

National Park Service U.S. Department of the Interior

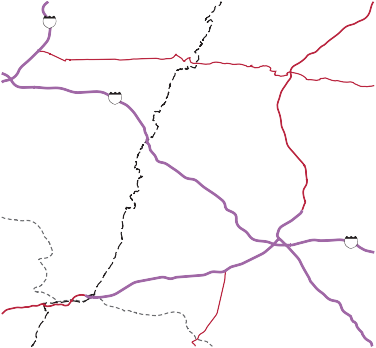
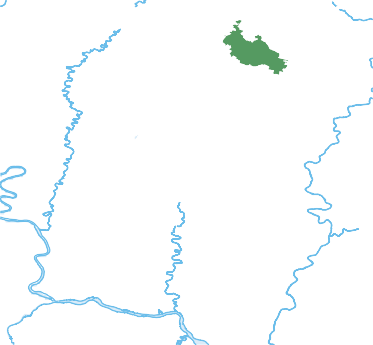
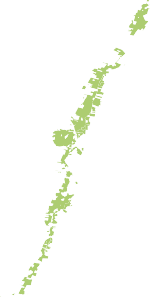
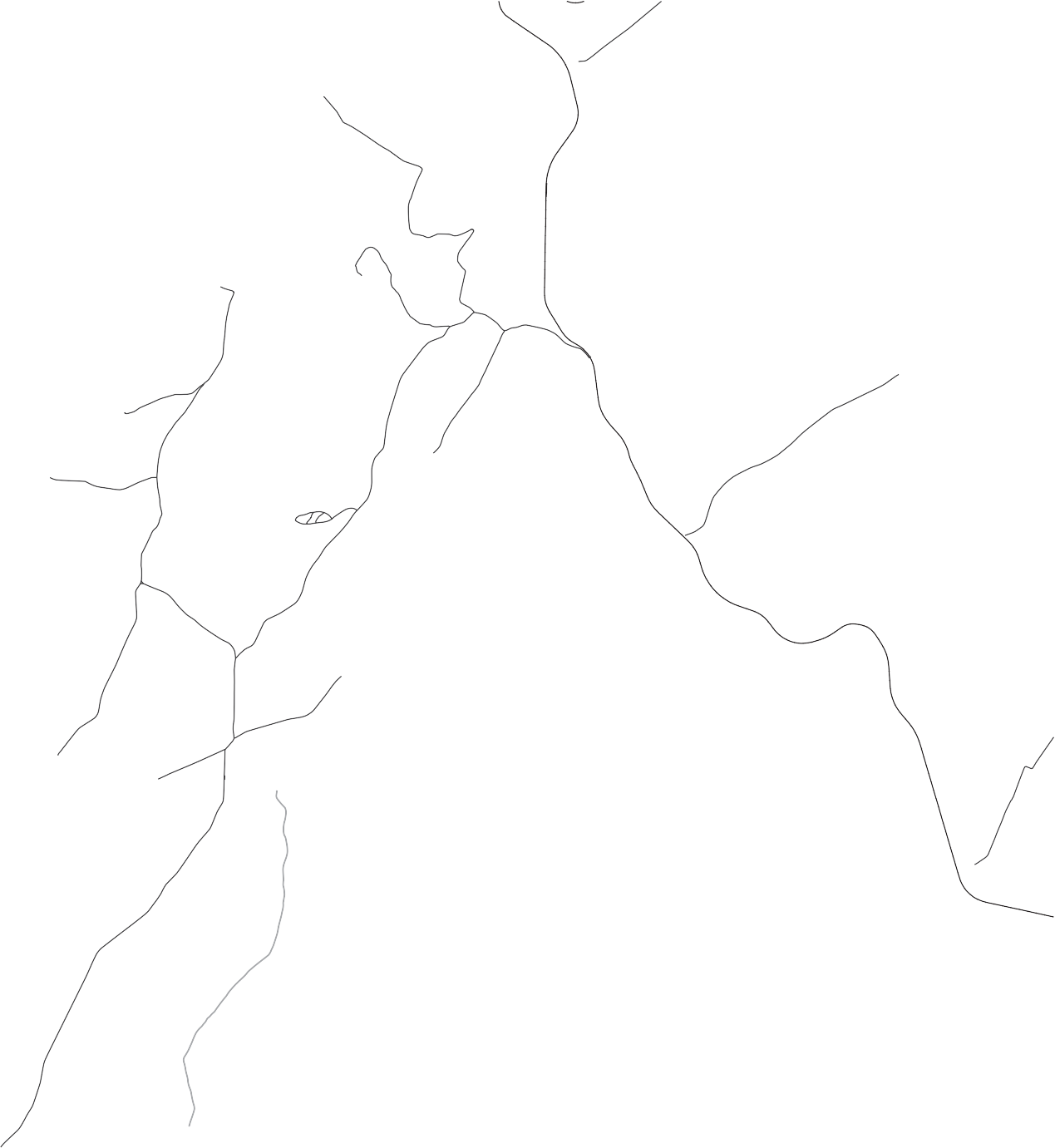
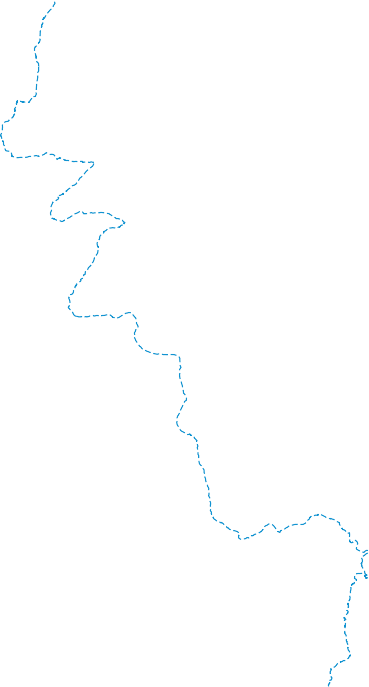
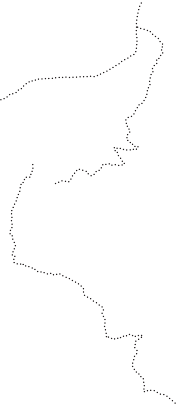
