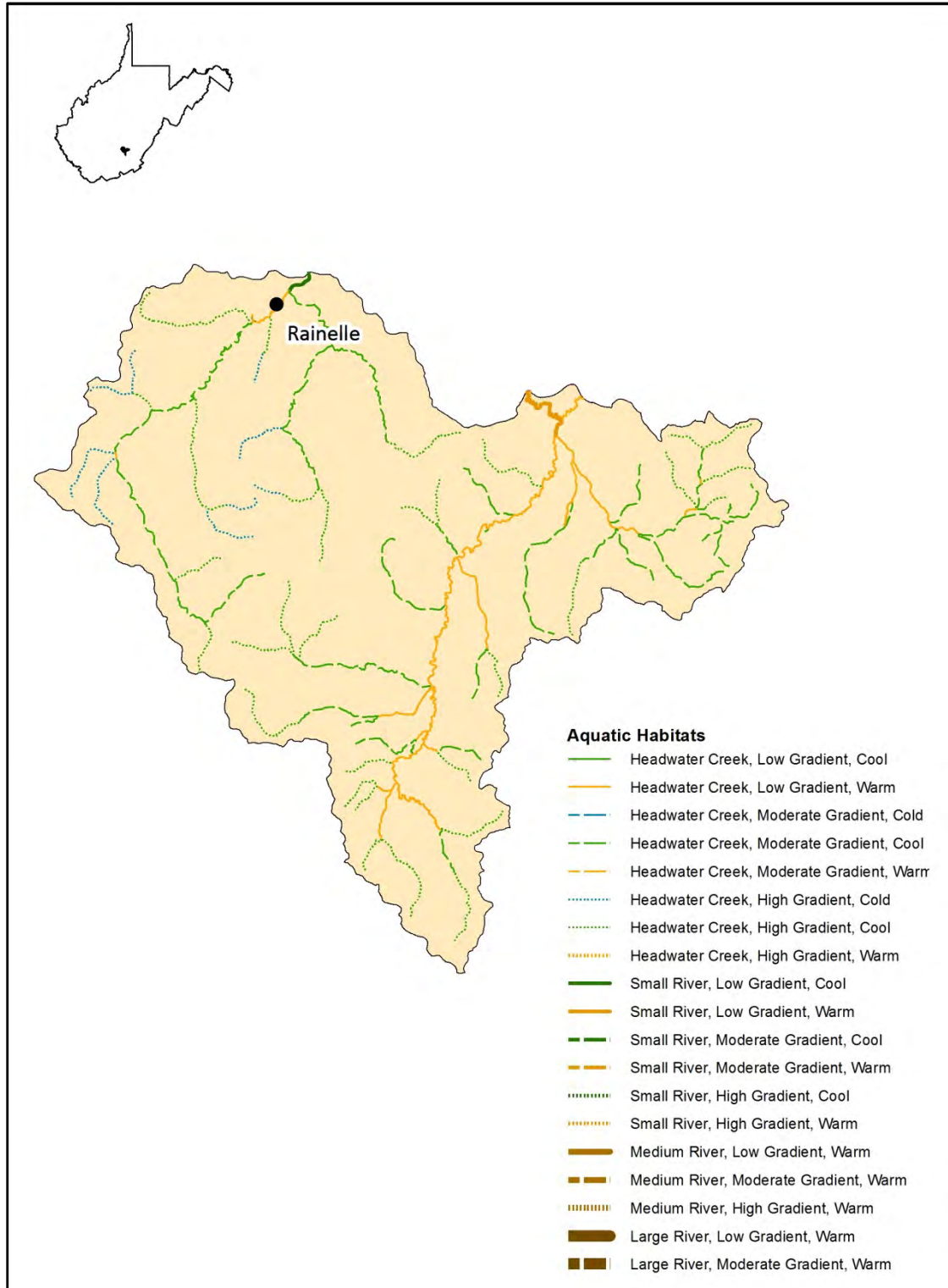
6.10: Meadow River Wetlands CFA

Meadow River Wetlands CFA – Terrestrial Habitats



Meadow River Wetlands CFA (cont.)

Meadow River Wetlands CFA – Aquatic Habitats



Meadow River Wetlands CFA (cont.)

6.10.1: Description

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 exists within the wetlands. One of only two known global populations for a species of crayfish being currently described is in this CFA.

6.10.3: Distinctive Stresses

Livestock graze in many wetland areas of Meadow River and some filling and draining of wetlands 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: WV Division of Highways, West Liberty University, West Virginia Department of Environmental Protection, Natural Resources Conservation Service.
- Public Lands: Meadow River Wildlife Management Area.

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	
Birds	7	2
Crayfish	1	
Dragonflies and Damselflies		3
Fish	1	
Plants	5	18
Totals	15	23

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Meadow River Wetlands

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

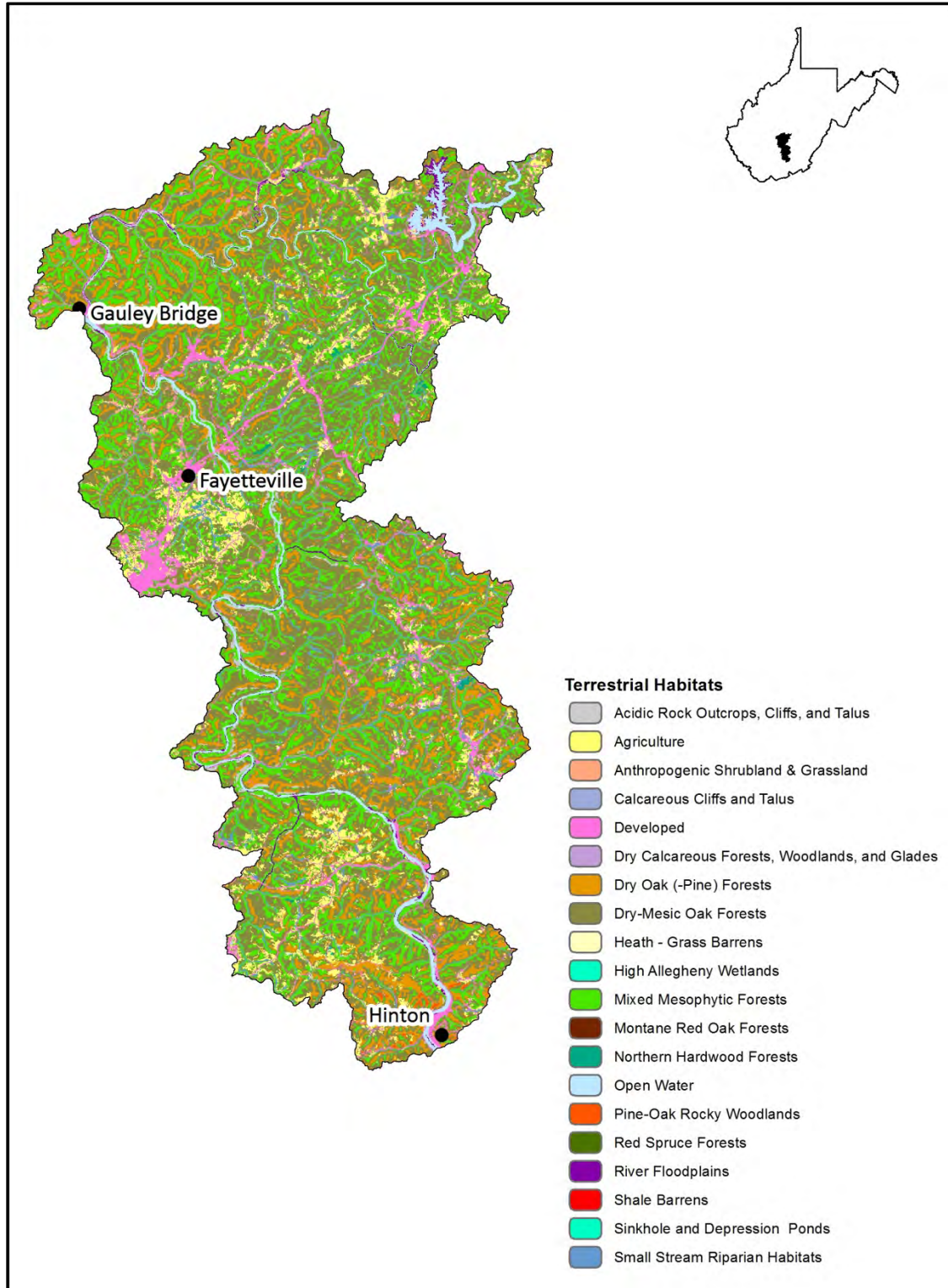
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Meadow River Wetlands

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

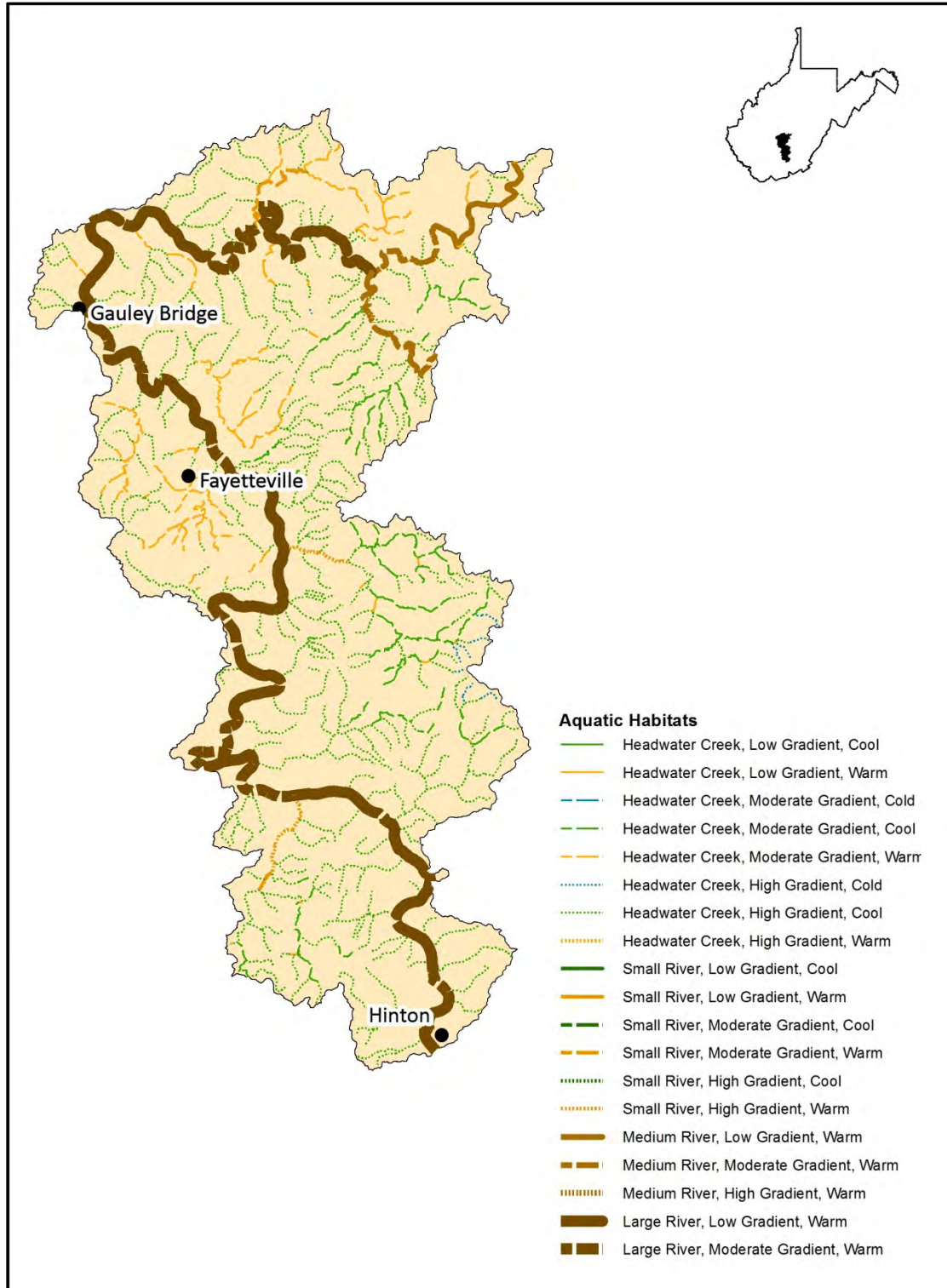
6.11: Gorges CFA

Gorges CFA – Terrestrial Habitats



Gorges CFA (cont.)

Gorges CFA – Aquatic Habitats



Gorges CFA (cont.)

6.11.1: Description

The deep, forested gorges of the New, Gauley, and Meadow rivers and surrounding mountainous uplands characterize this 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 upland areas support dry oak and mixed mesophytic forests, are largely forested, and are often managed for timber production, with 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, and the Boy Scouts of America Bechtel/The Summit High Adventure Camp is located here. Legacy deep mining and some surface mining occurs throughout most of the area. Residential and second home development has been episodic and has been 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 Cumberlands. 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 of high importance 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*), Eastern Big-eared Bat, Eastern Small-footed Bat (*Myotis leibii*), and Indiana Bat, Long-tailed Shrew (*Sorex dispar*), Green Salamander (*Aneides aeneus*), Timber Rattlesnake, and nesting Peregrine Falcon. Floodplains along the New and Gauley include some of the most extensive riverscours 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 of SGCN plants (109). The federally threatened Virginia Spiraea is found along the Gauley and Meadow rivers. Rivers in the CFA provide substantial statewide portions of several river habitat types. The New River in the gorge, along with the Kanawha Falls area just downstream, provides the last stronghold for the Purple Wartyback mussel (*Cyclonaiia tuberculata*) in West Virginia.

6.11.3: Distinctive Stresses

The Summersville Dam on the Gauley River is a coldwater release on a stream that was originally warmwater, impeding mussel reproduction. The fluctuations of the water releases from the dam for seasonal recreational boating create added difficulty for fishes and their invertebrate food source

Gorges CFA (cont.)

6.11.3: Distinctive Stresses (cont.)

because of the periodic and excess scouring of the river channel and substrate. Episodic development, especially for second homes, near and adjacent to federal lands has substantially increased forest fragmentation.

6.11.4: Conservation Actions

- Cooperative efforts with public land owners 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.
- Conserve forest lands adjacent to and near existing public lands.
- Assess opportunities for improving mussel, fish, and riparian plant populations in the Gauley River gorge.

6.11.5: Conservation Opportunities

- Key WVDNR Partners: WV Division of Forestry, WV Department of Environmental Protection, US Army Corps of Engineers, National Park Service, Boy Scouts of America, The Nature Conservancy, New River Conservancy, Natural Resources Conservation Service, Appalachian Mountains Joint Venture.
- Public Lands: New River Gorge National River, Gauley River National Recreation Area, Beury Mountain Wildlife Management Area, Hawks Nest State Park, Carnifex Ferry State Park, Babcock State Park.

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	4	1
Birds	21	8
Butterflies and Moths	4	4
Dragonflies and Damselflies	2	6
Fish	4	1
Mammals	7	2
Mussels	4	9
Plants	27	82
Reptiles	4	2
Snails		4
Tiger Beetles	1	
Totals	78	119

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Gorges

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

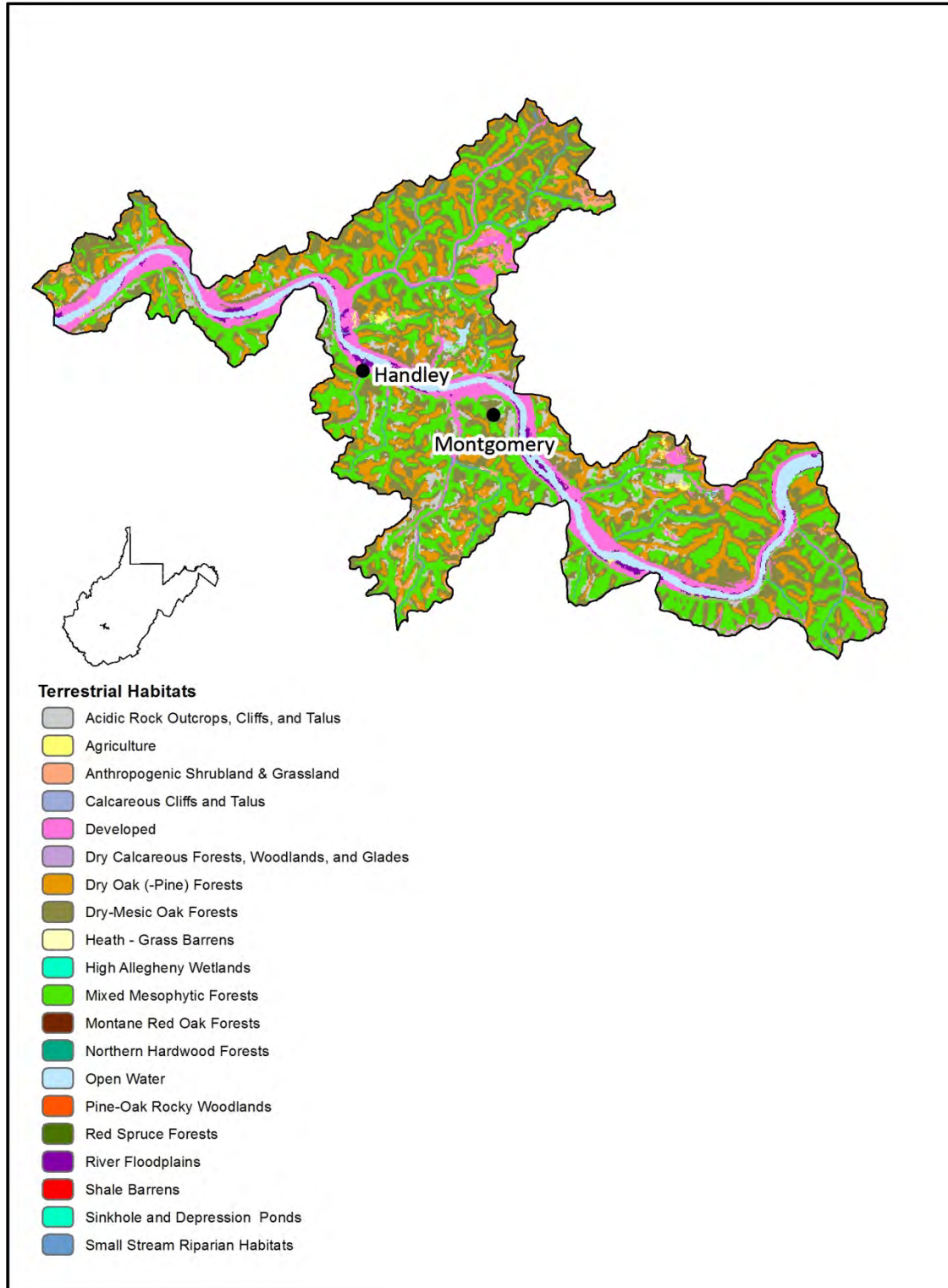
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Gorges

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

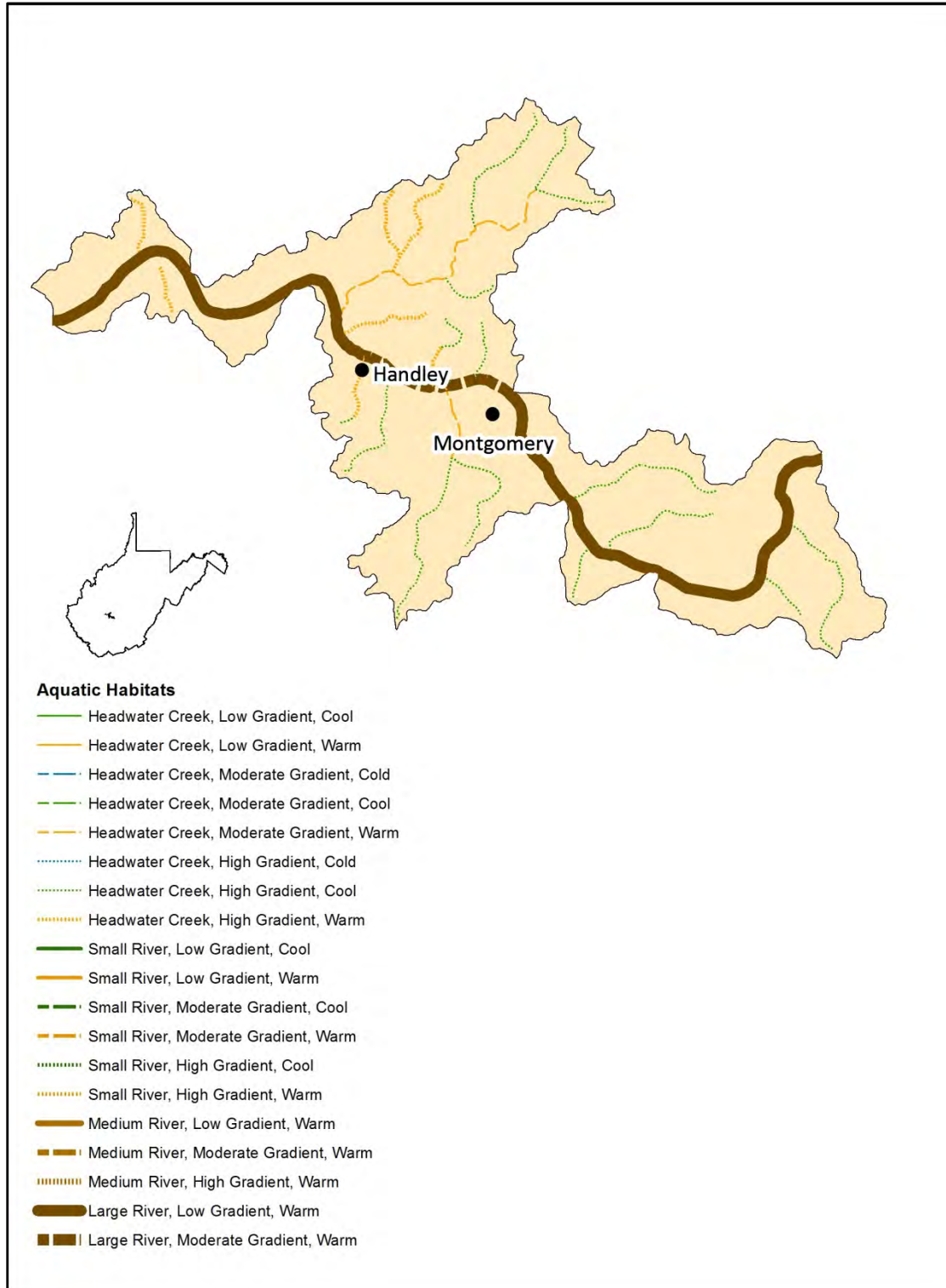
6.12: Kanawha Falls CFA

Kanawha Falls CFA – Terrestrial Habitats



Kanawha Falls CFA (cont.)

Kanawha Falls CFA – Aquatic Habitats



Kanawha Falls CFA (cont.)

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 unimpounded. 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 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 system 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*) was reintroduced here in 2014. Along with the New River in the Gorge just upstream, this provides the last stronghold for the Purple Wartback mussel in West Virginia. There is a highly diverse fish fauna here. Of the 73 species of fishes documented here, ten are of concern.

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

- Protection of this reach as unimpounded is critical.
- 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.
- A hazardous spill protocol should be developed that addresses biological and ecological concerns.

6.12.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, US Fish and Wildlife Service, hydropower operator, CSX.
- Public Lands: Kanawha Falls Stream Access Site (owned privately, but managed by WVDNR).

Kanawha Falls CFA (cont.)

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	2	
Birds	7	2
Butterflies and Moths	1	1
Fish	3	7
Mussels	16	21
Plants		1
Reptiles		1
Totals	29	33

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Kanawha Falls

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

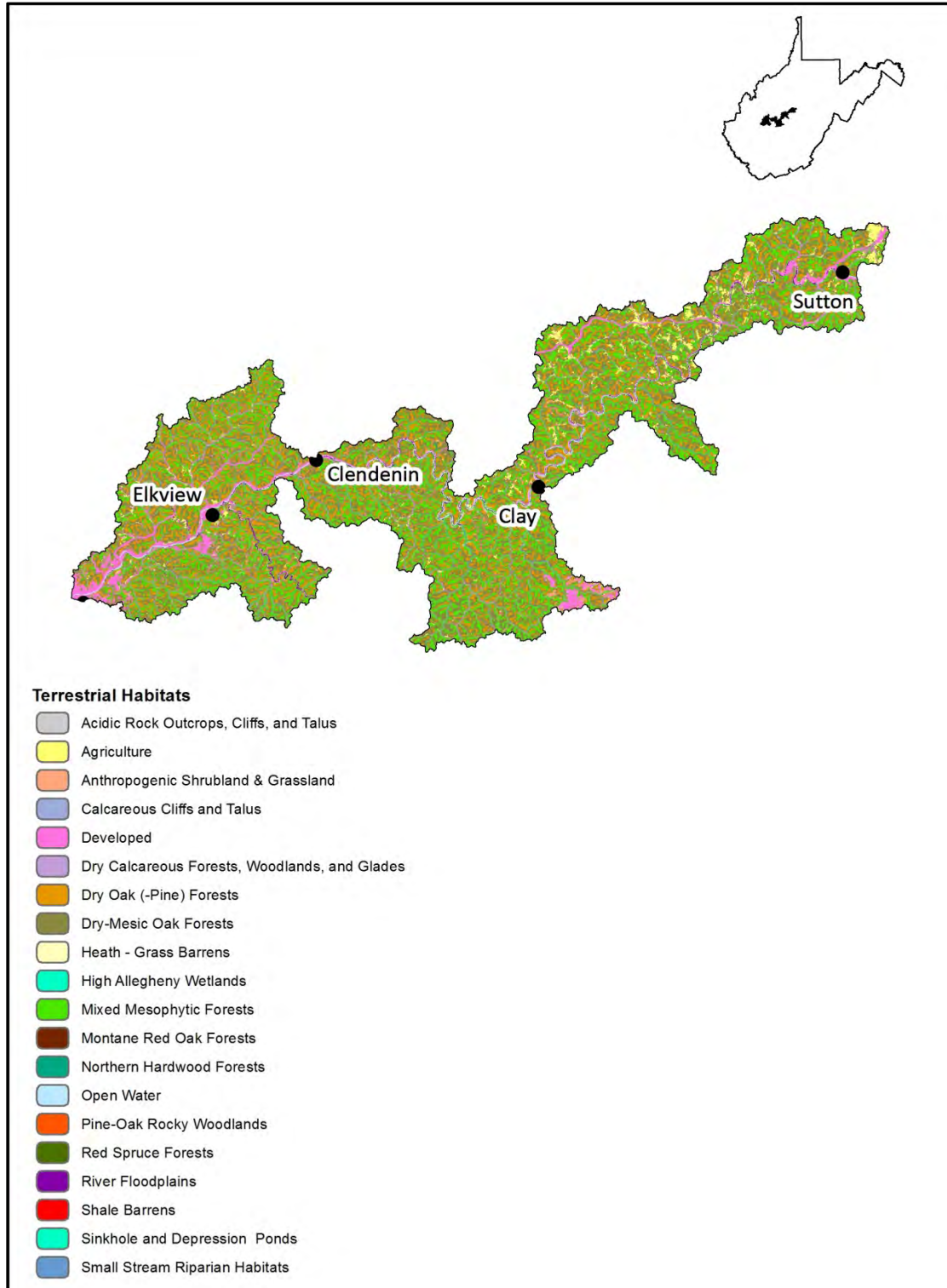
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Kanawha Falls

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

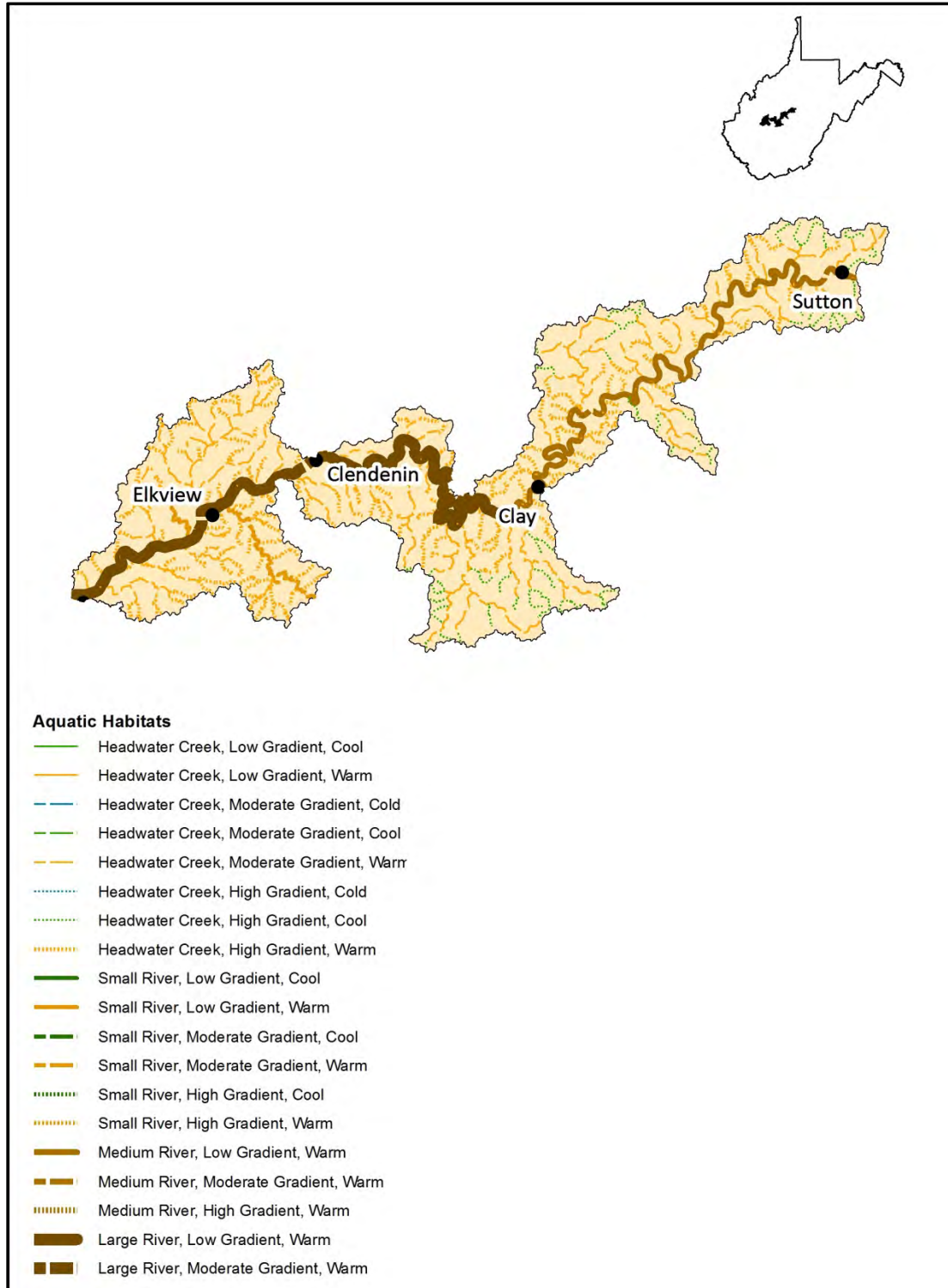
6.13: Lower Elk River CFA

Lower Elk River CFA – Terrestrial Habitats



Lower Elk River CFA (cont.)

