

Ecological Analysis &
Conservation Strategy for the
*Blue Ridge Center for Environmental
Stewardship*

Robert and Dee Leggett Foundation
Loudoun County, VA

FINAL REPORT

Report to

Blue Ridge Center for Environmental Stewardship
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TOOLS SECTION

This section includes materials that can be added to and updated. The tools can also serve as a resource for volunteers, local projects, etc.

- 1 Natural Heritage Resources
- 2 500-Yr Forest Foundation, American Chestnut Information
- 3 Federal Cost share program
- 4 Trails and Trail Maintenance
- 5 Riparian and wetland restoration
- 6 Birds, Fish and Insects
- 7 Reptiles and Amphibians
- 8 Botanical information, plot procedure, non-native invasive species
- 9 Mammals
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- 11 Articles from The Nature Conservancy
- 12 Adaptive Management

MAPS

1. Present land use and natural community
2. Management Zones
3. Historic/cultural features, Recreational features (trails)

INTRODUCTION

The Blue Ridge Center for Environmental Stewardship (BRCES) consists of over 900 acres situated in the northwestern corner of Loudoun County, Virginia. The property encompasses a mosaic of naturally and culturally diverse landscapes. The property has trails, farmland, streams and wetlands, forests of various ages and conditions, cultural resources and an enthusiastic vision for the future.

The purpose of this report is to describe and analyze the ecological condition of the natural resources on the BRCES property, based on observations and data collected during 2000-2001. The report will provide conservation strategies based on professional opinion on the resource needs and management direction in order to meet the Center's goals. Using a site conservation planning approach (adapted from The Nature Conservancy, 2000), the property ecological assets and stresses are defined and conservation targets, management zones and priority tasks are outlined.

Conservation Vision and Priorities

The Blue Ridge Center for Environmental Stewardship is a program arm of the Robert and Dee Leggett Foundation. Based near Purcellville, Virginia, BRCES' mission is to foster innovative stewardship in support of the environment. BRCES invites and supports research and education programs involving scientists, students, farmers, scholars, gardeners, activists, and consumers that utilize the conservation land in the Blue Ridge Mountains of Western Loudoun County, Virginia (BRCES, 2000).

BRCES activities aim to:

- Promote public understanding of environmental stewardship.
- Provide a venue for partners to study and collaborate. (Serve as a local resource by operating as a field station to study the human history and ecology of the northern Blue Ridge)
- Produce sustainable harvests with a Community Support Agriculture program.
- Care for and understand the natural, historical, and agricultural resources on the land in order to become better stewards.
- Develop responsible land use plans.
- Implement effective restoration and preservation efforts.

This report is concerned with providing a baseline from which to address the last three bulleted goals. The conservation vision at BRCES centers on the preservation of a large, contiguous forest that is the **keystone** of the property. BRCES vision is also concerned with managing streams, riparian buffers, sensitive and rare species, water quality and providing educational opportunities on the landscape.

The primary conservation target at the BRCES property is the large, functioning ecosystems including contiguous blocks of forest and a forested wetland community, several drainages, ponds and open meadows. The ponds, streams and riparian habitat areas include several state rare species of plants and animals.

The conservation goals include reforestation, eradication of non-native invasive species, wetland restoration along Piney Run, maintenance of rare species, protection of the riparian corridor along Sweet Run, improved water quality, enhanced interior forest habitat, and open meadow creation. The potential threats include conversion of adjacent forested areas, degradation of water quality from agriculture and nearby development, timbering, and alteration of natural hydrological processes.

Property Description

The Blue Ridge Center for Environmental Stewardship property is situated in the northern portion of the Loudoun Valley, an area long known as “Between the Hills,” bounded on the west by the Blue Ridge Mountains and to the east by Short Hill Mountain (Figure 1). The Blue Ridge Center is bounded on the west by the National Park Service lands of the Appalachian Trail corridor and the Fairfax heirs lands which, when combined with BRCES lands and adjacent landowners’ holding, create a block of undeveloped land totally more than 2,000 acres. Elevation ranges on the property are from 500 feet to 1000 feet above sea level, the forest zones are considered low-elevation dry and dry-mesic, reflective of elevations below 3000 feet in Blue Ridge Mountains ecosystems.

The BRCES property is adjacent to the National Park Service’s Appalachian Trail (AT) and serves as a visual and ecological buffer. Forested habitat utilized by forest interior birds and movement of wildlife north and south along the AT corridor should be protected.

Geology

The BRCES property straddles two physiographic provinces in Virginia, the Northern Blue Ridge and Northern Piedmont provinces. Geologically, the property is underlain with sandstone and volcanic rock (a type of gneiss). (Southworth, 2000; Frye, 1986). The geologic map is found in Figure 2.

Human Occupation

There is a long history of human occupation and land manipulation through timbering and agricultural activities on the BRCES property. Remnants of 6 historic homesteads, cemeteries, pasture walls, and farm buildings are dotted across the property, within access of the freshwater streams. Much of the property has been logged over several times, most recently in the mid 1990s (BRCES, 2001). The steepest portions of the western ridgelines have remained untouched since being logged in the late 1800’s. The eastern half of the property has been in farmland. Details on the cultural history are found in the BRCES Archaeology Research Program Final Report (Galaty, et.al., 2000).

ECOLOGICAL OVERVIEW

Methodology

The process of analyzing the ecological resources on the BRCES property began with classifying land areas using aerial photos and maps. Once general landscape divisions were defined, the areas were inventoried in order to map distinct ecological communities. Ecological communities are groupings of associated species defined as the finest level of function for management. Mapping communities is necessary for planning the management, monitoring and research at the site.

