



Terrestrial Resources Study Report

Byllesby-Buck Hydroelectric Project
(FERC No. 2514)

November 17, 2021

Prepared by:



Prepared for:

Appalachian Power Company



An AEP Company

BOUNDLESS ENERGY™

This page intentionally left blank.



Contents

1	Project Introduction and Background	2
2	Study Goals and Objectives	2
3	Study Area.....	3
4	Background and Existing Information.....	3
5	Methodology	5
5.1	Desktop Mapping.....	6
5.2	Field Verification	6
6	Study Results	6
6.1	Desktop Mapping.....	6
6.2	Field Verification	9
6.2.1	Ecological Groups and Community Types.....	9
6.2.2	Wildlife	12
6.2.3	Invasive Species Documentation.....	13
7	Summary and Discussion.....	14
8	Project Impacts on Terrestrial Resources	14
9	Variances from FERC-Approved Study Plan.....	15
10	Germane Correspondence and Consultation	15
11	References	15

Tables

Table 1.	The Nature Conservancy (2018b) Terrestrial Habitats within the Study Area.....	6
Table 2.	Ecological Groups and Community Types Observed During 2021 Surveys	12
Table 3.	Terrestrial Wildlife Species Observed During 2021 Surveys.....	12
Table 4.	Invasive Species and Ranking (VDCR 2014) Observed During 2021 Surveys	13

Figures

Figure 1.	Study Area for the Terrestrial Resources Study.....	4
Figure 2.	Study Area for the Terrestrial Resources Study.....	8
Figure 3.	Ecological Groups and Natural Communities	11



Attachments

Attachment 1 – Terrestrial Habitat Photographs

Attachment 2 – Invasive Species Photographs

Attachment 3 – Virginia Department of Game and Inland Fisheries – Species Search Report

Acronyms

AEP	American Electric Power
Appalachian or Licensee	Appalachian Power Company
CFR	Code of Federal Regulations
FERC or Commission	Federal Energy Regulatory Commission
ILP	Integrated Licensing Process
ISR	Initial Study Report
PAD	Pre-Application Document
PM&E	protection, mitigation, and enhancement
Project	Byllesby-Buck Hydroelectric Project
RM	river miles
RSP	Revised Study Plan
SPD	Study Plan Determination
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USR	Updated Study Report
VDCR	Virginia Department of Conservation and Recreation
VDGIF	Virginia Department of Game and Inland Fisheries

This page intentionally left blank.

1 Project Introduction and Background

Appalachian Power Company (Appalachian or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the two-development Byllesby-Buck Hydroelectric Project (Project) (Project No. 2514), located on the upper New River in Carroll County, Virginia. The Byllesby development is located about 9 miles north of the city of Galax, and the Buck development is located approximately 3 river miles (RM) downstream of Byllesby and 43.5 RM upstream of Claytor Dam.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission). The Project underwent relicensing in the early 1990s, including conversion to run-of-river operations and incorporating additional protection, mitigation, and enhancement (PM&E) measures. The current operating license for the Project expires on February 29, 2024. Accordingly, Appalachian is pursuing a subsequent license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with FERC's regulations at 18 CFR §16.9(b), the licensee must file its final application for a new license with FERC no later than February 28, 2022.

In accordance with 18 CFR §5.11, Appalachian developed a Revised Study Plan (RSP) for the Project that was filed with the Commission and made available to stakeholders on October 18, 2019. On November 18, 2019 FERC issued the Study Plan Determination (SPD). On December 18, 2019, Appalachian filed a request for rehearing of the SPD. The SPD was subsequently modified by FERC by an Order on Rehearing dated February 20, 2020.

On July 27, 2020, Appalachian filed an updated ILP study schedule and a request for extension of time to file the Initial Study Report (ISR) to account for Project delays resulting from the COVID-19 pandemic. The request was approved by FERC on August 10, 2020, and the filing deadline for the ISR for the Project was extended from November 17, 2020 to January 18, 2021. Appalachian conducted a virtual ISR Meeting on January 28, 2021 and filed the ISR Meeting summary with the Commission on February 12, 2021. Stakeholders provided written comments in response to Appalachian's filing of the ISR meeting summary, which are addressed in this Updated Study Report (USR) along with study methods and results.

Appalachian has conducted studies in accordance with 18 CFR §5.15, as provided in the RSP and as subsequently modified by FERC. This USR describes the methods and results of the Terrestrial Resources Study conducted in support of preparing an application for new license for the Project.

2 Study Goals and Objectives

The goals and objectives of the Terrestrial Resources Study are to:

- Perform a desktop characterization of the upland vegetation types within the study area boundary utilizing the Nature Conservancy's (TNC) Guide to the Freshwater and Terrestrial Habitats of the Northeast (Virginia Geographic Subset) (TNC 2018a) and Terrestrial Habitat Map (TNC 2018b), and classify plant communities according to the Virginia Department of Conservation and Recreation (VDCR) Natural Communities of Virginia Classification of Ecological Groups and Community Types (VDCR 2021a) in the field;

- Perform a characterization of the upland habitat types in relation to wildlife species that are known to inhabit or that were directly observed during the field visit; and
- Develop a map of the vegetative community within the upland portions of the study area, identifying general location and community type. The map will also identify the location of any invasive terrestrial species identified in the study area based on the literature review or observed during the field verification efforts.

3 Study Area

The study area for this Terrestrial Resources Study includes the upland vegetative communities on each bank of the upper New River and lowermost tributary segments of Crooked Creek and Chestnut Creek and extends 3.4 miles upstream of Byllesby Dam and 1.15 miles downstream of Buck Dam, including 2.7 miles of the New River in between the two dams. The study area is located in the easternmost portion of the Mt. Rogers National Recreation area and the New River Trail State Park is also situated within the study area along the western streambank (Figure 1).

4 Background and Existing Information

Existing relevant and reasonably available information regarding upland vegetative communities in the Project vicinity was presented in Section 5.5 of the PAD (Appalachian 2019). Most of the land adjacent to the Project is steep and forested in mixed a chestnut oak type community, although there are many bare rock exposures in the rugged terrain. The western side of the project is bounded by the Jefferson National Forest and the east side consists of similarly forested terrain (Appalachian 1991). According to the environmental assessment prepared by FERC for the existing license (FERC 1994), upland forests in the vicinity of the Project are characterized by silver maple (*Acer saccharinum*), black willow (*Salix nigra*), and American sycamore (*Platanus occidentalis*) as the primary species.

Up to 100 invasive plant species have been documented within Virginia (VDCR 2014). Invasive aquatic plants are known to exist in the New River, including hydrilla (*Hydrilla verticillata*), curly-leaf pondweed (*Potamogeton crispus*), and brittle naiad (*Naja minor*). An aquatic plant community study performed in 2012 between Buck Dam and upper Claytor Lake identified 13 macrophyte species, including curly-leaf pondweed (Weberg et al. 2015). Terrestrial invasive plant species including Chinese lespedeza (*Lespedeza cuneata*), mutiflora rose (*Rosa multiflora*), and Japanese stiltgrass (*Microstegium vimineum*) have been documented in the study area in previous studies (ESI 2017a). Additional general information regarding invasive aquatic plants in the New River basin is provided in Section 5.6.2 of the PAD.

The study area supports many small mammals, avifauna, reptiles, and amphibians. Over 511 animal species (including both terrestrial and aquatic species) were identified as potentially occurring within a 3.0-mile radius of the Project per a geographic search on the Virginia Department of Wildlife Resources (formerly the Department of Game and Inland Fisheries [VDGIF]) Fish and Wildlife Information Service (VDGIF 2021). Of these 511 species, 342 were terrestrial species.

Habitat for several federal protected species including Indiana bat (*Myotis sodalist*), northern long-eared bat (*Myotis septentrionalis*), and Virginia spirea (*Spiraea virginiana*) are located within the

study area. Surveys for protected bat species have not been conducted as part of this relicensing effort since proposed improvement plans and Project activities are not expected to involve clearing of trees in upland forested communities that provide habitat for roosting or maternity colonies for these species.