Lower Elk River CFA – Aquatic Habitats



Lower Elk River CFA (cont.)

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, Cumberland Mountains, and Allegheny 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 matrix 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 good water quality, the Elk provides drinking water to several communities including Charleston.

6.13.2: Significant Wildlife Values

The Lower Elk 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 Northern Riffleshell 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 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 and the northernmost breeding extent of Swainson's Warbler.

6.13.3: Distinctive Stresses

Energy development can contribute to habitat loss, forest fragmentation, water pollution, and acid mine drainage. Additional water pollution problems can 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 time can significantly reduce water temperatures when the dam is forced to release a large portion of its discharge from the bottom port. Cooler water temperatures can 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 the river in over 10 years. Likewise, significant algae blooms are occurring from Duck to the Ivydale area.

Lower Elk River CFA (cont.)

6.13.4: Conservation Actions

- Continue to support efforts to reduce water pollution and avoid future spills.
- Where feasible and applicable, public and private land managers should be encouraged to implement practices for benefiting forest interior birds.
- Determine factors leading to poor mussel reproduction and algae blooms in order to develop strategies for addressing the problems.

6.13.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, US Fish and Wildlife Service, US Army Corps of Engineers, watershed groups, Natural Resources Conservation Service, Appalachian Mountains Joint Venture.
- Public Lands: Morris Creek and Wallback Wildlife Management Areas, 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
Birds	16	6
Butterflies and Moths		2
Crayfish	1	
Dragonflies and Damselflies	3	4
Fish	11	13
Mammals	2	
Mussels	15	21
Plants		5
Snails		4
Totals	48	55

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Lower Elk

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

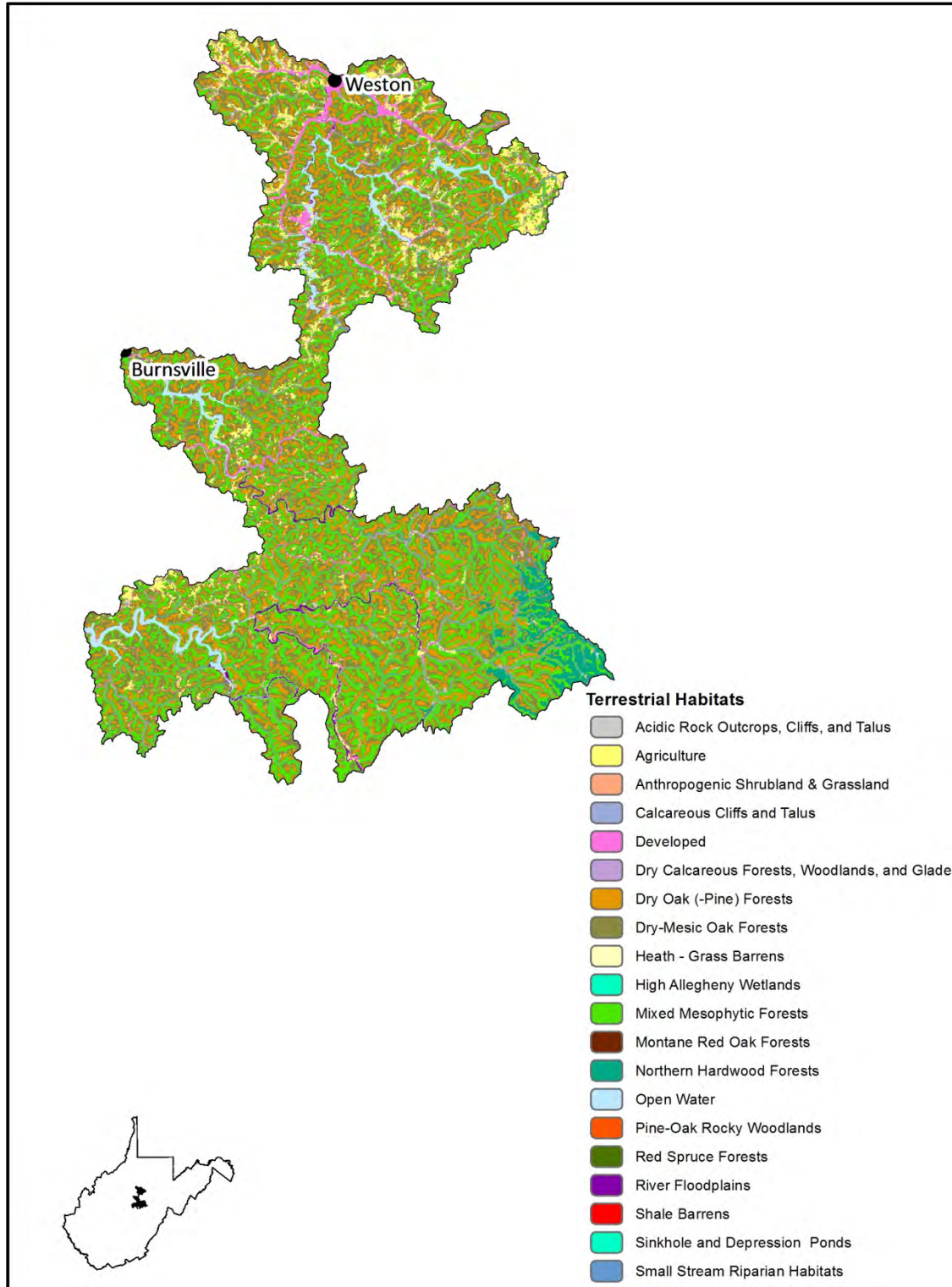
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Lower Elk

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

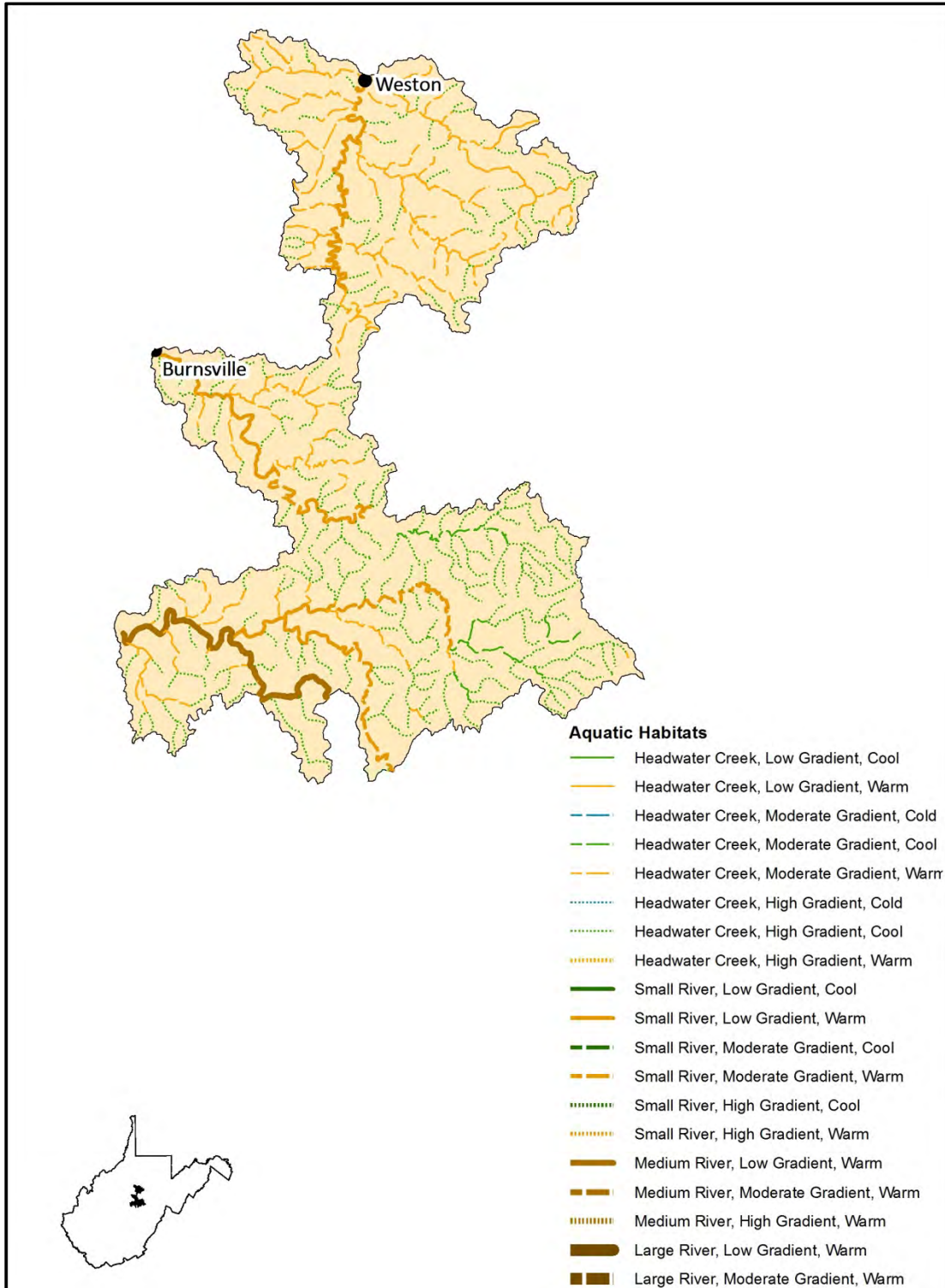
6.14: Central Reservoirs CFA

Central Reservoirs CFA – Terrestrial Habitats



Central Reservoirs CFA (cont.)

Central Reservoirs CFA – Aquatic Habitats



Central Reservoirs CFA (cont.)

6.14.1: Description

The Central Reservoirs landscape centers around US Army Corps of Engineers reservoirs on the upper reaches of the Elk River, Little Kanawha River, and West Fork River, and a power company reservoir on Stonecoal Creek. Together, these reservoirs cover 5268 acres and provide a significant portion of the large lentic waters in WV. 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 a mostly 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 Wildlife Management Areas.

6.14.2: Significant Wildlife Values

This CFA supports important habitats for many aquatic species, including 23 mussels and six fish of concern. *Cambarus elkensis* (Elk River Crayfish), 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*), 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 Wildlife Management Area, 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 are unknown.

6.14.4: Conservation Actions

- Incorporate steps to reduce forest habitat loss and fragmentation in planning for gas well developments, as well as associated infrastructure.
- Continue to improve and maintain water quality of significant streams.
- 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: WV Department of Environmental Protection, US Fish and Wildlife Service, US Army Corps of Engineers, watershed groups, Natural Resources Conservation Service, Appalachian Mountains Joint Venture, National Wild Turkey Federation, gas companies.

Central Reservoirs CFA (cont.)

6.14.5: Conservation Opportunities (cont.)

- Public Lands: Stonecoal Lake, Elk River, Burnsville Lake, and Stonewall Jackson Wildlife Management Areas; 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
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
Snails		4
Totals	39	42

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Central Reservoirs

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

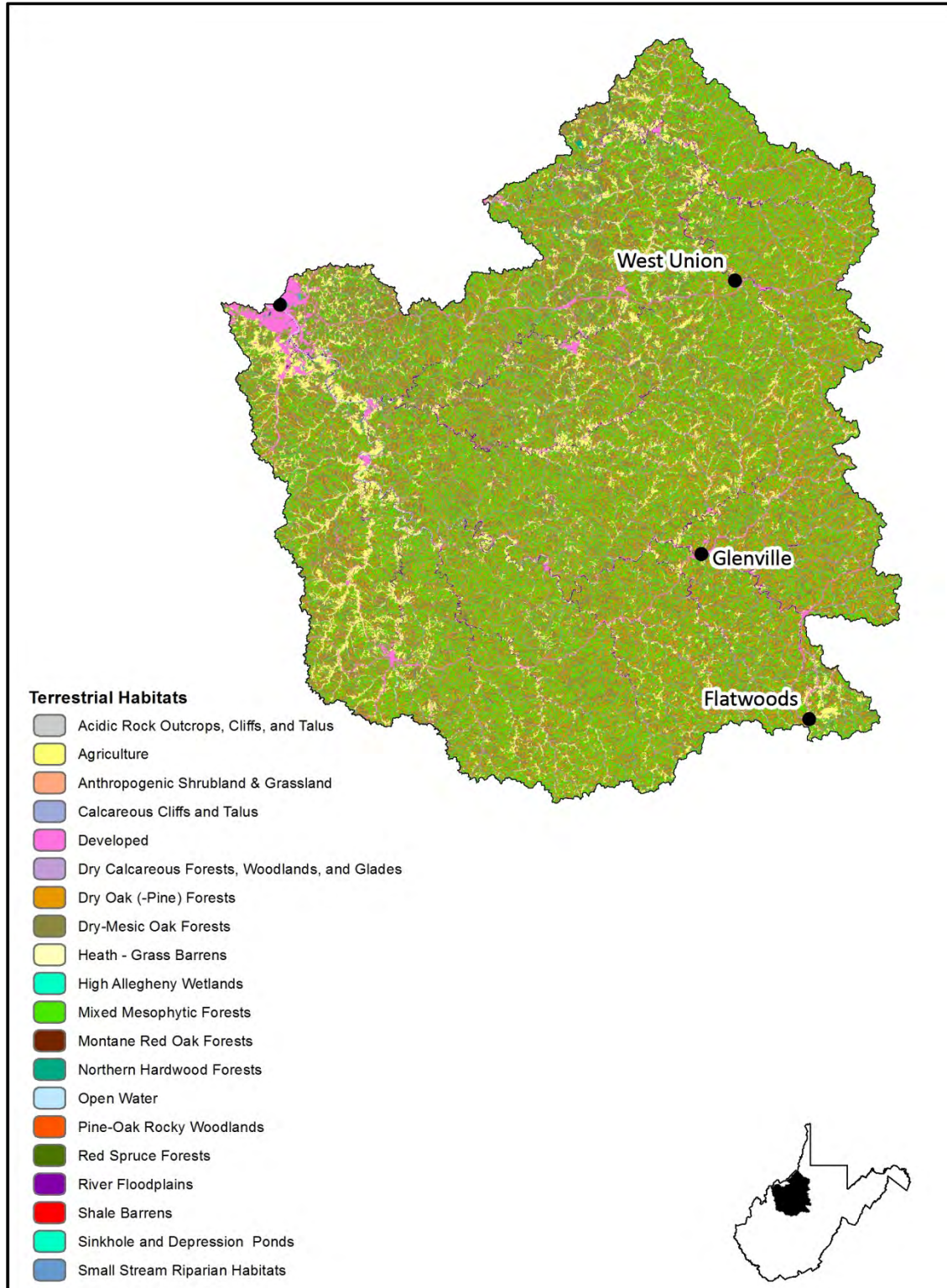
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Central Reservoirs

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

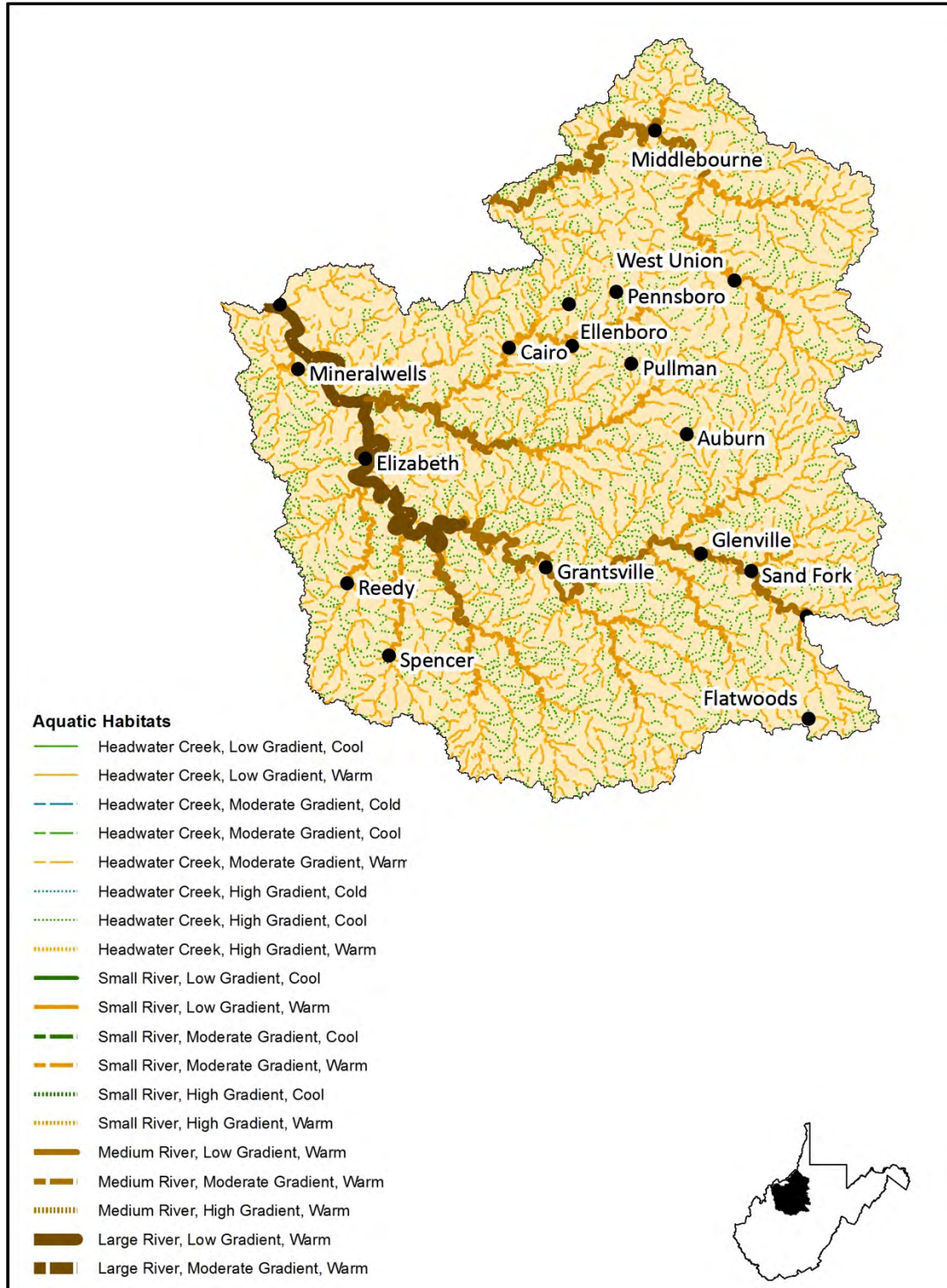
6.15: Little Kanawha and Middle Island Creek CFA

Little Kanawha and Middle Island Creek CFA – Terrestrial Habitats



Little Kanawha and Middle Island Creek CFA (cont.)

Little Kanawha and Middle Island Creek CFA – Aquatic Habitats



Little Kanawha and Middle Island Creek CFA (cont.)

6.15.1: Description

The Little Kanawha River and Middle Island Creek are two significant tributaries of the Ohio River. Their 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 in small to medium, non-industrial, private holdings but there is 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 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 57 kilometer 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, with 25 SGCN dragonflies and damselflies. 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. These watersheds provide significant habitat for interior forest nesting 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 gas development and associated infrastructure that can fragment and eliminate habitat and add sediment loads to the streams. Spills of brine fluids and hazardous materials and water withdrawals can also put aquatic species at risk. The minimum flow below North Bend Dam is only 1 cubic foot/second, which prolongs drought conditions and may harm aquatic life.

6.15.4: Conservation Actions

- Cooperate with gas industry in infrastructure planning to reduce fragmentation and other habitat impacts.
- Avoiding and minimizing forest fragmentation at North Bend State Park, , and other public lands is important for forest interior nesting birds.

Little Kanawha and Middle Island Creek CFA (cont.)

6.15.4: Conservation Actions (cont.)

- Study low flow and poor oxygen issues at North Bend Lake to identify potential remediation measures.
- Develop and implement an ecologically sustainable water use protocol for streams.

6.15.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, US Fish and Wildlife Service, Natural Resources Conservation Service, watershed groups, Appalachian Mountains Joint Venture, gas industry.
- Public Lands: North Bend State Park and Rails Trail, Cedar Creek State Park, The Jug, Ritchie Mines, Sand Hill, Stumptown, and Buffalo Run Wildlife Management Areas, Mountwood Community Park, several 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	3	2
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	2	
Snails		14
Totals	63	101

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

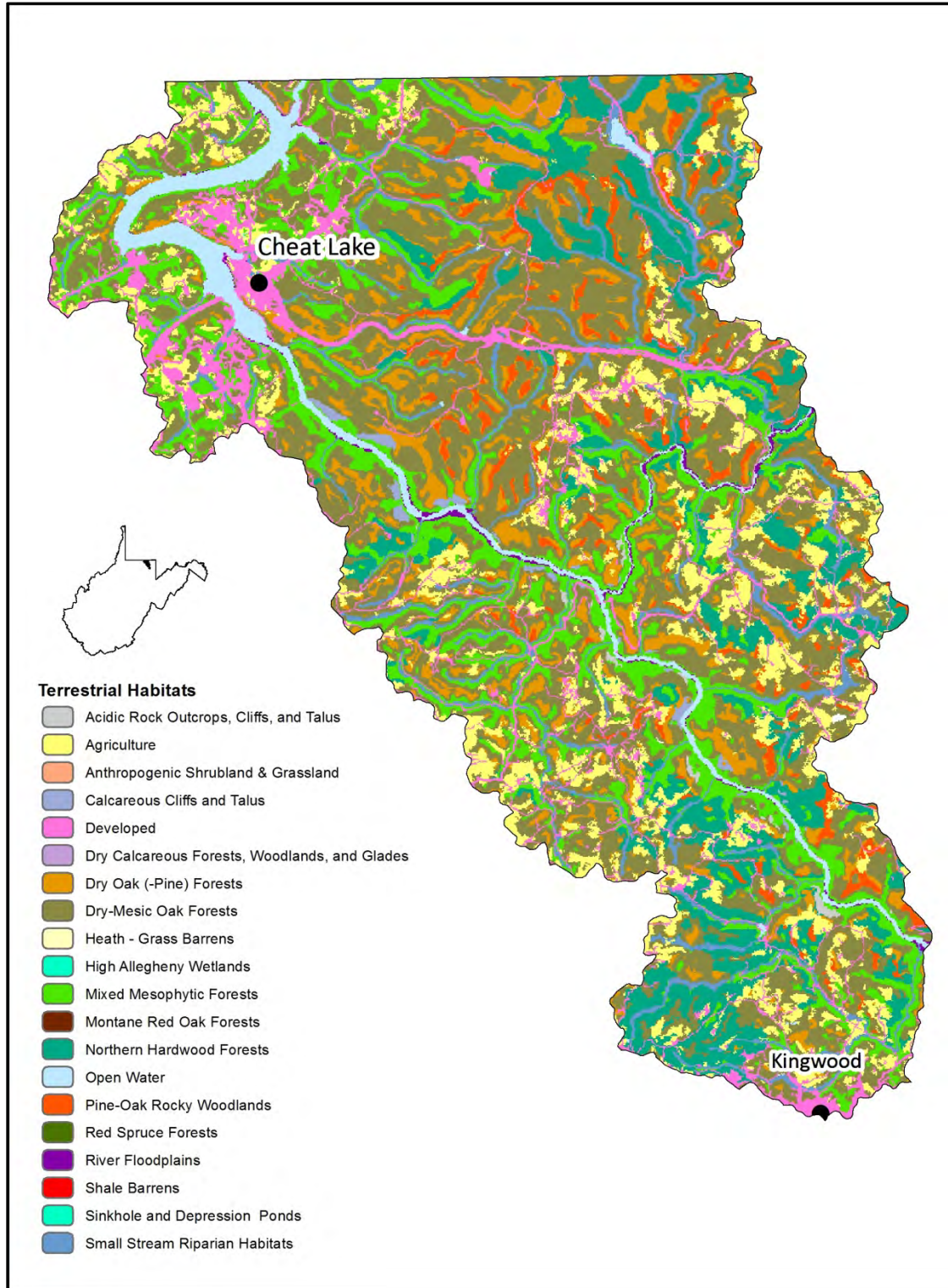
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Little Kanawa/Middle Island Creek

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

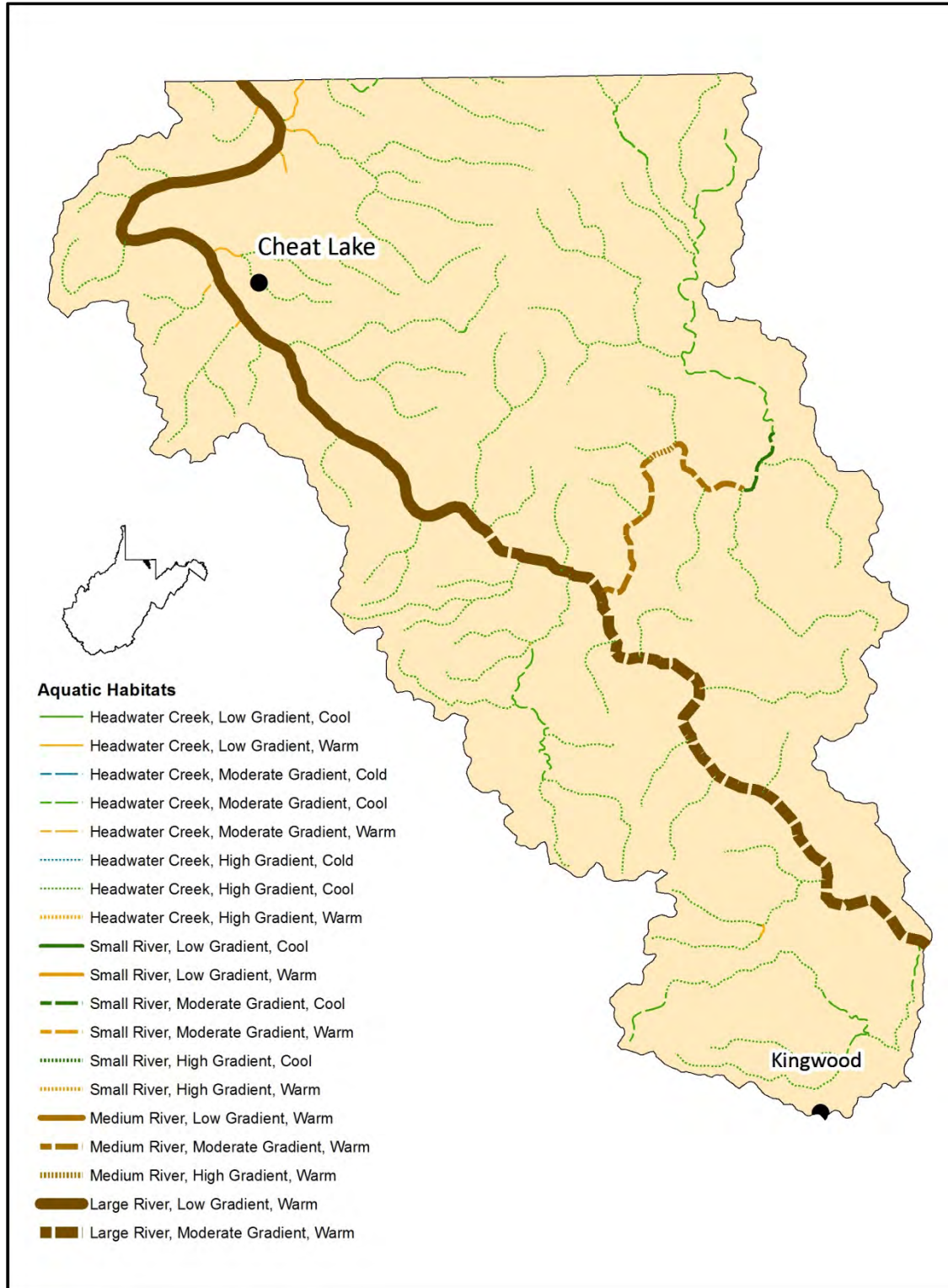
6.16: Cheat Canyon CFA

Cheat Canyon CFA – Terrestrial Habitats



Cheat Canyon CFA (cont.)

Cheat Canyon CFA – Aquatic Habitats



Cheat Canyon CFA (cont.)

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 exceeding 65%. A layer of Greenbrier limestone is exposed in the lower reaches of the canyon and contains several caves. The surrounding upland areas are rolling, mid-elevation, hilly plateaus, culminating in Chestnut Ridge (2600 feet), the westernmost Allegheny Mountain. 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 lowermost 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, a reservoir downstream of the canyon, 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 platysoides*) and includes a cave that is a hibernaculum for the federally endangered Indiana Bat. 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. The steep sandstone cliffs and rocky habitats that line both sides of the canyon provide habitat for Allegheny Woodrat, 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.

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 special 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 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.

Cheat Canyon CFA (cont.)