A walking survey of each community across the BRCES property was conducted. Dominant species observed during surveys were recorded. The survey information, along with information from the Millsaps College investigations was reviewed (Mann, 2000). A series of plots (adapted from Gary Fleming method, Natural Heritage Program of VA) were used in two areas to describe in detail the community composition.

The State of Virginia has developed a classification of natural communities, used in this report (Fleming, et al., 2001).

Ecological Communities

The community survey at BRCES revealed three general types:

- I. Basic Oak-Hickory Forest
 - Mesic Oak-maple ravines
 - Dry chestnut oak steep slopes
- II. Wetlands, Streams and Ponds
 - Forested wetlands and floodplains
 - Wetland meadows
 - Moderate flow first order and second order streams
 - Ponds with associated wetland edges
- III. “Open” communities
 - Former agricultural old fields
 - Active agricultural areas
 - Meadows
 - Powerline right of way

The communities have been influenced by human occupation and use of the property through time. Evidence of human manipulations, such as dam remains, rock piles, orchard species, cut stumps and non-native invasive plant species are evident in most places on the BRCES property.

The pre-settlement forest of the BRCES area in Virginia consisted of primarily a native cover of American chestnut, oak, hickory and maple. Forest interior birds, large and small mammals and fish probably thrived in pre-colonial times. The ratio of edge to forest interior habitat was lower than it is today, providing higher quality interior habitats. There were rich soil ravines with moist-loving species such as hemlock, ferns and wetland plants. A diversity of wetland meadows, wetland forests and seepage swamps created a mosaic of habitats. Significant forest

openings in this region were probably kept open naturally by fire. Much of Loudoun County has been logged over, settled, developed and manipulated, but a large, representative forest in good condition remains at the BRCES property.

What follows is a description of natural communities as they occur generally from west to east across the property (refer to map of natural communities). The general community types are underlined and the specific sites found on the BRCES property are in italics.

Basic Oak – Hickory Forests

The forests at BRCES have undergone patterns of change following timbering, pasturing, and fire, and the result is a patchwork ranging from shrub thickets to mature forests. These varied forested habitats are home to a wide variety of mammals, birds, insects, amphibians, and reptiles.

The umbrella community type mapped is the Basic (refers to pH) Oak - Hickory Forest. This is characterized by a dry, calcium-rich soil with upland forest species typical of western slopes and ridge tops of the low altitude Blue Ridge Mountains. The Basic-Oak-Hickory Forests have been reduced by a long history of land-use conversion in Virginia. According to the State of Virginia Natural Heritage Program, “Community types in this group can be considered uncommon or rare in the state” (Flemming, et al., 2001)

This community includes the following co-dominants in the canopy: chestnut oak (*Quercus montana*), red oak (*Q. rubra*), white oak (*Q. alba*), black oak (*Q. velutina*), pignut hickory (*Carya glabra*), shagbark hickory (*C. ovata*), and white ash (*Fraxinus americana*). Common sub canopy species include: eastern hop hornbeam (*Ostrya virginiana*) and flowering dogwood (*Cornus florida*), and the shrub layer contains, viburnum (*Viburnum* sp.), dogwood (*Cornus florida*), eastern red bud (*Cercis canadensis*), spice bush (*Lindera benzoin*) and vines. The herb layer is frequently species-rich in this community, including patches of dry-loving and moisture-loving wildflowers, where soils and slope aspect dictate.

At BRCES, along trails formed primarily by former logging roads and logged areas, the plant community suffers from a host of non-native, invasive species such as Japanese honeysuckle (*Lonicera japonica*), multiflora rose (*Rosa multiflora*), tree-of-heaven (*Ailanthus altissima*), garlic mustard (*Alliaria petiolata*), and Oriental stilt grass (*Microstegium vimineum* var. *imberbe*). Horses probably have hastened the spread of the non-native invasives, especially Oriental stilt grass. Every former horse trail has thick stands of the invasive grass that is spreading into the forest.

East-facing Blue Ridge steep slopes

On the western edge of the BRCES property is a drier variant of the Basic Oak-Hickory forest. This habitat has harsher conditions and rockier soils and a steep, eastern aspect. The co-dominant canopy species are: hickory, chestnut oak, black oak, black cherry, black locust, white ash. The rugged and steep slopes have a sparse shrub and herb layer with grasses, hairy beard tongue (*Penstemon hirsutus*), Christmas fern and aster species.

In areas of recent logging activities, much of the vegetation consists of non-native invasives and early colonizing species.

Dry Chestnut Oak forest

Expanses of mostly chestnut oak form along the rocky ridgelines near the western portion of the property. The herb layer is sparse and includes low bush blueberry (*Vaccinium vacillans*) and grasses. This second growth forest type has signs of disturbance throughout – including rock piles, cut stumps, blackberry thickets, non-native species, and escaped cultivated species like Japanese barberry and cultivated cherries. Canopy gaps from recent logging have created open, dry habitats dominated by multiflora rose, blackberry and green briar.

Mesic Oak-Maple ravines

These areas are dominated by species that favor a calcium-rich (basic pH) soil, like oaks, red bud, slippery elm (*Ulmus rubra*), ironwood (*Carpinus caroliniana*), hickories, elm leaf goldenrod (*Solidago ulmifolia*), and grasses. Ravines in the oak-hickory uplands, reflect the higher soil fertility and moisture and here the vegetation includes, white ash, sugar maple, paw paw and spice bush. Displays of spring wildflowers, such as yellow violet (*Viola pensylvanica*), sweet cicely (*Osmorhiza claytoni*), cleavers (*Galium aparine*), may apple (*Podophyllum peltatum*), Jack-in-the-pulpit (*Arisaema atrorubens*) and spring beauty (*Claytonia virginica*) are found in these ravine habitats. Hemlock trees are sparse in the property, but do occur in these moist, cool ravines. An isolated population of American ginseng (*Panax quinquefolius*) is also found in this community.