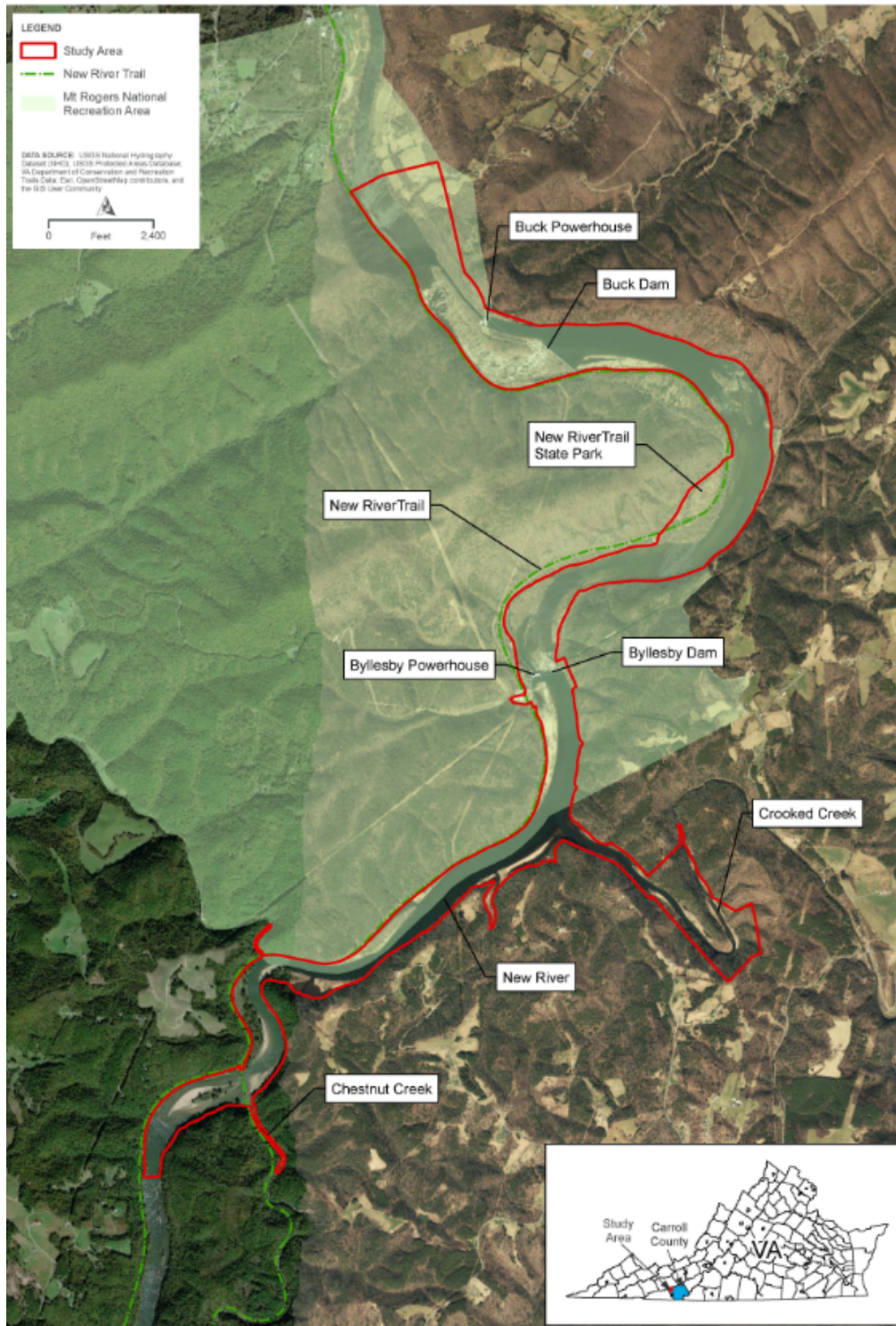


Figure 1. Study Area for the Terrestrial Resources Study

Virginia spirea, which is federally listed as threatened, has been historically reported by the U.S. Fish and Wildlife Service (USFWS) upstream of Byllesby Dam; however, there is no documentation or verification of any historical presence or exact location. Environmental Solutions & Innovations, Inc (ESI) performed a habitat assessment in 2017 for this species within the Project boundary (ESI 2017b) and no individual species were observed within the identified suitable habitats for Virginia spirea. HDR performed follow up surveys at these locations during the summer of 2021. No individual species were identified. The methods and results of HDR's survey is included in the Byllesby-Buck Hydroelectric Project Wetlands, Riparian, and Littoral Habitat Characterization Study Report (Appendix D of the USR).

Bald eagle (*Haliaeetus leucocephalus*) nesting and roosting habitat occurs in the vicinity of the Project. The bald eagle was removed from the Federal Endangered Species List on August 8, 2007 and is no longer protected under the Endangered Species Act; however, bald eagles are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. An aerial transect helicopter survey for nesting bald eagles was conducted in the vicinity of the Project in March 2021 by ESI in support of a project not associated with Project relicensing (ESI 2021). The survey area included approximately 2.5 miles of line crossing the Jefferson National Forest and approximately 1.6 miles on private lands immediately adjacent to the Jefferson National Forest, comprising 90.7 miles of flight across the survey area. One active bald eagle nest observed in the survey area on the New River; the nest is approximately 0.52 miles from the transmission line corridor and approximately 0.27 miles south of the Buck Dam. An unoccupied nest was identified along the New River approximately 1.1 mile north of Buck Dam at the top of a transmission tower; however, after several fly-by attempts over two days, no birds were observed attending and the nest could potentially be an osprey nest. A third smaller stick nest was observed 2.4 river miles upstream of Byllesby Dam; however, it is not consistent with a bald eagle nest. Additionally, three individual eagles were observed within the survey area over two survey events. Anticipated continuation of routine Project-related activities will not adversely affect this species. Coordination with the USFWS would be required should future operations, modifications, or developments have the potential to affect bald eagles.

5 Methodology

The Terrestrial Resources Study was performed initially as a desktop analysis followed by a field verification to confirm locations and boundaries of upland terrestrial habitat types within the study area. The desktop study used several data resources and GIS databases to identify high-level plant communities. Plant species were identified in the field by qualified biologists with regional experience with assistance using appropriate regional field guides and plant identification mobile applications. The continuation of Project operations is not expected to adversely impact terrestrial resources; however, local improvements to recreational facilities could have the potential to disturb botanical and wildlife resources. The study methods proposed by Appalachian outlined below provide adequate information to assess potential Project operations-related effects to upland terrestrial resources in the study area.



5.1 Desktop Mapping

A high-level characterization of the upland vegetation communities within the study area boundary was completed using high-resolution orthoimagery and other online databases including the TNC Terrestrial Habitat Map (TNC 2018b) and Virginia Natural Heritage Data Explorer (VDCR 2021b).

The Virginia Invasive Plant Species List (VDCR 2014) was used to rank the level of threat to forests and other natural communities and native species. A “high ranking” indicates a species poses a significant threat to native species, natural communities, or the economy. A “medium ranking” indicates the species poses a moderate threat to native species, natural communities, or the economy, and “low ranking” indicates a species poses a low threat.

5.2 Field Verification

The onsite terrestrial surveys were conducted from May 26 through May 28, 2021. Applicable reference materials were used during the field assessments including regional field guides and plant identification mobile apps to identify plants to genus and species level. Upland vegetation cover types were verified in the field and plant communities were characterized according to (VDCR 2021). The dominant species of upland vegetation, and any invasive species observations, were noted within each community type. The location of invasive species observed during the field verification were georeferenced and photographed using the ArcGIS Collector mobile app. Finalized cover type maps depicting plant community classifications and locations of invasive species were generated along with a summary list of the upland vegetative plant species documented during the field verification effort.

During the field verification activities, observations of avifauna, mammals, or observations of their tracks and scat were recorded. A summary list of the wildlife species or signs of their presence were compiled along with the general vegetative community where the observation occurred.

6 Study Results

6.1 Desktop Mapping

Table 1 provides a summary of the terrestrial habitats within the study area and a base map depicting these major upland vegetation cover types present within the study area is shown on Figure 2. This base map was used to verify and characterize terrestrial communities that best represent ecological groups described in accordance with VDCR (2021a).

Table 1. The Nature Conservancy (2018b) Terrestrial Habitats within the Study Area

Habitat	Description	Percent within Study Area
Acidic Cliff and Talus	A sparsely vegetated cliff or talus slope formed on granitic, sandstone, or other acidic bedrock. The lack of soil, high acidic bedrock, and constant erosion limits vegetation to mosses, lichens, and herbs growing on bare rock or crevices, and to sparse trees and shrubs rooted in deeper soil pockets.	0.30
Agricultural	No habitat description available.	4.25



Habitat	Description	Percent within Study Area
Allegheny-Cumberland Dry Oak Forest and Woodland	A dry hardwood forest dominated by white oak (<i>Quercus alba</i>), southern red oak (<i>Quercus falcata</i>), chestnut oak (<i>Quercus montana</i>), scarlet oak (<i>Quercus coccinea</i>), and black oak (<i>Quercus velutina</i>), with lesser amounts of red maple (<i>Acer rubrum</i>), pignut hickory (<i>Carya glabra</i>), mockernut hickory (<i>Carya tomentosa</i>), and sometimes sprouts of American chestnut (<i>Castanea dentata</i>). Scattered and small inclusions of shortleaf pine (<i>Pinus echinata</i>) or Virginia pine (<i>Pinus virginiana</i>) may occur.	0.32
Developed	No habitat description available.	1.73
Open Water	New River and tributaries including Crooked Creek and Chestnut Creek. No habitat description available.	61.63
Northern-Central Interior Large River Floodplain	A complex of wetland and upland vegetation on floodplains of medium to large rivers. Vegetation is variable, dominant types often include silver maple (<i>Acer saccharinum</i>), sycamore (<i>Platanus occidentalis</i>), green ash (<i>Fraxinus pennsylvanica</i>), American elm (<i>Ulmus americana</i>), sweet gum (<i>Liquidambar styraciflua</i>), pin oak (<i>Quercus palustris</i>), and swamp white oak (<i>Quercus bicolor</i>). Understory species are mixed but include sedges and shrubs such as buttonbush. A single occurrence may extend from river's edge across the outermost extent of the floodplain or to where it meets a wet meadow or upland system.	2.60
Shrubland/grassland; mostly ruderal shrublands, regenerating clear-cuts	No habitat description available.	0.85
Southern Appalachian and Central Appalachian Cove Forest	A hardwood or mixed forest with a high diversity of mesophytic (moisture loving but non-wetland) trees. Canopy species commonly include yellow buckeye (<i>Aesculus flava</i>), sugar maple (<i>Acer saccharum</i>), white ash (<i>Fraxinus americana</i>), basswood (<i>Tilia americana</i>), tulip polar (<i>Liriodendron tulipifera</i>), cucumber tree (<i>Magnolia acuminata</i>), and American beech (<i>Fagus grandifolia</i>), sometimes in a single stand. Hemlock (<i>Tsuga</i> sp.) is sometimes present, mostly in acidic coves. Shrub and herb layers are similarly rich, and calcium-bearing and circumneutral bedrock tends to support the richest examples	8.75
Southern Appalachian Low Elevation Pine Forest	An open forest or woodland of acidic substrates at low elevations in southwest Virginia. Vegetation is dominated by Virginia and shortleaf pine; occasionally with pitch pine (<i>Pinus rigida</i>). Hardwoods may be abundance, especially dry-site oaks such as southern red oak, chestnut oak, and scarlet oak, but also pignut hickory, red maple, and others. A heath shrub layer may be well developed. Herbs are usually sparse, though communities of this system may have been grassy when fires were more frequent.	3.61
Southern Appalachian Oak Forests	An oak forest of low to mid-elevations and low to moderate moisture dominated by white, red, black, chestnut, and scarlet oaks, with varying amounts of hickory, black gum (<i>Nyssa sylvatica</i>) and red maple. Some areas have dense evergreen heath shrubs of mountain laurel (<i>Kalmia latifolia</i>) or great rhododendron (<i>Rhododendron maximum</i>); others have deciduous heath layers of blueberry and/or huckleberry (<i>Vaccinium</i> sp). Successional communities with heavy tuliptree, pine, and black locust (<i>Robinia pseudoacacia</i>) are also included in this system	15.96