6.16.5: Conservation Opportunities

- Key WVDNR Partners: WV Department of Environmental Protection, WV Division of Forestry, Friends of the Cheat, West Virginia University, Coopers Rock Foundation, The Nature Conservancy, the rafting community, Cheat River Watershed Association, The Conservation Fund, Appalachian Mountains Joint Venture, West Virginia Geologic and Economic Survey.
- Public Lands: Snake Hill and Cheat Canyon Wildlife Management Areas, 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	1	
Birds	16	9
Butterflies and Moths	1	2
Cave Invertebrates	1	1
Dragonflies and Damselflies	2	
Fish		1
Mammals	4	1
Mussels	2	6
Plants	6	5
Snails	2	12
Totals	35	37

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cheat Canyon

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

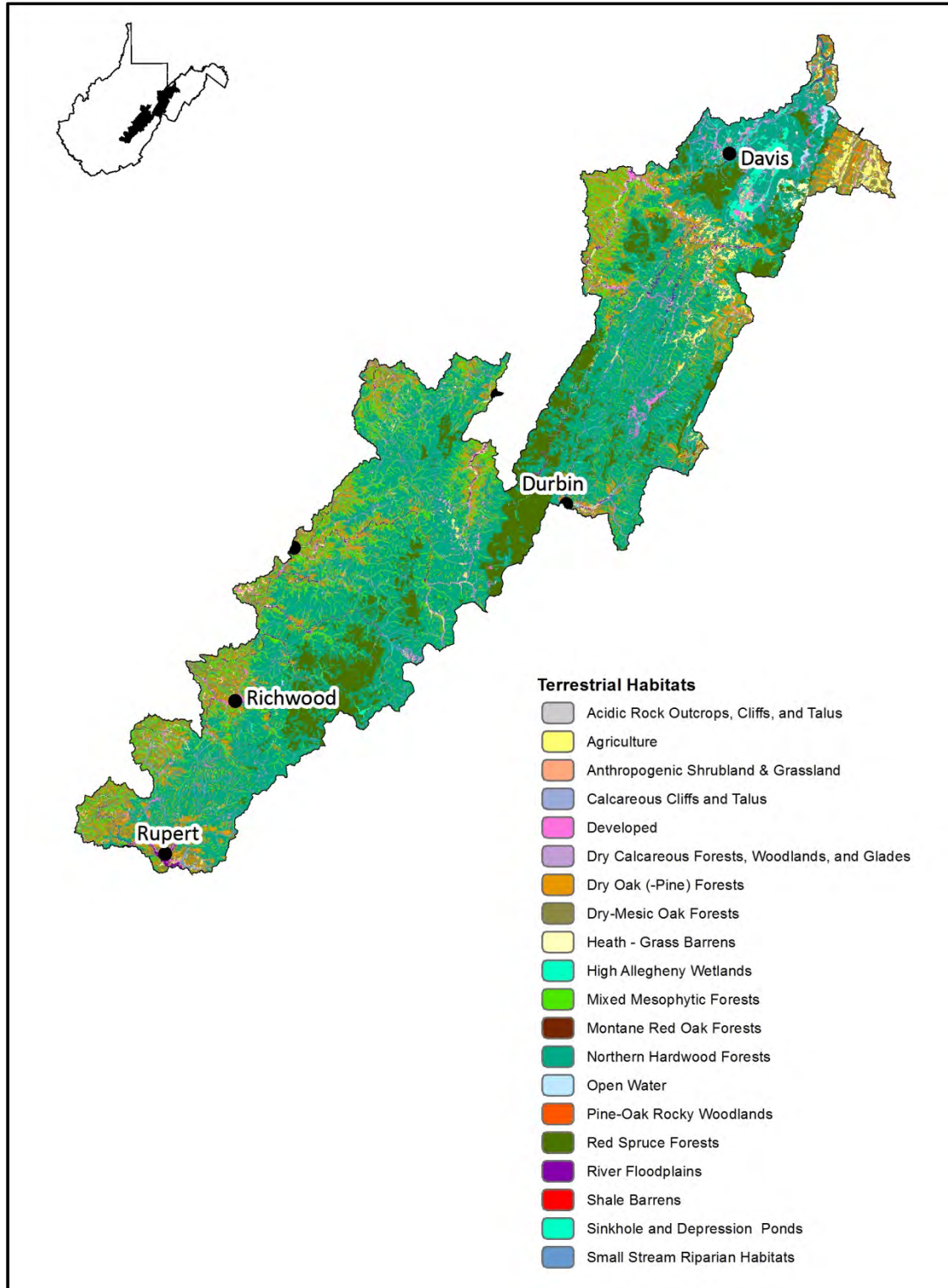
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cheat Canyon

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

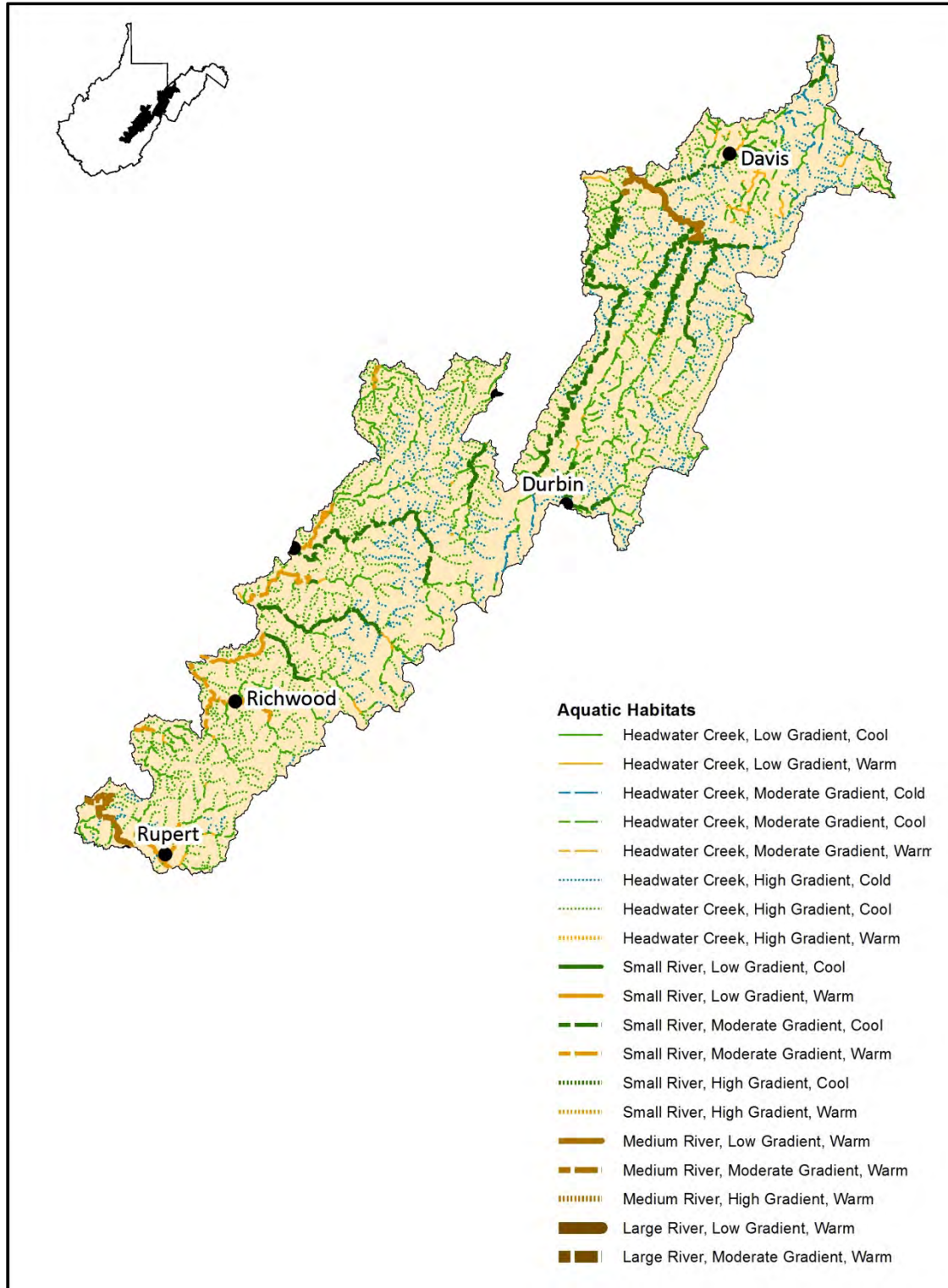
6.17: High Alleghenies CFA

High Alleghenies CFA – Terrestrial Habitats



High Alleghenies CFA (cont.)

High Alleghenies CFA – Aquatic Habitats



High Alleghenies CFA (cont.)

6.17.1: Description

This CFA spans the highest mountains (above 4000') 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 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 WV. 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 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 high elevation grass balds and heathlands, the majority of high elevation 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 Appalachians. 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. 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 Appalachians. 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 21 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 and/or Indiana Bats. With 61 SGCN birds, the importance of this CFA to birds can't 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 occurrences of Candy Darter (*Etheostoma osburni*). Forested streams in the national forest are increasingly recognized as strongholds for the Eastern Hellbender in West Virginia. The amazing

High Alleghenies CFA (cont.)

6.17.2: Significant Wildlife Values (cont.)

diversity and extent of high quality habitats here also support 25 SGCN butterflies and moths, 36 SGCN dragonflies and damselflies, 15 SGCN mammals, 16 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. High elevation energy, transmission, 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.
- Work with public land owners so that habitat loss and fragmentation by renewable energy and other development can be avoided on public lands.
- 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 benefiting early successional forest species.

6.17.5: Conservation Opportunities

- Key WVDNR Partners: US Forest Service, WV Division of Forestry, US Fish and Wildlife Service, Central Appalachian Spruce Restoration Initiative, Potomac Highlands Cooperative Weed and Pest Management Area, The Nature Conservancy, Appalachian Mountains Joint Venture, Wild Turkey Federation, corporate land owners.
- Public Lands: Monongahela National Forest; Canaan Valley National Wildlife Refuge; Canaan Valley, Blackwater Falls, and Cass Scenic RR state parks; Little Canaan, Huttonsville, Becky's Creek, and Handley Wildlife Management Areas; 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	5	2
Birds	34	27
Butterflies and Moths	11	14
Cave Invertebrates	14	7
Crayfish	3	1
Dragonflies and Damselflies	12	24
Fish	9	3
Mammals	9	6
Mussels	4	1
Plants	35	141
Reptiles	5	1
Snails	3	13
Tiger Beetles	2	
Totals	146	240

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = High Alleghenies

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

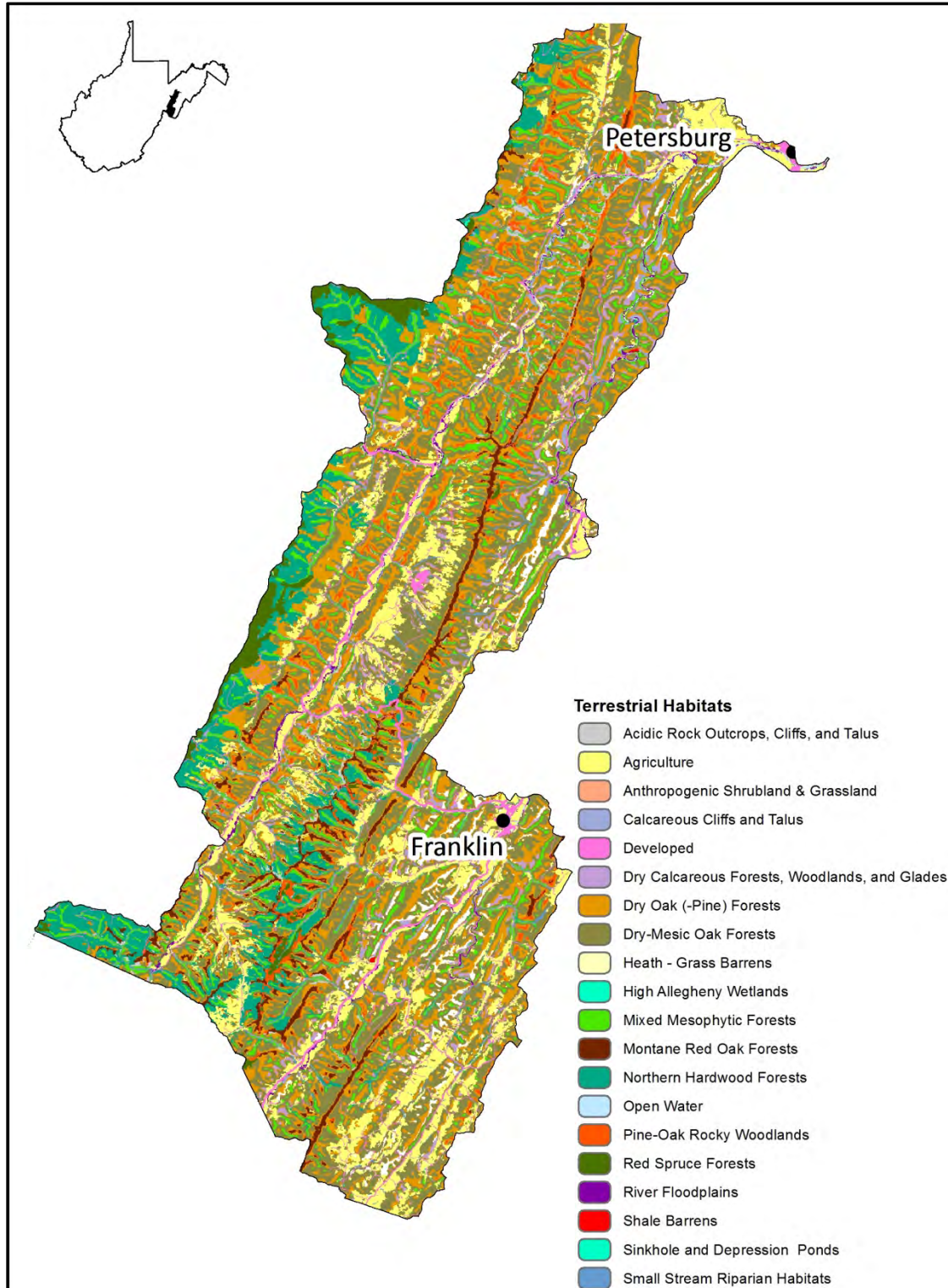
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = High Alleghenies

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

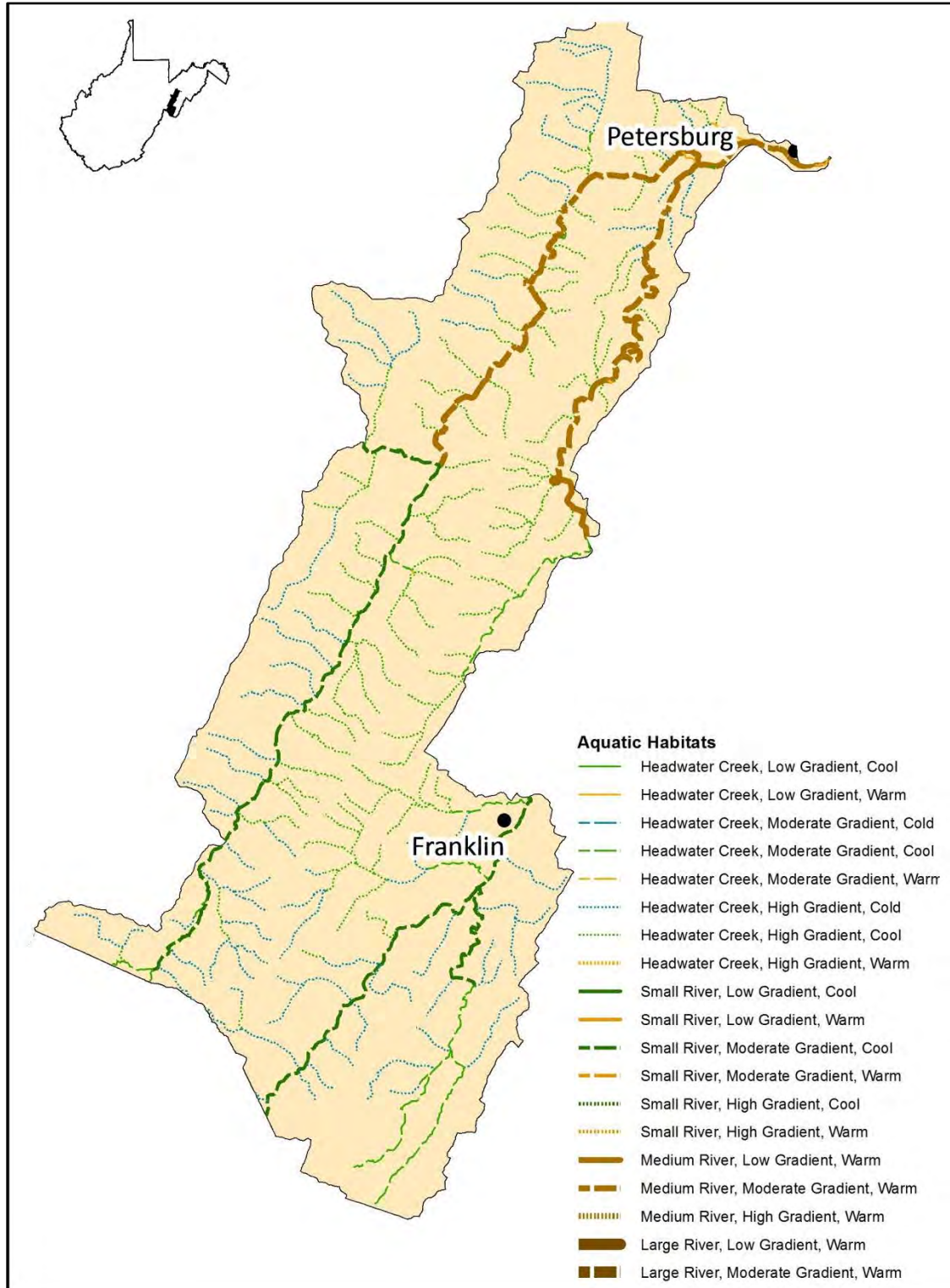
6.18: North Fork Mountain/Thorn Creek CFA

North Fork Mountain/Thorn Creek CFA – Terrestrial Habitats



North Fork Mountain/Thorn Creek CFA (cont.)

North Fork Mountain/Thorn Creek CFA – Aquatic Habitats



North Fork Mountain/Thorn Creek CFA (cont.)

6.18.1: Description

This landscape extends along the north to south spine of North Fork Mountain, the highest mountain in the Northern Ridge and Valley (4500+ feet), and includes Germany Valley and the parallel River Knobs along the North Fork South Branch of the Potomac to the west, and to the east it includes the rugged Smoke Hole Canyon along the mainstem South Branch of the Potomac 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 south of Franklin. The area is in the rain shadow and has very low precipitation, among the lowest in eastern North America. Consequently, most upland habitats are notably dry. Sandstone dominates North Fork Mountain and several other ridges, with shales in the lowlands and extensive areas of limestone in the Smoke Hole and Germany Valley. 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 (seven SGCN, including four cave species known from only one cave each) and all bats of concern in West Virginia, including 40% of the global population of Virginia Big-eared Bat, Indiana Bat, and Northern Long-eared Bat. Prior to White-Nose Syndrome infections, Hellhole Cave supported 100,000 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 forest, the state's most extensive montane red oak forests, and high proportions of dry calcareous habitats. These forests and the embedded patch communities are of regional significance for forest interior nesting birds, Allegheny Woodrat, Timber Rattlesnake, 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 (*Pinus resinosa*). Pike and Panther Knobs on North Fork Mountain support outstanding examples of rare high elevation habitats, including acidic summits, 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.

North Fork Mountain/Thorn Creek CFA (cont.)

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.

6.18.4: Conservation Actions

- Continue to coordinate with the quarry company to minimize potential for the quarry to impact 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.

6.18.5: Conservation Opportunities

- Key WVDNR Partners: Monongahela National Forest, The Nature Conservancy, West Virginia Division of Forestry, 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 Wildlife Management Area. 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	1
Birds	24	12
Butterflies and Moths	7	8
Cave Invertebrates	5	2
Dragonflies and Damselflies	2	5
Fish	4	2
Mammals	7	1
Mussels	1	3
Plants	24	71
Reptiles	2	
Snails	1	14
Tiger Beetles	2	
Totals	83	119

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

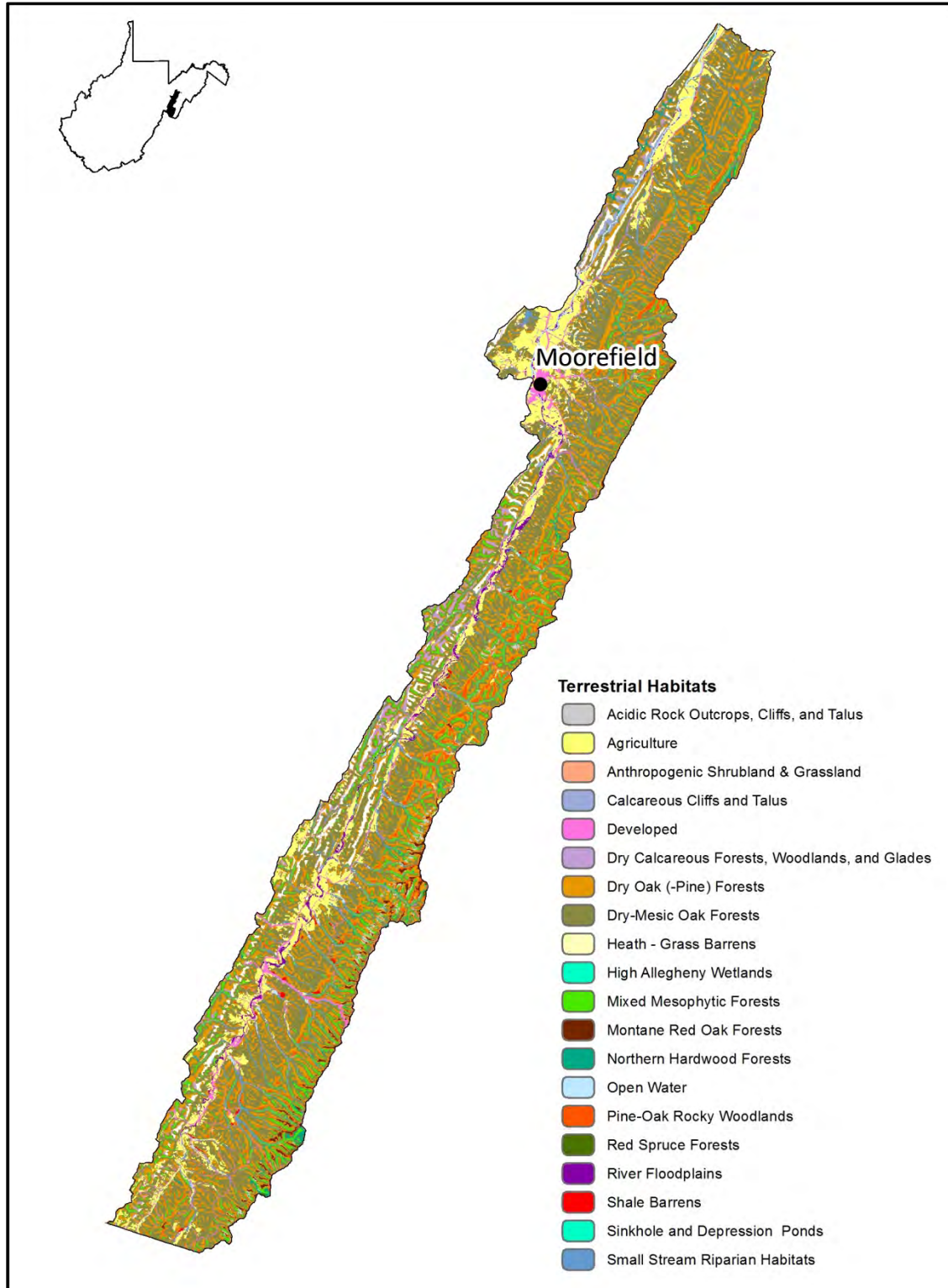
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

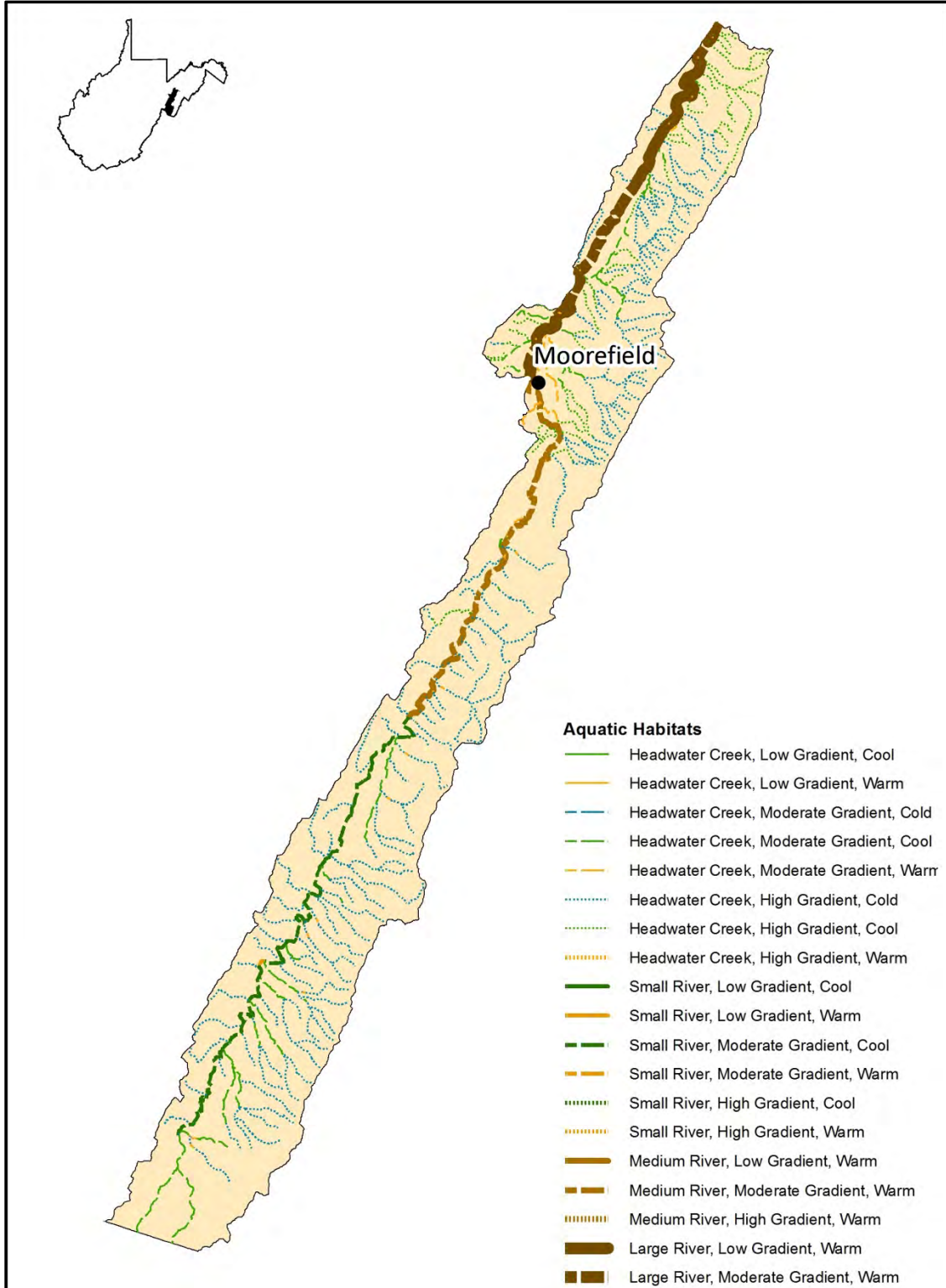
6.19: Shenandoah and Nathaniel Mountains CFA

Shenandoah and Nathaniel Mountains CFA – Terrestrial Habitats



Shenandoah and Nathaniel Mountains CFA (cont.)

Shenandoah and Nathaniel Mountains CFA – Aquatic Habitats



Shenandoah and Nathaniel Mountains CFA (cont.)

6.19.1: Description

Shenandoah Mountain is the largest massif in the Northern Ridge and Valley, rising dramatically above the South Fork of the South Branch Valley to elevations above 4000 feet. The Virginia state line follows the crest of the mountain for much of its West Virginia length. Northward, wholly in West Virginia, it stretches into South Branch Mountain and eventually Nathaniel Mountain. River valleys are low in elevation. The valley of the South Fork 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 that is the largest private tract in the Chesapeake Bay 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 endemics. 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 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, 11 SGCN snails, and 52 SGCN plants. A cave with a significant population of Indian Bat occurs along the South Fork. American Eel (*Anguilla rostrata*) adults are still commonly found in larger streams. The Trough is a gorge carved out of limestone that 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.

Shenandoah and Nathaniel Mountains CFA (cont.)

6.19.4: Conservation Actions

- Cooperative efforts with public land owners to maintain large, intact forest blocks thus protecting many other special habitats;
- Work with public land owners 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.