South of the powerline right of way, surrounding a seasonal streambed and its environs, is a pocket of mesic forest habitat with American beech (*Fagus grandifolia*), tulip poplar, black oak, mountain laurel, and whorled loosestrife (*Lysimachia quadrifolia*).

Wetlands, Streams and Ponds

There are two types of surface water features: ponds and streams. There are two types of wetlands on the property: forested and non-forested. The forested wetlands occur along the floodplains of the stream riparian corridor. The non-forested wetlands are the dry lake, sweetflag wetland and edges of ponds.

A thicket of raspberry, multiflora rose and spice bush sometimes surrounds riparian areas. In other places, riparian areas are very diverse pockets of ferns and wetland emergent plants, including jewelweed (*Impatiens pallida*), skunk cabbage (*Symplocarpus foetidus*), cinnamon fern (*Osmunda cinnamomea*), poison ivy (*Toxicodendron radicans*), bottlebrush grass (*Hystrix patula*), straw-colored cyperus (*Cyperus strigosus*), mints, and sedges (*Carex sp.*).

Gordon Pond

Parts of this pond have not been disturbed for many years and exhibit a diversity of wetland species. Some of the notable ground layer species are cardinal flower (*Lobelia cardinalis*), black snake root (*Sanicula marilandica*), cup plant (*Silphium perfoliatum*), swamp milkweed (*Asclepias incarnata*), native rushes and sedges, including a county record¹ for the four-angled spikerush (*Eleocharis quadrangulata*) and hedge parsley (*Torilis japonica*) along the pond path.

Surrounding the edges of Gordon Pond are canopy species: red maple, spice bush, silver maple, and eastern red cedar.

Piney Run riparian zone

This is the most manipulated of all features on the property – the stream has been channeled, drained and dammed – but despite this, Piney Run has become a healthy stream. Despite being greatly manipulated in the past, the water runs clear with fish and a variety of macro-invertebrates, indicators of a healthy stream. The water quality was classified as good to excellent with a neutral (pH 6-7) chemistry (Mann, 2000).

The forested wetlands along Piney run exhibit past disturbance by the dominance of non-native species.

Sweet Run riparian zone

This is the most ecologically significant drainage on the property. It originates from a series of seeps underlain by acidic quartzites and metasilstones, producing distinct water chemistry. The unusual plants and the State-threatened wood turtle are found only along Sweet Run at the BRCES property. The co-dominants in the canopy layer in this rich riparian forest are tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), sassafras (*Sassafras albidum*), hackberry (*Celtis occidentalis*), silver maple (*Acer saccharinum*) black gum (*Nyssa sylvatica*), spice bush (*Lindera benzoin*), and witch hazel (*Hamamelis virginiana*). The threat most often noted in surveys of the area is the threat of non-native invasive plants in the understory.

Sweetflag wetland

¹ A county record signifies that it is the first time the species has been recorded in this county of Virginia.

This seasonally flooded wet meadow is a low area adjacent to Sweet Run that spreads out to create a relatively large wetland, dominated by a dense patch of sweetflag (*Acorus calamus*). Common associates are crinite sedges (*Carex crinita* group), sparganium species, jewelweed (*Impatiens capensis*), nettles (*Urtica dioica*), tearthumb (*Polygonum sagittatum*), and other polygonum species. The soils are strongly hydric, and it can be surmised that this wetland has been here a long time. It does not appear from site evidence and the 1966 aerial photos to have been manipulated.

Buttonbush Pond

This small remnant pond is fringed with wetland, which dries up in drought. The wooded edges and standing dead snags provide excellent wood duck habitat and habitat for other nesting birds and amphibians.

Dry Lake Bed

A successional wetland is changing this former human-created pond. The dam has not functioned for decades (refer to BRCEs archaeological report), causing the wetland to gradually fill in. While the lake and dam show clearly in the 1966 aerial photos, the wetland vegetation is gradually drying out.

Native wetland plants include spikerush, sedges, tearthumb, jewelweed, and jack in the pulpit. However, the area is dominated by non-native invasive species, such as mile-a-minute (*Polygonum perfoliatum*), Japanese honeysuckle (*Lonicera japonica*) and aggressive native colonizers, such as cattails (*Typha* sp.), alder (*Alnus serrulata*) and black willow (*Salix nigra*). Eventually, if the area was left un-managed, the willows and alders would increase and eventually green ash and red maple and sycamore would follow. Over time, this area would not function as a wetland. The wetland is restorable, however, and reintroducing the hydrology is the first significant step.

Open grassland communities

These communities are maintained grasslands, such as old fields, roadsides, pastureland, fencerows, recently clearcut forest, and the powerline right-of-way. The more common species of open areas are foxtail grass (*Setaria glauca*), red fescue (*Festuca rubra*), pigweed (*Amaranthus hybridus*), yellow rocket (*Barbarea vulgaris*), asters (*Aster* sp.) and goldenrods (*Solidago* sp.). This community contains a large proportion of non-native species. Some areas also include thicket and shrubs like blackberries and multiflora rose, and grapevine. Over time, seedlings of box elder, Norway maple, silver maple and eastern red cedar will gain footing, then dominate un-managed open communities.