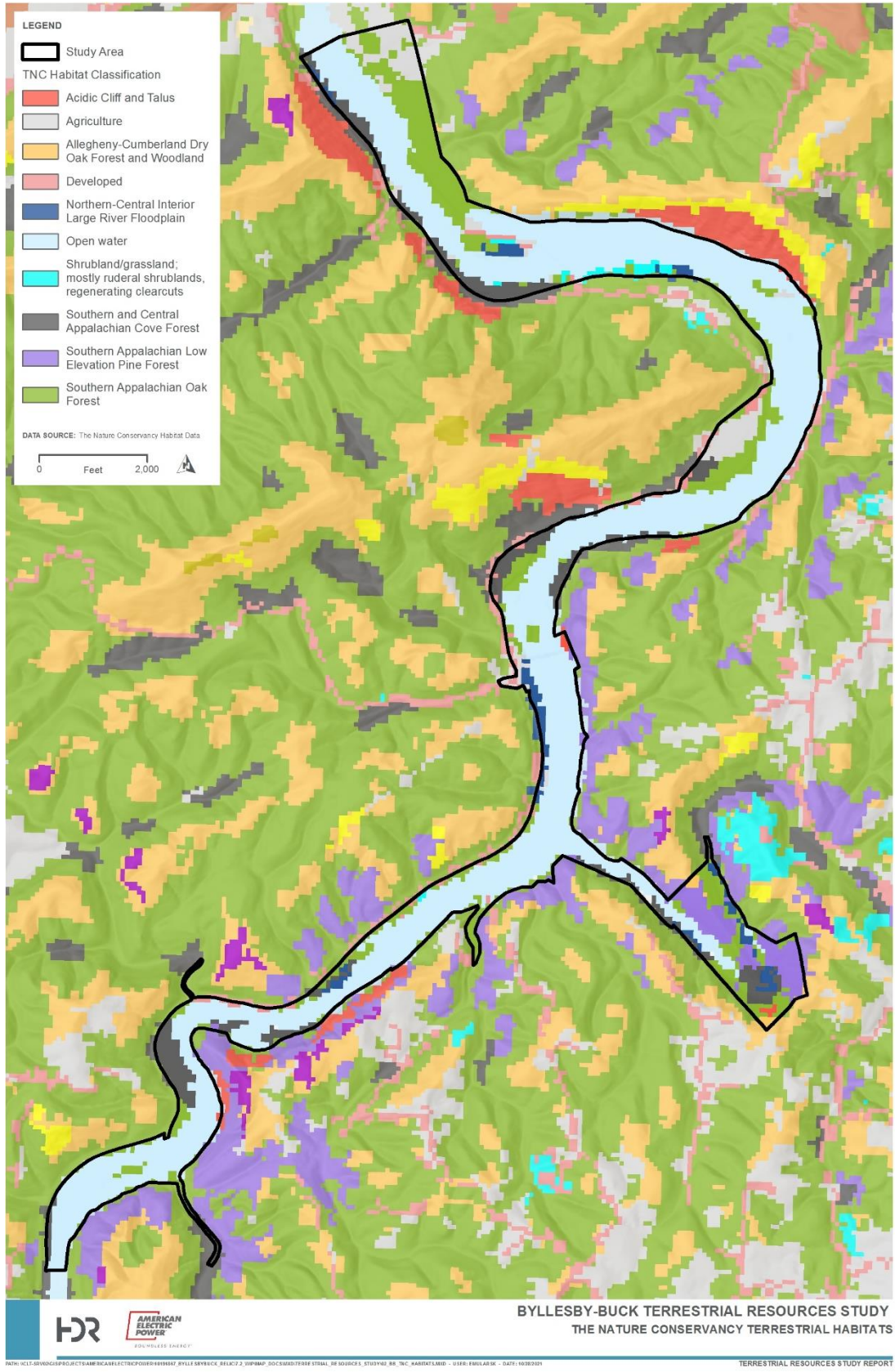


Figure 2. Study Area for the Terrestrial Resources Study

6.2 Field Verification

6.2.1 Ecological Groups and Community Types

Terrestrial habitats varied throughout the study area and best professional judgement was used to categorize identified habitats into ecological groups and community types described in VDCR (2021). Four upland communities were mapped within the study area: 1) Acidic Cove Forests, 2) Montane Mixed Oak and Oak Hickory Forests, 3) Mountain/Piedmont Basic Woodlands, 4) Piedmont/Mountain Floodplain Forests and Swamps (Figure 3).

Open maintained area and agricultural fields were also documented. Photographs of terrestrial habitats are located in Attachment 1. Detailed descriptions of ecological groups and community types and observed vegetation are described below.

6.2.1.1 Acidic Cove Forests

This group contains mixed hardwoods and hard-wood hemlock forests of infertile, mesic, montane habitats. These forests occur extensively throughout the mountains, occupying moist lower slopes, ravines, and coves underlain by sandstone, quartzite, granite, and other acidic bedrock (VDCR 2021). Overstory species observed included tulip poplar (*Liriodendron tulipifera*), eastern hemlock (*Tsuga canadensis*), American basswood, sweet birch (*Betula lenta*), chestnut oak, shagbark hickory (*Carya ovata*), and white pine. Understory species included flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginiana*), striped maple (*Acer pensylvanicum*), spicebush (*Lindera benzoin*), wineberry (*Rubus phoenicolasius*) with areas of dense, evergreen shrub layers including great rhododendron and mountain laurel. Herbaceous species included galax (*Galax urceolata*), trillium (*Trillium* sp.), black cohosh (*Actaea racemosa*), jewelweed (*Impatiens capensis*), spotted lady's thumb (*Persicaria maculosa*), mayapple (*Podophyllum peltatum*), wood-nettle (*Laportea canadensis*), Virginia strawberry (*Fragaria virginiana*), violets (*Viola* sp.), polypody ferns (*Polypodium* sp.), and Christmas fern (*Polystichum acrostichoides*).

6.2.1.2 Montane Mixed Oak and Oak Hickory Forests

This group contains relatively diverse, mixed oak and oak-hickory forest of submesic to subxeric mountain slopes and crests located mostly between 2,000 feet and 4,000 feet elevation (VDCR 2021). Overstory species observed included Chestnut oak, northern red oak (*Quercus rubra*), white oak, shagbark hickory, mockernut hickory, sourwood (*Oxydendrum arboretum*), tulip poplar, white pine, silver maple, black locust, and yellow buckeye. Understory species included witch hazel, striped maple, and maple-leaved viburnum (*Viburnum acerifolium*). Herbaceous species included galax, Jack in the pulpit (*Arisaema triphyllum*), spotted ladys' thumb, wood nettle, fire pink (*Silene virginica*), violets (*Viola* sp.), New York fern (*Parathelypteris noveboracensis*) and wood ferns (*Dryopteris* sp.).

6.2.1.3 Mountain/Piedmont Basic Woodlands

This group is represented by deciduous and mixed woodlands of xeric, rocky habitats over mafic substrate such as diabase, gabbro, metabasalt (greenstone), and amphibolite. A few examples occur in habitats underlain by base-rich granite, calcareous shale, and calcareous sandstone. Occurrences in Virginia are widely and locally scattered throughout the mountains and Piedmont foothills, often occurring in patch-mosaics with exposed outcrop barrens (VDCR 2021a). Overstory species observed included Chestnut oak, northern red oak, shagbark hickory, mockernut hickory, silver maple, black cherry (*Prunus serotina*), white ash, and Virginia pine. Understory species included eastern redcedar (*Juniperus virginiana*), eastern redbud (*Cercis canadensis*), eastern hophornbeam (*Ostrya virginiana*), slippery elm (*Ulmus rubra*), witch hazel, blueberry (*Vaccinium* sp.) with localized patches of evergreen shrubs including great rhododendron and mountain laurel. Herbaceous species consisted of smooth solomon's seal (*Polygonatum biflorum*), rattlesnake weed (*Hieracium venosum*), common mullein (*Verbascum Thapsus*), licorice fern (*Polypodium glycyrrhiza*), polypody ferns, wood ferns, reindeer moss (*Cladonia* sp.), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*).

6.2.1.4 Piedmont/Mountain Floodplain Forests and Swamps

These temporarily to seasonally flooded forests encompass most river floodplain habitats of the northern and western Piedmont and major mountain valleys, except those that are cleared (VDCR 2021). Overstory species observed included American sycamore, boxelder (*Acer negundo*), northern red oak, white oak, willow oak (*Quercus phellos*), American basswood, honey locust (*Gleditsia triacanthos*), black walnut (*Juglans nigra*), black gum, black cherry, tulip polar, red maple, silver maple, and green ash (*Fraxinus pennsylvanica*). Understory species included black willow (*Salix nigra*), persimmon (*Diospyros virginiana*), silky dogwood (*Cornus amomum*), redbud (*Cercis canadensis*), alders (*Alnus* sp.), elderberry (*Sambucus canadensis*), and spicebush. Herbaceous species consisted of black cohosh, beggar-ticks (*Bidens* sp.), mayapple, bedstraw (*Galium* sp.), arrow-arum (*Peltandra virginica*), arrowheads (*Sagittaria* sp.), marsh dayflower (*Murdannia keisak*), false nettle (*Boehmeria cylindrica*), clearweed (*Pilea pumila*), marsh seedbox (*Ludwigia palustris*), lizards's tail (*Saururus cernuus*), soft rush (*Juncus effusus*), blunt spikerush (*Eleocharis obtuse*), winged monkey flower (*Mimulus alatus*), Virginia spiderwort (*Tradescantia virginiana*), American bur-reed (*Sparganium americanum*), broadleaf cattail (*Typha latifolia*), reed canary grass (*Phalaris arundinacea*), rice cutgrass (*Leersia oryzoides*), deertongue (*Dichanthelium clandestinum*), woolgrass (*Scirpus cyperinus*), cinnamon fern (*Osmundastrum cinnamomeum*), Christmas fern, Virginia creeper, and poison ivy.

Open maintained areas were observed and several locations around the existing hydropower infrastructure and transmission right of way. One agricultural area was observed in the furthest western extent of the study area north of the New River and south of Loafers Rest Road. Plant species observed within these areas include American sycamore, tulip polar, eastern redcedar, black cherry, black locust, green ash, Virginia pine, blackberry (*Rubus* sp.), Chinese lespedeza (*Lespedeza cuneata*), Japanese clover (*Kummerowia striata*), wingstem (*Verbesina alternifolia*), goldenrods (*Solidago* sp.), deertongue, common dandelion (*Taraxacum officinale*), wild mint (*Mentha canadensis*), red clover (*Trifolium pratense*), partridge pea (*Chamaecrista fasciculata*), plantain (*Plantago* sp.), ground ivy (*Glechoma hederacea*), Cherokee sedge (*Carex cherokeensis*) and Japanese honeysuckle (*Lonicera japonica*).