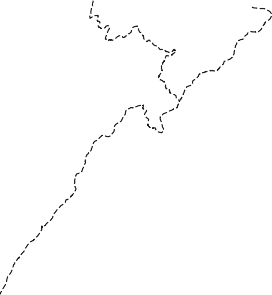
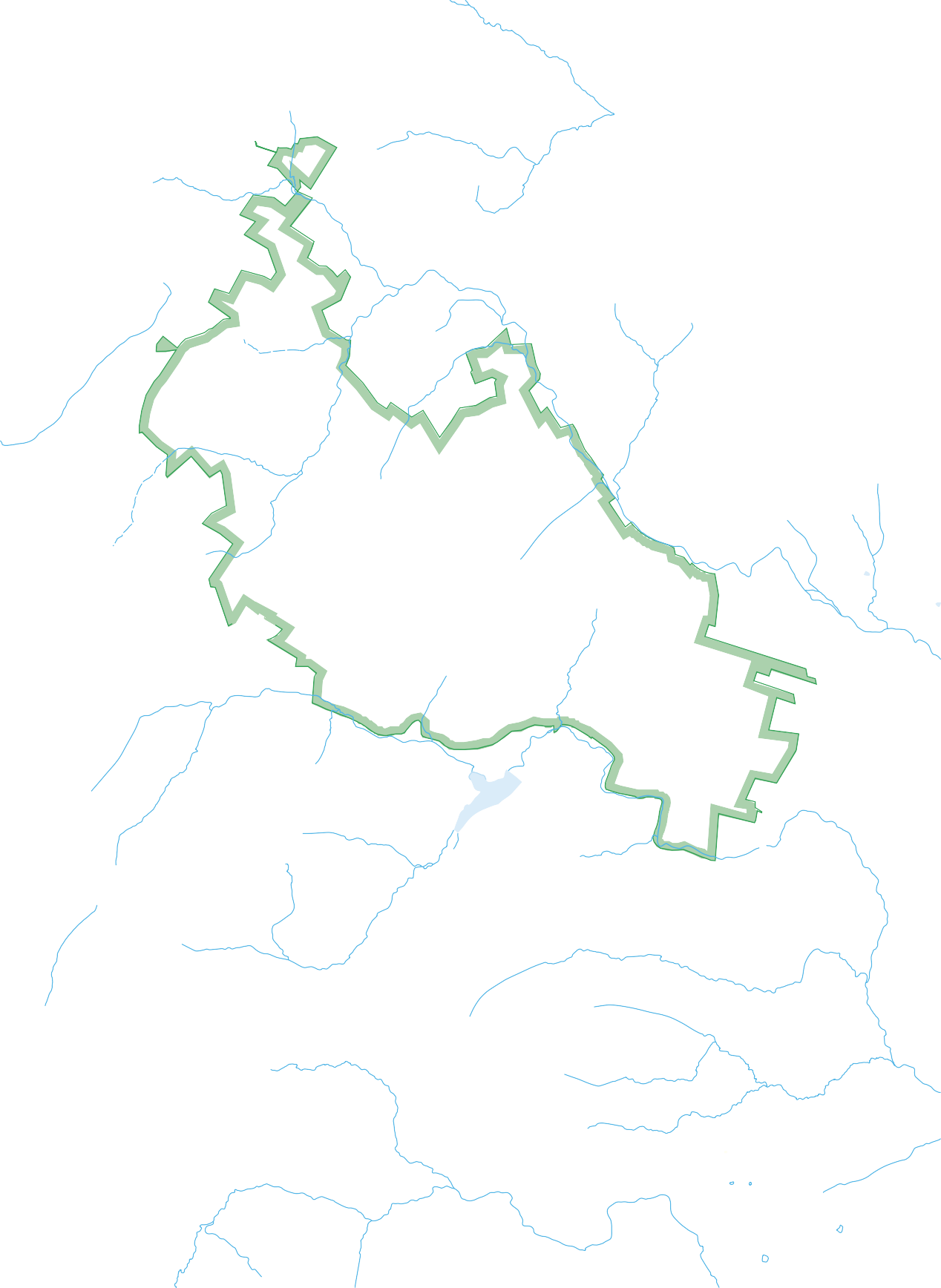
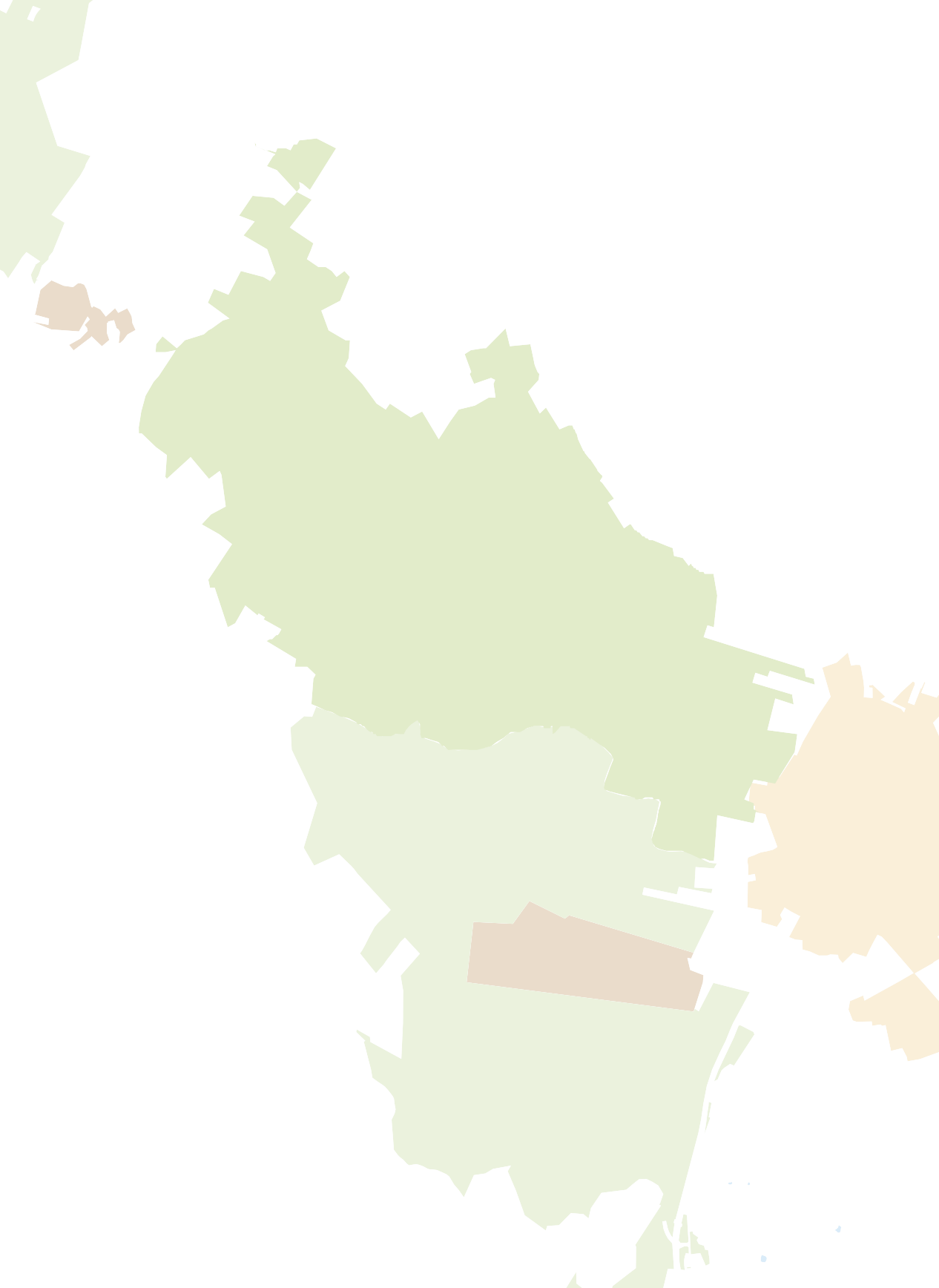
**Resource Stewardship Strategy**