6.19.5: Conservation Opportunities

- Key WVDNR Partners: George Washington-Jefferson National Forest, West Virginia Division of Forestry, Natural Resources Conservation Service, Potomac Highlands Cooperative Weed and Pest Management Area, Appalachian Mountains Joint Venture, large hunt clubs.
- Public Lands: George Washington-Jefferson National Forest, Nathaniel Mountain Wildlife Management Area, South Branch Wildlife Management Area, 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	2
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	2	
Snails		11
Totals	59	78

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

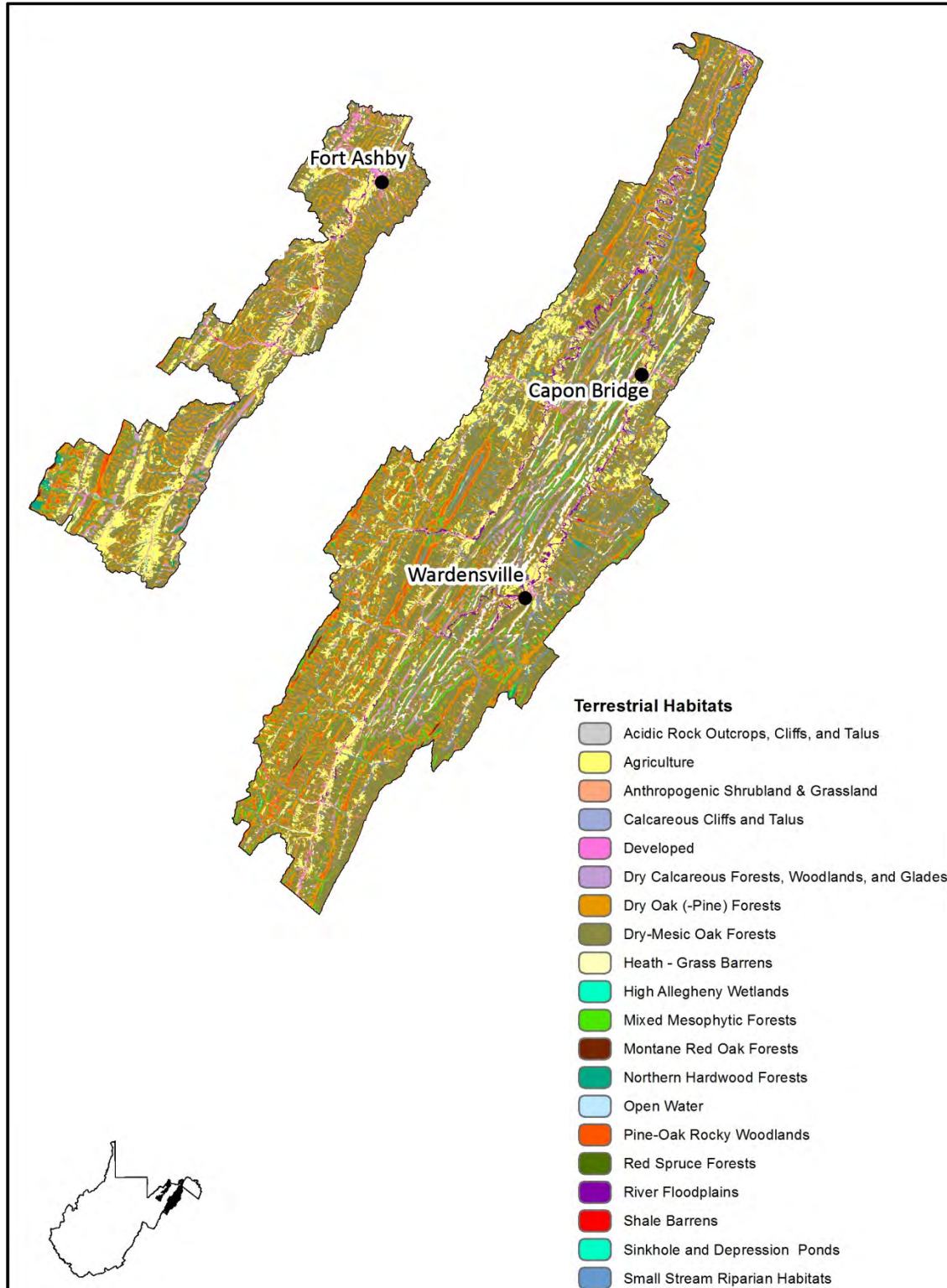
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mou

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

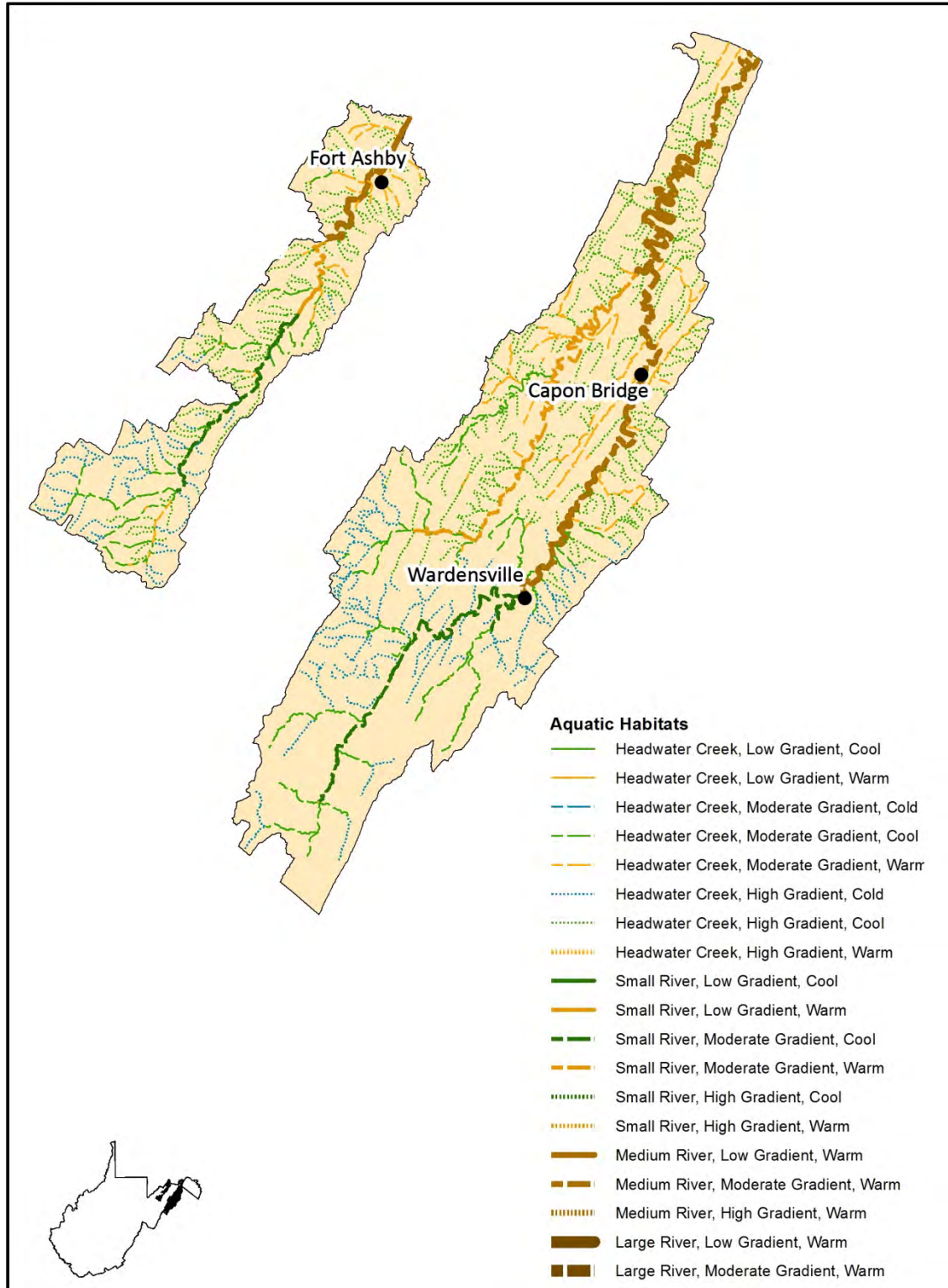
6.20: Cacapon River and Patterson Creek CFA

Cacapon River and Patterson Creek CFA – Terrestrial Habitats



Cacapon River and Patterson Creek CFA (cont.)

Cacapon River and Patterson Creek CFA – Aquatic Habitats



Cacapon River and Patterson Creek CFA (cont.)

6.20.1: Description

This 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 extensive low elevation, primarily shaley uplands which give way to parallel ridges of mostly shale and sandstone. Higher mountains, some of which rise above 3000 feet, include Cacapon Mountain, Great North Mountain, Short Mountain, Long Mountain, Patterson Creek Mountain, Knobly Mountain, and the Allegheny Front. Some areas of limestone occur in both watersheds. 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 land, hay land, 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, the as-yet undescribed Checkered Sculpin, and Tessellated Darter (*Etheostoma olmstedi*). 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 at Ice Mountain is a notable refugium for rare plants and snails and the extensive, high quality wetlands on Short Mountain Wildlife Management Area 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.

Cacapon River and Patterson Creek CFA (cont.)

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.
- Cooperative efforts with public land owners 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-Jefferson National Forest, West Virginia Division of Forestry, West Virginia Department of Environmental Protection, Natural Resources Conservation Service, West Virginia Conservation Agency, county farmland protection boards, The Cacapon and Lost Rivers Land Trust, Friends of the Cacapon, The Cacapon Insititute, Potomac Conservancy.
- Public Lands: George Washington-Jefferson National Forest, Short Mountain Wildlife Management Area, Edwards Run Wildlife Management Area, Nathaniel Mountain Wildlife Management Area, Sideling Hill Wildlife Management Area, Cacapon State Park, and Lost River State Park.

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	3	1
Birds	29	15
Butterflies and Moths	11	3
Cave Invertebrates	2	
Dragonflies and Damselflies	10	18
Fish	8	4
Mammals	4	1
Mussels	8	5
Plants	15	60
Reptiles	2	
Snails	1	6
Tiger Beetles	1	
Totals	94	113

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

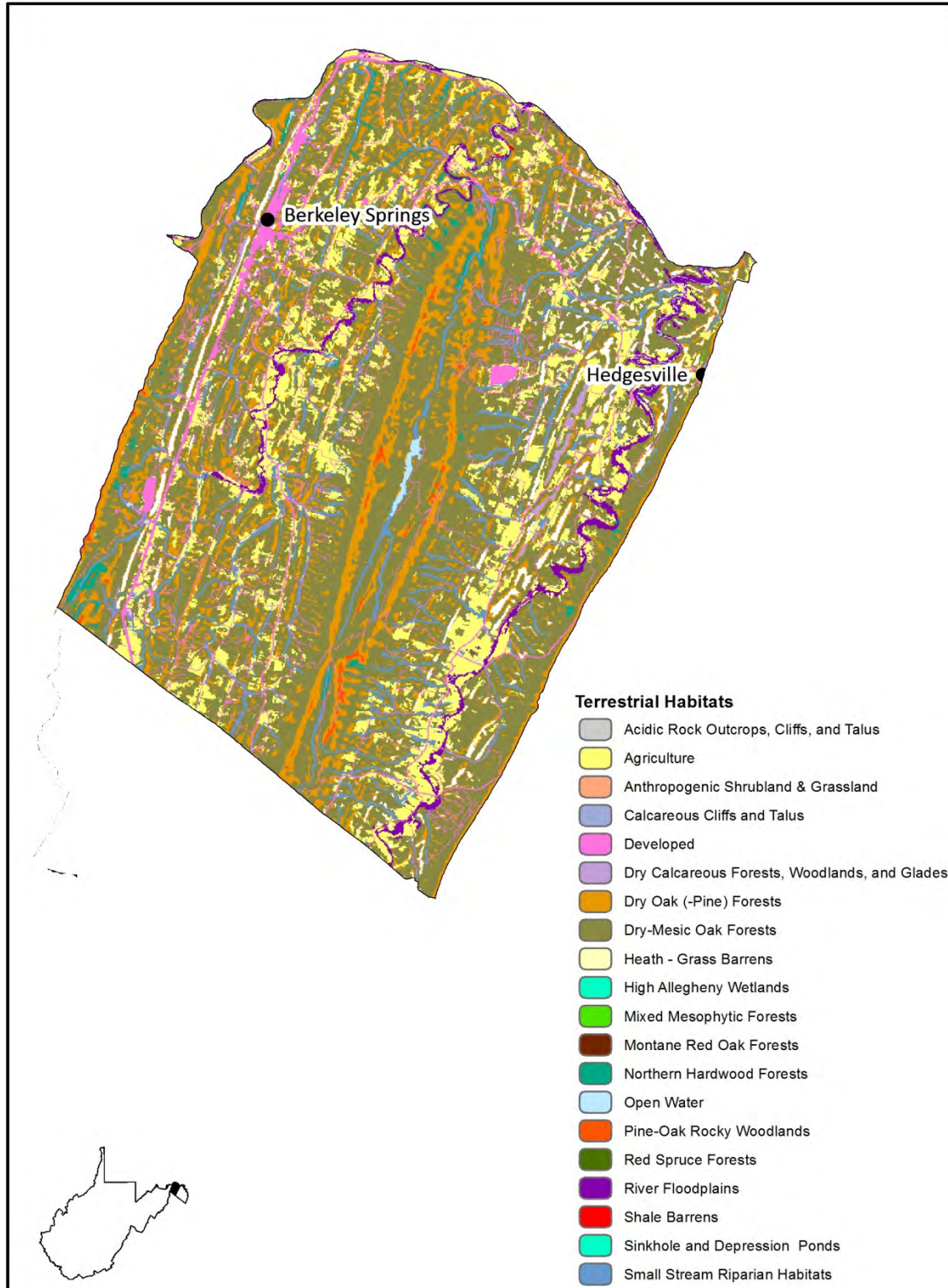
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Cacapon River/Patterson Creek

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

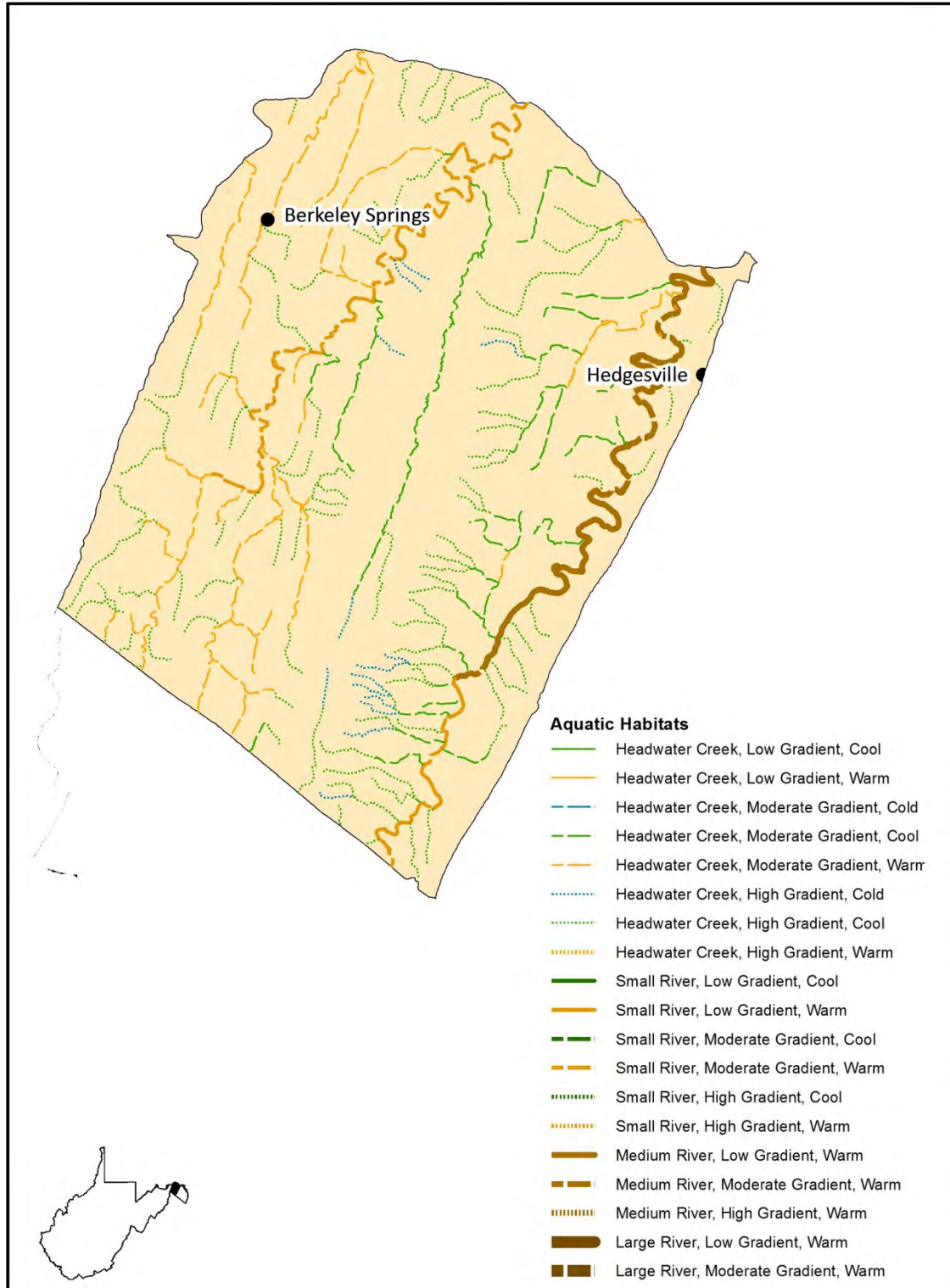
6.21: Sleepy Creek and Back Creek CFA

Sleepy Creek and Back Creek CFA – Terrestrial Habitats



Sleepy Creek and Back Creek CFA (cont.)

Sleepy Creek and Back Creek CFA – Aquatic Habitats



Sleepy Creek and Back Creek CFA (cont.)

6.21.1: Description

This CFA encompasses three adjoining Ridge and Valley watersheds: Warm Spring Run, Sleepy Creek, and Back Creek. All streams flow north and drain directly into the Potomac River. 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 ridge tops and upper slopes are mostly forested, with significant moderate-sized forest blocks surviving only at Cacapon State Park and Sleepy Creek Wildlife Management Area. 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, including 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 Wildlife Management Area - 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.

Sleepy Creek and Back Creek CFA (cont.)

6.21.5: Conservation Opportunities

- Key WVDNR Partners: West Virginia Department of Environmental Protection, West Virginia Conservation Agency, Natural Resources Conservation Service, West Virginia Division of Forestry, 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 Wildlife Management Area, 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	3	2
Birds	17	10
Butterflies and Moths	4	1
Dragonflies and Damselflies	1	9
Fish	6	2
Mammals	1	3
Mussels	6	4
Plants	8	25
Reptiles	2	1
Snails		5
Totals	48	62

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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%	

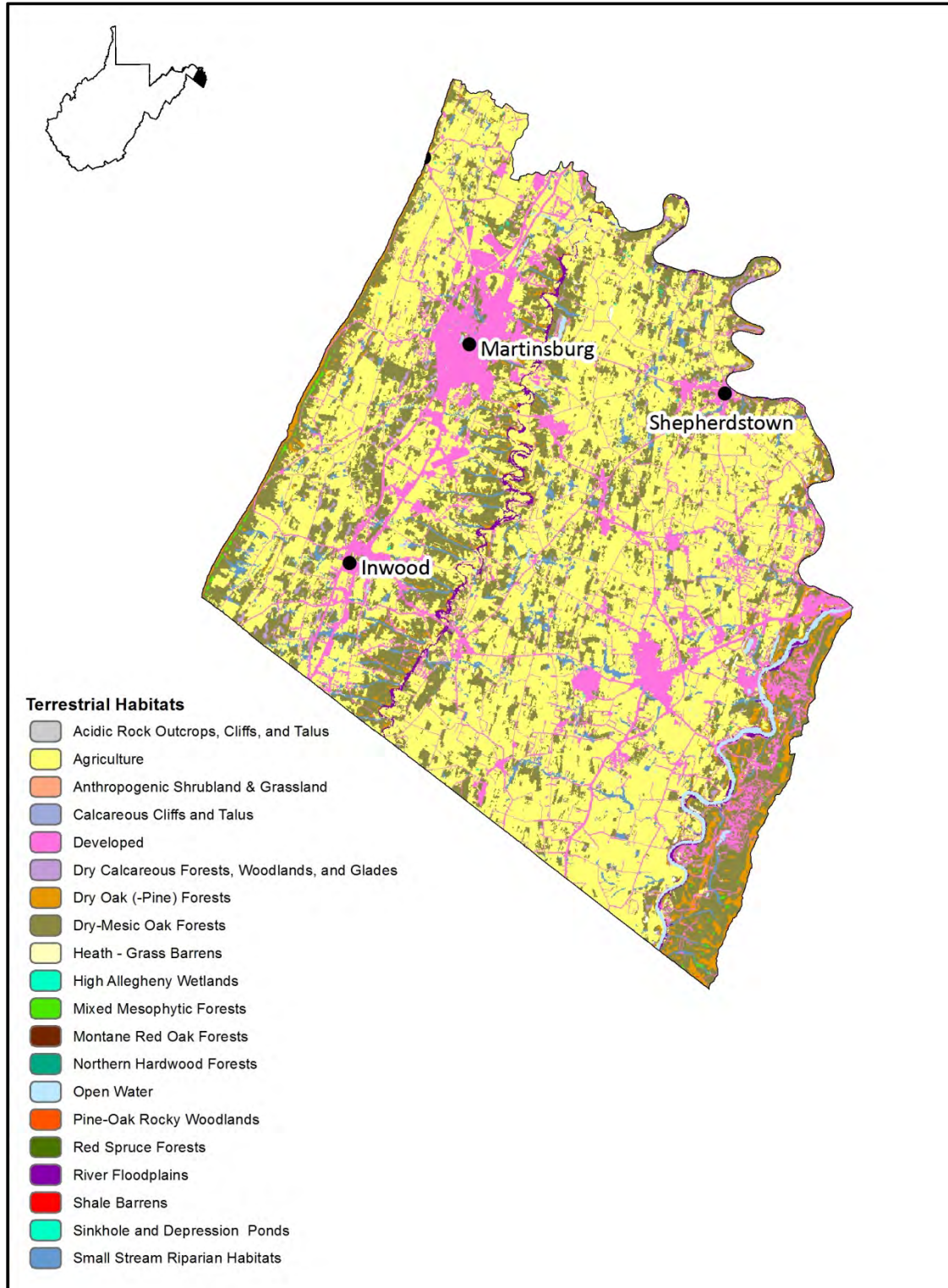
AQUATIC HABITAT SUMMARY

CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

HABITAT TYPE	MILES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT 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%	

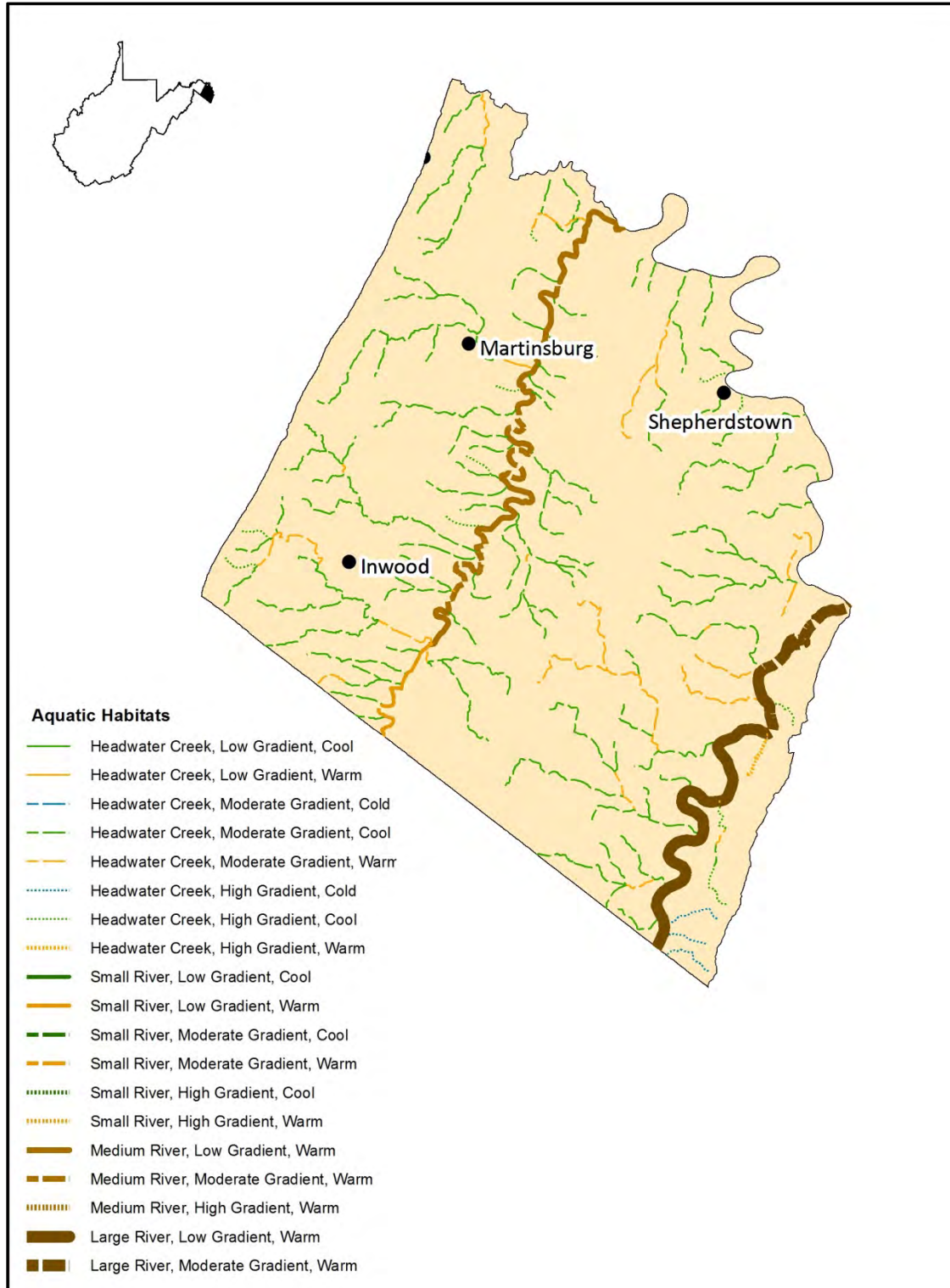
6.22: Shenandoah Valley CFA

Shenandoah Valley CFA – Terrestrial Habitats



Shenandoah Valley CFA (cont.)

Shenandoah Valley CFA – Aquatic Habitats



Shenandoah Valley CFA (cont.)

6.22.1: Description

This 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 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 matrix 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 substantially 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 five other SGCN cave invertebrates, including a cave amphipod known only from one site. This is an important CFA for birds (37 SGCN). The extensive farmlands (grasslands and shrublands) are among the most extensive in the state and represent a significant portion of the state's habitat for a suite of grassland birds, including loggerhead shrike, 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, Prothonotary Warbler, and Nodding Trillium (*Trillium cernuum*). The Shenandoah River is a dominant landscape feature that supports riparian birds of concern and as many as ten fish species of concern. 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).

Shenandoah Valley CFA (cont.)

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, West Virginia Department of Environmental Protection, West Virginia Conservation Agency, Opequon Creek Watershed Association, Natural Resource Conservation Service, 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 Wildlife Management Area, National Conservation Training Center, Harpers Ferry National Historical Park, Appalachian Trail National Scenic Trail, Leetown Science Center (USGS), 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	1
Birds	23	14
Butterflies and Moths	2	8
Cave Invertebrates	4	2
Dragonflies and Damselflies		7
Fish	9	5
Mussels	6	3
Plants	14	66
Reptiles	4	1
Snails		5
Totals	64	112

TERRESTRIAL HABITAT SUMMARY

CONSERVATION FOCUS AREA = Greater Shenandoah Valley

HABITAT TYPE	ACRES IN CFA	PERCENT OF CFA	PERCENT OF HABITAT
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	PERCENT OF HABITAT 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 SWAP was published, conservation planning for 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 decade that has passed since 2005 has witnessed both the progress that has been made in those areas and 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 is 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. While that effort proceeds, however, there is much that can be done to ensure that the conservation community does the best job that 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, is clearly a recipe for better conservation results. The sections that follow present a framework for those results.

7.2: Monitoring

An integral component of the framework is monitoring to assess species and habitat trends and responses to management actions. However, monitoring can easily consume so many limited human and financial resources that little time or money is left 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. This 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 at SGCN's identified in the West Virginia SWAP in its Biotics5 database. Biotics5 contains taxonomic information, global and state conservation status ranks (based on degree of

endangerment), status on the state tracking list and other ecological details for over 8500 plant and animal species and plant communities found in the state. For the WVDNR, Biotics5 will continue to be the extensive, statewide species monitoring component of the framework.

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 the status of population trends. 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 subsequent to approval of 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

The most effective strategy to extensively monitor habitats at a statewide scale is to improve and regularly repeat habitat mapping for the state as was done for the West Virginia SWAP. This strategy has been prioritized in Section 10.4 Research and Data Acquisition.

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 10.4 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

Measuring and monitoring the results of implementing 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 are integrated with conservation actions themselves.

There should be no implementation of conservation action without integrated monitoring protocols. These protocols will include biological components and feedback assessments from partners.

7.3: Adaptive Management

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/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.

7.4: 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

- 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 SGCN'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.

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. The annual federal aid reports for the project will contain all of the updated elements of the continuously revised West Virginia State Wildlife Action Plan.