The headquarters area is planted with typical farmstead tree plantings and weeds. Fencerows, unless planned specifically for natural values, typically have very little value for wildlife and are typically dominated by colonizing species such as box elder (*Acer negundo*), tree-of-heaven, white mulberry (*Morus alba*), multiflora rose, poison ivy, Japanese honeysuckle (*Lonicera japonica*), sassafras, and sycamore.

Old-field succession describes the natural process of a field returning to its original ecosystem. At each stage in the pattern of vegetation, there is a corresponding change in the fauna. Actively maintaining grasslands at a specific stage would provide habitat for the specific species seeking out grasslands.

Meadows and successional agricultural areas

Meadows and grasslands with native grasses have all but vanished from the region. The open areas on the property are former agricultural areas (fallow corn fields) that have potential to be restored for grassland habitat that may attract the state-endangered upland sandpiper and other grassland birds, such as grasshopper sparrow, dickcissel, Henslow's sparrow, and killdeer. These birds have become dependent on managed habitats for their nesting and foraging.

Powerline right-of-ways are typically kept clear of tall vegetation by mechanical or herbicide treatments. Management agreements with the powerline companies to retain the meadow community with controlled burning, cutting or grazing would keep this habitat more biologically diverse. Technical assistance should be sought for guidance on the amount and rotation of grazing to maintain native meadows. Wetland hydric soils would develop over time in the lower elevation of the powerline meadow restoration.

Along trails and former logging roads, tree-of-heaven is a noted problem non-native invasive species.

Animals

BRCES has the habitat for a diversity of mammals that can range north and south along the AT corridor. Several of the species require forest interiors and are indicators of large blocks of forest (Webster, et al., 1985). The habitat types present at BRCES most likely support the following list of animals.

white-tailed deer	beaver
raccoon	muskrat
opossum	meadow vole
eastern cottontail rabbit	black bear
woodchuck (groundhog)	eastern chipmunk
red squirrel	eastern mole
southern flying squirrel	shrews
gray squirrel	mink
white-footed mice	red fox
striped skunk	long-tailed weasel

The floodplains and stream corridors serve as places of refuge, foraging areas and nesting areas for many animals. Beaver ponds often create habitat similar to natural wetlands and increase the abundance of related mammals, such as mink, muskrats and raccoons.

The large, contiguous forest is prime for the group of species, known collectively as Forest Interior birds. A breeding bird survey would offer more information about the exact species using the forest.

Any meadow restoration could attract another important group, the grassland birds. This group of habitat specific birds are imperiled region-wide. BRCES could support a diversity of bird life with appropriate management.

A listing of all flora and fauna confirmed present at the Blue Ridge Center is listed on Web site www.blueridgecenter.org, and should be maintained by BRCES personnel.

Species of special concern

Several county-rare plants occur in the high quality habitat on the property, four-angled spikerush (*Eleocharis quadrangulata*), hedge parsley (*Torilis japonica*) and American ginseng (*Panax quinquefolius*).

Populations of a state-listed reptile, the wood turtle, (*Clemmys insculpta*) have been found in surveys of Sweet Run. The wood turtle is a threatened species in several states, including Virginia. It is a largely terrestrial turtle with a brown, rough shell with the look and feel of sculpted wood (LeClere, [no date]). Two of the most limiting factors for the rare wood turtle are: (1) its habitat preference, and (2) illegal collections for the pet trade. The wood turtle is found near unpolluted streams with sandy bottoms and well-vegetated riparian zone. Northern Virginia is at the southern end of its range. Wood turtles are diurnal and spend the early and late portions of the day searching for food (berries, plants, earthworms and insects) and the hottest part of the day in the stream or under heavy brush.

Because of their intelligence and interesting behaviors, wood turtles are often sought by poachers to sell in the reptile pet trade. Wood turtles are a late maturing species (between 14-18 years of age) so taking individuals from the wild has a considerable impact on the population. The fate of the wood turtle's cousin, the bog turtle (*Clemmys muhlenbergii*), was recently listed as federally threatened due to over collection. Some zoos are engaged in wood turtle and bog turtle husbandry to augment the wild populations.

Conservation Targets and Site Goals

Conservation Targets

The purpose of conservation targets in ecological planning is to guide conservation strategies at the site. The targets are chosen to capture the biodiversity interests at various scales; ecological systems at regional scale (forest), natural community scale (streams and wetland), and local scale (rare plants). The targets are ecological systems on which BRCES will focus conservation efforts.

The targets can be representative of highly threatened natural communities in the region. For BRCES to meet its mission to be a good steward of the land, restoring ecosystems and safeguarding the high quality areas, targets need to be defined.

To address key species within these communities the broader targets are further broken down to nested elements; those ecologically linked can be conserved via strategies used for the broader target.

Table 1. Conservation targets, their elements and potential threats that affect each conservation target for BRCES property.

Conservation Target	Nested Elements	Threats
Contiguous blocks of native forest	forest interior birds, large mammals using AT corridor (black bear, deer) small mammals	<ol style="list-style-type: none"> 1. Weed invasion 2. Soil disturbances (erosion) 3. Fire 4. Logging 5. Hemlock wooly adelgid 6. Disease

Stream corridors	associated wetlands, wood turtle, rare wetland plants, fish, riparian habitat	<ol style="list-style-type: none"> 1. Agricultural run off and contaminants (non-point) 2. Siltation of stream 3. Flooding 4. Flood repair 5. Dams and impoundments 6. Introduced species competition
Dry lake	restoration of deteriorating wetland habitat, wood duck, migratory waterfowl, wetland plant species, beaver	<ol style="list-style-type: none"> 1. Weed invasion 2. Sedimentation 3. Succession of community
Meadows and successional fields	Grassland restoration, breeding populations of grassland birds	<ol style="list-style-type: none"> 1. Succession of community 2. Herbicide drift 3. Road and Powerline maintenance (salting and herbicide use)

Site Goals

1. Maintain high quality forest in large contiguous blocks.

- Minimize forest habitat fragmentation from developments, trails, timbering, etc.
- Protect acreage and diversity of forested habitat for forest interior species, such as bear, migrating birds and other animals that are most likely use the mid-elevation forest as a north-south corridor for movement. It is important to protect the ridgeline and mid-slopes as a forested wildlife corridor.
- Maintain quality forest structure, diversity, and continuity of habitat.