June 2013

**Catoctin Mountain Park**

Maryland

*To Blue Ridge Summit, Pa.*



Sabillasville

Emmitsburg

**Catoctin Mountain Park**

81

HAGERSTOWN

Smithsburg

*To Gettysburg*

64

77

**Cunningham**

**Falls State Park**

Thurmont

SOUTH

70

**Greenbrier State Park**

15

**C & O Canal Towpath**

Boonsboro

**City of Frederick Municipal Forest**

Myersville

*C*

MOUNTAIN STATE PARK

MARYLAND

**Gambrill State Park**

550

FREDERICK

491

Keedysville

Sharpsburg

**Antietam National Battlefield**

**Gathland State Park**

70

WEST 15

340

VIRGINIA

340

**Monocacy National Battlefield**

HAGERSTOWN WATERSHED

Harpers Ferry

Brunswick

**Harpers Ferry National Historical**

15

*v*

270

**Park**

VIRGINIA

Lantz

H

**Deerfield Nature Trail Loop**

**Owens Creek**

1300ft

396m

**Sawmill**

HAGERSTOWN WATERSHED

**Owens Creek**

**Browns Farm Trail**

**Poplar Grove**

**CATOCTIN MOUNTAIN PARK**

(National Park Service)

**Chestnut**

**Spicebush Nature Trail**

wheelchair-accessible trail

Blue Ridge Summit Overlook

1520ft

463m

**Round Meadow**

**Greentop**

1880ft

573m

**Hog Rock Nature Trail**

Hog Rock 1610ft 491m

**Misty Mount Cabins**

**Charcoal Trail**

Thurmont Vista 1499ft

457m

550

*To Smithsburg*

*and Hagerstown*

*g* **wheelchair-accessible**

**parking only and trail**

77

**no trail connection**

**l**

***Cunningham Falls***

**Blue Blazes Whiskey Still**

**Visitor Center**

920ft/280m

Wolf Rock 1401ft

427m

*To Gettysburg,*

*Pa.*

806

**William Houck Area**

**Snack bar Boat rental**

**Catoctin Mountain Park Headquarters** 840ft

Chimney Rock 1419ft

432m

**Store**

Contact Station

***Hunting Creek Lake***

**Boat launch**

256m THURMONT

522ft

159m

**Campground registration**

**Dump station**

**Fishing pier**

**Cunningham Falls State Park Administrative Office**

*Frank Bentz* 77

*Memorial Lake* 15

e

Cat Rock 1562ft

476m

*To*

*Wolfsville R*

THURMONT W A TERSHED

806

Hiking trail

Horse and hiking trail

Steep trail; arrows point uphill

Overlook

Parking Ranger station Picnic area Cabin camp

Bobs Hill 1765ft

538m

**CUNNINGHAM FALLS STATE PARK**

(Maryland Park Service)

Unpaved road Wheelchair-accessible

**Catoctin National Recreation Trail:**

hiking trail

horse and hiking trail

Park Central Road is closed for 2.5 miles from the visitor center for winter recreation mid-December to mid-March.