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Appendix 1: SGCN Species List by Taxa and Priority

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 texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Gyrinophilus subterraneus</i> *	West Virginia Spring Salamander	S1	G1
	<i>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Necturus maculosus</i> *	Mudpuppy	S4	G5
	<i>Plethodon nettingi</i> *	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus</i> *	Cow Knob (white Spotted) Salaman	S2	G3
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander	S2	G2G3Q
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot	S1	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

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Desmognathus monticola</i>	Seal Salamander	S5	G5
	<i>Desmognathus ochrophaeus</i>	Allegheny Mountain Dusky Salama	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 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 ruber ruber</i>	(northern) Red Salamander	S3	G5

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>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>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>Botaurus lentiginosus</i> *	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	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>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

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>Lanius ludovicianus</i> *	Loggerhead Shrike	S1B,S1N	G4
	<i>Limnothlypis swainsonii</i> *	Swainson's Warbler	S3B	G4
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	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 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>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Asio flammeus</i>	Short-eared Owl	S2N	G5
	<i>Butorides virescens</i>	Green Heron	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	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	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 [B,W]</i>	Rusty Blackbird	S1N	G4
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	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

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	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>Setophaga caerulescens</i>	Black-throated Blue 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>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

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>Atrytonopsis hianna</i> *	Dusted Skipper	S1	G4G5
	<i>Autochton cellus</i> *	Golden-banded Skipper	S1S2	G4
	<i>Brachionycha borealis</i> *	Boreal Fan Moth	S1	G4
	<i>Callophrys irus</i> *	Frosted Elfin	S1	G3
	<i>Catocala dulciola</i> *	Sweet Underwing	SU	G3
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing	SU	G3T3
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Chaetagnaea cerata</i> *	Waxed Sallow Moth	S1	G3G4
	<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>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hadena ectypa</i> *	Starry Champion Moth	S1	G3G4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Lophocampa maculata</i> *	Spotted Tussock Moth	S1	G5
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Phyciodes cocyta selene*</i>	Northern Crescent	S2	G5
	<i>Polygonia faunus symthi*</i>	Smyth's Green Comma	S1	G5T3
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Speyeria idalia*</i>	Regal Fritillary	SH	G3
	<i>Zale calycanthata*</i>	Double-banded Zale	SU	G4
	<i>Aplectoides condita</i>	A Noctuid Moth	S1	G4
	<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>Cerastis salicarum</i>	Willow Dart	S1	G5
	<i>Colias interior (high elev)</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Eilema bicolor</i>	Bicolor Moth	S1	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Euchlaena effecta</i>	Effective Euchaena Moth	S1	G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes conspicua</i>	Black Dash	S1	G4
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Lycaena epixanthe</i>	Bog Copper	S1	G4G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Melanchnra assimilis</i>	Black Arches	S1	G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth	SH	G4
	<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>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Antrolana lira</i> *	Madison Cave Isopod	S1	G2G4
	<i>Apochthonius paucispinosus</i> *	Dry Fork Valley Cave Pseudoscorpi	S1	G1
	<i>Arrhopalites commorus</i> *	A Collembola	S1	G2G4
	<i>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G1G2
	<i>Arrhopalites sacer</i> *	A Collembola	S1	G1G2
	<i>Arrhopalites sp. 3</i> *	A Collembola	S1	G1
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2G3
	<i>Caecidotea franzi</i> *	Franz's Cave Isopod	S1	G2G4
	<i>Caecidotea pricei</i> *	Price's Cave Isopod	S1	G5
	<i>Caecidotea scyphus</i> *	An Isopod	S1	G1G2
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1G2
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1G2
	<i>Chitrella regina</i> *	Royal Syarinid Pseudoscorpion	S1	G1G2
	<i>Conotyla vista</i> *	A Cave Millipede	SH	G1G2
	<i>Crangonyx sp. 2</i> *	An Amphipod	S2	G2
	<i>Geocentrophora cavernicola</i> *	Cave Flatworm	SH	G1G2
	<i>Haplotaxis brinkhursti</i> *	An Oligochaete	S1	G1
	<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 Pseudoscor	S1	G3G4
	<i>Kleptochthonius hetricki</i> *	Organ Cave Pseudoscorpion	S1	G1

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Kleptochthonius orpheus</i> *	Orpheus Cave Pseudoscorpion	S1	G1
	<i>Kleptochthonius proserpinae</i> *	Proserpina Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi</i> *	Diplura	S2	G3G4
	<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>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	G2G3
	<i>Pseudanophthalmus grandis elevatus</i> *	A Cave Beetle	S1	G3T2
	<i>Pseudanophthalmus grandis grandis</i> *	A Cave Beetle	S3	G3T3
	<i>Pseudanophthalmus grandis ssp. 1</i> *	A Cave Beetle	S1	G3TNR
	<i>Pseudanophthalmus hadenoecus</i> *	Timber Ridge Cave Beetle	S1	G1
	<i>Pseudanophthalmus higinbothami</i> *	A Cave Beetle	S2	G3G4
	<i>Pseudanophthalmus lallemanti</i> *	Lallemant's Cave Beetle	S1	G1
	<i>Pseudanophthalmus montanus</i> *	Dry Fork Valley Cave Beetle	S1	G1G2
	<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

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<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 lusciosa*</i>	Germany Valley Cave Millipede	S1	G1G2
	<i>Pseudotremia princeps*</i>	South Branch Valley Cave Millipede	S1	G1
	<i>Pseudotremia sp. 1*</i>	General Davis Cave Millipede	S1	G1?
	<i>Sinella agna*</i>	A Springtail	S3	G3G4
	<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	G3G4
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus gracilipes*</i>	Shenandoah Valley Cave Amphipod	S1	G3G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Stygobromus morrisoni</i> *	Morrison's Cave Amphipod	S1	G2G3
	<i>Stygobromus nanus</i> *	Pocahontas Cave Amphipod	S1	G1G2
	<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>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	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
	<i>Anthrobia coylei</i>	Spider	S2	GNR
	<i>Bathyphantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Erebomaster nr. acanthina</i>	A Cave Spider	S2	GNR
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<i>Horologion speokites</i>	Arbuckle Cave Ground Beetle	SH	GH
	<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

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Pseudanophthalmus henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G5
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G4
	<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 Amphi	S2	G5
	<i>Zygonopus packardi</i>	Packard's Blind Cave Millipede	S2	G4

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish	<i>Dubius A*</i>	Teays Burrowing Crayfish	S2	GNR
	<i>Dubius B*</i>	Meadow River Burrowing Crayfish	S2	GNR

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<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 angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G3G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Lanthus vernalis</i> *	Southern Pygmy Clubtail	S1	G4
	<i>Leucorrhinia glacialis</i> *	Crimson-ringed Whiteface	S1	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Nehalennia gracilis</i> *	Sphagnum Sprite	S1	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>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Rhionaeschna mutata</i> *	Spatterdock Darner	S1	G4
	<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>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<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>Epitheca canis</i>	Beaverpond Baskettail	S3	G5
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Hetaerina titia</i>	Smoky Rubyspot	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Ischnura kellicotti</i>	Lilypad Forktail	S1	G5
	<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 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>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>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<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 ambiguum</i>	Blue-faced Meadowhawk	S1	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>Telebasis byersi</i>	Duckweed Firetail	S1	G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies	<i>Tramea onusta</i>	Red Saddlebags	S1	G5

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Eastern Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G4T2
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel	S2	G5T2
	<i>Lasiurus borealis</i> *	Eastern Red Bat	S4	G5
	<i>Lasiurus cinereus</i> *	Hoary Bat	S3	G5
	<i>Microtus chrotorrhinus carolinensis</i> *	Southern Rock Vole	S2	G4T3
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis lucifugus</i> *	Little Brown Myotis	S2*	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<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>Perimyotis subflavus</i> *	Tricolored Bat	S2*	G3
	<i>Sorex palustris punctulatus</i> *	Southern Water Shrew	S1	G5T3
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S1	G5
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Erethizon dorsatum</i>	Porcupine	S3	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Lasiurus seminolus</i>	Seminole Bat	S1	G5
	<i>Lepus americanus</i>	Snowshoe Hare		G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Microtus ochrogaster</i>	Prairie Vole	S3	G5
	<i>Nycticeius humeralis</i>	Evening Bat	S1	G5
	<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>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

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Allium allegheniense</i> *	Allegheny Onion	S2	G3?
	<i>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2Q
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lanceolate Grapefern	S1	G5T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex davisii</i> *	Davis' Sedge	S1	G4
	<i>Carex lucorum</i> var. <i>australucorum</i> *	Blue Ridge Sedge	S1	G4T3T5
	<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 polymorpha</i> *	Variable Sedge	S1	G3
	<i>Carex purpurifera</i> *	Purple Sedge	S1	G4?
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G3
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex tetanica</i> *	Rigid Sedge	S1	G4G5
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort	S1	G4?
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G1G2
	<i>Corallorhiza maculata var. occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Eleocharis engelmannii</i> *	Engelmann's Spikerush	S1	G4G5Q
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gentiana alba</i> *	Yellow Gentian	S1	G4
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Gratiola viscidula</i> *	Short's Hedgehyssop	S1	G4G5
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Gymnopogon ambiguus</i> *	Bearded Skeleton Grass	S1	G4
	<i>Helianthemum propinquum</i> *	Low Frostweed	S1	G4
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana var. hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Hottonia inflata</i> *	Featherfoil	S1	G4
	<i>Huperzia porophila</i> *	Rock Clubmoss	S1	G4
	<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 valida</i> *	True Quillwort	S1	G4?
	<i>Isotria medeoloides</i> *	Small Whorled Pogonia	S1	G2
	<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>Ludwigia polycarpa</i> *	Top-pod Primrose-willow	S1	G4
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Panicum verrucosum</i> *	Warty Panicgrass	S1	G4
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus	S1	G3

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Phacelia covillei</i> *	Phacelia	S1	G3
	<i>Phlox buckleyi</i> *	Swordleaf Phlox, Shale Barren Phlo	S2	G2
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid	S1	G1?
	<i>Poa paludigena</i> *	Bog Bluegrass	S1	G3
	<i>Polemonium vanbruntiae</i> *	Bog Jacob's-ladder	S2	G3G4
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2
	<i>Prenanthes crepidinea</i> *	Corymbed Rattlesnake-root	S1	G4
	<i>Prosartes maculata</i> *	Yellow Mandarin	S1	G3G4
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Rhynchospora fusca</i> *	Brown Beaksedge	S1	G4G5
	<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
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush	S1	G3
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita</i> *	Virginia Mallow	S3	G3

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Silene caroliniana ssp. wherryi</i> *	Sticky Catchfly	S1	G5T2T4Q
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Silene rotundifolia</i> *	Sandstone Fire-pink	S1	G4
	<i>Silene virginica var. robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Silphium compositum var. reniforme</i> *	Rosinweed	S1	G5T3T5
	<i>Silphium perfoliatum var. connatum</i> *	Cup-plant	S1	G5T3?
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Spermacoce glabra</i> *	Buttonweed	S1	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Stenanthium gramineum var. micranthum</i> *	Tiny-flower Featherbells	S1	G4G5TNR
	<i>Stenanthium gramineum var. robustum</i> *	Stout Featherbells	S1S2	G4G5T3T5
	<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>Thelypteris simulata</i> *	Bog Fern	S1	G4G5
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel	S1	G3G5
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 pusillum var. virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Utricularia geminiscapa</i> *	Hidden-fruit Bladderwort	S1	G4G5
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern	S1	G4
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4
	<i>Zigadenus elegans ssp. glaucus</i> *	Mountain Deathcamas	S1	G5T4T5
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica var. 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>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 var. glaucophylla</i>	Bog-rosemary	S1	G5T5
	<i>Andropogon glomeratus var. glomeratus</i>	Bushy Broom-sedge	S3	G5T5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arctostaphylos uva-ursi</i>	Kinniinnick	S1	G5
	<i>Aristida purpurascens var. purpurascens</i>	Arrowfeather Three-awn	S1	G5T5
	<i>Arundinaria gigantea ssp. 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 var. distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Bartonia paniculata ssp. paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Bolboschoenus fluviatilis</i>	River Bulrush	S1	G5
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<i>Bouteloua curtipendula var. curtipendula</i>	Sideoats Grama	S3	G5T5
	<i>Calamagrostis porteri ssp. porteri</i>	Reedgrass	S3	G4T4
	<i>Calamagrostis stricta ssp. stricta var. stricta</i>	Reedgrass	S1	G5T5
	<i>Calopogon tuberosus var. tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Calystegia spithamea ssp. purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Campanula rotundifolia</i>	Bluebell Bellflower	S3	G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Campylopus flexuosus</i>	Campylopus Moss	S1	G5?
	<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 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 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

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 var. americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex laxiculmis var. copulata</i>	Spreading Sedge	S2	G5T3T5
	<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 var. oligosperma</i>	Fewseed Sedge	S1	G5?T5?
	<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 prairea</i>	Prairie Sedge	S1	G5?
	<i>Carex projecta</i>	Necklace Sedge	S3	G5
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex straminea</i>	Straw Sedge	S2	G5
	<i>Carex tonsa var. rugosperma</i>	Parachute Sedge	S2S3	G5T5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex tonsa</i> var. <i>tonsa</i>	Shaved Sedge	S1	G5T5
	<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>Ceanothus herbaceus</i>	Prairie Redroot	S1	G5
	<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>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, Satyr O	S1	G5T5
	<i>Commelina erecta</i>	Slender Dayflower	S2	G5T5
	<i>Coptis trifolia</i>	Threeleaf Goldthread	S2	G5
	<i>Corallorhiza trifida</i>	Early Coralroot	S1	G5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroo	S2	G5
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Crataegus pringlei</i>	Pringle's Hawthorn	SH	G5
	<i>Crataegus spathulata</i>	Littlehip Haw	S1	G5
	<i>Cryptogramma stelleri</i>	Fragile Rockbrake	S1	G5
	<i>Cuscuta indecora</i> var. <i>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>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>Desmodium lineatum</i>	Tick-trefoil	S1	G5
	<i>Desmodium pauciflorum</i>	Few-flower Tick-trefoil	S1	G5
	<i>Dichanthelium acuminatum</i> ssp. <i>acuminatum</i>	Hairy Panicgrass	S1	G5T5
	<i>Dichanthelium acuminatum</i> ssp. <i>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

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SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Drosera rotundifolia</i> var. <i>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 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</i> ssp. <i>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>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 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>Fimbristylis annua</i>	Annual Fimbry	S1	G5
	<i>Fraxinus nigra</i>	Black Ash	S2	G5

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Plants				
	<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 dumosa</i>	Dwarf Huckleberry	S1	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
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria grandis var. grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<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>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 longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass	S1	G5T5

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Plants				
	<i>Hudsonia tomentosa</i> var. <i>tomentosa</i>	False Heather, Woolly Hudsonia	S1	G5T5
	<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>Isoetes riparia</i> var. <i>riparia</i>	Shore Quillwort	SH	G5?T5?Q
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus articulatus</i>	Jointleaf Rush	S2	G5
	<i>Juncus balticus</i> var. <i>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</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>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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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	G4G5T4T5
	<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
	<i>Lonicera canadensis</i>	Fly Honeysuckle	S2	G5
	<i>Ludwigia leptocarpa</i>	River Seedbox	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>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</i> var. <i>alatum</i>	Winged Loosestrife	S2	G5T5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G4G5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Melica nitens</i>	Three-flower Melicgrass	S1	G5
	<i>Melothria pendula</i> var. <i>pendula</i>	Creeping Cucumber, Guadeloupe C	S1	G5?
	<i>Menyanthes trifoliata</i>	Buckbean	S1	G5
	<i>Minuartia groenlandica</i>	Greenland Stitchwort	S1	G5
	<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 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

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Plants				
	<i>Packera plattensis</i>	Prairie Ragwort	S1	G5
	<i>Panicum flexile</i>	Wiry Panicgrass	S1	G5
	<i>Parnassia asarifolia</i>	Kidneyleaf Grass-of-parnassus	S2	G4
	<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>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>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>Poa saltuensis</i>	Old-pasture Bluegrass	S1	G5
	<i>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Polygonum careyi</i>	Carey's Smartweed	SH	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	S1	G5T5
	<i>Potamogeton illinoensis</i>	Illinois Pondweed	S2	G5
	<i>Potamogeton pusillus var. tenuissimus</i>	Slender Pondweed	S1	G5T5
	<i>Potamogeton spirillus</i>	Spiral Pondweed	S2	G5
	<i>Potamogeton zosteriformis</i>	Flatstem Pondweed	SH	G5
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Prunus pumila var. depressa</i>	Sand Cherry	S1	G5T5
	<i>Pycnanthemum clinopodioides</i>	Basil Mountain-mint	SH	G2
	<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>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 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 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>Rhexia mariana var. mariana</i>	Maryland Meadowbeauty	S1	G5T5

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Plants				
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora recognita</i>	Beaked Rush	S2	G5?
	<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 pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5

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Plants				
	<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, Bulrush	S3	G4G5
	<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 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>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>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Solidago patula var. patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Solidago simplex ssp. 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>Spiranthes lacera var. lacera</i>	Northern Slender Ladies' Tresses	S1	G5T5

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Plants				
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<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 eplingii</i>	Epling's Hedge-nettle	S1	G5
	<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>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>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>Torreyochloa pallida var. fernaldii</i>	Mannagrass	S2	G5T4Q
	<i>Torreyochloa pallida var. pallida</i>	Pale False Mannagrass	S1	G5T5?
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Triadenum walteri</i>	Greater Marsh-st. John's-wort	S1	G5
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5

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Plants				
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<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
	<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 septentrionalis</i>	Northern Blue Violet	S2	G5
	<i>Vitis rotundifolia var. rotundifolia</i>	Muscadine	SH	G5T5
	<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>Xyris torta</i>	Slender Yellow-eyed-grass	S2	G5
	<i>Zannichellia palustris</i>	Horned Pondweed	S1	G5
	<i>Zigadenus leimanthoides</i>	Pine Barren Deathcamas	S2	G4Q

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Reptiles				
	<i>Apalone mutica mutica</i> *	Midland Smooth Softshell	S1	G5T5
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner	S1	G5
	<i>Clemmys guttata</i> *	Spotted Turtle	S1	G5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G4
	<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>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>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>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	SNR	G5T5

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Diadophis punctatus edwardsii</i>	Northern Ring-necked Snake	S5	G5T5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<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>Virginia valeriae valeriae</i>	Eastern Earthsnake	S2	G5T5

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira stihleri</i> *		S1	GNR
	<i>Fontigens turritella</i> *	Greenbrier Cavesnail	S1	G1
	<i>Glyphyalinia sp 1</i> *		S1	GNR
	<i>Glyphyalinia virginica</i> *		SH	G3
	<i>Helicodiscus triodus</i> *	Talus Coil	SH	G2
	<i>Helicodiscus villosus</i> *		S1	GNR
	<i>Mesodon aff. Andrewsae</i> *	Balsam Globe	S1	GNR
	<i>Mesomphix luisant</i> *		S1	G1
	<i>Mesomphix sp. 1</i> *		S1	GNR
	<i>Paravitrea bellona</i> *	Club Supercoil	S1	G1
	<i>Paravitrea ceres</i> *	Sidelong Supercoil	SH	G1
	<i>Stenotrema simile</i> *	Bear Creek Slitmouth	S2	G2
	<i>Triodopsis juxtidentis robiniae</i> *		S5T1	GNR
	<i>Triodopsis picea</i> *	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis platysayoides</i> *	Flat-spined Three-toothed Landsnai	S1	G1
	<i>Triodopsis rugosa</i> *	Buttressed Threetooth	S1	G1
	<i>Triodopsis sp. 1</i> *		S1	GNR
	<i>Vertigo clappi</i> *		SH	G1G2
	<i>Vitrina angelicae</i> *		S1	G5
	<i>Anguispira clarki</i>		S1	GNR
	<i>Anguispira kochi</i>	Banded Tigersnail	S1	G5

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Anguispira strongylodes</i>		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>		S1	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Gastrocopta procera</i>	Wing Snaggletooth	S2	G5
	<i>Gastrocopta tappaniana</i>		S3	G5
	<i>Gastrodonta fonticula</i>		S2	G3G4
	<i>Gastrodonta interna</i>	Brown Bellytooth	S3	G5
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Glyphyalinia lewisiana</i>		S2	G4
	<i>Glyphyalinia picea</i>		S2	G3
	<i>Glyphyalinia praecox</i>	Brilliant Glyph	SH	G4
	<i>Glyphyalinia rimula</i>		SH	G3
	<i>Glyphyalinia solida</i>		SH	G5

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Glyphyalinia specus</i>	Hollow Glyph	SH	G4
	<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>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>		SNR	G3G4
	<i>Lucilla singleyana</i>	Smooth Coil	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
	<i>Mesomphix capnodes</i>	Dusky Button	SH	G5
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Mesomphix rugeli</i>		S2	G4
	<i>Nesovitrea electrina</i>	Amber Glass	S3	G5
	<i>Oxyloma retusum</i>		S1	G5
	<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>		S1	G2

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Patera laevior</i>		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
	<i>Punctum vitreum</i>	Glass Spot	S2	G5
	<i>Pupoides albilabris</i>	White-lip Dagger	S3	G5
	<i>Somatogyryus 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>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>		S1	G5
	<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

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* Priority 1 species

SPECIES BY TAXA AND PRIORITY

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<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 coelaxis</i>	Bidentate Dome	S1	G3
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4G5
	<i>Ventridens lawae</i>	Rounded Dome	SH	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Vertigo cristata</i>	Crested Vertigo	S1	G5
	<i>Vertigo elatior</i>		SH	G5
	<i>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Vertigo oscariana</i>		SH	G4
	<i>Vertigo ovata</i>		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
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

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 cursitans</i> *	A Tiger Beetle	S1	G4
	<i>Cicindela marginipennis</i> *	Cobblestone Tiger Beetle	S1	G2
	<i>Cicindela patruela</i> *	Barrens Tiger Beetle	S2S3	G3
	<i>Cicindela splendida</i> *	A Tiger Beetle	S1	G5
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5
	<i>Cicindela formosa generosa</i>	A Tiger Beetle	S1	G5T4
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle	S1	G5
	<i>Cicindela limbalis</i>	A Tiger Beetle	S1	G5
	<i>Cicindela purpurea</i>	A Tiger Beetle	S3	G5
	<i>Cicindela scutellaris</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

Appendix 2: SGCN Species List by Habitat

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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
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 Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Vertigo milium</i>	Blade Vertigo
Tiger Beetles		
	<i>Cicindela cursitans</i> *	A Tiger Beetle

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Anguispira stihleri</i> *	
	<i>Carychium nannodes</i>	File Thorn
	<i>Gastrocopta procera</i>	Wing Snaggletooth
	<i>Glyphyalinia lewisiana</i>	
	<i>Glyphyalinia solida</i>	
	<i>Helicodiscus villosus</i> *	
	<i>Hendersonia occulta</i>	Cherrystone Drop
	<i>Inflectarius inflectus</i>	Shagreen
	<i>Mesomphix luisant</i> *	
	<i>Paravitrea pontis</i>	Natural Bridge Supercoil
	<i>Stenotrema edwardsi</i>	Ridge-and-valley Slitmouth
	<i>Triodopsis platysayoides</i> *	Flat-spired 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

TERRESTRIAL SPECIES BY HABITAT

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 scyphus</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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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> *	Eastern 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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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-spined Three-toothed Landsnail

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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> *	Eastern Big-eared Bat
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat
	<i>Myotis lucifugus</i> *	Little Brown Myotis
	<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>	

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Vallonia costata</i>	Costate Vallonia
	<i>Vallonia excentrica</i>	Iroquois Vallonia
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo ovata</i>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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, Rough Heuchera
	<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

TERRESTRIAL SPECIES BY HABITAT

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>glaucus</i> *	Mountain Deathcamas
Snails		
	<i>Anguispira clarki</i>	
	<i>Anguispira stihleri</i> *	
	<i>Anguispira strongylodes</i>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>Glaucopsyche l. 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> *	Eastern Big-eared Bat
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat
	<i>Cryptotis parva</i>	Least Shrew

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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 Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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, Rough Heuchera
	<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, Shale Barren 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

TERRESTRIAL SPECIES BY HABITAT

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Plants		
	<i>Trillium pusillum var. 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>	
	<i>Carychium exiguum</i>	Obese Thorn
	<i>Discus catskillensis</i>	Angular Disk
	<i>Discus whitneyi</i>	Forest Disc
	<i>Euconulus polygyratus</i>	
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Gastrocopta tappaniana</i>	
	<i>Gastrodonta fonticula</i>	
	<i>Glyphyalinia lewisiana</i>	
	<i>Glyphyalinia rimula</i>	
	<i>Glyphyalinia solida</i>	

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Glyphyalinia sp 1*</i>	
	<i>Glyphyalinia virginica*</i>	
	<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>	
	<i>Oxyloma retusum</i>	
	<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

TERRESTRIAL SPECIES BY HABITAT

HABITAT TYPE Dry Oak (-Pine) Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Ventridens virginicus</i>	Split-tooth Dome
	<i>Vertigo clappi</i> *	
	<i>Vertigo oscariana</i>	
	<i>Vertigo ovata</i>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>	Eastern 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 Myotis
	<i>Myotis septentrionalis*</i>	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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, Satyr Orchid
	<i>Corallorhiza bentleyi*</i>	Bentley's Coralroot
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroot
	<i>Eupatorium godfreyanum</i>	Godfrey's Thoroughwort

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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, Guadeloupe 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, Shale Barren 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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<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>	
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth
	<i>Gastrocopta tappaniana</i>	
	<i>Gastrodonta fonticula</i>	
	<i>Gastrodonta interna</i>	Brown Bellytooth
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

HABITAT TYPE Dry-Mesic Oak Forests

TAXA	SCIENTIFIC NAME	COMMON NAME
Snails		
	<i>Glyphyalinia lewisiana</i>	
	<i>Glyphyalinia praecox</i>	Brilliant Glyph
	<i>Glyphyalinia rimula</i>	
	<i>Glyphyalinia solida</i>	
	<i>Glyphyalinia sp 1*</i>	
	<i>Glyphyalinia virginica*</i>	
	<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>	
	<i>Oxyloma retusum</i>	
	<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>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail
	<i>Triodopsis sp. 1 *</i>	
	<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 arcellus</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>	
	<i>Vertigo cristata</i>	Crested Vertigo
	<i>Vertigo milium</i>	Blade Vertigo
	<i>Vertigo oscariana</i>	
	<i>Vertigo ovata</i>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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 (high elev)</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>Melanelia 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

TERRESTRIAL SPECIES BY HABITAT

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
	<i>Colias interior (high elev)</i>	Pink-edged Sulphur
	<i>Eilema bicolor</i>	Bicolor 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

TERRESTRIAL SPECIES BY HABITAT

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>Dubius A*</i>	Teays Burrowing Crayfish
	<i>Dubius B*</i>	Meadow River Burrowing Crayfish
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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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, Satyr 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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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, Bulrush
	<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

TERRESTRIAL SPECIES BY HABITAT

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 appalachiensis*</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>	
	<i>Webbhelix multilineata</i>	Striped Whitelip

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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 [B,W]</i>	Rusty Blackbird
	<i>Geothlypis formosa</i> *	Kentucky Warbler

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

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TERRESTRIAL SPECIES BY HABITAT

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> *	Eastern 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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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, Satyr Orchid
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring 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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Gastrodonta interna</i>	Brown Bellytooth
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph
	<i>Glyphyalinia lewisiana</i>	
	<i>Glyphyalinia praecox</i>	Brilliant Glyph
	<i>Glyphyalinia rimula</i>	
	<i>Glyphyalinia solida</i>	
	<i>Glyphyalinia virginica*</i>	
	<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>	
	<i>Mesomphix sp. 1 *</i>	
	<i>Oxyloma retusum</i>	
	<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>	
	<i>Patera laevior</i>	
	<i>Patera pennsylvanica</i>	Proud Globelet

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Vertigo cristata</i>	Crested Vertigo
	<i>Vertigo milium</i>	Blade Vertigo
	<i>Vertigo ovata</i>	

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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 Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Triodopsis anteridon</i>	Carter Threetooth

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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>Antrostomus 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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<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-spired Three-toothed Landsnail
	<i>Ventridens arcellus</i>	Golden Dome
	<i>Webbhelix multilineata</i>	Striped Whitelip
	<i>Zonitoides elliotti</i>	Green Dome

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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 l. 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 Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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, Woolly Hudsonia
	<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

TERRESTRIAL SPECIES BY HABITAT

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>	

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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>	Bicolor 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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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 (R. 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
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 [B,W]</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

TERRESTRIAL SPECIES BY HABITAT

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>Dubius B*</i>	Meadow River Burrowing Crayfish
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

TERRESTRIAL SPECIES BY HABITAT

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> *	Eastern 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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<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>	
	<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>	
	<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

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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 l. 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

TERRESTRIAL SPECIES BY HABITAT

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, Shale Barren 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

TERRESTRIAL SPECIES BY HABITAT

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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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

TERRESTRIAL SPECIES BY HABITAT

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 (R. 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
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

TERRESTRIAL SPECIES BY HABITAT

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 Myotis
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

TERRESTRIAL SPECIES BY HABITAT

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>	
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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>Dubius B*</i>	Meadow River Burrowing Crayfish
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

TERRESTRIAL SPECIES BY HABITAT

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 scudderii</i> *	Zebra Clubtail
	<i>Tachopteryx thoreyi</i>	Gray Petaltail
Mammals		
	<i>Condylura cristata</i>	Star-nosed Mole
	<i>Corynorhinus rafinesquii</i> *	Eastern 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 Myotis
	<i>Myotis septentrionalis</i> *	Northern Myotis
	<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 var. glomeratus</i>	Bushy Broom-sedge
	<i>Anemone quinquefolia var. minima</i> *	Dwarf Anemone

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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</i> var. <i>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</i> ssp. <i>trachycaulus</i>	Slender Wild Rye
	<i>Equisetum fluviatile</i>	Water Horsetail
	<i>Eupatorium maculatum</i> var. <i>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</i> ssp. <i>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</i> var. <i>littoralis</i>	Baltic Rush

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

TERRESTRIAL SPECIES BY HABITAT

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, Bulrush
	<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

TERRESTRIAL SPECIES BY HABITAT

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>Hawaiiia alachuana</i>	Southeastern Gem
	<i>Helicodiscus shimeki</i>	Temperate Coil
	<i>Mesodon mitchellianus</i>	Sealed Globelet
	<i>Oxyloma retusum</i>	

* Priority 1 species

TERRESTRIAL SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

HABITAT TYPE Headwater Creek,High Gradient,Cold

TAXA	SCIENTIFIC NAME	COMMON NAME
Other Invertebrates		
	<i>Allocaenia 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

AQUATIC SPECIES BY HABITAT

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> *	An Underground 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

AQUATIC SPECIES BY HABITAT

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>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
Reptiles		
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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 Fork 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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

HABITAT TYPE Headwater Creek, Low Gradient, Warm

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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 chasmodactylus</i>	New River Crayfish
	<i>Cambarus nerterius*</i>	An Underground Crayfish
	<i>Cambarus smilax*</i>	Greenbrier River Crayfish
	<i>Cambarus veteranus*</i>	"guyandotte River" Crayfish
	<i>Cambarus callainus*</i>	Big Sandy 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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

HABITAT TYPE Headwater Creek, Moderate Gradient, Cool

TAXA	SCIENTIFIC NAME	COMMON NAME
Reptiles		
	<i>Clemmys guttata</i> *	Spotted Turtle

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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 Fork Valley Crayfish
	<i>Cambarus theepiensis</i>	Coalfields Crayfish
	<i>Fallicambarus fodiens</i> *	A Crayfish (digger)
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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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> *	A Crayfish (digger)
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 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>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

AQUATIC SPECIES BY HABITAT

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 blennioides</i>	River Shiner
	<i>Notropis buchanaui</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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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>Ptychobranthus 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

AQUATIC SPECIES BY HABITAT

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>	
	<i>Somatogyrus pennsylvanicus</i>	Shale Pebblesnail

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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 Wartyback
	<i>Elliptio complanata</i>	Eastern Elliptio
	<i>Elliptio crassidens</i> *	Elephant-ear

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

HABITAT TYPE Large River, Moderate Gradient, Warm

TAXA	SCIENTIFIC 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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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 illinoiensis</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>Carpiodes carpio</i>	River Carpsucker
	<i>Carpiodes 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

AQUATIC SPECIES BY HABITAT

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 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 torulosa rangiana</i> *	Northern Riffleshell

* Priority 1 species

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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

AQUATIC SPECIES BY HABITAT

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 elkensis</i> *	Elk River Crayfish
	<i>Cambarus nerterius</i> *	An Underground Crayfish
	<i>Cambarus veteranus</i> *	"guyandotte River" Crayfish
	<i>Cambarus callainus</i> *	Big Sandy 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

AQUATIC SPECIES BY HABITAT

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 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>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

AQUATIC SPECIES BY HABITAT

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 List by Ecoregion

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri*</i>	Black Mountain Salamander	S2	G4
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Gyrinophilus subterraneus*</i>	West Virginia Spring Salamander	S1	G1
	<i>Lithobates pipiens (R. pipiens)*</i>	Northern Leopard Frog	S1	G5
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus*</i>	Cow Knob (white Spotted) Salamander	S2	G3
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

SPECIES BY EOCREGION, 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>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>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>Botaurus lentiginosus</i> *	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	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>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	S3B	G5

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* Priority 1 species

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>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>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	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 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

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* Priority 1 species

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Aegolius acadicus</i>	Northern Saw-whet Owl	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>Butorides virescens</i>	Green Heron	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	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	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

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* Priority 1 species

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	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>Setophaga caerulescens</i>	Black-throated Blue 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>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Callophrys irus</i> *	Frosted Elfin	S1	G3
	<i>Catocala dulciola</i> *	Sweet Underwing	SU	G3
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Polygonia faunus symthi</i> *	Smyth's Green Comma	S1	G5T3
	<i>Pyrgus (centaureae) wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Speyeria diana</i> *	Diana Fritillary	S2S3	G3G4
	<i>Aplectoides condita</i>	A Noctuid Moth	S1	G4

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* Priority 1 species

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

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>Cerastis salicarum</i>	Willow Dart	S1	G5
	<i>Colias interior (high elev)</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Eilema bicolor</i>	Bicolor Moth	S1	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Euchlaena effecta</i>	Effective Euchaena Moth	S1	G5
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Euphyes conspicua</i>	Black Dash	S1	G4
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Lycaena epixanthe</i>	Bog Copper	S1	G4G5
	<i>Melanchnra assimilis</i>	Black Arches	S1	G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Pseudohermonassa tenuicula</i>	Morrison's Sooty Dart Moth	SH	G4
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4

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* Priority 1 species

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G1G2
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2G3
	<i>Caecidotea franzi</i> *	Franz's Cave Isopod	S1	G2G4
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1G2
	<i>Caecidotea sinuncus</i> *	An Isopod	S1	G1G2
	<i>Kleptochthonius henroti</i> *	Greenbrier Valley Cave Pseudoscorpion	S1	G3G4
	<i>Kleptochthonius hetricki</i> *	Organ Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi</i> *	Diplura	S2	G3G4
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Pseudanophthalmus grandis grandis</i> *	A Cave Beetle	S3	G3T3
	<i>Pseudanophthalmus higginbothami</i> *	A Cave Beetle	S2	G3G4
	<i>Pseudanophthalmus lallemanti</i> *	Lallemant's 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>Sinella agna</i> *	A Springtail	S3	G3G4
	<i>Sphalloplana culveri</i> *	Culver's Planarian	S1	G1
	<i>Stygobromus culveri</i> *	Culver's Cave Amphipod	S1	G1G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3G4
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus parvus*</i>	Minute Cave Amphipod	S1	G2G3
	<i>Stygobromus pollostus*</i>	An Amphipod	S1	G2G3
	<i>Stygobromus spinatus*</i>	Spring Cave Amphipod	S2	G2G3
	<i>Stylodrilus beattiei*</i>	A Cave Lumbriculid Worm	S1	G2G3
	<i>Trichodrilus culveri*</i>	An Oligochaete	S1	G2G3
	<i>Zygonopus weyeri</i>	Grand Caverns Blind Cave Millipede	S2	G3G4
	<i>Anthrobia coylei</i>	Spider	S2	GNR
	<i>Bathypantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<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 henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G5
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G4
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus nerterius</i> *	An Underground Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	GNR
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<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 angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G3G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Lanthus vernalis</i> *	Southern Pygmy Clubtail	S1	G4
	<i>Leucorrhinia glacialis</i> *	Crimson-ringed Whiteface	S1	G5
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Nehalennia gracilis</i> *	Sphagnum Sprite	S1	G5
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail	S2	G5
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Rhionaeschna mutata*</i>	Spatterdock Darner	S1	G4
	<i>Stylurus scudderii*</i>	Zebra Clubtail	SH	G4
	<i>Stylurus spiniceps*</i>	Arrow Clubtail	S2	G5
	<i>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<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>Epitheca canis</i>	Beaverpond Baskettail	S3	G5
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<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 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>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<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
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tramea carolina</i>	Carolina Saddlebags	S3	G5

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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>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>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G4T2
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel	S2	G5T2
	<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 Myotis	S2*	G2G3
	<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	S1	G5
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback	S1	G5
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<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>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<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>	Deertoie	S2	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5

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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	G2Q
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<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>Botrychium lanceolatum</i> var. <i>angustisegment</i>	Lanceolate Grapefern	S1	G5T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex lucorum</i> var. <i>australucorum</i> *	Blue Ridge Sedge	S1	G4T3T5
	<i>Carex manhartii</i> *	Manhart's Sedge	S1	G3G4
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G3
	<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>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G1G2
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana var. hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<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
	<i>Isotria medeoloides</i> *	Small Whorled Pogonia	S1	G2
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Lupinus perennis ssp. perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Monarda fistulosa ssp. brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Phlox buckleyi</i> *	Swordleaf Phlox, Shale Barren Phlox	S2	G2
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid	S1	G1?