- 2. Restore and maintain high quality aquatic communities.**
 - Protect contiguous riparian systems of Sweet Run and Piney Run.
 - Restore hydrology to dry lake at the level of a wetland.
 - Maintain uncontaminated ponds, streams and springs.
 - Maintain habitat for and populations of rare plant species along Gordon Pond and Sweetflag wetland.
- 3. Establish and maintain grassland communities in meadows and open lands.**
 - Plant native grass and forb mix to establish a re-creation of native grassland.
 - Plant species and design structure to encourage use by grassland bird species.
- 4. Control invasive non-native plant species**
 - Identify and map areas of concern to create a plan of action for eradicating non-native weeds.
 - Control first where they pose a threat to rare species or threaten high quality natural communities.
 - Conduct research on eradication methods.
- 5. Maintain high quality habitat and corridors for animal species.**
 - Maintain (or increase) wood turtle population and other aquatic vertebrate and invertebrate species integral to a healthy ecosystem in Sweet Run.
 - Maintain forested wildlife corridors parallel to the AT and riparian wetland forest corridors.
- 6. Engage in resource use activities that are consistent with the conservation goals at the site.**
 - Demonstrate sustainable forestry techniques on the property, such as establishing experimental plots with chestnut and butternut production for genetic stock and selective cutting with horse-drawn skids.
 - Demonstrate exemplary land stewardship practices, including sustainable agriculture.
- 7. Establish an environmental presence in Loudoun County and participate in local decision-making that affects the region.**
 - Complete an outreach and education plan.
 - **Establish property as site for wetland and forest banking in the County.**

The Human Dimension

The BRCES property is within a rural community in transition. Development pressures surround the property and selling of forested land is accelerating growth. There is a “smart growth” constituency in the county that values open space and farmland and desires more trails and passive recreational areas for use by residents of the more crowded parts of the county. The local government has placed northern Loudoun County in a zoning district to remain as rural open space. There is currently a mix of properties that are in stable ownership (farming families) but uncertain future and those large properties that have been sold for development.

Wild places are few in this part of Virginia. The importance of the BRCES property to people is that it protects a remote portion of the AT and offers protection against rampant development.

Although it can not be accomplished in detail in this report, it will be important to examine the economic, political, and cultural characteristics in the County and the influence they have on conservation targets at the site.

Social and economic profiles

The major rural economics in this area depends on open space. The county depends on this northern region to remain rural for the future of sustainable agriculture and recreational opportunities. Small family farm operations and forestry are valued. The county’s Purchase of Development Rights program is one county project aimed at keeping western Loudoun rural.

The standard agricultural practices in the watershed can also be threats to BRCES natural resources. The threats to Piney Run before it reaches the BRCES property are siltation from development and agricultural activities, bank scour and erosion, and potential for septic pollution. Control of the entire watershed by acquisition is not practical or desirable. While implementing its management plan, the Blue Ridge Center should support and work with local community with organizations such as the Between the Hills Community Association and the BTH Conservation Council and environmental education partners.

Stakeholders

As a conservation committee is developed at BRCES, stakeholders will be involved. They need to include the individuals or groups or institutions are likely to affect or be affected by conservation actions at BRCES. Stakeholder involvement involves finding common ground, so some goals can not be drafted until a committee is on board.

Effective stakeholder participation information on BRCES conservation plan should be easily and widely available so that people can be informed about projects.

Management Zones

The conservation targets are treated differently in different functional pieces of the property. Programmatic and other goals of BRCES are overlaid on the ecological analysis and conservation targets in order to design management zones. The conservation strategies will be different for the 3 basic management zones defined here and indicated on the site map.

Recommended land management practices have been divided in management zones. The creation of these general zones reflects the goals outlined for each area. A land management committee should create finer resolution management map and assign priorities to actions for each area.

Zone 1 – Active Use Zone. This zone is the center of activity at BRCES. Activities include the current office headquarters and parking, the high use public areas, space for large tents, roads, agricultural buildings and agricultural operations. In comparison with the rest of property, there are aesthetic considerations, which require regular mowing, and fence management. Use of pesticides and herbicides should be limited. Demonstrations for public tour may include, butterfly gardens, native plant nursery for landscaping, edible gardens, and lawn areas. Cultural and historical interpretation, farm and building maintenance are considerations in this zone.

Zone 2 – Transitional Use Zone. This zone receives moderate agricultural and visitor use. This includes other maintained fields, public use trails, powerlines, cultural resources such as buildings and on-going archaeological sites. Trails should be maintained and devices installed to prevent erosion. Cultural areas should be preserved with regular vegetation control. Signs, trail markers and interpretive materials are encouraged in this zone. Additionally, some restoration and reforestation may be implemented on former agricultural fields and taken out of agricultural lease. Removal of non native invasive vegetation such as multiflora rose (*Rosa multiflora*), mile-a-minute (*Polygonum perfoliatum*), tree-of-heaven (*Ailanthus altissima*) and garlic mustard (*Alliaria petiolata*) will need to be accomplished in order to allow establishment of native vegetation in some areas.