Public campground Sleeping shelter

**Manor Area**

**Playground**

0 0.5

1 Kilometer

**Visitor Center**

**Scales and Tales Aviary**

0 0.5 1 Mile

North

**Catoctin Furnace Trail**

pedestrian bridge over road

**CatoctinIronFurnace**

495ft 151m

Catoctin Furnace

**Catoctin Mountain Park Resource Stewardship Strategy**

**June 2013**

*Approved by:*

- *Superintendent, Catoctin Mountain Park*

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# EXECUTIVE SUMMARY

The Resource Stewardship Strategy (RSS) provides strategic guidance for the research, resource management, and resource education programs of the National Park Service (NPS) at Catoctin Mountain Park.

## CATOCTIN MOUNTAIN PARK

Catoctin Mountain comprises the easternmost ridge of the Blue Ridge Mountains in Maryland. Here, the story of human habitation is written on the land. Years of clear-cutting the hardwood forests for making charcoal and building homesteads and farming the valley left a deep mark on the landscape. Previous to European incursions by second-generation Americans and German immigrants, small tribal groups led a seminomadic existence—they farmed, hunted, and fished the land and rivers. They also quarried metarhyolite for the production of lithic tools. Evidence of their presence in western Maryland can be traced back 3,500 years. The name Catoctin is thought to have come from the Kittocton, an American Indian tribe or clan that once lived between the mountain and the Potomac River. In 1732, European American settlers began arriving in the Monocacy River Valley, where the native people were seldom seen. Farming and small industries, such as sawmills, gave way to a burgeoning charcoal and iron industry whose structures are still visible today.

Catoctin Mountain Park originated during the Great Depression. The federal government acquired more than 10,000 acres beginning in 1935 and established Catoctin Recreational Demonstration Area (RDA) in 1936 with Executive Order 7496. The program created public parks out of marginal farmland near cities—most eventually became state or national parks. In 1936, a New Deal agency named the Works Progress Administration (WPA) (to be renamed the Works Projects Administration in 1939) hired hundreds of local men to create maintenance shops, a visitor center, and cabin camps. Later, in 1939, the Civilian Conservation Corps (CCC) set up camp in today’s Round Meadow, tasked with returning the Catoctin landscape to native eastern hardwood forest. The Works Progress Administration operated from 1933 to 1942 providing unskilled manual labor jobs related to conservation and the development of natural resources in rural lands owned by federal, state, and local governments. At Catoctin, the Civilian Conservation Corps planted trees, turned old farmland into open meadows, and restored the streams to their natural flow—all of which revitalized the land and brought back native plants and wildlife. The Civilian Conservation Corps also built roads, trails, cabins, guardrails, stone walls, and shelters, and conducted historic preservation projects and archeological work on nearby Catoctin Furnace. In 1965, the park was also the site of the first Job Corps Center. Today, the 5,748-acre Catoctin Mountain Park represents a spirit of regeneration—the second-growth forest, mountain streams, historic cabin camps, and facilities for persons with disabilities offer visitors diverse outdoor recreation opportunities near mid-Atlantic population centers. Hiking trails through red oaks, birches, dogwood, and other native forest species lead to high valley panoramas and one of the best trout- fishing streams in the region.

In the spring of 1942, at the request of President Franklin D. Roosevelt, the National Park Service began to consider several areas for a presidential retreat. An existing camp area within Catoctin Recreational Demonstration Area known as Camp Hi-Catoctin was selected by the president. He christened the camp Shangri-La (named for the fictional Himalayan paradise). In 1953, President

Dwight D. Eisenhower renamed the retreat Camp David after his father and grandson, both named David.

In 1945, with the added significance of the establishment of the Presidential Retreat and “the historical events of national and international interest” that occurred there, President Harry S Truman determined the area would “be retained by the National Park Service of the Department of the Interior . . . in accord with the position expressed by . . . President Roosevelt.” Subsequently, in 1954, the existing 5,748-acre park was carved out of the recreational demonstration area and designated Catoctin Mountain Park by the director of the National Park Service. The remaining 4,445 acres of the recreational demonstration area south of Maryland State Route 77 were transferred to the State of Maryland and became present-day Cunningham Falls State Park.