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Polemonium vanbruntiae</i> *	Bog Jacob's-ladder	S2	G3G4
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2
	<i>Prenanthes crepidinea</i> *	Corymbed Rattlesnake-root	S1	G4
	<i>Rhynchospora fusca</i> *	Brown Beaksedge	S1	G4G5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<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 faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes ovalis var. erostellata</i> *	Oval Ladies' Tresses	S1	G5?T4?
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Thelypteris simulata</i> *	Bog Fern	S1	G4G5
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel	S1	G3G5
	<i>Trichomanes boschianum</i> *	Appalachian Bristle Fern	S1	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Viola appalachensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern	S1	G4
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<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>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>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<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>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 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
	<i>Carex haydenii</i>	Cloud Sedge	S1	G5

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ECOREGION = Allegheny Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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</i> var. <i>americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex laxiculmis</i> var. <i>copulata</i>	Spreading Sedge	S2	G5T3T5
	<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 seorsa</i>	Weak Stellate Sedge	S2	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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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, Satyr Orchid	S1	G5T5
	<i>Coptis trifolia</i>	Threeleaf Goldthread	S2	G5
	<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
	<i>Cuscuta rostrata</i>	Beaked Dodder	S2	G4
	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	S3	G4
	<i>Dalibarda repens</i>	Robin-run-away	S3	G5
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>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
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria grandis var. grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<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>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Juglans cinerea</i>	Butternut	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>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>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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G4G5
	<i>Menyanthes trifoliata</i>	Buckbean	S1	G5
	<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>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
	<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>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	S1	G5T5
	<i>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<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 var. sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	S1S2	G5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Ribes lacustre</i>	Bristly Black Currant	S2	G5
	<i>Rosa blanda var. blanda</i>	Smooth Rose	S2	G5T5
	<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
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Scheuchzeria palustris ssp. americana</i>	Pod Grass	SH	G5T5
	<i>Schizachne purpurascens</i>	False Melicgrass	S1	G5
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Solidago simplex ssp. randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<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>Symphyotrichum laeve var. concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<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>Torreyochloa pallida var. fernaldii</i>	Mannagrass	S2	G5T4Q

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Torreyochloa pallida</i> var. <i>pallida</i>	Pale False Mannagrass	S1	G5T5?
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<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>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 blanda</i> var. <i>palustriformis</i>	Violet	SH	G4G5T4T5
	<i>Viola septentrionalis</i>	Northern Blue Violet	S2	G5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake	S2	G5T3T4
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe	S1	GNR
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail	S1	G1
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Carychium nannodes</i>	File Thorn	S3	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>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<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 mitchellianus</i>	Sealed Globelet	S3	G4
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	S2	G2
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	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 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	G4G5
	<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 elliotti</i>	Green Dome	S2	G4

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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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri*</i>	Black Mountain Salamander	S2	G4
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

SPECIES BY EOCREGION, 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>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>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>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	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>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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 chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B, S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B, S3N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B, S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B, S3N	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	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>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5

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SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

SPECIES BY EOCREGION, 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>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<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>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>Eroria laeta</i>	Early Hairstreak	S2	GU
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

SPECIES BY EOCREGION, 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 Fork Valley Crayfish	S2	G2G3?
	<i>Cambarus veteranus</i> *	"guyandotte River" Crayfish	S1	G1
	<i>Procambarus acutus</i> *	White River Crayfish	S1	G5
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Stylurus scudderi</i> *	Zebra Clubtail	SH	G4
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Calopteryx amata</i>	Superb Jewelwing	S3	G4
	<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>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Ischnura kellicotti</i>	Lilypad Forktail	S1	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5
	<i>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Libellula flavida</i>	Yellow-sided Skimmer	S3	G5
	<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>Somatochlora linearis</i>	Mocha Emerald	S3	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

SPECIES BY EOCREGION, 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>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G3
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpiodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2
	<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>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Notropis scabriceps</i> *	New River Shiner	S2	G4
	<i>Noturus stigmosus</i> *	Northern Madtom	S1	G3
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	S2S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<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 blennioides</i>	River Shiner	S2	G5
	<i>Notropis buchanani</i>	Ghost Shiner	S3	G5
	<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 gymnocephala</i>	Appalachia 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

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Eastern Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G4T2
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<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>Spilogale putorius</i> *	Eastern Spotted Skunk	S1	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Cumberlandia monodonta*</i>	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata*</i>	Purple Wartback	S1	G5
	<i>Cyprogenia stegaria*</i>	Fanshell	S1	G1Q
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis abrupta*</i>	Pink Mucket	S1	G2
	<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 subviridis*</i>	Green Floater	S2	G3
	<i>Ligumia recta*</i>	Black Sandshell	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G2
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5

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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>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	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
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<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>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<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		G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Gymnopogon ambiguus</i> *	Bearded Skeleton Grass	S1	G4
	<i>Helianthemum propinquum</i> *	Low Frostweed	S1	G4
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Hypericum virgatum</i> *	Sharpleaf St. John's-wort	S1	G4?
	<i>Ilex collina</i> *	Hill Holly	S2	G3
	<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>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Monarda fistulosa ssp. brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<i>Polygala cruciata var. aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Prosartes maculata</i> *	Yellow Mandarin	S1	G3G4
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Ranunculus pusillus var. pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage	S3	G3
	<i>Saxifraga caroliniana</i> *	Carolina Saxifrage	S1	G3
	<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	G5T3?
	<i>Solidago faucibus</i> *	Gorge Goldenrod	S1	G2G4
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Synandra hispidula</i> *	Guyandotte Beauty	S1	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>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Vitis rupestris*</i>	Sand Grape	S2	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica var. 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 var. glomeratus</i>	Bushy Broom-sedge	S3	G5T5
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Aristida purpurascens var. purpurascens</i>	Arrowfeather Three-awn	S1	G5T5
	<i>Arundinaria gigantea ssp. gigantea</i>	Giant Cane	S2	G5T5?
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<i>Calopogon tuberosus var. tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex bromoides ssp. bromoides</i>	Brome-like Sedge	S3	G5T5
	<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 var. copulata</i>	Spreading Sedge	S2	G5T3T5
	<i>Carex mesochorea</i>	Midland Sedge	S2	G4G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 tonsa</i> var. <i>rugosperma</i>	Parachute Sedge	S2S3	G5T5
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Green Orchid, Satyr Orchid	S1	G5T5
	<i>Commelina erecta</i>	Slender Dayflower	S2	G5T5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroot	S2	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Croton glandulosus</i> var. <i>septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cuscuta indecora</i> var. <i>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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<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 longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<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 var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Muhlenbergia capillaris var. 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 ssp. 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
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5

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SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Prunus pumila var. depressa</i>	Sand Cherry	S1	G5T5
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint	S2	G4?
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Rhexia mariana var. 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 ssp. sayi</i>	Bristly Rose	S1	G5T5
	<i>Rudbeckia fulgida var. fulgida</i>	Orange Coneflower	S2	G5T4?
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Solidago simplex ssp. randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Vaccinium macrocarpon</i>	Large Cranberry	S3	G4
	<i>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Cumberland Mountains

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5
	<i>Mesodon mitchellianus</i>	Sealed Globelet	S3	G4
	<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 tennesseensis</i>	Budded Threetooth	S3	G4
	<i>Ventridens acerra</i>	Glossy Dome	S2	G4
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3

SPECIES BY EOCREGION, 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

SPECIES BY EOCREGION, 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>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Eurycea lucifuga</i> *	Cave Salamander	S3	G5
	<i>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Plethodon punctatus</i> *	Cow Knob (white Spotted) Salamander	S2	G3
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander	S2	G2G3Q
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

SPECIES BY EOCREGION, 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>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>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>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	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 chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	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>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	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>Setophaga caerulescens</i>	Black-throated Blue 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>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				

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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>Brachionycha borealis</i> *	Boreal Fan Moth	S1	G4
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Catocala herodias gerhardi</i> *	Pine Barrens Underwing	SU	G3T3
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<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>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Pyrgus (centaureae) wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Speyeria diana</i> *	Diana Fritillary	S2S3	G3G4
	<i>Zale calycanthata</i> *	Double-banded Zale	SU	G4

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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>Colias interior (high elev)</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Eroria laeta</i>	Early Hairstreak	S2	GU
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<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>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Ridge and 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>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Pseudotremia lusciosa</i> *	Germany Valley Cave Millipede	S1	G1G2
	<i>Pseudotremia princeps</i> *	South Branch Valley Cave Millipede	S1	G1
	<i>Stygobromus allegheniensis</i> *	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3G4
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus gracilipes</i> *	Shenandoah Valley Cave Amphipod	S1	G3G4
	<i>Anthrobia coylei</i>	Spider	S2	GNR
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<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>Rhagidia varia</i>	A Cave Mite	S3	G5

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ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<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>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G3G4
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Ophiogomphus incurvatus alleghaniensis</i> *	Appalachian Snaketail	SH	G3T2T3
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<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 vesperum</i>	Vesper Bluet	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<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>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 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>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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<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>Etheostoma longimanum*</i>	Longfin Darter	S1	G4
	<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>Margariscus margarita*</i>	Pearl Dace	S2S3	G5
	<i>Moxostoma macrolepidotum*</i>	Shorthead Redhorse	S1	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
	<i>Percina peltata*</i>	Shield Darter	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus*</i>	Virginia Big-eared Bat	S2	G4T2
	<i>Myotis leibii*</i>	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis*</i>	Northern Myotis	S2*	G2G3
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S1	G5
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<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

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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>Epioblasma triquetra*</i>	Snuffbox	S2	G3
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<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>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

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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	G2Q
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Carex lupuliformis</i> *	False Hop Sedge	S1	G4
	<i>Carex polymorpha</i> *	Variable Sedge	S1	G3
	<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>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G1G2
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i> *	Hyssopleaf Thoroughwort	S1	G5T4T5
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3

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Plants				
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Panicum verrucosum</i> *	Warty Panicgrass	S1	G4
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus	S1	G3
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Phlox buckleyi</i> *	Swordleaf Phlox, Shale Barren Phlox	S2	G2
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush	S1	G3
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3

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Plants				
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Silene virginica</i> var. <i>robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Talinum teretifolium</i> *	Eastern Fameflower	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium pusillum</i> var. <i>virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4
	<i>Zigadenus elegans</i> ssp. <i>glaucus</i> *	Mountain Deathcamas	S1	G5T4T5
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<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>Bartonia paniculata</i> ssp. <i>paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Betula papyrifera</i>	Paper Birch	S2	G5

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Plants				
	<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
	<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</i> ssp. <i>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</i> var. <i>americana</i>	Woolly-fruit Sedge	S1	G5T5
	<i>Carex molesta</i>	Troublesome Sedge	S3	G4

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Plants				
	<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
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex prairea</i>	Prairie Sedge	S1	G5?
	<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>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, Satyr Orchid	S1	G5T5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroot	S2	G5
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<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>Cuscuta indecora</i> var. <i>neuropetala</i>	Dodder	S1	G5T5

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Plants				
	<i>Cyperus squarrosus</i>	Awne d Flatsedge	S3	G5
	<i>Dasistoma macrophylla</i>	Mullein Foxglove	S2	G4
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Dichanthelium acuminatum ssp. acuminatum</i>	Hairy Panicgrass	S1	G5T5
	<i>Dichanthelium boreale</i>	Panicgrass	S1	G5
	<i>Drosera rotundifolia var. 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 var. capitatum</i>	Western Wallflower	S1	G5T5
	<i>Eupatorium maculatum var. 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>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Hudsonia tomentosa var. tomentosa</i>	False Heather, Woolly Hudsonia	S1	G5T5
	<i>Hydrocotyle ranunculoides</i>	Swamp Pennywort	S2	G5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus balticus var. 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 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>Juncus trifidus</i>	Highland Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Lilium philadelphicum var. philadelphicum</i>	Wood Lily	S2S3	G5T4T5

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Plants				
	<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	G4G5T4T5
	<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 smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Lobelia kalmii</i>	Ontario Lobelia	S1	G5
	<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</i> var. <i>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	G4G5
	<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>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Oryzopsis asperifolia</i>	Roughleaf Ricegrass	S1	G5

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Plants				
	<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>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliffbrake	S2	G5T5
	<i>Peltandra virginica</i>	Green Arrow-arum	S2	G5
	<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
	<i>Potamogeton spirillus</i>	Spiral Pondweed	S2	G5
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4

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Plants				
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<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 pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hardstem Bulrush	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scutellaria galericulata</i>	Hooded Skullcap	S1	G5
	<i>Scutellaria ovata</i> ssp. <i>virginiana</i>	Heart-leaved Skullcap	S1?	G5TNR
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stenanthium gramineum</i> var. <i>gramineum</i>	Featherbells	S2S3	G4G5T3T5

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SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Symphoricarpos albus var. albus</i>	Snowberry	S2	G5T5
	<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>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<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 var. rotundifolia</i>	Muscadine	SH	G5T5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Zannichellia palustris</i>	Horned Pondweed	S1	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Aspidoscelis sexlineata</i> *	Eastern Six-lined Racerunner	S1	G5
	<i>Clemmys guttata</i> *	Spotted Turtle	S1	G5
	<i>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G4
	<i>Heterodon platirhinos</i> *	Eastern Hog-nosed Snake	S2	G5
	<i>Pantherophis guttatus</i> *	Red Cornsnake	S1	G5
	<i>Plestiodon laticeps</i> *	Broad-headed Skink	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<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>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesodon clausus</i>	Yellow Globelet	S2	G5
	<i>Mesodon normalis</i>	Grand Globe	S1	G5
	<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>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Triodopsis anteridon</i>	Carter 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

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ECOREGION = Ridge and Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<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	G4G5
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3

SPECIES BY EOCREGION, 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

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Ambystoma barbouri</i> *	Streamside Salamander	S1	G4
	<i>Ambystoma texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot	S1	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

SPECIES BY EOCREGION, 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>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>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>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	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>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	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 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>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>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5

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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>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<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>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>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

SPECIES BY EOCREGION, 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>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Chaetagnia cerata</i> *	Waxed Sallow Moth	S1	G3G4
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hadena ectypa</i> *	Starry Champion Moth	S1	G3G4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<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>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
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Butterflies and Moths

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SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4

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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 Fork Valley Crayfish	S2	G2G3?
	<i>Fallicambarus fodiens</i> *	A Crayfish (digger)	S1	G5
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Aeshna verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	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>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<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 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>Somatochlora linearis</i>	Mocha Emerald	S3	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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Tramea onusta</i>	Red Saddlebags	S1	G5

SPECIES BY EOCREGION, 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>Ammocrypta clara</i> *	Western Sand Darter	S1	G3
	<i>Ammocrypta pellucida</i> *	Eastern Sand Darter	S3	G3
	<i>Anguilla rostrata</i> *	American Eel	S2	G4
	<i>Carpionodes velifer</i> *	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Crystallaria cincotta</i> *	Diamond Darter	S1	G1
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2
	<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 greeleyi</i> *	Mountain Brook Lamprey	S1	G3G4
	<i>Lepomis humilis</i> *	Orangespotted Sunfish	S1	G5
	<i>Lythrurus umbratilis</i> *	Redfin Shiner	S3	G5
	<i>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Notropis boops</i> *	Bigeye Shiner	S1	G5
	<i>Noturus stigmosus</i> *	Northern Madtom	S1	G3
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Carpiondes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Esox americanus vermiculatus</i>	Grass Pickerel	S1S2	G5T5
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<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>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 blennioides</i>	River Shiner	S2	G5
	<i>Notropis burchanani</i>	Ghost Shiner	S3	G5
	<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 phoxocephala</i>	Slenderhead Darter	S1	G5
	<i>Percina sciera</i>	Dusky Darter	S3	G5

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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

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus rafinesquii</i> *	Eastern Big-eared Bat	S1	G3G4
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Lasiorycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Microtus ochrogaster</i>	Prairie Vole	S3	G5
	<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

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<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 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 subviridis</i> *	Green Floater	S2	G3
	<i>Ligumia recta</i> *	Black Sandshell	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pleurobema clava</i> *	Clubshell	S1	G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Pleurobema sintoxia</i> *	Round Pigtoe	S2	G4G5
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Ellipsaria lineolata</i>	Butterfly	S2	G4
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	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
	<i>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Pleurobema cordatum</i>	Ohio Pigtoe	S2	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Ptychobranchus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		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>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		G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort	S1	G4?
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Gratiola viscidula</i> *	Short's Hedgehyssop	S1	G4G5
	<i>Hottonia inflata</i> *	Featherfoil	S1	G4
	<i>Huperzia porophila</i> *	Rock Clubmoss	S1	G4
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Phacelia covillei</i> *	Phacelia	S1	G3
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<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>Spermacoce glabra</i> *	Buttonweed	S1	G4G5
	<i>Synandra hispidula</i> *	Guyandotte Beauty	S1	G4
	<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>Amorpha fruticosa</i>	Tall Indigobush	S2S3	G5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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	G4Q
	<i>Calycanthus floridus var. glaucus</i>	Carolina Allspice, Strawberry-shrub	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
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex typhina</i>	Cattail Sedge	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Carex woodii</i>	Pretty Sedge	S3	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, Spring 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
	<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>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<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>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
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lythrum alatum var. 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 ssp. pilosella</i>	Meadow Sundrops	S2	G5T5?
	<i>Paspalum pubiflorum</i>	Hairy-seed Crowngrass	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 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
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scleria oligantha</i>	Little-head Nutrush	S1	G5
	<i>Scutellaria ovata</i> ssp. <i>ovata</i>	Heart-leaved Skullcap	S1	G5T5
	<i>Solidago patula</i> var. <i>patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5

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SPECIES BY EOCREGION, TAXA AND PRIORITY

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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

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Graptemys geographica*</i>	Northern 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>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail	S1	G1
	<i>Triodopsis rugosa*</i>	Buttressed Threetooth	S1	G1
	<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>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Hawaiiia alachuana</i>	Southeastern Gem	S3	G4G5Q
	<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 edwardsi</i>	Ridge-and-valley Slitmouth	S3	G4G5
	<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

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ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<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>Webbhelix multilineata</i>	Striped Whitelip	S1	G5
	<i>Zonitoides elliotti</i>	Green Dome	S2	G4

SPECIES BY EOCREGION, TAXA AND PRIORITY

ECOREGION = Western Allegheny Plateau

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela marginipennis*</i>	Cobblestone Tiger Beetle	S1	G2
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5
	<i>Cicindela formosa generosa</i>	A Tiger Beetle	S1	G5T4
	<i>Cicindela hirticollis</i>	Beach-dune Tiger Beetle	S1	G5

Appendix 4: SGCN Species List by CFA

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>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri*</i>	Black Mountain Salamander	S2	G4
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	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	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>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	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 chrysoptera</i> *	Golden-winged Warbler	S1B	G4

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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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	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>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Erynnis martialis*</i>	Mottled Duskywing	S3	G3
	<i>Glaucopsyche l. lygdamus*</i>	Silvery Blue	S4	G5T3T4
	<i>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<i>Celastrina serotina</i>	Cherry Gall Azure	SNR	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU

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>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3G4
	<i>Bathyphantes 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>Pseudanophthalmus fuscus</i>	A Cave Beetle	S2	G4

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 veteranus*</i>	"guyandotte River" Crayfish	S1	G1
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4

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>Ophiogomphus incurvatus alleghaniensis*</i>	Appalachian Snaketail	SH	G3T2T3
	<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 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

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

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>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

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>Alasmidonta marginata*</i>	Elktoe	S1	G4
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback	S1	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<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

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>Allium oxyphilum</i> *	Nodding Wild Onion	S2	G2Q
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Berberis canadensis</i> *	American Barberry	S1	G3
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<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>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1
	<i>Trifolium reflexum</i> *	Buffalo Clover	S1	G3G4
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Agrimonia microcarpa</i>	Small-fruit Groovebur	S1	G5
	<i>Anemone canadensis</i>	Roundleaf Thimbleweed	S1	G5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4

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* Priority 1 species

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 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 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
	<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>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

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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>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<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>Myosotis macrosperma</i>	Large-seed Forget-me-not	S3	G5
	<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>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>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

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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				

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>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 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	G4G5
	<i>Ventridens lawae</i>	Rounded Dome	SH	G4
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

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

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>Plethodon punctatus</i> *	Cow Knob (white Spotted) Salamander	S2	G3
	<i>Plethodon virginia</i> *	Shenandoah Mountain Salamander	S2	G2G3Q
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>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>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>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	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>Lanius ludovicianus migrans</i> *	Migrant Loggerhead Shrike	S1B,S1N	G4T3Q
	<i>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5

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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>Piranga rubra*</i>	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus*</i>	Vesper Sparrow	S2B, S2N	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 chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Anrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	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

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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>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue 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>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>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>Glauopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Pieris virginiensis</i> *	West Virginia White	S3	G3?
	<i>Pyrgus (centaureae) wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Zale calycanthata</i> *	Double-banded Zale	SU	G4
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4

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>Stygobromus allegheniensis*</i>	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus franzi*</i>	Franz's Cave Amphipod	S1	G3G4

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 verticalis</i> *	Green-striped Darner	S2S3	G5
	<i>Calopteryx angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Cordulegaster erronea</i> *	Tiger Spiketail	S2	G4
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G3G4
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	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 vesperum</i>	Vesper Bluet	S3	G5
	<i>Gomphus descriptus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5

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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 australis</i>	Southern Spreadwing	S3	G5
	<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 illinoiensis</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

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>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>Etheostoma olmstedii*</i>	Tessellated Darter	S1S2	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 procne*</i>	Swallowtail Shiner	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5

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 Myotis	S2*	G2G3
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S1	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

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>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

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>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush	S1	G3
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Astragalus distortus</i> var. <i>distortus</i>	Bent Milkvetch	S2	G5T5?
	<i>Betula papyrifera</i>	Paper Birch	S2	G5

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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>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
	<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>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

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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>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Hierochloe hirta ssp. arctica</i>	Holy Grass, Sweetgrass	S1	G5T5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Linnaea borealis ssp. americana</i>	Twinflower	S1	G5T5
	<i>Linum lewisii var. lewisii</i>	Prairie Flax	S2	G4G5T4T5
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<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>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Paronychia argyrocoma</i>	Silvery Nailwort	S3	G4
	<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

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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>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</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Rosa acicularis</i> ssp. <i>sayi</i>	Bristly Rose	S1	G5T5
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<i>Saxifraga pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Symphoricarpos albus</i> var. <i>albus</i>	Snowberry	S2	G5T5
	<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>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

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>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G4

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>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Glyphyalinia cumberlandiana</i>	Hill Glyph	S3	G4
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Triodopsis vulgata</i>	Dished Threetooth	S2	G5
	<i>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens collisella</i>	Sculptured Dome	S3	G4G5
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	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	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>Parkesia motacilla</i> *	Louisiana Waterthrush	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
	<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>Antrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5
	<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>Parrhasius m-album</i>	White-m Hairstreak	S2	G5

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

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>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg	SH	G4G5
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2
	<i>Ichthyomyzon bdellium</i> *	Ohio Lamprey	S2S3	G3G4
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina sciera</i>	Dusky Darter	S3	G5

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 Myotis	S2*	G2G3

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Ligumia recta*</i>	Black Sandshell	S3	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	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>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		G3G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Central Reservoirs

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Phacelia covillei*</i>	Phacelia	S1	G3
	<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

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

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

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>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	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>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>Riparia riparia*</i>	Bank Swallow	S2B	G5
	<i>Scolopax minor*</i>	American Woodcock	S3B	G5
	<i>Setophaga cerulea*</i>	Cerulean Warbler	S2B	G4
	<i>Spizella pusilla*</i>	Field Sparrow	S3B	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4

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>Stygobromus emarginatus*</i>	Greenbrier Cave Amphipod	S3	G3G4
	<i>Phanetta subterranea</i>	A Spider	S3	G5

* Priority 1 species

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

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

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 Myotis	S2*	G2G3
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Lasmigona costata</i>	Fluted-shell	S3	G5
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

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>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<i>Carex emoryi</i>	Emory's Sedge	S2	G5
	<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>Woodwardia areolata</i>	Netted Chainfern	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cheat Canyon

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Triodopsis platysayoides*</i>	Flat-spired Three-toothed Landsnail	S1	G1
	<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>Striatura ferrea</i>	Black Striate	S3	G5
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Desmognathus quadramaculatus</i> *	Black-bellied Salamander	S3	G5
	<i>Desmognathus welteri</i> *	Black Mountain Salamander	S2	G4

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>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>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Falco sparverius*</i>	American Kestrel	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>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	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

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* Priority 1 species

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

* Priority 1 species

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>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>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

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 Fork Valley Crayfish	S2	G2G3?
	<i>Cambarus veteranus</i> *	"guyandotte River" Crayfish	S1	G1
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

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>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>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	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>Lestes forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Carpionodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<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

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 Myotis	S2*	G2G3
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius</i> *	Eastern Spotted Skunk	S1	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5

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>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<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>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>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<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, Satyr Orchid	S1	G5T5
	<i>Heuchera longiflora</i>	Long-flower Alumroot	S2	G4

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* Priority 1 species

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<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 tosa</i>	Southern Loosestrife	SH	G4
	<i>Platanthera psycodes</i>	Lesser Purple Fringed Orchid	S1	G5
	<i>Polygala curtissii</i>	Curtiss' Milkwort	S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands East

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Paravitrea bellona*</i>	Club Supercoil	S1	G1
	<i>Anguispira mordax</i>	Appalachian Tigersnail	S2	G4
	<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>Vertigo parvula</i>	Smallmouth Vertigo	S2	G3

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Scaphiopus holbrookii*</i>	Eastern Spadefoot	S1	G5
	<i>Gyrinophilus porphyriticus duryi</i>	Kentucky Spring Salamander	S3	G5T4T5
	<i>Plethodon kentucki</i>	Cumberland Plateau Salamander	S3	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Buteo platypterus*</i>	Broad-winged Hawk	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	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>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Celastrina nigra*</i>	Dusky Azure	S3	G4
	<i>Glaucopsyche l. lygdamus*</i>	Silvery Blue	S4	G5T3T4
	<i>Hadena ectypa*</i>	Starry Campion Moth	S1	G3G4
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Satyrrium caryaevorus</i>	Hickory Hairstreak	S2	G4

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 Fork Valley Crayfish	S2	G2G3?
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

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>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	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

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>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G3
	<i>Carpiodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus*</i>	Redside Dace	S1S2	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<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

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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> *	Eastern Big-eared Bat	S1	G3G4
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Cyprogenia stegaria*</i>	Fanshell	S1	G1Q
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Obovaria subrotunda*</i>	Round Hickorynut	S3	G4
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	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>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>Uniomerus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5

* Priority 1 species

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Cleistes bifaria</i> *	Small Rosebud Orchid	S1	G4?
	<i>Monotropsis odorata</i> *	Sweet Pinesap	S1	G3
	<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>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	S1	G5T5
	<i>Ampelopsis cordata</i>	Heartleaf Peppervine	S1	G5
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<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>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroot	S2	G5
	<i>Croton glandulosus</i> var. <i>septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Lysimachia tonsa</i>	Southern Loosestrife	SH	G4
	<i>Manfreda virginica</i>	Eastern Agave	S1	G5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<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>Viola tripartita</i>	Three-parted Yellow Violet	S1	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Cumberlands West

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	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

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>Triodopsis tennesseensis</i>	Budded Threetooth	S3	G4

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>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>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
	<i>Antrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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	GNR
	<i>Phanetta subterranea</i>	A Spider	S3	G5

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

* Priority 1 species

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

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 Myotis	S2*	G2G3
	<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

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>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Heuchera americana</i> var. <i>hispidula</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Lilium michauxii</i> *	Carolina Lily	S1	G4G5
	<i>Carex cumberlandensis</i>	Cumberland Sedge	S3	GNR
	<i>Carex eburnea</i>	Bristleleaf Sedge	S3	G5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5

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>Hendersonia occulta</i>	Cherrystone Drop	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 collisella</i>	Sculptured Dome	S3	G4G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	S3B	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>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>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	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

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Sturnella magna*</i>	Eastern Meadowlark	S3B, S2N	G5
	<i>Vermivora chrysoptera*</i>	Golden-winged Warbler	S1B	G4
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>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>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5

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>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<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 forcipatus</i>	Sweetflag Spreadwing	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4

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>Cottus kanawhae</i> *	Kanawha Sculpin	S2	G4
	<i>Etheostoma osburni</i> *	Candy Darter	S1	G3
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5

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> *	Eastern Big-eared Bat	S1	G3G4
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G4T2
	<i>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback	S1	G5
	<i>Fusconaia subrotunda*</i>	Long-solid	S3	G3
	<i>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Cardamine flagellifera</i> var. <i>flagellifera</i> *	Bittercress	S2	G3
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex suberecta</i> *	Prairie Straw Sedge	S1	G4
	<i>Gentiana austromontana</i> *	Appalachian Gentian	S1	G3
	<i>Gymnopogon ambiguus</i> *	Bearded Skeleton Grass	S1	G4
	<i>Helianthemum propinquum</i> *	Low Frostweed	S1	G4
	<i>Hypericum virgatum</i> *	Sharpleaf St. John's-wort	S1	G4?
	<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>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Ranunculus pusillus</i> var. <i>pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Saxifraga careyana</i> *	Golden-eye Saxifrage	S3	G3
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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	G5T3?
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3
	<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>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>Calopogon tuberosus</i> var. <i>tuberosus</i>	Tuberous Grass-pink	S1	G5T5
	<i>Carex aestivalis</i>	Summer Sedge	S3	G4
	<i>Carex bromoides</i> ssp. <i>bromoides</i>	Brome-like Sedge	S3	G5T5
	<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

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

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 planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex seorsa</i>	Weak Stellate Sedge	S2	G4
	<i>Carex tonsa</i> var. <i>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, Spring Coralroot	S2	G5
	<i>Coreopsis pubescens</i>	Star Tickseed	S2	G5?
	<i>Cornus rugosa</i>	Roundleaf Dogwood	S1	G5
	<i>Croton glandulosus</i> var. <i>septentrionalis</i>	Vente-conmigo	S3	G5T5
	<i>Cuscuta indecora</i> var. <i>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

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>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>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5
	<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>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus dichotomus</i>	Forked Rush	S1	G5
	<i>Lechea tenuifolia</i>	Narrowleaf Pinweed	S1	G5

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CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lythrum alatum var. alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Melica mutica</i>	Two-flower Melicgrass	S2	G5
	<i>Muhlenbergia capillaris var. 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 ssp. 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
	<i>Polygonum amphibium</i>	Water Knotweed	S3	G5
	<i>Prunus pumila var. depressa</i>	Sand Cherry	S1	G5T5
	<i>Pycnanthemum loomisii</i>	Loomis' Mountain-mint	S2	G4?
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Rhexia mariana var. mariana</i>	Maryland Meadowbeauty	S1	G5T5
	<i>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rhynchospora recognita</i>	Beaked Rush	S2	G5?