The proposed wetland restoration demonstration project in the dry lake bed would be a focal point of this zone. The purposes of this zone are to restore the unique biological and hydrological wetland, to provide a buffer to the high quality habitats in zone 3, and to provide a passive recreational or outdoor laboratories setting.

Zone 3 – Conservation Zone. This zone includes those areas of the property where the most biologically intact communities and rare species are found. This zone includes wetlands, streams, small meadow openings, and woodlands. Long term preservation of the natural communities using passive management and a minimal maintenance approach is the goal of this zone. Conservation should be the first priority when making decisions in this zone. Development of facilities, mowing, underbrush removal and new trail cuts are discouraged in this area. Natural succession should be allowed to continue, with limited intervention.

Some of the criteria for choosing Management Zone 3:

1. Contains a habitat that supports rare plant or animal species;
2. Contains a habitat that serves as a breeding, feeding, or resting sites for wildlife;
3. Contains geological and forest features vulnerable to human disturbance;
4. Is suitable for environmental education;
5. Provides a buffer to lands already dedicated to the AT.

The conservation zone is divided into two sub-areas, 3a and 3b. Area 3a is the interior conservation zone, and area 3b serves as a buffer to the AT lands. The recently logged areas within this zone can withstand low impact activities, such as a low impact camping, hiking, and educational visits.

CONSERVATION Strategies

Consider the array of strategies and approaches to abate threats to and enhance the quality of conservation targets. The types of conservation actions to restore and manage sites on the property need to be planned further than the strategies listed below. A measurement system for assessing conservation success and the effectiveness of the strategies is important to put into place.

For each goal, there are recommend strategies to achieve the goal. These are listed in priority order. Other strategies can and should be developed and amended to this document. For example, the Blue Ridge Center might develop a policy restricting backcountry camping to groups led by people certified in Leave No Trace skills and ethics.

Goal: Maintain high quality forest in large contiguous blocks.

STRATEGIES

Large tract forestry restoration. Management Zone 1.

The most significant regional impact that the BRCS property can have is the restoration of forests across large portions of previously cleared land. The specific stages for accomplishing a reforestation can be found with the USDA Forest Service's Morgantown, WV Research Station. The level of management can be expected to be low once the forest restoration is established.

Goal: Restore and maintain high quality aquatic communities.STRATEGIES

Create and restore wetlands as part of re-watering project of 'dry lake' along Piney Run Management Zone 2.

Piney Run should be the focus of an intensive wetland creation/restoration and monitoring effort in order to document the results of wetland restoration. First, have it placed under a government program such as the USDA Wetlands Reserve Program or US Fish & Wildlife Wetland program. An intensive monitoring program should be established to measure both flow rates and water quality in Piney Run before and after wetland creation. Investigate engineering methods for restoring the function of the breached dam.

It may be feasible to repair the breached dam in a way that does not flood the dry lake bed as a pond, but as the type of wetland you would like to see. An adaptive management and research strategy involving intensive wetland restoration/creation and monitoring should be employed.

Re-vegetate needed portions of stream banks along Piney Run. Management Zone 2.

Piney Run has some areas of bank erosion and a major non-native invasive plant species problem. A well-vegetated riparian corridor, defined as at least 30 meters from either side of the streambank, performs four important functions for the stream biota: 1) absorption of chemical nutrients and contaminants from shallow sub-surface flow; 2) reduction in runoff rate and erosion; 3) shading of the stream, which creates a cooler environment; and 4) seasonal variation such as an influx of organic nutrients at autumn leaf fall.

Make BRCEs property a showcase for the conservation of aquatic biodiversity.

BRCEs property can become a demonstration projects for The Nature Conservancy's Freshwater Initiative as a testing ground for conservation of freshwater biodiversity.

Goal: Establish and maintain grassland communities in meadows and open lands.STRATEGIES

Create meadow/grassland habitat. Management Zone 1 and 2.

Investigate grazing, mowing, or prescribed burning as restoration options for maintaining open grassland conditions. Work closely with the Virginia Department of Game for funding of grassland bird habitat restoration.

Replace non-native plantings near headquarters with butterfly garden. Management Zone 1

Replace horticultural species with native species that could attract pollinators for the agricultural operations as well.

Goal: Control invasive non-native plant speciesSTRATEGIES

Investigate methods to eliminate the non-native invasive weed species from the natural areas of BRCES property, especially along riparian areas. Management zone 2 and 3.

Non-native weeds are a serious threat to many natural areas throughout the region. Non-native species pose a major threat to the integrity of the rich forests and rare plants in the riparian corridors.

Take an aggressive approach to remove all known individuals of both species with complete eradication expected within the next three years. In addition, BRCES should inform landowners about the threats these species pose. (see Tab 5 in Tools section)

The following plants are known non-native invasive species that occur extensively on the BRCES property. An action plan addressing how to control and reduce the populations of these species should be devised immediately.

Mile-a-minute	<i>Polygonum perfoliatum</i>
Asiatic bittersweet	<i>Celastrus orbiculatus</i>
Beefsteak plant	<i>Perilla frutescens</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Garlic mustard	<i>Alliaria petiolata</i>
Multiflora rose	<i>Rosa multiflora</i>
Tree-of-heaven	<i>Ailanthus altissima</i>
Oriental stilt grass	<i>Microstegium vimineum</i> var. <i>imberbe</i>

Goal: Maintain high quality habitat and corridors for animal species.