The buildings and structures built by the Works Progress Administration and Civilian Conservation Corps, along with the site of the nation’s first Job Corps Center in 1964, left a tangible presence that speaks to the nation’s progress in times of great challenge.

## RESOURCE STEWARDSHIP

As steward of Catoctin Mountain Park’s natural and cultural resources, park management recognizes the importance of developing a comprehensive approach to resource management. Such an approach must be information-based and also needs to engage the public about park issues through science and scholarship. Director’s Order 2-1, *Resource Stewardship Planning* (which recommends the preparation of a resource stewardship strategy to replace the resource management plan at parks nationwide), the 2004 NPS *Program Standards: Park Planning*, and *Management Policies 2006* provide a useful framework for developing the resource strategies needed at Catoctin Mountain Park.

The resource stewardship strategy serves as a bridge between qualitative statements of the park’s priority resources, established in a guiding document, such as the park’s foundation document (NPS 2013a), and the measureable goals and implementation strategies determined through park strategic planning. The resource stewardship strategy is an analytical tool that focuses on identifying and tracking indicators of *reference condition.* In this resource stewardship strategy, an *indicator of condition* is defined as an element of a priority resource that is particularly “information rich” and represents or “indicates” the overall condition of the priority resource. There may be one or several indicators of condition for a particular priority resource. The reference condition is defined as a quantifiable or otherwise objective value for an indicator to provide context for comparison with the *current condition* values. The reference condition is established by park managers and is intended to represent an acceptable resource condition, with appropriate information and scientific or scholarly consensus. The reference condition might be based on a regulatory or program standard, historical data, data from relatively undisturbed sites, predictive models, or expert opinion. Related to reference condition, the resource stewardship strategy also indicates a *management target* for each indicator. In some cases the park may set the management target as a “better” or “worse” value than reference condition.

The resource stewardship strategy recommends comprehensive strategies to achieve and maintain reference conditions over time. It provides the basis for assessing and updating comprehensive strategies periodically, based on new information and the results of completed activities. The resource stewardship strategy also provides the park with a strategy for investing both human and fiscal resources in the stewardship of natural and cultural resources and reports progress in attaining and maintaining desired resource conditions at the park.

## Inventory and Monitoring Program

To improve park management through greater reliance on scientific information, the NPS Inventory and Monitoring Program (I&M) provided guidance, funding, and technical assistance to complete a set of 12 natural resource inventories for parks. The inventories are a baseline for long- term ecological monitoring by the National Capital Region Network (NCRN) I&M of numerous natural resources at Catoctin Mountain Park (see “Table 18. NCRN I&M Natural Resource Monitoring at Catoctin Mountain Park”).

## Natural Resource Condition Assessment

The NPS Water Resources Division provides national oversight for a series of park-based natural resource assessments. Each natural resource condition assessment evaluates current conditions, identifies critical data gaps, and highlights notable resource condition influences for a park unit’s important natural resources. Natural resource condition assessments rely on existing scientific data and information from varied sources, combined with expert interpretations or syntheses of data sources as the primary basis for developing condition findings. The assessments also highlight emerging or cross-cutting issues that require the greatest management attention. For example, this resource stewardship strategy includes data obtained from a national air quality assessment (NPS 2013b) that identified four specific measures and associated reference conditions.

## State of the Park Report

Integrated in this resource stewardship strategy are components of Catoctin Mountain Park’s *State of the Park Report* (NPS 2013c), which provides a snapshot of the status and trend in the condition of priority park resources. The *State of the Park Report* highlights park stewardship activities and accomplishments that maintain or improve the state of the park and identifies key issues and challenges facing and affecting park management. A joint RSS “indicators, specific measures, reference condition, and management targets” / State of the Park workshop was held in April 2012.

## FUNDAMENTAL AND OTHER RESOURCES AND VALUES

The first step in developing comprehensive strategies is to identify the resources and values the National Park Service is responsible for preserving at Catoctin Mountain Park. These qualities are called the park’s fundamental resources and values (FRVs) and are referred to as *priority resources* in this resource stewardship strategy. FRVs are defined as: those features, systems, processes, experiences, stories, scenes, sounds, smells, or other qualities determined to warrant primary consideration during planning and management. These resources and values are contained in executive orders and congressional direction to the National Park Service through the park’s enabling legislation and the NPS *Organic Act* (1916). They are closely associated with the park’s purpose and further developed in the park’s foundation document (NPS 2013a).