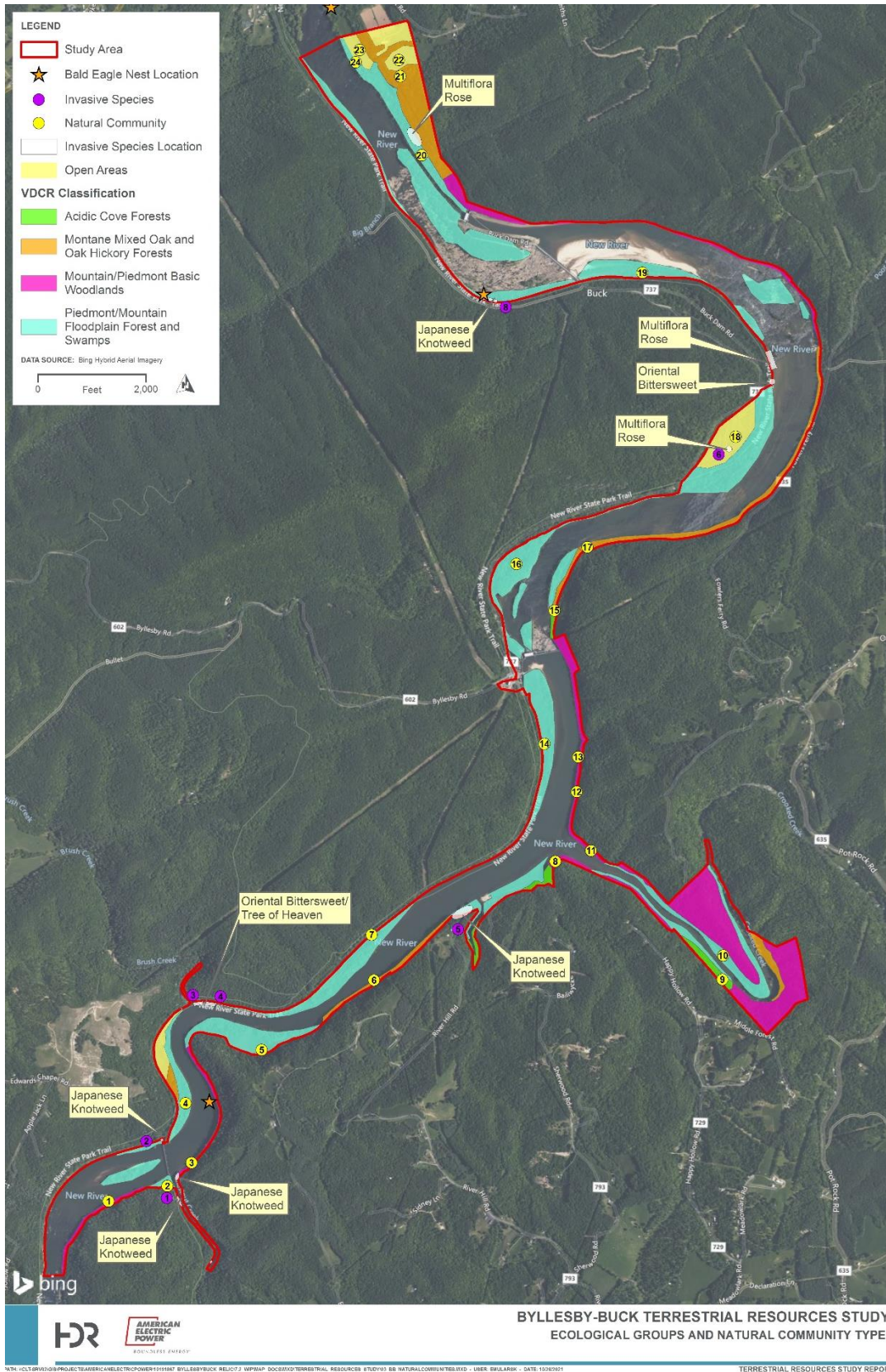


Figure 3. Ecological Groups and Natural Communities



The most prevalent natural community was Piedmont/Mountain Floodplain Forests and Swamps, encompassing 227 acres. Table 2 provides a summary of ecological groups and community types mapped within the study area.

Table 2. Ecological Groups and Community Types Observed During 2021 Surveys

VDCR Ecological Group and Community Type	Acres within Study Area	Percent within Study Area
Acidic Cove Forests	8.85	2.22
Montane Mixed Oak and Oak Hickory Forests	51.38	12.80
Open Areas	32.82	8.17
Mountain/Piedmont Basic Woodlands	80.52	20.06
Piedmont/Mountain Floodplain Forests and Swamps	227.77	56.75

6.2.2 Wildlife

According to the VDGIF Fish and Wildlife Information Services Search Report (VDGIF 2021), a total of 511 animal species (including terrestrial and aquatic species) are known or likely to occur within a 3-mile radius of the study area (Attachment 3). Of these 511 species, 342 are terrestrial species, 127 are aquatic species, and 42 are semi-aquatic species. Table 3 lists wildlife species directly observed or signs of their presence evident during the field visit and corresponding community type in which each species was observed.

Table 3. Terrestrial Wildlife Species Observed During 2021 Surveys

Scientific Name	Common Name	Community Type
HERPETOFAUNA		
<i>Chelydra serpentina</i>	Common snapping turtle	Piedmont/Mountain Floodplain Forest & Swamps
<i>Pantherophis alleghaniensis</i>	Eastern ratsnake	Piedmont/Mountain Floodplain Forest & Swamps
<i>Pantherophis guttatus</i>	Red cornsnake	Piedmont/Mountain Floodplain Forest & Swamps
<i>Pseudacris crucifer</i>	Spring peeper	Piedmont/Mountain Floodplain Forest & Swamps
<i>Thamnophis sirtalis</i>	Eastern gartersnake	Montane Mixed Oak and Oak Hickory Forests
BIRDS		
<i>Agelaius phoeniceus</i>	Red-winged blackbird	Piedmont/Mountain Floodplain Forest & Swamps
<i>Aix sponsa</i>	Wood duck	Piedmont/Mountain Floodplain Forest & Swamps
<i>Branta canadensis</i>	Canada goose	Piedmont/Mountain Floodplain Forest & Swamps
<i>Buteo jamaicensis</i>	Red-tailed hawk	Open Areas
<i>Cathartes aura</i>	Turkey vulture	Open Areas
<i>Cardinalis cardinalis</i>	Northern cardinal	Piedmont/Mountain Floodplain Forest & Swamps
<i>Colinus virginianus</i>	Northern bobwhite	Open Areas
<i>Dumetella carolinensis</i>	Gray catbird	Mountain/Piedmont Basic Woodlands
<i>Haliaeetus leucocephalus</i>	Bald eagle	Piedmont/Mountain Floodplain Forest & Swamps
<i>Meleagris gallopavo</i>	Eastern wild turkey	Piedmont/Mountain Floodplain Forest & Swamps Mountain/Piedmont Basic Woodlands
<i>Spizella pusilla</i>	Field sparrow	Open Areas
<i>Pandion haliaetus</i>	Osprey	Piedmont/Mountain Floodplain Forest & Swamps
<i>Zenaidura macroura carolinensis</i>	Mourning dove	Open Areas
MAMMALS		
<i>Canis latrans</i>	Coyote	Open Areas

Scientific Name	Common Name	Community Type
<i>Castor canadensis</i>	Beaver	Piedmont/Mountain Floodplain Forest & Swamps
<i>Lontra canadensis</i>	North American river otter	Piedmont/Mountain Floodplain Forest & Swamps
<i>Sylvilagus floridanus mallurus</i>	Eastern cottontail	Open Areas
<i>Odocoileus virginianus</i>	White-tailed deer	All Communities
<i>Ondatra zibethicus</i>	Common muskrat	Piedmont/Mountain Floodplain Forest & Swamps
<i>Sciurus niger vulpinus</i>	Eastern fox squirrel	Piedmont/Mountain Floodplain Forest & Swamps
<i>Sciurus carolinensis pennsylvanicus</i>	Northern gray squirrel	Montane Mixed Oak and Oak Hickory Forests Mountain/Piedmont Basic Woodlands
<i>Tamias striatus</i>	Common eastern Chipmunk	Piedmont/Mountain Floodplain Forest & Swamps
<i>Ursus americanus</i>	Black bear	Mountain/Piedmont Basic Woodlands

6.2.3 Invasive Species Documentation

The presence of several species on VDCR’s Virginia Invasive Species Plant List (VDCR 2014) were identified throughout the study area. Many invasive species were noticed at low densities scattered throughout the study area and not feasible to map each individual location. Significant infestations were mapped in the field and are highlighted on Figure 3. Photographs of invasive species are provided in Attachment 2. Table 4 lists the invasive species identified along its’ Virginia Invasiveness Ranking and natural community type.

Table 4. Invasive Species and Ranking (VDCR 2014) Observed During 2021 Surveys

Scientific Name	Common Name	Virginia Invasiveness Rank ¹	Natural Community Location
<i>Ailanthus altissima</i>	Tree-of-Heaven	High	Piedmont/Mountain Floodplain Forest & Swamps
<i>Berberis thunbergii</i>	Japanese Barberry	Medium	Montane Mixed Oak and Oak Hickory Forests
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	High	Piedmont/Mountain Floodplain Forest & Swamps Open Lands
<i>Elaeagnus pungens</i>	Thorny Olive	Low	Piedmont/Mountain Floodplain Forest & Swamps
<i>Lespedeza cuneata</i>	Sericea Lespedeza	High	Piedmont/Mountain Floodplain Forest & Swamps Open Lands
<i>Lonicera japonica</i>	Japanese Honeysuckle	High	Piedmont/Mountain Floodplain Forest & Swamps
<i>Ligustrum sinense</i>	Chinese Privet	High	Montane Mixed Oak and Oak Hickory Forests Mountain/Piedmont Basic Woodlands
<i>Murdannia keisak</i>	Marsh dewflower	High	Piedmont/Mountain Floodplain Forest & Swamps
<i>Microstigium viminium</i>	Japanese stiltgrass	High	Piedmont/Mountain Floodplain Forest & Swamps
<i>Reynoutria japonica</i>	Japanese knotweed	High	Piedmont/Mountain Floodplain Forest & Swamps
<i>Rosa multiflora</i>	Multiflora Rose	High	Piedmont/Mountain Floodplain Forest & Swamps Open Lands Montane Mixed Oak and Oak Hickory Forests
<i>Rubus phoenicolasius</i>	Wineberry	High	Acid Cove Forests



Scientific Name	Common Name	Virginia Invasiveness Rank ¹	Natural Community Location
<i>Sorghum halepense</i>	Johnson Grass	High	Open Areas
<i>Urtica dioica</i>	European Stinging Nettle	High	Montane Mixed Oak and Oak Hickory Forests Mountain/Piedmont Basic Woodlands

¹VCDR ranked species as exhibiting high, medium or low levels of invasiveness based on their threat to natural communities and native species. Invasiveness rank is high for species that:

- Alter ecosystem processes, such as succession, hydrology or fire regime.
- Are capable of invading undisturbed natural communities.
- Cause substantial impacts on rare or vulnerable species or natural communities.
- Are found widely distributed and general abundant where present.
- Disperse readily to new areas.
- Are difficult to control.