STRATEGIES

Monitor and protect the wood turtle. Management zone 3

Currently, wood turtle populations are reduced and scattered throughout the historic range. Factors involved in their decline are thought to include loss of nesting sites, increased nest predation, illegal collection for pets, and riparian development. Continue to work with the state on mark and release monitoring. Do not advertise the presence of the wood turtle, as it may invite poachers who will collect them for the pet trade.

Maintain riparian corridors for wildlife movement. Management zones 2 and 3.

Avoid placing hiking trails parallel to streams. Limit the amount of program development within known wildlife corridors and breeding and nesting sites.

Goal: Engage in resource use activities that are consistent with the conservation goals at the site.

STRATEGIES

Trails should be improved for visitor use and as access points for community management. All management zones.

BRCES trails should be limited in number, and be located only where consistent with the plan. To ensure visitors stay clear of sensitive zones, the trails should be marked and a map/brochure should be provided for visitors.

Conduct a summer and winter survey of the trails in order to prioritize maintenance needs. Erosion control methods are the first priority. Currently, some trails are aligned straight upslope and are prone to heavy erosion. Installing waterbars, gravel or switchbacks are options for trails designed on steep grades. Minimize widening the trail and re-routing the trail through the forested portions of the site in order to minimize the light penetration into the forest. Preserve character of the landscape by using logging roads and historic trails whenever possible. (see Tab 4 in Tools Section).

Apply best management practices (BMPs) in agricultural areas of the BRCES property to reduce the primary threats to conservation targets. Management zone 1.

- Encourage neighboring landowners to use BMP's in farming, grazing and forestry operations. By providing technical and financial assistance to area farmers, BRCES and its partners can implement BMPs on all farms in the watershed.
- Work on compatible agricultural best management practices.
- Learn more about flows regime, ground water influxes and hydrology details.

Monitor the effects of best management practices to measure their impacts on the economics of farm operations and 'eco-farming' techniques. Management zone 1.

Farmers who understand the advantages of BMPs will look for ways to implement them, and well-documented success stories will make it easier for federal and state officials to attract support for programs that fund BMPs.

Apply best management practices to forestry operations. All management zones.

Best Forestry Practices can be accomplished using draft horse logging methods, demonstrating new species for forestry, and selective logging in sensitive areas.

In order to maintain high water quality, review the following recommendations from the foresters in the mid-Atlantic region advising on operations near rare species habitat:

1. Retain a minimum of 150 ft undisturbed buffer on each side of perennial streams.
2. Retain a minimum of 50 ft undisturbed buffer on each side of intermittent streams.
3. Avoid crossing the perennial and intermittent streams with equipment. If crossing streams is unavoidable, culverts should be used on any intermittent and perennial streams with rock approaches on either side.
4. Avoid logging during the wettest time of the year - logging between early August and late November is encouraged to avoid logging when precipitation is high and soils are wettest.
5. Retain dead and downed woody debris on forest floor. This material absorbs water, and as it decays it increases the water holding capacity of the soil. In order to avoid disturbance to the

forested wetland habitat, no logging should occur within the wetlands bordering Sweet Run at the north end of the parcel. Selective logging that maintains 70% basal area, is compatible with habitat protection for sensitive and rare species.

Goal: Establish an environmental presence in Loudoun County with BRCES and participate in local decision-making that affects the region.

STRATEGIES

- Develop public support for conservation at the BRCES property through educational programs, and develop cooperative management projects with resource development groups.
- Develop educational programs that integrate conservation and stewardship with the needs of the local rural community. To enable school children to explore and learn about the natural wonders of BRCES property, support an educational program to engage local schools in monitoring stream conditions or removing non-native plants. BRCES can serve as the centerpiece for public field trips and annual field days for area middle school students. Similar area groups have obtained funding for educational use from the W.K. Kellogg Foundation and the Trust for Public Lands.
- Develop an information-sharing network of farmers and agriculture agency professionals to pool knowledge and take ownership of conservation efforts, and to help influence federal and state policies to better meet the needs of both the natural environment and the producer.
- Establish a network of farmers who can compare experiences in applying BMPs and share success stories. Help research markets for organic produce or green harvested wood or market for tourist potential of open space. Register as a mitigation bank site for development from other parts of the state.

Organize a BRCES Management Committee to oversee conservation actions.

A Management Committee could play an advisory role in projects and activities affecting the natural and cultural resources at the property. A diverse membership on the committee should include representatives from recreation, agriculture, forestry and ecology and include stakeholders from the local area. Opportunities for funding management activities should be a priority for the “Friends” sub portion of the committee. Partnerships with Loudoun County and the NPS should foster a team work approach to the management of a larger area than just the BRCES property.

As a model, The Fish & Wildlife Service’s National Conservation Training Center in nearby Jefferson County, West Virginia has an oversight land management committee. Their committee is responsible for the direction of facility management, approving permits for volunteer projects, research and general oversight of habitat restorations.

Integrate BRCES with the conservation program of the Naturalist Center (Smithsonian property) and Appalachian trail (NPS Property).

Continue to foster dialogue and relationships that lead to mutually supportive conservation actions in the area. A coordinated effort to secure funding should take place to pay for management and educational programs.