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	Orange Coneflower	S2	G5T4?
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scleria triglomerata</i>	Whip Nutrush	S2	G5
	<i>Solidago simplex</i> ssp. <i>randii</i>	Rand's Goldenrod	S2	G5T4T5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<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</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5
	<i>Woodsia appalachiana</i>	Allegheny Cliff Fern	S2	G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Gorges

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Lampropeltis getula*</i>	Eastern Kingsnake	S2	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5

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

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Eurycea lucifuga*</i>	Cave Salamander	S3	G5
	<i>Gyrinophilus subterraneus*</i>	West Virginia Spring Salamander	S1	G1
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

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>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>Cardellina canadensis</i> *	Canada Warbler	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>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	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>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>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5

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CONSERVATION FOCUS AREA = Great Greenbrier

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>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 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>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Antrastomus carolinensis</i>	Chuck-will's-widow	S1B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	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	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5

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CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	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>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Podilymbus podiceps</i>	Pied-billed Grebe	S2B,S4N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue 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>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Calephelis borealis</i> *	Northern Metalmark	S2	G3G4
	<i>Celastrina nigra</i> *	Dusky Azure	S3	G4
	<i>Erynnis martialis</i> *	Mottled Duskywing	S3	G3
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<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>Pyrgus (centaureae) wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S2	G4
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5

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CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Kleptochthonius henroti</i> *	Greenbrier Valley Cave Pseudoscorpion	S1	G3G4
	<i>Kleptochthonius hetricki</i> *	Organ Cave Pseudoscorpion	S1	G1
	<i>Litocampa fieldingi</i> *	Diplura	S2	G3G4
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Poecilophysis extraneostella</i> *	A Cave Mite	S2	G2?
	<i>Pseudanophthalmus grandis grandis</i> *	A Cave Beetle	S3	G3T3
	<i>Pseudanophthalmus higginbothami</i> *	A Cave Beetle	S2	G3G4
	<i>Pseudanophthalmus lallemanti</i> *	Lallemant's Cave Beetle	S1	G1
	<i>Pseudosinella gisini gisini</i> *	A Cave Springtail	S3	G3G4T3
	<i>Sinella agna</i> *	A Springtail	S3	G3G4
	<i>Stygobromus emarginatus</i> *	Greenbrier Cave Amphipod	S3	G3G4
	<i>Stygobromus parvus</i> *	Minute Cave Amphipod	S1	G2G3
	<i>Stygobromus pollostus</i> *	An Amphipod	S1	G2G3
	<i>Stygobromus spinatus</i> *	Spring Cave Amphipod	S2	G2G3
	<i>Stylodrilus beattiei</i> *	A Cave Lumbriculid Worm	S1	G2G3
	<i>Trichodrilus culveri</i> *	An Oligochaete	S1	G2G3
	<i>Anthrobia coylei</i>	Spider	S2	GNR
	<i>Bathyphantes weyeri</i>	A Cave Spider	S3	G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Gammarus minus tenuipes</i>	An Amphipod	S2	GNRTNR
	<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 henroti</i>	A Cave Beetle	S2	GNR
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G5
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G4
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Crayfish				
	<i>Cambarus nerterius*</i>	An Underground Crayfish	S1?	G2
	<i>Cambarus smilax*</i>	Greenbrier River Crayfish	S2	GNR
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<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>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Nehalennia gracilis</i> *	Sphagnum Sprite	S1	G5
	<i>Ophiogomphus carolus</i> *	Riffle Snaketail	S2	G5
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Stylurus scudderi</i> *	Zebra Clubtail	SH	G4
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<i>Enallagma vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus lineatifrons</i>	Splendid Clubtail	S2	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	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>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Ophiogomphus rupinsulensis</i>	Rusty Snaketail	S2	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Tachopteryx thoreyi</i>	Gray Petaltail	S3	G4
	<i>Tamea carolina</i>	Carolina Saddlebags	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<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>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Glaucomys sabrinus fuscus*</i>	WV Northern Flying Squirrel	S2	G5T2
	<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 Myotis	S2*	G2G3
	<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	S1	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

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>Lampsilis fasciola*</i>	Wavy-rayed Lampmussel	S3	G5
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Lampsilis cardium</i>	Plain Pocketbook	S3	G5
	<i>Truncilla truncata</i>	Deertoe	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Allium oxypilum</i> *	Nodding Wild Onion	S2	G2Q
	<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>Carex roanensis</i> *	Roan Mountain Sedge	S2	G3
	<i>Carex styloflexa</i> *	Bent Sedge	S1	G4G5
	<i>Carex trichocarpa</i> *	Hairy-fruit Sedge	S1	G4
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Gaylussacia brachycera</i> *	Box Huckleberry	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<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>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Phlox buckleyi</i> *	Swordleaf Phlox, Shale Barren Phlox	S2	G2
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Silphium compositum</i> var. <i>reniforme</i> *	Rosinweed	S1	G5T3T5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Spiranthes ovalis</i> var. <i>erostellata</i> *	Oval Ladies' Tresses	S1	G5?T4?
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Tortula ammonsiana</i> *	Ammons' Twist Moss	S1	G1
	<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>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vitis rupestris</i> *	Sand Grape	S2	G3

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Vittaria appalachiana*</i>	Appalachian Shoestring Fern	S1	G4
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<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
	<i>Carex pellita</i>	Woolly Sedge	S2	G5
	<i>Carex planispicata</i>	Flat-spiked Sedge	S2	G4Q
	<i>Carex woodii</i>	Pretty Sedge	S3	G4
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Clematis occidentalis</i> var. <i>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>Decodon verticillatus</i>	Swamp-loosestrife	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 palustris</i>	Marsh Spikerush	S3	G5
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<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>Juglans cinerea</i>	Butternut	S3	G4
	<i>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<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

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CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lygodium palmatum</i>	American Climbing Fern	S3	G4
	<i>Maianthemum stellatum</i>	Starflower False Solomon's-seal	S2	G5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Nuttallanthus canadensis</i>	Old-field Toadflax	S2	G5
	<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>Pedicularis lanceolata</i>	Swamp Lousewort	S2	G5
	<i>Pellaea glabella ssp. glabella</i>	Smooth Cliffbrake	S2	G5T5
	<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>Prunus alleghaniensis var. alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<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>Rhododendron viscosum</i>	Swamp Azalea	S1	G5
	<i>Rosa blanda var. blanda</i>	Smooth Rose	S2	G5T5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Stachys nuttallii</i>	Heartleaf Hedge-nettle	S3	G5?
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<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>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 septentrionalis</i>	Northern Blue Violet	S2	G5
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake	S2	G5T3T4
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Carychium nannodes</i>	File Thorn	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Gastrocopta holzingeri</i>	Lambda Snaggletooth	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Great Greenbrier

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Tiger Beetles				
	<i>Cicindela ancocisconensis</i> *	Appalachian Tiger Beetle	S3	G3

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>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Buteo platypterus</i> *	Broad-winged Hawk	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>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius</i> *	American Kestrel	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>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>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	G5
	<i>Riparia riparia</i> *	Bank Swallow	S2B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B, S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B, S3N	G5
	<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>Protonotaria citrea</i>	Prothonotary Warbler	S2B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B, S1N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Erynnis lucilius*</i>	Columbine Duskywing	S2	G4
	<i>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<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>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5

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>Stygobromus allegheniensis*</i>	Allegheny Cave Amphipod	S1	G5
	<i>Stygobromus gracilipes*</i>	Shenandoah Valley Cave Amphipod	S1	G3G4
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5

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

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CONSERVATION FOCUS AREA = Greater Shenandoah Valley

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>Cyprinella analostana*</i>	Satinfin Shiner	S1	G5
	<i>Etheostoma olmstedi*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Margariscus margarita*</i>	Pearl Dace	S2S3	G5
	<i>Moxostoma macrolepidotum*</i>	Shorthead Redhorse	S1	G5
	<i>Notropis procne*</i>	Swallowtail Shiner	S1	G5
	<i>Percina peltata*</i>	Shield Darter	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5
	<i>Hybognathus regius</i>	Eastern Silvery Minnow	S1	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5

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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>Plethobasus cyphus*</i>	Sheepnose	S2	G3
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

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 patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<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>Diarrhena obovata</i> *	Twin Grass	S1	G4G5
	<i>Parnassia grandifolia</i> *	Largeleaf Grass-of-parnassus	S1	G3
	<i>Pycnanthemum torrei</i> *	Torrey's Mountain-mint	S1	G2
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Silene nivea</i> *	Snowy Catchfly	S1	G4?
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Arabis shortii</i>	Short's Rockcress	S1	G5
	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	Giant Cane	S2	G5T5?
	<i>Bolboschoenus fluviatilis</i>	River Bulrush	S1	G5
	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Sideoats Grama	S3	G5T5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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
	<i>Carex prairea</i>	Prairie Sedge	S1	G5?
	<i>Cheilanthes eatonii</i>	Chestnut Lipfern	S2	G5?
	<i>Cheilanthes tomentosa</i>	Woolly Lipfern	S1	G5
	<i>Corallorhiza wisteriana</i>	Wister's Coralroot, Spring Coralroot	S2	G5
	<i>Cyperus squarrosus</i>	Awned Flatsedge	S3	G5
	<i>Decodon verticillatus</i>	Swamp-loosestrife	S1	G5
	<i>Eleocharis compressa</i>	Flat-stem Spikerush	S2	G4
	<i>Eleocharis intermedia</i>	Spikerush	S1	G5

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CONSERVATION FOCUS AREA = Greater Shenandoah Valley

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 var. maculatum</i>	Spotted Joe-pyeweed	S1	G5T5
	<i>Galactia volubilis</i>	Downy Milkpea	S2	G5
	<i>Glyceria acutiflora</i>	Creeping Mannagrass	S2	G5
	<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?

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Lysimachia thysiflora</i>	Water Loosestrife	S1	G5
	<i>Lythrum alatum</i> var. <i>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>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>Quercus shumardii</i>	Shumard Oak	S2	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	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>Schoenoplectus acutus</i> var. <i>acutus</i>	Hardstem Bulrush	S2	G5T5
	<i>Scutellaria galericulata</i>	Hooded Skullcap	S1	G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Trillium cernuum</i>	Nodding Trillium	S1	G5

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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

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>Clemmys guttata*</i>	Spotted Turtle	S1	G5
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G4
	<i>Plestiodon laticeps*</i>	Broad-headed Skink	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5

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>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis*</i>	Eastern Hellbender	S2	G3G4
	<i>Desmognathus welteri*</i>	Black Mountain Salamander	S2	G4
	<i>Lithobates pipiens (R. pipiens)*</i>	Northern Leopard Frog	S1	G5
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander	S2	G2G3
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>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>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>Botaurus lentiginosus</i> *	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Cardellina canadensis</i> *	Canada Warbler	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>Contopus cooperi</i> *	Olive-sided Flycatcher	S1B	G4
	<i>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Falco sparverius</i> *	American Kestrel	S3B	G5
	<i>Geothlypis formosa</i> *	Kentucky Warbler	S3B	G5
	<i>Helmitheros vermivorum</i> *	Worm-eating Warbler	S3B	G5

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CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Pooecetes gramineus</i> *	Vesper Sparrow	S2B, S2N	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 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>Aegolius acadicus</i>	Northern Saw-whet Owl	S2B,S2N	G5
	<i>Antrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	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>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5

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CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S2B,S3N	G5
	<i>Spizella pallida</i>	Clay-colored Sparrow	S1B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5
	<i>Vermivora ruficapilla</i>	Nashville Warbler	S1B	G5

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>Catocala dulciola</i> *	Sweet Underwing	SU	G3
	<i>Chlosyne harrisii</i> *	Harris's Checkerspot	S2	G4
	<i>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Papilio appalachiensis</i> *	Appalachian Tiger Swallowtail	SNR	G4
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	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
	<i>Boloria selene myrina</i>	Silver-bordered Fritillary	S3	G5T5
	<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>Colias interior (high elev)</i>	Pink-edged Sulphur	S1	G5T2Q
	<i>Eilema bicolor</i>	Bicolor Moth	S1	G5
	<i>Erora laeta</i>	Early Hairstreak	S2	GU
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<i>Lithophane oriunda</i>	Immigrant Pinion Moth	S1	G4
	<i>Melanchnra assimilis</i>	Black Arches	S1	G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<i>Speyeria atlantis</i>	Atlantis Fritillary	S3	G5
	<i>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

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>Arrhopalites pavo</i> *	A Cave Springtail	S1S2	G1G2
	<i>Caecidotea cannula</i> *	An Isopod	S1	G2G3
	<i>Caecidotea simonini</i> *	An Isopod	S1	G1G2
	<i>Macrocotyla hoffmasteri</i> *	Hoffmaster's Cave Flatworm	S2	G3G4
	<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>Sinella agna</i> *	A Springtail	S3	G3G4
	<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	G3G4
	<i>Stygobromus franzi</i> *	Franz's Cave Amphipod	S1	G3G4
	<i>Stygobromus parvus</i> *	Minute Cave Amphipod	S1	G2G3
	<i>Zygonopus weyeri</i> ensis*	Grand Caverns Blind Cave Millipede	S2	G3G4
	<i>Caecidotea holsingeri</i>	Greenbrier Valley Cave Isopod	S3	G5
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5
	<i>Pseudanophthalmus hypertrichosis</i>	A Cave Beetle	S3	G5
	<i>Pseudotremia fulgida</i>	Greenbrier Valley Cave Millipede	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Rhagidia varia</i>	A Cave Mite	S3	G5
	<i>Sinella hoffmani</i>	Hoffman's Springtail	S3	G5

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 elkensis</i> *	Elk River Crayfish	S1	G2
	<i>Cambarus nerterius</i> *	An Underground Crayfish	S1?	G2
	<i>Cambarus smilax</i> *	Greenbrier River Crayfish	S2	GNR
	<i>Cambarus chasmodactylus</i>	New River Crayfish	S3	G4

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 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 angustipennis</i> *	Appalachian Jewelwing	S3	G4
	<i>Gomphus abbreviatus</i> *	Spine-crowned Clubtail	SH	G3G4
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Lanthus parvulus</i> *	Northern Pygmy Clubtail	S3	G4
	<i>Leucorrhinia glacialis</i> *	Crimson-ringed Whiteface	S1	G5
	<i>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Rhionaeschna mutata</i> *	Spatterdock Darner	S1	G4
	<i>Aeshna canadensis</i>	Canada Darner	S3	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<i>Calopteryx amata</i>	Superb 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

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CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Dragonflies and Damselflies				
	<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 desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<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 hudsonica</i>	Hudsonian Whiteface	S3	G5
	<i>Libellula axilena</i>	Bar-winged Skimmer	S2	G5
	<i>Libellula flava</i>	Yellow-sided Skimmer	S3	G5
	<i>Macromia illinoensis</i>	Illinois River Cruiser	S3	G5
	<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

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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>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>Phenacobius teretulus</i> *	Kanawha Minnow	S1	G3G4
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Percina gymnocephala</i>	Appalachia Darter	S2	G4
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Corynorhinus townsendii virginianus</i> *	Virginia Big-eared Bat	S2	G4T2
	<i>Glaucomys sabrinus fuscus</i> *	WV Northern Flying Squirrel	S2	G5T2
	<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 Myotis	S2*	G2G3
	<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	S1	G5
	<i>Condylura cristata</i>	Star-nosed Mole	S2	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Sorex dispar</i>	Long-tailed Shrew	S2S3	G4
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

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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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Anemone quinquefolia</i> var. <i>minima</i> *	Dwarf Anemone	S2	G5T3
	<i>Botrychium lanceolatum</i> var. <i>angustisegment</i>	Lanceolate Grapefern	S1	G5T4
	<i>Carex careyana</i> *	Carey's Sedge	S1	G4G5
	<i>Carex lucorum</i> var. <i>australucorum</i> *	Blue Ridge Sedge	S1	G4T3T5
	<i>Carex manhartii</i> *	Manhart's Sedge	S1	G3G4
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G3
	<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>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G1G2
	<i>Corallorhiza maculata</i> var. <i>occidentalis</i> *	Western Spotted Coralroot	S1	G5T3T5
	<i>Cypripedium reginae</i> *	Showy Lady's-slipper	S1	G4
	<i>Euphorbia purpurea</i> *	Glade Spurge	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<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>Marshallia grandiflora</i> *	Monongahela Barbara's-buttons	S2	G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Platanthera shriveri</i> *	Shriver's Frilly Orchid	S1	G1?
	<i>Polemonium vanbruntiae</i> *	Bog Jacob's-ladder	S2	G3G4
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2
	<i>Prenanthes crepidinea</i> *	Corymbed Rattlesnake-root	S1	G4
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<i>Stachys aspera</i> *	Gritty Hedge-nettle	S1	G4?
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Thelypteris simulata</i> *	Bog Fern	S1	G4G5
	<i>Triantha glutinosa</i> *	Sticky Bog-asphodel	S1	G3G5
	<i>Trifolium stoloniferum</i> *	Running Buffalo Clover	S3	G3
	<i>Triphora trianthophora</i> *	Threebirds	S2	G3G4
	<i>Viola appalachiensis</i> *	Appalachian Blue Violet	S3	G3
	<i>Vittaria appalachiana</i> *	Appalachian Shoestring Fern	S1	G4
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Agrostis mertensii</i>	Northern Bentgrass	S1	G5
	<i>Amelanchier bartramiana</i>	Oblong-fruit Serviceberry	S2	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Betula papyrifera</i>	Paper Birch	S2	G5
	<i>Botrychium matricariifolium</i>	Daisy-leaved Grape-fern	S2	G5
	<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	S3	G4Q
	<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?
	<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 comosa</i>	Longhair Sedge	S2	G5
	<i>Carex deflexa</i>	Northern Sedge	S1	G5

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Plants				
	<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</i> var. <i>americana</i>	Woolly-fruit Sedge	S1	G5T5
	<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
	<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 seorsa</i>	Weak Stellate Sedge	S2	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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Coeloglossum viride var. virescens</i>	Long-bracted Green Orchid, Satyr Orchid	S1	G5T5
	<i>Coptis trifolia</i>	Threelobed Goldthread	S2	G5
	<i>Corallorhiza trifida</i>	Early Coralroot	S1	G5
	<i>Cornus canadensis</i>	Canadian Bunchberry	S2	G5
	<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>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>Fraxinus nigra</i>	Black Ash	S2	G5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	S3	G5
	<i>Gentianopsis crinita</i>	Greater Fringed Gentian	S1	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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 var. grandis</i>	American Mannagrass	S2	G5T5
	<i>Glyceria laxa</i>	Mannagrass	S2S3	G5
	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	S1S2	G5
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Hasteola suaveolens</i>	False Indian-plantain	S3	G4
	<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>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

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Plants				
	<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>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G4G5
	<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>Ophioglossum engelmannii</i>	Limestone Adder's-tongue	S1	G5
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>Pogonia ophioglossoides</i>	Rose Pogonia	S2	G5
	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	S1	G5T5
	<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
	<i>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5
	<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 purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Scirpus microcarpus</i>	Red-tinge Bulrush	S3	G5
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5

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Plants				
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Stellaria borealis</i> ssp. <i>borealis</i>	Northern Stitchwort	S1	G5T5
	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	Smooth Blue American-aster	S2	G5T4
	<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>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>Trillium nivale</i>	Snowy Trillium	S2	G4
	<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

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Plants				
	<i>Viburnum rafinesquianum</i>	Downy Arrow-wood	S2	G5
	<i>Viola blanda</i> var. <i>palustriformis</i>	Violet	SH	G4G5T4T5
	<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

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Crotalus horridus*</i>	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G4
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5
	<i>Thamnophis sauritus*</i>	Eastern Ribbonsnake	S2	G5
	<i>Virginia valeriae pulchra*</i>	Mountain Earthsnake	S2	G5T3T4
	<i>Carphophis amoenus</i>	Wormsnake	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = High Alleghenies

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Mesodon aff. Andrewsae*</i>	Balsam Globe	S1	GNR
	<i>Stenotrema simile*</i>	Bear Creek Slitmouth	S2	G2
	<i>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<i>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Fontigens tartarea</i>	Organ Cavesnail	S2	G2
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesomphix perlaevis</i>	Smooth Button	S3	G4G5
	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	S2	G2
	<i>Striatura exigua</i>	Ribbed Striate	S2	G5
	<i>Striatura ferrea</i>	Black Striate	S3	G5
	<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 coelaxis</i>	Bidentate Dome	S1	G3
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4
	<i>Zonitoides ellioti</i>	Green Dome	S2	G4

* Priority 1 species

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

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 quadramaculatus*</i>	Black-bellied Salamander	S3	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	G5
	<i>Chaetura pelagica</i> *	Chimney Swift	S3B	G5
	<i>Falco sparverius</i> *	American Kestrel	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 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>Antrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5

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>Speyeria diana*</i>	Diana Fritillary	S2S3	G3G4
	<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

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Lampsilis ovata</i>	Pocketbook	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5

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	G2Q
	<i>Corallorhiza bentleyi</i> *	Bentley's Coralroot	S1	G1G2
	<i>Heuchera americana</i> var. <i>hispida</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Liatris turgida</i> *	Turgid Gayfeather	S2	G3
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<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>Asplenium septentrionale</i>	Forked Spleenwort	S2	G4G5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Calystegia spithamea</i> ssp. <i>purshiana</i>	Shale Bindweed	S3	G4G5T4
	<i>Carex aggregata</i>	Glomerate Sedge	S2	G5
	<i>Clematis albicoma</i>	White-hair Leatherflower	S3	G4
	<i>Eriogonum allenii</i>	Shalebarren Wild Buckwheat	S2	G4
	<i>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Packera antennariifolia</i>	Shalebarren Ragwort	S3	G4
	<i>Pieris floribunda</i>	Mountain Fetterbush	S3	G4
	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny Plum	S3	G4T4
	<i>Woodsia ilvensis</i>	Rusty Cliff Fern	S2	G5

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* Priority 1 species

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = James Headwaters

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				

* Priority 1 species

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Amphibians				
	<i>Desmognathus quadramaculatus*</i>	Black-bellied Salamander	S3	G5
	<i>Pseudotriton montanus diastictus*</i>	Midland Mud Salamander	S1	G5T5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Pieris virginiensis*</i>	West Virginia White	S3	G3?
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5

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>Noturus stigmosus*</i>	Northern Madtom	S1	G3
	<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 buchanaui</i>	Ghost Shiner	S3	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4
	<i>Percina sciera</i>	Dusky Darter	S3	G5
	<i>Pimephales vigilax</i>	Bullhead Minnow	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<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>Fusconaia subrotunda</i> *	Long-solid	S3	G3
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<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 subviridis</i> *	Green Floater	S2	G3
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	S2	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<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>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<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>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		G5

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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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Kanawha Falls

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5

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>Aneides aeneus</i> *	Green Salamander	S3	G3G4
	<i>Cryptobranchus alleganiensis</i> *	Eastern Hellbender	S2	G3G4
	<i>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus*</i>	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus*</i>	Broad-winged Hawk	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>Falco sparverius*</i>	American Kestrel	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>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	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

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* Priority 1 species

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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Rallus limicola</i>	Virginia Rail	S1B,S1N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Glauopsyche l. lygdamus*</i>	Silvery Blue	S4	G5T3T4
	<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

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>Anax longipes</i> *	Comet Darner	S3	G5
	<i>Dromogomphus spoliatus</i> *	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus adelphus</i> *	Mustached Clubtail	S1	G4
	<i>Gomphus fraternus</i> *	Midland Clubtail	S2	G5
	<i>Gomphus quadricolor</i> *	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons</i> *	Green-faced Clubtail	S3	G3G4
	<i>Macromia alleghaniensis</i> *	Allegheny River Cruiser	S2S3	G4
	<i>Progomphus obscurus</i> *	Common Sanddragon	S2S3	G5
	<i>Stylurus spiniceps</i> *	Arrow Clubtail	S2	G5
	<i>Aeshna tuberculifera</i>	Black-tipped Darner	S3	G4
	<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 vesperum</i>	Vesper Bluet	S3	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Helocordulia uhleri</i>	Uhler's Sundragon	S2S3	G5
	<i>Ladona deplanata</i>	Blue Corporal	S3	G5

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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>Lestes australis</i>	Southern Spreadwing	S3	G5
	<i>Macromia illinoiensis</i>	Illinois River Cruiser	S3	G5
	<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	S3	G5
	<i>Somatochlora linearis</i>	Mocha Emerald	S3	G5
	<i>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S3	G5

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>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G3
	<i>Carpiodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Etheostoma tippecanoe*</i>	Tippecanoe Darter	S2	G3G4
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Ichthyomyzon greeleyi*</i>	Mountain Brook Lamprey	S1	G3G4
	<i>Lythrurus umbratilis*</i>	Redfin Shiner	S3	G5
	<i>Notropis boops*</i>	Bigeye Shiner	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	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>Lethenteron appendix</i>	American Brook Lamprey	S2	G4
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5
	<i>Moxostoma carinatum</i>	River Redhorse	S3	G4
	<i>Notropis buchanani</i>	Ghost Shiner	S3	G5
	<i>Percina copelandi</i>	Channel Darter	S2S3	G4

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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

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 Myotis	S2*	G2G3

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>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<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 fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Lampsilis teres</i> *	Yellow Sandshell	S1	G5
	<i>Lasmigona compressa</i> *	Creek Heelsplitter	S1	G5
	<i>Ligumia recta</i> *	Black Sandshell	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pleurobema clava</i> *	Clubshell	S1	G2
	<i>Pleurobema sintoxia</i> *	Round Pigtoe	S2	G4G5
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5

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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>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<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>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<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

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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>Truncilla truncata</i>	Deertoe	S2	G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5

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>Huperzia porophila</i> *	Rock Clubmoss	S1	G4
	<i>Liatris scariosa</i> var. <i>nieuwlandii</i> *	Devil's-bite	S1	G5?T3T5
	<i>Calycanthus floridus</i> var. <i>glaucus</i>	Carolina Allspice, Strawberry-shrub	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>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>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>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Trillium flexipes</i>	Nodding Wakerobin	S2	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5

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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				

* Priority 1 species

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>Graptemys geographica*</i>	Northern Map Turtle	S1	G5
	<i>Plestiodon anthracinus anthracinus*</i>	Northern Coal Skink	S2	G5T5

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>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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	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	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>Parkesia motacilla</i> *	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra</i> *	Summer Tanager	S3B	G5
	<i>Scolopax minor</i> *	American Woodcock	S3B	G5
	<i>Setophaga cerulea</i> *	Cerulean Warbler	S2B	G4
	<i>Spizella pusilla</i> *	Field Sparrow	S3B	G5
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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

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

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 quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Gomphus viridifrons*</i>	Green-faced Clubtail	S3	G3G4
	<i>Progomphus obscurus*</i>	Common Sanddragon	S2S3	G5
	<i>Gomphus desertus</i>	Harpoon Clubtail	S2S3	G4
	<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