7 Summary and Discussion

HDR identified and mapped four upland terrestrial ecological groups and community types including Acidic Cove Forests, Montane Mixed Oak and Oak Hickory Forests, Mountain/Piedmont Basic Woodlands, and Piedmont/Mountain Floodplain Forests and Swamp as well as open maintained areas and agricultural fields within the study area. The boundaries were consistent with similar habitat classification descriptions that are depicted on the TNC Terrestrial Habitat Map (TNC 2018b). Many invasive species were noticed at low densities scattered throughout upland areas. Significant infestations of Japanese knotweed (most abundant), oriental bittersweet, and multiflora rose were noticed primarily in riparian areas along the reservoirs. Five herpetofauna, 15 bird species, and 10 mammal species were observed during the field surveys. Several bald eagle nests are located in the vicinity of the Project and two were observed within the study area (ESI 2021). No other federally protected plant or animal species were observed during the field efforts.

8 Project Impacts on Terrestrial Resources

Continued operation and maintenance of the Project over the new license term is not anticipated to have any short- or long-term, unavoidable, adverse impacts on terrestrial resources. Appalachian proposes to continue to operate the Project in the existing run-of-river mode for the protection of multiple resources. There are no plans for improvements or activities at the Project that would include extensive clearing of vegetation other than vegetation management activities using mostly mechanical removal techniques (e.g. mowing) on an as-needed basis. Therefore, trees that provide habitat for roosting or maternity colonies for Indiana bat and northern long-eared bat and nesting and roosting trees for bald eagles would not be impacted. In the event such activities were proposed to be undertaken in the future in support of Project operation, modifications, or development of new recreational facilities within the Project Boundary, Appalachian would consult or coordinate with USFWS regarding impacts to bald eagles and migratory birds federally protected under the Migratory Bird Treaty Act and the Bald and Golden Protection Act in advance of the proposed activities. Similar consultation would be expected to occur if activities were proposed that could potentially affect other protected species.

9 Variances from FERC-Approved Study Plan

Due to the remote nature of the Project area and lack of cell phone service, HDR was unable to utilize the Early Detection and Distribution Mapping System (EDDMapS [UGA 2021]) mobile application to record and report invasive species locations, as recommended by the VDCR Division of Natural Heritage in the approved RSP.

10 Germane Correspondence and Consultation

No consultation with state or federal agencies was undertaken for this USR.

11 References

- Appalachian Power Company (Appalachian). 1991. Application for License for Major Project Existing Dam, Byllesby/Buck Hydroelectric Project No. 2514. American Electric Power Services Corporation, Roanoke, VA.
- _____. 2019. Pre-Application Document Byllesby-Buck Hydroelectric Project FERC No. 2514. January 2019.
- Environmental Solutions & Innovations, Inc (ESI). 2017a. Field Surveys for Rare Plants for the AEP Buck Hydro Distribution Line Project. Prepared for Appalachian Power Company. July 27, 2017.
- _____. 2017b. Field Surveys for Virginia Spiraea and Bald Eagle on the AEP Byllesby/Buck Hydroelectric Project. Prepared for Appalachian Power Company. July 24, 2017.
- _____. 2021. Aerial Transect Surveys for Nesting Bald Eagles along the AEP Byllesby-Ivanhoe 88kV Transmission Line Retirement Project Carroll county, Virginia. Prepared for American Electric Power. April 20, 2021.
- Federal Energy Regulatory Commission (FERC). 1994. Final Environmental Assessment, Byllesby-Buck Hydroelectric Project, FERC No. 2514-003, Virginia. March 15, 1994.
- The Nature Conservancy (TNC). 2018a. A Guide to the Freshwater and Terrestrial Habitats of the Northeast (Virginia Geographic Subset). Boston, Mass. [URL]: [terrestrialhabitats_VA.pdf \(conservationgateway.org\)](#)
- _____. 2018b. Terrestrial habitat map for the Northeast U.S. and Atlantic Canada. [URL]: <http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.aspx>. (accessed October 2021).
- University of Georgia (UGA). 2021. Early Detection and Distribution Mapping System. Center of Invasive Species and Ecosystem Health. [URL]: [EDDMapS](#) (Accessed May 2021).
- Virginia Department of Conservation and Recreation (VDCR). 2021a. The Natural Communities of Virginia Classification of Ecological Groups and Community Types, Third Approximation

- (Version 3.3). March 2021. [URL]: [Natural Communities of Virginia](#). (Accessed May 2021).
- _____. 2021b. Natural Heritage Data Explorer. Division of Natural Heritage. [URL]: [Natural Heritage Data Explorer \(virginia.gov\)](#). (Accessed May 2021).
- _____. 2014. Virginia Invasive Plant Species List. Department of conservation and Recreation Division of natural Heritage. Natural Heritage Technical Document 14-11. Richmond, VA. [URL]: [NH_invasivePlantList_2014.indd \(virginia.gov\)](#) (Accessed May 2021).
- Virginia Department of Game and Inland Fisheries (VDGIF). 2021. Fish and Wildlife Information Services Search Report. [URL] [VaFWIS Home Page \(virginia.gov\)](#) (report compiled on May 18, 2021).
- Weberg, M.A., B.R. Murphy, A.L. Rypel, and J.R. Copeland. 2015. A survey of the New River Plant Community in Response to Recent Triploid Grass Carp Introductions into Claytor Lake, Virginia. *Southeastern Naturalist* 14(2): 308-318.



Attachment 1

Attachment 1 – Terrestrial
Habitat Photographs

This page intentionally left blank.



Photograph 1 – Mountain/Piedmont Basic Woodland



Photograph 2 – Piedmont/Mountain Floodplain



Photograph 3 – Mountain/Piedmont Basic Woodland



Photograph 4 – Piedmont/Mountain Floodplain



Photograph 5 – Piedmont/Mountain Floodplain



Photograph 6 – Montane Mixed Oak and Oak Hickory Forest



Photograph 7 – Piedmont/Mountain Floodplain



Photograph 8 – Mountain/Piedmont Basic Woodland



Photograph 9 – Acidic Cove Forest



Photograph 10 – Piedmont/Mountain Floodplain



Photograph 11 – Mountain/Piedmont Basic Woodland



Photograph 12 – Mountain/Piedmont Basic Woodland



Photograph 13 – Mountain/Piedmont Basic Woodland



Photograph 14 – Piedmont/Mountain Floodplain



Photograph 15 – Acidic Cove Forest



Photograph 16 – Piedmont/Mountain Floodplain



Photograph 17 – Montane Mixed Oak and Oak Hickory Forest



Photograph 18 – Old Fields



Photograph 19 – Piedmont/Mountain Floodplain



Photograph 20 – Piedmont/Mountain Floodplain



Photograph 21 – Montane Mixed Oak and Oak Hickory Forest



Photograph 22 – Open Area



Photograph 23 – Open Area



Photograph 24 – Piedmont/Mountain Floodplain



Attachment 2

Attachment 2 – Invasive
Species Photographs

This page intentionally left blank.



Photograph 1 – Japanese Knotweed



Photograph 2 – Japanese Knotweed



Photograph 3 – Oriental Bittersweet



Photograph 4 – Oriental Bittersweet & Tree of Heaven



Photograph 5 – Japanese Knotweed



Photograph 6 – Multiflora Rose



Photograph 7 – Multiflora Rose



Photograph 8 - Japanese Knotweed



Attachment 3

Attachment 3 – Virginia
Department of Game and
Inland Fisheries – Species
Search Report

This page intentionally left blank.



Virginia Department of Game and Inland Fisheries

5/18/2021 9:03:49 AM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 5/18/2021, 9:03:49 AM

[Help](#)

Known or likely to occur within a **3 mile radius** around point **36.8148056 -80.9684167**
in **035 Carroll County, 197 Wythe County, VA**

[View Map of Site Location](#)

511 Known or Likely Species ordered by Status Concern for Conservation

BOVA Code	Status*	Tier**	Common Name	Scientific Name
010199	FESE	Ib	Darter, candy	Etheostoma osburni
050021	FESE	IIa	Bat, gray	Myotis grisescens
030061	FTSE	Ia	Turtle, bog (= Muhlenberg)	Clemmys muhlenbergii
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis
050020	SE	Ia	Bat, little brown	Myotis lucifugus
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus
060080	SE	IIa	Heelsplitter, Tennessee	Lasmigona holstonia
040096	ST	Ia	Falcon, peregrine	Falco peregrinus
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus
060081	ST	IIa	Floater, green	Lasmigona subviridis
060140	ST	IIIb	Pistolgrip	Tritogonia verrucosa
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans
020020	CC	Ia	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis
020030	CC	IIb	Salamander, green	Aneides aeneus
030012	CC	IVa	Rattlesnake, timber	Crotalus horridus
040092		Ia	Eagle, golden	Aquila chrysaetos
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera
050024		Ia	Myotis, eastern small-footed	Myotis leibii
100248		Ia	Fritillary, regal	Speyeria idalia idalia
040213		Ic	Owl, northern saw-whet	Aegolius acadicus
020011		IIa	Frog, mountain chorus	Pseudacris brachyphona
040052		IIa	Duck, American black	Anas rubripes
040320		IIa	Warbler, cerulean	Setophaga cerulea
040140		IIa	Woodcock, American	Scolopax minor
040203		IIb	Cuckoo, black-billed	Coccyzus erythrophthalmus
040304		IIc	Warbler, Swainson's	Limnothlypis swainsonii