Adaptive Management & Research Strategies

It's easy to get caught in a loop of indecision, postponing action indefinitely while awaiting more detailed information. According to scientists and managers, it may be better to make the best decision possible, evaluate progress and modify actions as information becomes clearer. The process of "adaptive management" is a relatively new concept of land management. Adaptive management is basically the process of "learning by doing". It is a planning approach that ensures progress despite a lack of complete scientific information that might otherwise hinder activity. Adaptive management involves incremental planning and making progress in the face of changing circumstances and some degree of scientific uncertainty. It provides for potential to change course should better, more appropriate practices be needed, but also takes a broader and longer term view on the functioning of the organization as it relates to its capacity to accommodate change. This approach would be a good companion to the sustainable agriculture program at BRCES. (see Tab 12 in Tools section)

Protection Strategies

- Complete protection of the Blue Ridge buffer to the AT including the private portions of the rare acidic seep at the headwaters of Sweet Run.
- Just off the BRCES property is a rare plant community along Sweet Run. Work with the VA Heritage Program to create a site design that delineates processes that keep the acid seep community healthy and to gain better understanding of the threats to the community.
- Request the Virginia Natural Heritage Program to reevaluate the health of the swamp in 2003.

Potential partners for BRCEs projects

A partial list of federal, state, county and conservation partners that could help BRCEs meet conservation goals.

Loudoun County Economic Development Council
Loudoun Soil & Water Conservation District
Sustainable Loudoun Network
Land Trust of Virginia
Virginia Coalition for Teaming with Wildlife
Audubon Naturalist Society
Loudoun Wildlife Conservancy
Virginia Chapter of The Nature Conservancy
Virginia Chapter of the Wildlife Society
The Virginia Natural History Society
Virginia Society of Ornithology
Virginia Herpetological Society
The Virginia Museum of Natural History
The Virginia Chapter of the American Fisheries Society (VCAFS)
U.S. Department of Agriculture
U.S. Fish and Wildlife Service
Virginia Fish & Wildlife Information Exchange
Virginia Department of Conservation and Recreation
Virginia Department of Game and Inland Fisheries
Virginia Reptile Rescue
Virginia Native Plant Society
National Park Service
Potomac Appalachian Trail Club
National Zoo
Smithsonian Institution
Potomac Valley Audubon Society

MEASURES OF CONSERVATION SUCCESS

Management at the BRCES property will include assessing whether or not conservation goals have been met. An oversight committee needs to tailor measures to each strategy under the goals. The time frame to meet accomplishments should include interim check points (as described in adaptive management techniques under Tab 12 in the Tools Section) so that highest priority items can be completed in meaningful steps. Many of the goals outlined could stretch into multiple year projects, and they need to be broken down into discrete, annual plans. The plans should have measurable objectives that articulate the timing, funding and personnel requirements, and quantitative end points. Objectives should be specific and realistic.

Objectives need to define the parameters of what your goal looks like when it is complete. Using interim goals can help define “goal posts” against which to compare the results of monitoring as a way of assessing progress.

Sample objectives:

Riparian corridor

Objective: To protect or restore the riparian corridor on Sweet Run and Piney Run (30 meters on each side of stream) so that 90% of the high priority segments consist of native vegetation within 5 years, using volunteer work parties for hand weeding, cutting and herbicide application. Monitor the vegetation composition every year using the plot sampling method.

Trails

Objective: to have a trail system that fits in the natural landscape and minimizes disturbance to natural areas and erosion. Construct new trails across logging roads and through disturbed areas.

Limit horse use to 10 horses per week per mile to designated trails only. Measure with use of trail user surveys.

Literature Cited

- BRCES, 2001. Blue Ridge Center for Environmental Stewardship home page.
<<http://blueridgecenter.org/>>
- Brown, M.L. and R.G. Brown, 1984. Herbaceous plants of Maryland. Port City Press, Baltimore, MD.
- Everson, Dan et al. 1999. NCTC Land Management Plan. Land Management Committee. Unpublished report to the US Fish & Wildlife Service.
- Fleming, G.P., P.P. Coulling, D.P. Walton, K.M. McCoy, and M.R. Parrish. 2001. The natural communities of Virginia: classification of Ecological Community groups. First approximation. Natural Heritage Technical Report 01-1. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA. Unpublished report. 76 pp.
- Fleming, Gary. Community ecologist, Virginia Natural Heritage Program. Personal communication, Summer 2001.
- Frye, Keith, 1986. Roadside Geology of Virginia. Mountain Press Publishing Company, Missoula.
- Galaty, Michael, J. Haws, T. Camp, K. McMahon, 2000. Archaeological Research Program Final Report: Summer 2000. Unpublished report to the Blue Ridge Center for Environmental Stewardship. Millsaps College, Jackson, Mississippi.
- Le Clere, Jeff, [no date] Wood turtle. In: Reptiles and Amphibian of Minnesota, <<http://207.36.67.48/Minnesota-Hertetology/turtles>>
- Mann, Debora, E. Bates, J. Buck and J. Rogers. 2000. Biological survey of the Blue Ridge Center for Environmental Stewardship, Loudoun County, Virginia. Unpublished report to BRCES. Millsaps College, Jackson, Mississippi. December 23, 2000.
- Plescow, S.T., 2000. Blue Ridge Center for Environmental Stewardship, Loudon Co, VA, Preliminary Wetlands Investigation. Letter to Patton Harris Rust & Associates, Williamsburg Environmental Group, Environmental Consultant, Sterling, VA. March 7, 2000.
- Southworth, Scott and David K. Brezinski, 1996. Geologic Map of the Harper's Ferry Quadrangle, Virginia, Maryland, and West Virginia. USGS Bulletin 2123.
- Southworth, Scott, 2000. The geology of the Harper's Ferry Quadrangle. USGS web site <<http://pubs.usgs.gov/bulletin/b2123>>
- USGS Northern Prairie Wildlife Research Center, [no date]. Butterflies of Loudoun County, Virginia. Web page: Butterflies of North America.

Webster, W.D., J.F. Parnell and W.C. Biggs, 1985. Mammals of the Carolinas, Virginia, and Maryland. The University of North Carolina Press.