* Priority 1 species

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	G3
	<i>Clinostomus elongatus</i> *	Redside Dace	S1S2	G3G4
	<i>Crystallaria cincotta</i> *	Diamond Darter	S1	G1
	<i>Etheostoma maculatum</i> *	Spotted Darter	S1	G2
	<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>Notropis ariommus</i> *	Popeye Shiner	S2	G3
	<i>Noturus stigmosus</i> *	Northern Madtom	S1	G3
	<i>Percina macrocephala</i> *	Longhead Darter	S2	G3
	<i>Carpionodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<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

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<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

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 Myotis	S2*	G2G3
	<i>Neotoma magister</i> *	Allegheny Woodrat	S3	G3G4

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Cyclonaias tuberculata</i> *	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<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 fasciola</i> *	Wavy-rayed Lampmussel	S3	G5
	<i>Ligumia recta</i> *	Black Sandshell	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pleurobema clava</i> *	Clubshell	S1	G2
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2
	<i>Villosa lienosa</i> *	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Ellipsaria lineolata</i>	Butterfly	S2	G4

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Lower Elk

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Elliptio complanata</i>	Eastern Elliptio	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	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
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Ptychobranhus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		G3G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<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

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	G4Q
	<i>Calycanthus floridus var. glaucus</i>	Carolina Allspice, Strawberry-shrub	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

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

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>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5

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>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
	<i>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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

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

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

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>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Polygala cruciata</i> var. <i>aquilonia</i> *	Cross-leaved Milkwort	S1	G5T4
	<i>Potamogeton tennesseensis</i> *	Tennessee Pondweed	S2	G2
	<i>Rhynchospora fusca</i> *	Brown Beaksedge	S1	G4G5
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2
	<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 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>Sanguisorba canadensis</i>	Canada Burnet	S2S3	G5

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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>Scirpus atrocinctus</i>	Blackgirdle Bulrush	S3	G5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Veronica scutellata</i>	Grassleaf Speedwell	S2	G5

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>Aneides aeneus*</i>	Green Salamander	S3	G3G4
	<i>Plethodon nettingi*</i>	Cheat Mountain Salamander	S2	G2G3
	<i>Plethodon punctatus*</i>	Cow Knob (white Spotted) Salamander	S2	G3
	<i>Pseudacris feriarum*</i>	Upland Chorus Frog	S3	G5
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	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>Dolichonyx oryzivorus</i> *	Bobolink	S3B	G5
	<i>Falco peregrinus</i> *	Peregrine Falcon	S2B,S2N	G4
	<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>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 cerulea</i> *	Cerulean Warbler	S2B	G4

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CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B,S3N	G5
	<i>Mergus merganser</i>	Common Merganser	S3B,S3N	G5
	<i>Setophaga caerulescens</i>	Black-throated Blue 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

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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>Erynnis lucilius</i> *	Columbine Duskywing	S2	G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<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>Calycopsis 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 (high elev)</i>	Pink-edged Sulphur	S1	G5T2Q
	<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>Syngrapha rectangula</i>	Salt & Pepper Looper Moth	S1	G5

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CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Cave Invertebrates				
	<i>Caecidotea sinuncus*</i>	An Isopod	S1	G1G2
	<i>Macrocotyla hoffmasteri*</i>	Hoffmaster's Cave Flatworm	S2	G3G4
	<i>Poecilophysis extraneostella*</i>	A Cave Mite	S2	G2?
	<i>Pseudotremia lusciosa*</i>	Germany Valley Cave Millipede	S1	G1G2
	<i>Pseudotremia princeps*</i>	South Branch Valley Cave Millipede	S1	G1
	<i>Phanetta subterranea</i>	A Spider	S3	G5
	<i>Porrhomma cavernicola</i>	Appalachian Cave Spider	S2	G5

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>Ophiogomphus mainensis fastigiatus</i> *	Maine Snaketail	S3	G4TU
	<i>Cordulia shurtleffi</i>	American Emerald	S4	G5
	<i>Gomphus desertus</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

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>Etheostoma olmstedi*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Thoburnia rhothoeca</i>	Torrent Sucker	S3	G4

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	G4T2
	<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 Myotis	S2*	G2G3
	<i>Myotis sodalis*</i>	Indiana Bat	S1	G2
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Spilogale putorius*</i>	Eastern Spotted Skunk	S1	G5
	<i>Sylvilagus obscurus</i>	Appalachian Cottontail	S2	G4

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

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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>Aconitum reclinatum</i> *	White Monkshood	S3	G3
	<i>Arabis patens</i> *	Spreading Rockcress	S2	G3
	<i>Arabis serotina</i> *	Shalebarren Rockcress	S2	G2
	<i>Astragalus neglectus</i> *	Cooper's Milkvetch	S1	G4
	<i>Carex polymorpha</i> *	Variable Sedge	S1	G3
	<i>Carex roanensis</i> *	Roan Mountain Sedge	S2	G3
	<i>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Monarda fistulosa</i> ssp. <i>brevis</i> *	Smoke Hole Bergamot	S1	G5T1
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Paxistima canbyi</i> *	Canby's Mountain-lover	S2	G2
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Saxifraga michauxii</i> *	Cliff Saxifrage	S1	G4G5
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Silene virginica</i> var. <i>robusta</i> *	Fire Pink	S1	G5T1Q
	<i>Spiraea virginiana</i> *	Virginia Spiraea	S1	G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Taenidia montana*</i>	Mountain-pimpernel	S3	G3
	<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>Zigadenus elegans ssp. glaucus*</i>	Mountain Deathcamas	S1	G5T4T5
	<i>Abies balsamea</i>	Balsam Fir	S1	G5
	<i>Adlumia fungosa</i>	Allegheny-vine	S2?	G4
	<i>Arabis hirsuta ssp. pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Astragalus distortus var. distortus</i>	Bent Milkvetch	S2	G5T5?
	<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

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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 tosa</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, Satyr 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>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
	<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S1	G5
	<i>Helianthemum canadense</i>	Long-branch Frostweed	S2	G5

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CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Hudsonia tomentosa</i> var. <i>tomentosa</i>	False Heather, Woolly Hudsonia	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</i> var. <i>philadelphicum</i>	Wood Lily	S2S3	G5T4T5
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax	S2	G4G5T4T5
	<i>Linum sulcatum</i> var. <i>sulcatum</i>	Grooved Yellow Flax	S1	G5T5
	<i>Listera cordata</i> var. <i>cordata</i>	Heartleaf Twayblade	S2	G5T5
	<i>Listera smallii</i>	Kidneyleaf Twayblade	S2	G4
	<i>Luzula bulbosa</i>	Bulbous Woodrush	S1	G5
	<i>Melanelia stygia</i>	Stygian Black-parmelia	S2	G4G5
	<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>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliffbrake	S2	G5T5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>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 pensylvanica</i>	Eastern Swamp Saxifrage	S2	G5
	<i>Scutellaria ovata</i> ssp. <i>virginiana</i>	Heart-leaved Skullcap	S1?	G5TNR
	<i>Sibbaldiopsis tridentata</i>	Mountain-cinquefoil	S2	G5
	<i>Solidago arguta</i> var. <i>harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<i>Spiranthes lucida</i>	Shining Ladies'-tresses	S1S2	G5
	<i>Spiranthes tuberosa</i>	Little Ladies'-tresses	S3	G5
	<i>Symphoricarpos albus</i> var. <i>albus</i>	Snowberry	S2	G5T5
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<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

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CONSERVATION FOCUS AREA = North Fork Mountain/Thorn Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
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Plants

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>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G4

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>Triodopsis picea*</i>	Spruce Knob Threetooth	S3	G3
	<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 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	G4G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

* Priority 1 species

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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

* Priority 1 species

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

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>Buteo platypterus*</i>	Broad-winged Hawk	S3B	G5
	<i>Chaetura pelagica*</i>	Chimney Swift	S3B	G5
	<i>Coccyzus erythrophthalmus*</i>	Black-billed Cuckoo	S2B	G5
	<i>Dolichonyx oryzivorus*</i>	Bobolink	S3B	G5
	<i>Falco sparverius*</i>	American Kestrel	S3B	G5
	<i>Geothlypis formosa*</i>	Kentucky Warbler	S3B	G5
	<i>Hylocichla mustelina*</i>	Wood Thrush	S3B	G5
	<i>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	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

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SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Tyto alba</i> *	Barn Owl	S2B,S2N	G5
	<i>Antrostomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Ardea herodias</i>	Great Blue Heron	S3B,S4N	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Certhia familiaris</i>	Brown Creeper	S3B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B,S3N	G5
	<i>Empidonax alnorum</i>	Alder Flycatcher	S3B	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	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>Porzana carolina</i>	Sora	S1B,S1N	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Lycaena hyllus</i> *	Bronze Copper	S2	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4

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

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Fish				
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Carpionodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus*</i>	Redside Dace	S1S2	G3G4
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Lepomis humilis*</i>	Orangespotted Sunfish	S1	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpionodes carpio</i>	River Carpsucker	S3	G5
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<i>Ictiobus niger</i>	Black Buffalo	S2	G5
	<i>Lepomis gulosus</i>	Warmouth	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

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 Myotis	S2*	G2G3
	<i>Myotis sodalis</i> *	Indiana Bat	S1	G2

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Cyclonaias tuberculata*</i>	Purple Wartyback	S1	G5
	<i>Cyprogenia stegaria*</i>	Fanshell	S1	G1Q
	<i>Elliptio crassidens*</i>	Elephant-ear	S2	G5
	<i>Lampsilis abrupta*</i>	Pink Mucket	S1	G2
	<i>Lampsilis cariosa*</i>	Yellow Lampmussel	S2	G3G4
	<i>Lampsilis teres*</i>	Yellow Sandshell	S1	G5
	<i>Lasmigona subviridis*</i>	Green Floater	S2	G3
	<i>Pleurobema clava*</i>	Clubshell	S1	G2
	<i>Simpsonaias ambigua*</i>	Salamander Mussel	S2	G3
	<i>Villosa fabalis*</i>	Rayed Bean	S1	G2
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<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>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Ptychobranchnus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Toxolasma parvus</i>	Lilliput	S2	G5
	<i>Tritogonia verrucosa</i>	Pistolgrip	S3	G4G5
	<i>Unio merus tetralasmus</i>	Pondhorn	S1	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Trifolium stoloniferum*</i>	Running Buffalo Clover	S3	G3
	<i>Carex appalachica</i>	Appalachian Sedge	S3	G4
	<i>Carex hirtifolia</i>	Pubescent Sedge	S3	G5
	<i>Carex laxiculmis var. 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 var. patula</i>	Roundleaf Goldenrod	S1	G5T5
	<i>Taxus canadensis</i>	Canada Yew	S2S3	G5
	<i>Woodwardia areolata</i>	Netted Chainfern	S2	G5

SPECIES BY CONSERVATION FOCUS AREA, TAXA AND PRIORITY

CONSERVATION FOCUS AREA = Northern Panhandle

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Snails				
	<i>Catinella vermeta</i>	Suboval Ambersnail	S3	G5

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>Ambystoma barbouri</i> *	Streamside Salamander	S1	G4
	<i>Ambystoma texanum</i> *	Smallmouth Salamander	S1	G5
	<i>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Pseudotriton montanus diastictus</i> *	Midland Mud Salamander	S1	G5T5
	<i>Scaphiopus holbrookii</i> *	Eastern Spadefoot	S1	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4

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>Botaurus lentiginosus*</i>	American Bittern	S1B,S1N	G4
	<i>Buteo platypterus*</i>	Broad-winged Hawk	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>Falco peregrinus*</i>	Peregrine Falcon	S2B,S2N	G4
	<i>Falco sparverius*</i>	American Kestrel	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>Icteria virens*</i>	Yellow-breasted Chat	S3B	G5
	<i>Limnothlypis swainsonii*</i>	Swainson's Warbler	S3B	G4
	<i>Parkesia motacilla*</i>	Louisiana Waterthrush	S3B	G5
	<i>Piranga rubra*</i>	Summer Tanager	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>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>Butorides virescens</i>	Green Heron	S3B	G5
	<i>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Circus cyaneus</i>	Northern Harrier	S1B, S3N	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B, S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B, S3N	G5
	<i>Ixobrychus exilis</i>	Least Bittern	S1B	G5
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3B, S3N	G5
	<i>Pandion haliaetus</i>	Osprey	S2B	G5
	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S3B	G5

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<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>Spiza americana</i>	Dickcissel	S1B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Glaucopteryx l. lygdamus*</i>	Silvery Blue	S4	G5T3T4
	<i>Lycaena hyllus*</i>	Bronze Copper	S2	G5
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5
	<i>Cyllopsis gemma</i>	Gemmed Satyr	S3	G4G5
	<i>Parrhasius m-album</i>	White-m Hairstreak	S2	G5
	<i>Staphylus hayhurstii</i>	Hayhurst's Scallopwing	S1	G5

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>Fallicambarus fodiens*</i>	A Crayfish (digger)	S1	G5
	<i>Cambarus theepiensis</i>	Coalfields Crayfish	S3	GNR

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>Dromogomphus spoliatus*</i>	Flag-tailed Spinyleg	SH	G4G5
	<i>Gomphus quadricolor*</i>	Rapids Clubtail	S3	G3G4
	<i>Macromia alleghaniensis*</i>	Allegheny River Cruiser	S2S3	G4
	<i>Stylurus notatus*</i>	Elusive Clubtail	S1S2	G3
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2	G4
	<i>Enallagma antennatum</i>	Rainbow Bluet	S1S2	G5
	<i>Epiaeschna heros</i>	Swamp Darner	S3	G5
	<i>Gomphus vastus</i>	Cobra Clubtail	S2	G5
	<i>Macromia illinoiensis</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>Sympetrum ambiguum</i>	Blue-faced Meadowhawk	S1	G5
	<i>Telebasis byersi</i>	Duckweed Firetail	S1	G5

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>Ammocrypta pellucida*</i>	Eastern Sand Darter	S3	G3
	<i>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Carpiodes velifer*</i>	Highfin Carpsucker	S1	G4G5
	<i>Clinostomus elongatus*</i>	Redside Dace	S1S2	G3G4
	<i>Ichthyomyzon bdellium*</i>	Ohio Lamprey	S2S3	G3G4
	<i>Lepomis humilis*</i>	Orangespotted Sunfish	S1	G5
	<i>Lythrurus umbratilis*</i>	Redfin Shiner	S3	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Carpiodes carpio</i>	River Carpsucker	S3	G5
	<i>Chrosomus erythrogaster</i>	Southern Redbelly Dace	S2S3	G5
	<i>Esox americanus vermiculatus</i>	Grass Pickerel	S1S2	G5T5
	<i>Hiodon alosoides</i>	Goldeye	S1	G5
	<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>Macrhybopsis hyostoma</i>	Shoal Chub	S2	G5
	<i>Macrhybopsis storeriana</i>	Silver Chub	S3	G5

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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

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>Myotis leibii</i> *	Eastern Small-footed Bat	S1	G3
	<i>Myotis septentrionalis</i> *	Northern Myotis	S2*	G2G3
	<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>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

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>Cumberlandia monodonta</i> *	Spectaclecase	S1	G3
	<i>Cyclonaias tuberculata</i> *	Purple Wartback	S1	G5
	<i>Cyprogenia stegaria</i> *	Fanshell	S1	G1Q
	<i>Elliptio crassidens</i> *	Elephant-ear	S2	G5
	<i>Epioblasma torulosa rangiana</i> *	Northern Riffleshell	S1	G2T2
	<i>Fusconaia ebena</i> *	Ebonysshell	S3	G4G5
	<i>Lampsilis abrupta</i> *	Pink Mucket	S1	G2
	<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 subviridis</i> *	Green Floater	S2	G3
	<i>Ligumia recta</i> *	Black Sandshell	S3	G5
	<i>Obovaria subrotunda</i> *	Round Hickorynut	S3	G4
	<i>Plethobasus cyphus</i> *	Sheepnose	S2	G3
	<i>Pleurobema clava</i> *	Clubshell	S1	G2
	<i>Pleurobema sintoxia</i> *	Round Pigtoe	S2	G4G5
	<i>Simpsonaias ambigua</i> *	Salamander Mussel	S2	G3
	<i>Villosa fabalis</i> *	Rayed Bean	S1	G2

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TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Villosa lienosa*</i>	Little Spectaclecase	S1	G5
	<i>Actinonaias ligamentina</i>	Mucket	S3	G5
	<i>Amblema plicata</i>	Threeridge	S3	G5
	<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	S2	G5
	<i>Elliptio dilatata</i>	Spike	S3	G5
	<i>Elliptio fisheriana</i>	Northern Lance	S2	G4
	<i>Lampsilis cardium</i>	Plain Pocketbook	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
	<i>Megalonaias nervosa</i>	Washboard	S2	G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Pleurobema cordatum</i>	Ohio Pigtoe	S2	G4
	<i>Ptychobranchus fasciolaris</i>	Kidneyshell	S3	G4G5
	<i>Pyganodon grandis</i>	Giant Floater	S3	G5
	<i>Quadrula cylindrica</i>	Rabbitsfoot		G3G4
	<i>Quadrula metanevra</i>	Monkeyface	S2	G4
	<i>Quadrula nodulata</i>	Wartyback	S1	G4
	<i>Quadrula pustulosa</i>	Pimpleback	S3	G5

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CONSERVATION FOCUS AREA = Ohio River Corridor

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mussels				
	<i>Quadrula quadrula</i>	Mapleleaf	S3	G5
	<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		G5

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>Carex tuckermanii</i> *	Tuckerman's Sedge	S1	G4
	<i>Ceratophyllum echinatum</i> *	Spineless Hornwort	S1	G4?
	<i>Gratiola viscidula</i> *	Short's Hedgehyssop	S1	G4G5
	<i>Hottonia inflata</i> *	Featherfoil	S1	G4
	<i>Ranunculus pusillus var. pusillus</i> *	Low Spearwort	S1	G5T4?
	<i>Scutellaria saxatilis</i> *	Rock Skullcap	S2	G3
	<i>Sida hermaphrodita</i> *	Virginia Mallow	S3	G3
	<i>Spermacoce glabra</i> *	Buttonweed	S1	G4G5
	<i>Triadenum tubulosum</i> *	Lesser Marsh-st. John's-wort	S1	G4?
	<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

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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>Carex typhina</i>	Cattail Sedge	S2	G5
	<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, Spring Coralroot	S2	G5
	<i>Cuscuta indecora</i> var. <i>neuropetala</i>	Dodder	S1	G5T5
	<i>Cyperus refractus</i>	Reflexed Flatsedge	S3	G5
	<i>Cyperus squarrosus</i>	Awed 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</i> ssp. <i>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>Heteranthera reniformis</i>	Kidneyleaf Mud-plantain	S1	G5
	<i>Hibiscus laevis</i>	Halberd-leaf Rosemallow	S2	G5
	<i>Juglans cinerea</i>	Butternut	S3	G4
	<i>Juncus biflorus</i>	Bog Rush	S2	G5
	<i>Juncus filiformis</i>	Thread Rush	S2	G5

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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>Lemna valdiviana</i>	Pale Duckweed	S3	G5
	<i>Lindernia dubia</i> var. <i>anagallidea</i>	Yellowseed False Pimpernel	S2	G5T4
	<i>Ludwigia leptocarpa</i>	River Seedbox	S2	G5
	<i>Lythrum alatum</i> var. <i>alatum</i>	Winged Loosestrife	S2	G5T5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	S2	G5
	<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-aram	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 pennsylvanicus</i>	Bristly Crowfoot	S1	G5
	<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Sparganium androcladum</i>	Branched Bur-reed	S2S3	G4G5
	<i>Stachys tenuifolia</i>	Smooth Hedge-nettle	S3	G5
	<i>Toxicodendron vernix</i>	Poison-sumac	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<i>Utricularia gibba</i>	Humped Bladderwort	S2	G5

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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

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>Carphophis amoenus</i>	Wormsnake	S3	G5
	<i>Opheodrys aestivus</i>	Rough Greensnake	S2	G5
	<i>Scincella lateralis</i>	Little Brown Skink	S2	G5

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>Vertigo milium</i>	Blade Vertigo	S2	G5
	<i>Webbhelix multilineata</i>	Striped Whitelip	S1	G5

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 marginipennis</i> *	Cobblestone Tiger Beetle	S1	G2
	<i>Cicindela cuprascens</i>	A Tiger Beetle	S1	G5

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>Plethodon punctatus*</i>	Cow Knob (white Spotted) Salamander	S2	G3
	<i>Plethodon virginia*</i>	Shenandoah Mountain Salamander	S2	G2G3Q
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	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	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>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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Birds				
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	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>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5
	<i>Setophaga fusca</i>	Blackburnian Warbler	S3B	G5
	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S3B	G5

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>Euchlaena milnei</i> *	Milne's Euchlaena Moth	S2	G2G4
	<i>Euchloe olympia</i> *	Olympia Marble	S2S3	G4G5
	<i>Euphyes bimacula</i> *	Two-spotted Skipper	S1	G4
	<i>Glaucopsyche l. lygdamus</i> *	Silvery Blue	S4	G5T3T4
	<i>Hesperia metea</i> *	Cobweb Skipper	S2S3	G4G5
	<i>Phyciodes cocyta diminutor</i> *	Summer Crescent	SNR	GNR
	<i>Phyciodes cocyta selene</i> *	Northern Crescent	S2	G5
	<i>Pyrgus (centaureae) wyandot</i> *	Grizzled Skipper	S1	G1G2Q
	<i>Celastrina lucia</i>	Northern Spring Azure	SNR	G5
	<i>Celastrina neglectamajor</i>	Appalachian Azure	SNR	G4
	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3S4	G4
	<i>Polygonia progne</i>	Gray Comma	S3	G4G5
	<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

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

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>Anguilla rostrata*</i>	American Eel	S2	G4
	<i>Etheostoma olmstedi*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Ameiurus nebulosus</i>	Brown Bullhead	S2	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Fundulus diaphanus</i>	Banded Killifish	S2	G5

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	G4T2
	<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>Spilogale putorius*</i>	Eastern Spotted Skunk	S1	G5
	<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S2	G5
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Synaptomys cooperi</i>	Southern Bog Lemming	S3	G5
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

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

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>Delphinium exaltatum</i> *	Tall Larkspur	S2	G3
	<i>Gymnocarpium appalachianum</i> *	Appalachian Oak Fern	S2	G3
	<i>Heuchera alba</i> *	White Alumroot	S2	G2Q
	<i>Heuchera americana</i> var. <i>hispidula</i> *	Rough Alumroot, Rough Heuchera	S2	G5T3?
	<i>Hexalectris spicata</i> var. <i>spicata</i> *	Spiked Crested Coralroot	S1	G5T4T5
	<i>Lupinus perennis</i> ssp. <i>perennis</i> *	Wild Lupine, Sundial Lupine	S1	G5T4?
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Rhamnus lanceolata</i> ssp. <i>lanceolata</i> *	Lance-leaved Buckthorn	S1	G5T4T5
	<i>Taenidia montana</i> *	Mountain-pimpernel	S3	G3
	<i>Talinum teretifolium</i> *	Eastern Fameflower	S1	G4
	<i>Trichophorum planifolium</i> *	Bashful Bulrush	S1	G4G5
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Trillium pusillum</i> var. <i>virginianum</i> *	Dwarf Wakerobin	S1	G3T2
	<i>Xerophyllum asphodeloides</i> *	Eastern Turkeybeard	S1	G4
	<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

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CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

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 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>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>Helianthus laevigatus</i>	Smooth Sunflower	S2	G4
	<i>Linum lewisii</i> var. <i>lewisii</i>	Prairie Flax	S2	G4G5T4T5
	<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

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CONSERVATION FOCUS AREA = Shenandoah Mountain/Nathaniel Mountain

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<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>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
	<i>Symphoricarpos albus</i> var. <i>albus</i>	Snowberry	S2	G5T5
	<i>Thalictrum clavatum</i>	Mountain Meadowrue	S2	G4
	<i>Thuja occidentalis</i>	Northern White-cedar	S2	G5
	<i>Trichostema setaceum</i>	Narrowleaf Bluecurls	S2	G5
	<i>Trillium nivale</i>	Snowy Trillium	S2	G4
	<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

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>Crotalus horridus</i> *	Timber Rattlesnake	S3	G4
	<i>Glyptemys insculpta</i> *	Wood Turtle	S3	G4

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>Euchemotrema leai</i>	Lowland Pillsnail	S3	G5
	<i>Hendersonia occulta</i>	Cherrystone Drop	S3	G4
	<i>Mesodon clausus</i>	Yellow Globelet	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	G4G5
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

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>Lithobates pipiens (R. pipiens)</i> *	Northern Leopard Frog	S1	G5
	<i>Pseudacris feriarum</i> *	Upland Chorus Frog	S3	G5
	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander	S2	G4
	<i>Pseudotriton ruber ruber</i>	(northern) Red Salamander	S3	G5

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>Bonasa umbellus</i> *	Ruffed Grouse	S3B,S3N	G5
	<i>Buteo platypterus</i> *	Broad-winged Hawk	S3B	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	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>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 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>Antrastomus vociferus</i>	Eastern Whip-poor-will	S3B	G5
	<i>Butorides virescens</i>	Green Heron	S3B	G5

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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>Catharus fuscescens</i>	Veery	S3B	G5
	<i>Eremophila alpestris</i>	Horned Lark	S2B,S3N	G5
	<i>Gallinago delicata</i>	Wilson's Snipe	S1B,S3N	G5
	<i>Haliaeetus leucocephalus</i>	Bald Eagle	S3B,S3N	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>Setophaga caerulescens</i>	Black-throated Blue Warbler	S3B	G5

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CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Butterflies and Moths				
	<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	G5
	<i>Calycopis cecrops</i>	Red-banded Hairstreak	S3	G5

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

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>Etheostoma olmstedi*</i>	Tessellated Darter	S1S2	G5
	<i>Luxilus cornutus*</i>	Common Shiner	S1S2	G5
	<i>Lythrurus ardens*</i>	Rosefin Shiner	S1	G5
	<i>Notropis procne*</i>	Swallowtail Shiner	S1	G5
	<i>Erimyzon oblongus</i>	Creek Chubsucker	S3	G5
	<i>Notropis amoenus</i>	Comely Shiner	S3	G5

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CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Mammals				
	<i>Neotoma magister*</i>	Allegheny Woodrat	S3	G3G4
	<i>Cryptotis parva</i>	Least Shrew	S2	G5
	<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	S2S3	G5T4
	<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S3	G5

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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>Pleurobema collina*</i>	James Spiny mussel	S1	G1
	<i>Pleurobema sintoxia*</i>	Round Pigtoe	S2	G4G5
	<i>Obliquaria reflexa</i>	Threehorn Wartyback	S3	G5
	<i>Strophitus undulatus</i>	Squawfoot	S3	G5
	<i>Utterbackia imbecillis</i>	Paper Pondshell		G5
	<i>Villosa iris</i>	Rainbow	S2	G5Q

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>Baptisia australis</i> var. <i>australis</i> *	False Blue Indigo	S3	G5T3T4
	<i>Carex lupuliformis</i> *	False Hop Sedge	S1	G4
	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i> *	Hyssopleaf Thoroughwort	S1	G5T4T5
	<i>Oenothera argillicola</i> *	Shalebarren Evening-primrose	S3	G3G4
	<i>Panicum verrucosum</i> *	Warty Panicgrass	S1	G4
	<i>Ptilimnium fluviatile</i> *	Harperella	S1	G2
	<i>Scirpus ancistrochaetus</i> *	Barbed-bristle Bulrush	S1	G3
	<i>Trifolium virginicum</i> *	Kate's Mountain Clover	S3	G3
	<i>Arabis hirsuta</i> ssp. <i>pycnocarpa</i>	Hairy Rockcress	S2	G5T5
	<i>Bartonia paniculata</i> ssp. <i>paniculata</i>	Twining Screwstem	S1	G5T5
	<i>Calamagrostis porteri</i> ssp. <i>porteri</i>	Reedgrass	S3	G4T4
	<i>Chenopodium standleyanum</i>	Standley's Goosefoot	S2	G5
	<i>Coreopsis verticillata</i>	Whorled Tickseed	S1	G5
	<i>Drosera rotundifolia</i> var. <i>rotundifolia</i>	Roundleaf Sundew	S3	G5T5
	<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

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CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Plants				
	<i>Liparis loeselii</i>	Yellow Wide-lip Orchid	S3	G5
	<i>Lysimachia hybrida</i>	Lowland Loosestrife	S1	G5
	<i>Piptochaetium avenaceum</i>	Eastern Speargrass	S2	G5
	<i>Platanthera ciliaris</i>	Yellow-fringe Orchid	S3	G5
	<i>Potamogeton pulcher</i>	Spotted Pondweed	S1	G5
	<i>Pycnanthemum muticum</i>	Clustered Mountainmint	S1	G5
	<i>Samolus valerandi ssp. parviflorus</i>	Seaside Brookweed	S2	G5T5
	<i>Schoenoplectus purshianus</i>	Clubrush, Bulrush	S3	G4G5
	<i>Solidago arguta var. harrisii</i>	Shalebarren Goldenrod	S3	G5T4
	<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

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CONSERVATION FOCUS AREA = Sleepy Creek/Back Creek

TAXA	SCIENTIFIC NAME	COMMON NAME	S RANK	G RANK
Reptiles				
	<i>Glyptemys insculpta*</i>	Wood Turtle	S3	G4
	<i>Heterodon platirhinos*</i>	Eastern Hog-nosed Snake	S2	G5
	<i>Pseudemys rubriventris</i>	Northern Red-bellied Cooter	S2	G5

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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>Ventridens arcellus</i>	Golden Dome	S3	G4
	<i>Ventridens suppressus</i>	Flat Dome	S3	G5
	<i>Ventridens virginicus</i>	Split-tooth Dome	S3	G4

List of Acronyms Used in the SWAP

AML – Abandoned Mine Lands

APHIS – Animal and Plant Health Inspection Service

ATV – All Terrain Vehicle

CCVI – Climate Change Vulnerability Index

CFA – Conservation Focus Area

CREP – Conservation Reserved Enhancement Program

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

ORSANCO – Ohio River Valley Water Sanitation Commission

PSC – Public Service Commission

SGCN – Species of Greatest Conservation Need

SWAP – State Wildlife Action Plan

SWG – State Wildlife Grant

TNC – The Nature Conservancy

USFS – US Forest Service

USFWS – US Fish and Wildlife Service

USGS – US Geological Service

WVDA – West Virginia Department of Agriculture

WVDEP – West Virginia Department of Environmental Protection

WVDNR – West Virginia Division of Natural Resources

WVU – West Virginia University

WVWCAP – West Virginia Wildlife Conservation Action Plan