080003		IIc	Snaketail, pygmy	Ophiogomphus howei
020056		IIIa	Salamander, Blue Ridge two-lined	Eurycea wilderae
030068		IIIa	Turtle, woodland box	Terrapene carolina carolina
040100		IIIa	Bobwhite, northern	Colinus virginianus
040202		IIIa	Cuckoo, yellow-billed	Coccyzus americanus
040099		IIIa	Grouse, ruffed	Bonasa umbellus
040094		IIIa	Harrier, northern	Circus hudsonius
040204		IIIa	Owl, barn	Tyto alba pratincola
040333		IIIa	Warbler, Kentucky	Geothlypis formosa
040215		IIIa	Whip-poor-will, Eastern	Antrostomus vociferus
070124		IIIa	Crayfish, Longclaw	Cambarus buntingi
100079		IIIa	Butterfly, monarch	Danaus plexippus
010215		IIIb	Sauger	Sander canadensis
040220		IIIb	Kingfisher, belted	Megaceryle alcyon
010195		IIIc	Darter, Kanawha	Etheostoma kanawhae
010097		IIIc	Minnow, Kanawha	Phenacobius teretulus
040372		IIIc	Crossbill, red	Loxia curvirostra
040247		IIIc	Swallow, bank	Riparia riparia
100150		IIIc	Butterfly, mottled duskywing	Erynnis martialis
010052		IVa	Trout, brook	Salvelinus fontinalis
020031		IVa	Salamander, Jefferson	Ambystoma jeffersonianum
030045		IVa	Ribbonsnake, common	Thamnophis saurita saurita
030033		IVa	Snake, queen	Regina septemvittata
040272		IVa	Catbird, gray	Dumetella carolinensis
040337		IVa	Chat, yellow-breasted	Icteria virens virens
040142		IVa	Dowitcher, short-billed	Limnodromus griseus
040229		IVa	Kingbird, eastern	Tyrannus tyrannus
040344		IVa	Meadowlark, eastern	Sturnella magna
040391		IVa	Sparrow, field	Spizella pusilla
040378		IVa	Sparrow, grasshopper	Ammodramus savannarum pratensis
040273		IVa	Thrasher, brown	Toxostoma rufum
040375		IVa	Towhee, eastern	Pipilo erythrophthalmus
040302		IVa	Warbler, black-and-white	Mniotilta varia
050029		IVa	Bat, eastern red	Lasiurus borealis
050030		IVa	Bat, hoary	Lasiurus cinereus
050025		IVa	Bat, silver-haired	Lasionycteris noctivagans
050106		IVa	Cottontail, Appalachian	Sylvilagus obscurus
050081		IVa	Woodrat, Allegheny	Neotoma magister
060075		IVa	Mussel, pocketbook	Lampsilis ovata
010184		IVb	Sunfish, longear	Lepomis megalotis

030050	IVb	Turtle, snapping	Chelydra serpentina
040221	IVb	Flicker, northern	Colaptes auratus
040028	IVb	Heron, green	Butorides virescens
040217	IVb	Swift, chimney	Chaetura pelagica
040277	IVb	Thrush, wood	Hylocichla mustelina
040340	IVb	Warbler, Canada	Cardellina canadensis
040243	IVb	Wood-Pewee, Eastern	Contopus virens
010348	IVc	Chub, highback	Hybopsis hypsinotus
010363	IVc	Darter, Appalachia	Percina gymnocephala
010210	IVc	Darter, blackside	Percina maculata
010212	IVc	Darter, sharpnose	Percina oxyrhynchus
010350	IVc	Jumprock, brassy	Moxostoma sp
010207	IVc	Logperch	Percina caprodes
010096	IVc	Minnow, tonguetied	Exoglossum laurae
010089	IVc	Shiner, New River	Notropis scabriceps
010376	IVc	Shiner, redlip	Notropis chiliticus
010126	IVc	Stonecat	Noturus flavus
020085	IVc	Salamander, Blue Ridge dusky	Desmognathus orestes
020057	IVc	Salamander, Yonahlossee	Plethodon yonahlossee
030024	IVc	Snake, eastern hog-nosed	Heterodon platirhinos
040248	IVc	Swallow, northern rough-winged	Stelgidopteryx serripennis
050006	IVc	Shrew, long-tailed (= rock)	Sorex dispar
050046	IVc	Skunk, eastern spotted	Spilogale putorius putorius
060135	IVc	Snail, seep mudalia	Leptoxis dilatata
100001	IVc	fritillary, Diana	Speyeria diana
010188		Bass, largemouth	Micropterus salmoides
010175		Bass, rock	Ambloplites rupestris
010186		Bass, smallmouth	Micropterus dolomieu
010187		Bass, spotted	Micropterus punctulatus
010167		Bass, white	Morone chrysops
010183		Bluegill	Lepomis macrochirus
010121		Bullhead, black	Ameiurus melas
010123		Bullhead, brown	Ameiurus nebulosus
010124		Bullhead, flat	Ameiurus platycephalus
010122		Bullhead, yellow	Ameiurus natalis
010062		Carp, common	Cyprinus carpio
010125		Catfish, channel	Ictalurus punctatus
010130		Catfish, flathead	Pylodictis olivaris
010372		Chub, bigmouth	Nocomis platyrhynchus
010066		Chub, bluehead	Nocomis leptcephalus
010103		Chub, creek	Semotilus atromaculatus

010455			Chub, Genus = Nocomis	Nocomis spp.
010190			Crappie, black	Pomoxis nigromaculatus
010189			Crappie, white	Pomoxis annularis
010101			Dace, blacknose	Rhinichthys atratulus
010102			Dace, longnose	Rhinichthys cataractae
010060			Dace, mountain redbelly	Chrosomus oreas
010366			Dace, rosyside	Clinostomus funduloides
010464			Dace, western blacknose	Rhinichthys obtusus
010193			Darter, fantail	Etheostoma flabellare
010402			Darter, gilt	Percina evides
010191			Darter, greenside	Etheostoma blennioides
010198			Darter, johnny	Etheostoma nigrum
010061			Darter, Roanoke	Percina roanoka
010202			Darter, Snubnose	Etheostoma simoterum
010397			Darter, tessellated	Etheostoma olmstedi
010129			Madtom, margined	Noturus insignis
010099			Minnow, bluntnose	Pimephales notatus
010063			Minnow, cutlips	Exoglossum maxillingua
010100			Minnow, fathead	Pimephales promelas
010365			Muskellunge	Esox masquinongy
010206			Perch, yellow	Perca flavescens
010182			Pumpkinseed	Lepomis gibbosus
010284			Sculpin, banded	Cottus carolinae
010417			Sculpin, Genus = Cottus	Cottus spp.
010283			Sculpin, mottled	Cottus bairdii
010041			Shad, gizzard	Dorosoma cepedianum
010078			Shiner, crescent	Luxilus cerasinus
010453			Shiner, Genus = Cyprinella	Cyprinella sp.
010068			Shiner, golden	Notemigonus crysoleucas
010094			Shiner, mimic	Notropis volucellus
010074			Shiner, rosefin	Lythrurus ardens
010466			shiner, rosyface	Notropis rubellus
010088			Shiner, saffron	Notropis rubricroceus
010085			Shiner, silver	Notropis photogenis
010091			Shiner, spotfin	Cyprinella spiloptera
010082			Shiner, spottail	Notropis hudsonius
010086			Shiner, swallowtail	Notropis procne
010383			Shiner, telescope	Notropis telescopus
010069			Shiner, white	Luxilus albeolus
010081			Shiner, whitetail	Cyprinella galactura

010058		Stoneroller, central	Campostoma anomalum
010108		Sucker, northern hog	Hypentelium nigricans
010105		Sucker, white	Catostomus commersonii
010181		Sunfish, green	Lepomis cyanellus
010180		Sunfish, redbreast	Lepomis auritus
010185		Sunfish, redear	Lepomis microlophus
010051		Trout, brown	Salmo trutta
010050		Trout, rainbow	Oncorhynchus mykiss
010216		Walleye	Sander vitreus vitreus
020004		Bullfrog, American	Lithobates catesbeianus
020008		Frog, green	Lithobates clamitans
020013		Frog, pickerel	Lithobates palustris
020018		Frog, upland chorus	Pseudacris feriarum
020019		Frog, wood	Lithobates sylvaticus
020065		Newt, red-spotted	Notophthalmus viridescens viridescens
020071		Peeper, spring	Pseudacris crucifer
020036		Salamander, Allegheny mountain dusky	Desmognathus ochrophaeus
020084		Salamander, Atlantic Coast Slimy	Plethodon chlorobryonis
020025		Salamander, black-bellied	Desmognathus quadramaculatus
020066		Salamander, Blue Ridge red	Pseudotriton ruber nitidus
020043		Salamander, eastern red-backed	Plethodon cinereus
020029		Salamander, four-toed	Hemidactylium scutatum
020033		Salamander, long-tailed	Eurycea longicauda longicauda
020079		Salamander, midland mud	Pseudotriton montanus diastictus
020038		Salamander, northern dusky	Desmognathus fuscus
020070		Salamander, northern red	Pseudotriton ruber ruber
020047		Salamander, northern slimy	Plethodon glutinosus
020077		Salamander, northern spring	Gyrinophilus porphyriticus porphyriticus
020075		Salamander, seal	Desmognathus monticola
020041		Salamander, southern ravine	Plethodon richmondi
020050		Salamander, southern two-lined	Eurycea cirrigera
020049		Salamander, spotted	Ambystoma maculatum
020055		Salamander, Wehrle's	Plethodon wehrlei
020080		Salamander, white-spotted slimy	Plethodon cylindraceus
020059		Toad, eastern American	Anaxyrus americanus americanus
020062		Toad, Fowler's	Anaxyrus fowleri
020006		Treefrog, Cope's gray	Hyla chrysoscelis
030016		Copperhead, eastern	Agkistrodon contortrix

030022		Cornsake, red	<i>Pantherophis guttatus</i>
030044		Gartersnake, eastern	<i>Thamnophis sirtalis sirtalis</i>
030038		Greensnake, northern rough	<i>Opheodrys aestivus aestivus</i>
030002		Lizard, eastern fence	<i>Sceloporus undulatus</i>
030029		Milksnake, eastern	<i>Lampropeltis triangulum</i>
030018		Racer, northern black	<i>Coluber constrictor constrictor</i>
030023		Ratsnake, eastern	<i>Pantherophis alleghaniensis</i>
030006		Skink, broad-headed	<i>Plestiodon laticeps</i>
030004		Skink, common five-lined	<i>Plestiodon fasciatus</i>
030020		Snake, northern ring-necked	<i>Diadophis punctatus edwardsii</i>
030052		Turtle, eastern musk	<i>Sternotherus odoratus</i>
030060		Turtle, eastern painted	<i>Chrysemys picta picta</i>
030034		Watersnake, northern	<i>Nerodia sipedon sipedon</i>
030019		Wormsnake, eastern	<i>Carphophis amoenus amoenus</i>
040346		Blackbird, red-winged	<i>Agelaius phoeniceus</i>
040282		Bluebird, eastern	<i>Sialia sialis</i>
040343		Bobolink	<i>Dolichonyx oryzivorus</i>
040068		Bufflehead	<i>Bucephala albeola</i>
040361		Bunting, indigo	<i>Passerina cyanea</i>
040064		Canvasback	<i>Aythya valisineria</i>
040357		Cardinal, northern	<i>Cardinalis cardinalis</i>
040257		Chickadee, black-capped	<i>Poecile atricapillus</i>
040258		Chickadee, Carolina	<i>Poecile carolinensis</i>
040113		Coot, American	<i>Fulica americana</i>
040024		Cormorant, double-crested	<i>Phalacrocorax auritus</i>
040353		Cowbird, brown-headed	<i>Molothrus ater</i>
040264		Creeper, brown	<i>Certhia americana</i>
040373		Crossbill, white-winged	<i>Loxia leucoptera</i>
040255		Crow, American	<i>Corvus brachyrhynchos</i>
040364		Dickcissel	<i>Spiza americana</i>
040198		Dove, mourning	<i>Zenaida macroura carolinensis</i>
040076		Duck, ruddy	<i>Oxyura jamaicensis</i>
040061		Duck, wood	<i>Aix sponsa</i>
040093		Eagle, bald	<i>Haliaeetus leucocephalus</i>
040367		Finch, house	<i>Haemorhous mexicanus</i>
040366		Finch, purple	<i>Haemorhous purpureus</i>
040239		Flycatcher, Acadian	<i>Empidonax vireescens</i>
040241		Flycatcher, alder	<i>Empidonax alnorum</i>
040234		Flycatcher, great crested	<i>Myiarchus crinitus</i>
040242		Flycatcher, least	<i>Empidonax minimus</i>

040240		Flycatcher, willow	Empidonax traillii
040238		Flycatcher, yellow-bellied	Empidonax flaviventris
040284		Gnatcatcher, blue-gray	Polioptila caerulea
040371		Goldfinch, American	Spinus tristis
040045		Goose, Canada	Branta canadensis
040352		Grackle, common	Quiscalus quiscula
040005		Grebe, horned	Podiceps auritus
040008		Grebe, pied-billed	Podilymbus podiceps
040360		Grosbeak, blue	Passerina caerulea
040365		Grosbeak, evening	Coccothraustes vespertinus
040358		Grosbeak, rose-breasted	Pheucticus ludovicianus
040167		Gull, herring	Larus argentatus
040089		Hawk, broad-winged	Buteo platypterus
040086		Hawk, Cooper's	Accipiter cooperii
040088		Hawk, red-shouldered	Buteo lineatus lineatus
040087		Hawk, red-tailed	Buteo jamaicensis
040090		Hawk, rough-legged	Buteo lagopus johannis
040085		Hawk, sharp-shinned	Accipiter striatus velox
040027		Heron, great blue	Ardea herodias herodias
040218		Hummingbird, ruby-throated	Archilochus colubris
040252		Jay, blue	Cyanocitta cristata
040387		Junco, dark-eyed	Junco hyemalis
040098		Kestrel, American	Falco sparverius sparverius
040119		Killdeer	Charadrius vociferus
040285		Kinglet, golden-crowned	Regulus satrapa
040286		Kinglet, ruby-crowned	Regulus calendula
040245		Lark, horned	Eremophila alpestris
040001		Loon, common	Gavia immer
040051		Mallard	Anas platyrhynchos
040251		Martin, purple	Progne subis
040079		Merganser, red-breasted	Mergus serrator serrator
040271		Mockingbird, northern	Mimus polyglottos
040112		Moorhen, common	Gallinula chloropus cachinnans
040216		Nighthawk, common	Chordeiles minor
040262		Nuthatch, red-breasted	Sitta canadensis
040261		Nuthatch, white-breasted	Sitta carolinensis
040348		Oriole, Baltimore	Icterus galbula
040347		Oriole, orchard	Icterus spurius
040095		Osprey	Pandion haliaetus carolinensis
040330		Ovenbird	Seiurus aurocapilla
040209		Owl, barred	Strix varia

040206		Owl, great horned	Bubo virginianus
040211		Owl, short-eared	Asio flammeus
040312		Parula, northern	Setophaga americana
040101		Pheasant, ring-necked	Phasianus colchicus
040236		Phoebe, eastern	Sayornis phoebe
040197		Pigeon, rock	Columba livia
040254		Raven, common	Corvus corax
040341		Redstart, American	Setophaga ruticilla
040275		Robin, American	Turdus migratorius
040132		Sandpiper, solitary	Tringa solitaria
040134		Sandpiper, spotted	Actitis macularia
040225		Sapsucker, yellow-bellied	Sphyrapicus varius
040205		Screech-owl, eastern	Megascops asio
040370		Siskin, pine	Spinus pinus
040141		Snipe, Wilson's	Gallinago delicata
040108		Sora	Porzana carolina
040389		Sparrow, chipping	Spizella passerina
040395		Sparrow, fox	Passerella iliaca
040342		Sparrow, house	Passer domesticus
040377		Sparrow, savannah	Passerculus sandwichensis
040398		Sparrow, song	Melospiza melodia
040397		Sparrow, swamp	Melospiza georgiana
040383		Sparrow, vesper	Pooecetes gramineus
040393		Sparrow, white-crowned	Zonotrichia leucophrys
040394		Sparrow, white-throated	Zonotrichia albicollis
040294		Starling, European	Sturnus vulgaris
040249		Swallow, barn	Hirundo rustica
040250		Swallow, cliff	Petrochelidon pyrrhonota pyrrhonota
040246		Swallow, tree	Tachycineta bicolor
040044		Swan, tundra	Cygnus columbianus columbianus
040355		Tanager, scarlet	Piranga olivacea
040356		Tanager, summer	Piranga rubra
040056		Teal, green-winged	Anas crecca carolinensis
040278		Thrush, hermit	Catharus guttatus
040260		Titmouse, tufted	Baeolophus bicolor
040102		Turkey, wild	Meleagris gallopavo silvestris
040281		Veery	Catharus fuscescens
040298		Vireo, blue-headed	Vireo solitarius
040299		Vireo, red-eyed	Vireo olivaceus
040301		Vireo, warbling	Vireo gilvus gilvus

040295		Vireo, white-eyed	Vireo griseus
040297		Vireo, yellow-throated	Vireo flavifrons
040081		Vulture, black	Coragyps atratus
040080		Vulture, turkey	Cathartes aura
040316		Warbler, black-throated blue	Setophaga caerulescens
040319		Warbler, black-throated green	Setophaga virens
040321		Warbler, blackburnian	Setophaga fusca
040325		Warbler, blackpoll	Setophaga striata
040307		Warbler, blue-winged	Vermivora cyanoptera
040315		Warbler, Cape May	Setophaga tigrina
040323		Warbler, chestnut-sided	Setophaga pensylvanica
040338		Warbler, hooded	Setophaga citrina
040314		Warbler, magnolia	Setophaga magnolia
040311		Warbler, Nashville	Leiothlypis ruficapilla
040329		Warbler, palm	Setophaga palmarum
040326		Warbler, pine	Setophaga pinus
040328		Warbler, prairie	Setophaga discolor
040303		Warbler, prothonotary	Protonotaria citrea
040309		Warbler, Tennessee	Oreothlypis peregrina
040305		Warbler, worm-eating	Helmitheros vermivorus
040313		Warbler, yellow	Setophaga petechia
040317		Warbler, yellow-rumped	Setophaga coronata
040332		Waterthrush, Louisiana	Parkesia motacilla
040331		Waterthrush, northern	Parkesia noveboracensis
040290		Waxwing, cedar	Bombycilla cedrorum
040227		Woodpecker, downy	Dryobates pubescens
040226		Woodpecker, hairy	Dryobates villosus
040222		Woodpecker, pileated	Dryocopus pileatus
040223		Woodpecker, red-bellied	Melanerpes carolinus
040224		Woodpecker, red-headed	Melanerpes erythrocephalus
040268		Wren, Carolina	Thryothorus ludovicianus
040265		Wren, house	Troglodytes aedon
040266		Wren, winter	Troglodytes troglodytes
040130		Yellowlegs, greater	Tringa melanoleuca
040336		Yellowthroat, common	Geothlypis trichas
050028		Bat, big brown	Eptesicus fuscus
050037		Bear, American black	Ursus americanus
050069		Beaver, American	Castor canadensis
050051		Bobcat	Lynx rufus rufus
050056		Chipmunk, common eastern	Tamias striatus striatus
050055		Chipmunk, Fisher's eastern	Tamias striatus fisheri

050103		Cottontail, eastern	<i>Sylvilagus floridanus mallurus</i>
050105		Cottontail, Mearn's eastern	<i>Sylvilagus floridanus mearnsii</i>
050125		Coyote	<i>Canis latrans</i>
050108		Deer, white-tailed	<i>Odocoileus virginianus</i>
050050		Fox, common gray	<i>Urocyon cinereoargenteus cinereoargenteus</i>
050049		Fox, red	<i>Vulpes vulpes fulva</i>
050085		Lemming, Stone's southern bog	<i>Synaptomys cooperi stonei</i>
050043		Mink, southwestern	<i>Neovison vison vison</i>
050017		Mole, eastern	<i>Scalopus aquaticus aquaticus</i>
050016		Mole, hairy-tailed	<i>Parascalops breweri</i>
050110		Mole, star-nosed	<i>Condylura cristata parva</i>
050077		Mouse, common golden	<i>Ochrotomys nuttalli aureolus</i>
050074		Mouse, common white-footed	<i>Peromyscus leucopus leucopus</i>
050072		Mouse, deer	<i>Peromyscus maniculatus nubiterrae</i>
050070		Mouse, eastern harvest	<i>Reithrodontomys humulis humulis</i>
050098		Mouse, house	<i>Mus musculus musculus</i>
050076		Mouse, Lewis' golden	<i>Ochrotomys nuttalli nuttalli</i>
050099		Mouse, meadow jumping	<i>Zapus hudsonius americanus</i>
050073		Mouse, northern white-footed	<i>Peromyscus leucopus noveboracensis</i>
050100		Mouse, woodland jumping	<i>Napaeozapus insignis roanensis</i>
050092		Muskrat, common	<i>Ondatra zibethicus zibethicus</i>
050001		Opossum, Virginia	<i>Didelphis virginiana virginiana</i>
050045		Otter, northern river	<i>Lontra canadensis lataxina</i>
050038		Raccoon	<i>Procyon lotor lotor</i>
050079		Rat, hispid cotton	<i>Sigmodon hispidus virginianus</i>
050095		Rat, Norway	<i>Rattus norvegicus norvegicus</i>
050010		Shrew, American pygmy	<i>Sorex hoyi</i>
050015		Shrew, least	<i>Cryptotis parva</i>
050002		Shrew, masked	<i>Sorex cinereus cinereus</i>
050013		Shrew, northern short-tailed	<i>Blarina brevicauda kirtlandi</i>
050004		Shrew, smoky	<i>Sorex fumeus</i>
050007		Shrew, southeastern	<i>Sorex longirostris longirostris</i>
050048		Skunk, striped	<i>Mephitis mephitis mephitis</i>
050063		Squirrel, eastern fox	<i>Sciurus niger vulpinus</i>
050058		Squirrel, northern gray	<i>Sciurus carolinensis pennsylvanicus</i>
050060		Squirrel, red	<i>Tamiasciurus hudsonicus abieticola</i>
050065		Squirrel, southern flying	<i>Glaucomys volans volans</i>
050088		Vole, Carolina red-backed	<i>Myodes gapperi carolinensis</i>
050082		Vole, meadow	<i>Microtus pennsylvanicus</i>

				pennsylvanicus
050091			Vole, pine	Microtus pinetorum scalopsoides
050087			Vole, southern red-backed	Myodes gapperi
050040			Weasel, least	Mustela nivalis allegheniensis
050041			Weasel, long-tailed	Mustela frenata noveboracensis
050054			Woodchuck	Marmota monax monax
060177			Clam, Asian	Corbicula fluminea
060046			Fossaria, Golden	Galba obrussa
060039			Limpet, creeping ancyliid	Ferrissia rivularis
060025			Mussel, eastern elliptio	Elliptio complanata
060022			Mussel, purple wartyback	Cyclonaias tuberculata
060028			Mussel, spike	Eurynia dilatata
060206			SNAIL, bayou physa	Physella hendersoni hendersoni
060134			Snail, crested mudalia	Leptoxis carinata
060095			Snail, European physa	Physella acuta
060198			Snail, sprite elimia	Elimia proxima
060200			Snail, symmetrical elimia	Elimia symmetrica
060064			Snail, two-ridge rams-horn	Helisoma anceps
070010			Amphipod, James Cave	Stygobromus abditus
070103			Crayfish	Orconectes spinosus
070130			CRAYFISH	Orconectes c. f. spinosus
070101			Crayfish, Appalachian brook	Cambarus bartonii cavatus
070088			Crayfish, Big Water	Cambarus robustus
070158			Crayfish, Cambarus	Cambarus sp.
070115			Crayfish, Chattahoochee	Cambarus howardi
070116			Crayfish, Clinch River	Cambarus angularis
070102			Crayfish, Common	Cambarus bartonii bartonii
070100			Crayfish, Conhaway	Cambarus appalachiensis
070091			Crayfish, Longnose	Cambarus longirostris
070090			Crayfish, New River	Cambarus chasmodactylus
070093			Crayfish, no common name	Cambarus longulus
070094			Crayfish, no common name	Cambarus acuminatus
070159			Crayfish, Orconectes	Orconectes sp.
070128			Crayfish, Spiny Stream	Faxonius cristavarius
070092			Crayfish, Upland Burrowing	Cambarus dubius
100043			Armyworm	Pseudaletia unipuncta
100041			Borer, European corn	Ostrinia nubilatis
100220			Butterfly, American copper	Lycaena phlaeas
100262			Butterfly, American lady	Vanessa virginiensis
100245			Butterfly, American snout	Libytheana carinenta
100274			Butterfly, Appalachian brown	Satyrodes appalachia

100250			Butterfly, Aphrodite fritillary	Speyeria aphrodite
100254			Butterfly, Baltimore checkerspot	Euphydryas phaeton
100232			Butterfly, banded hairstreak	Satyrium calanus
100092			Butterfly, black swallowtail	Papilio polyxenes asterius
100137			Butterfly, brown elfin	Callophrys augustinus
100205			Butterfly, cabbage white	Pieris rapae
100167			Butterfly, carus skipper	Polites carus
100206			Butterfly, checkered white	Pontia protodice
100159			Butterfly, clouded skipper	Lerema accius
100094			Butterfly, clouded sulphur	Colias philodice
100165			Butterfly, cobweb skipper	Hesperia metea
100265			Butterfly, common buckeye	Junonia coenia
100156			Butterfly, common checkered-skipper	Pyrgus communis
100157			Butterfly, common sootywing	Pholisora catullus
100277			Butterfly, common wood-nymph	Cercyonis pegala
100144			Butterfly, confused cloudywing	Thorybes confusus
100230			Butterfly, coral hairstreak	Satyrium titus
100168			Butterfly, crossline skipper	Polites origenes
100147			Butterfly, dreamy duskywing	Erynnis icelus
100258			Butterfly, eastern comma	Polygonia comma
100225			Butterfly, eastern pine elfin	Callophrys niphon
100238			Butterfly, eastern tailed-blue	Everes comyntas
100093			Butterfly, eastern tiger swallowtail	Papilio glaucus
100161			Butterfly, European skipper	Thymelicus lineola
100209			Butterfly, falcate orangetip	Anthocharis midea
100162			Butterfly, fiery skipper	Hylephila phyleus
100139			Butterfly, golden-banded skipper	Autochton cellus
100228			Butterfly, gray hairstreak	Strymon melinus
100249			Butterfly, great spangled fritillary	Speyeria cybele
100270			Butterfly, hackberry emperor	Asterocampa celtis
100219			Butterfly, harvester	Feniseca tarquinius
100224			Butterfly, Henry's elfin	Callophrys henrici
100141			Butterfly, hoary edge	Achalarus lyciades
100178			Butterfly, Hobomok skipper	Poanes hobomok
100149			Butterfly, Horace's duskywing	Erynnis horatius
100164			Butterfly, Indian skipper	Hesperia sassacus
100148			Butterfly, Juvenal's duskywing	Erynnis juvenalis
100160			Butterfly, least skipper	Ancyloxypha numitor
100175			Butterfly, little glassywing	Pompeius verna

100279		Butterfly, little wood-satyr	Megisto cymela
100217		Butterfly, little yellow	Eurema lisa
100252		Butterfly, meadow fritillary	Boloria bellona
100090		Butterfly, mourning cloak	Nymphalis antiopa
100173		Butterfly, northern broken dash	Wallengrenia egeremet
100143		Butterfly, northern cloudywing	Thorybes pylades
100272		Butterfly, northern pearly-eye	Enodia anthedon
100197		Butterfly, Ocola skipper	Panoquina ocola
100236		Butterfly, olive juniper hairstreak	Callophrys gryneus gryneus
100211		Butterfly, orange sulphur	Colias eurytheme
100263		Butterfly, painted lady	Vanessa cardui
100257		Butterfly, pearl crescent	Phyciodes tharos
100359		Butterfly, Peck's skipper	Polites peckius
100200		Butterfly, pipevine swallowtail	Battus philenor
100259		Butterfly, question mark	Polygonia interrogationis
100264		Butterfly, red admiral	Vanessa atalanta
100235		Butterfly, red-banded hairstreak	Calycopis cecrops
100268		Butterfly, red-spotted purple	Limenitis arthemis astyanax
100174		Butterfly, sachem	Atalopedes campestris
100082		Butterfly, silver-spotted skipper	Epargyreus clarus
100255		Butterfly, silvery checkerspot	Chlosyne nycteis
100146		Butterfly, sleepy duskywing	Erynnis brizo
100216		Butterfly, sleepy orange	Eurema nicippe
100142		Butterfly, southern cloudywing	Thorybes bathyllus
100202		Butterfly, spicebush swallowtail	Papilio troilus
100239		Butterfly, spring azure	Celastrina ladon
100234		Butterfly, striped hairstreak	Satyrium liparops
100158		Butterfly, swarthy skipper	Nastra lherminier
100269		Butterfly, tawny emperor	Asterocampa clyton
100266		Butterfly, viceroy	Limenitis archippus
100207		Butterfly, West Virginia white	Pieris virginiensis
100227		Butterfly, white M hairstreak	Parrhasius m-album
100153		Butterfly, wild indigo duskywing	Erynnis baptisiae
100204		Butterfly, zebra swallowtail	Eurytides marcellus
100012		Dipluran	Plusiocampa c
100042		Earworm, corn	Heliathis zea
100015		Gnat	Culicoides villosipennis
100016		Gnat	Culicoides stellifer
100030		Gnat	Culicoides arboricola
100032		Gnat	Culicoides guttipennis
100040		Moth, codling	Cydia pomonella

110243			Roundworm, raccoon	Baylisascaris procyonis
110230			Tick, American dog	Dermacentor variabilis
110232			Tick, brown dog	Rhipicephalus sanguineus
110231			Tick, rabbit	Haemaphysalis leporispalustris
110229			Tick, winter	Dermacentor albipictus

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed;
FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;

II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;

III=VA Wildlife Action Plan - Tier III - High Conservation Need;

IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Virginia Wildlife Action Plan Conservation Opportunity Ranking:

a - On the ground management strategies/actions exist and can be feasibly implemented.;

b - On the ground actions or research needs have been identified but cannot feasibly be implemented at this time.;

c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

Compiled on 5/18/2021, 9:03:49 AM V1095481.0 report=1 searchType=R dist= 4828.032 poi= 36.8148056 -80.9684167

audit no. 1095481 5/18/2021 9:03:49 AM Virginia Fish and Wildlife Information Service
© 1998-2021 Commonwealth of Virginia Department of Game and Inland Fisheries