The following FRVs have been identified for Catoctin Mountain Park:

### Natural resources.

1. Eastern deciduous forest
2. Geological resources
3. Wildlife communities
4. Views and vistas
5. Fish communities

### Cultural resources.

1. Cabin camps (Camp Greentop and Camp Misty Mount)
2. Ethnographic resources
3. Cultural landscapes

Catoctin Mountain Park has other resources and values that are not fundamental to the park’s purpose and significance but are, nevertheless, important to consider in park planning and management decisions. These are referred to as other important resources and values (OIRVs).1

Following are the OIRVs for Catoctin Mountain Park:

### Natural Resources.

1. Natural sounds / air quality / night skies
2. Water quantity and quality

### Cultural Resources.

1. Presidential Retreat
2. Historic structures (other than cabin camps)
3. Archeology
4. Museum collections

Reference conditions are presented for both FRVs and OIRVs and are conditions necessary for visitors to understand, enjoy, and appreciate those resources. Reference conditions and management targets for each priority resource or value were developed during the RSS process.

## STATUS OF RESOURCE KNOWLEDGE

The second step in developing a stewardship strategy is to review and understand the park’s resource conditions. Information on natural and cultural resources, visitation patterns, and the condition of the human environment in and around the park was summarized and data gaps were identified. Key findings in this resource review section include:

* Catoctin Mountain Park has identified the following planning needs:
  + vegetation management plan
  + watershed management plan
  + scenic byway corridor management plan
  + partnership enhancement plan
  + cabin and campground facilities management plan
  + oral history program and plan
  + collections management plan
  + Climate Friendly Parks action plan

1. Note that umbrella term for FRVs and OIRVs in this resource stewardship strategy is “priority resources.”
   * Catoctin Mountain Park has identified the following data and resource inventory needs:
     + ethnographic overview and assessment for the park unit, as well as the development of a park ethnography program
     + cultural landscape report or other treatment plan for the entire park unit and identified component landscapes
     + preliminary evaluation of four areas to determine whether cultural landscape inventories are needed
     + archeological protection strategy for law enforcement rangers
     + numerous archeological investigations
     + historic structure reports on representative historic structures in cabin camps
     + determination of National Register of Historic Places eligibility for undocumented resources, such as structures at the Braestrup Tract
     + historiography of the park’s program periods and historic resource studies
     + hydrological analysis for Braestrup ponds
     + economic analysis for cabin camps and campgrounds
     + identification and evaluation of important views and vistas
     + geological hazards report
     + bat and small mammal population surveys
     + baseline population surveys for certain insect communities
     + baseline air quality measurements
     + baseline night skies measurements
     + baseline natural sound measurements
     + amphibian and reptile disease study
     + groundwater study
   * The impact of development in the surrounding community on the visitor experience is not fully understood.
   * Further research is needed to fully understand the park’s visitor demographics and how to attract and serve those who have not already visited the park.

## INDICATOR SELECTION AND CONDITION ASSESSMENT

The development of comprehensive strategies also requires following specific steps to identify indicators of resource conditions and to assess the status of resources using these indicators:

1. Consideration of *beneficial influences* and *detrimental influences*
2. Determination of indicators
3. Assignment of *specific measures* to quantify or qualitatively evaluate the condition of an indicator at a particular place and time; there may be one or more specific measures of condition for each indicator
4. Specification of a reference condition for each indicator
5. Determination of a management target value relative to the reference condition
6. Measurement or assessment of the current condition
7. Comparison of management target and current condition to determine if “Target Met?”

The Catoctin Mountain Park resource stewardship strategy identifies 27 indicators of condition for priority natural resources and 17 indicators of condition for priority cultural resources.

## COMPREHENSIVE STRATEGIES AND ACTIVITIES

The final step in the RSS process is the development of comprehensive strategies. Each comprehensive strategy includes a set of activities to ensure the National Park Service is attaining and maintaining the reference condition for all fundamental and other important resources and values. For Catoctin Mountain Park, 36 total strategies (including 23 for natural resources; 11 for cultural resources; and 2 that are common to natural and cultural resources) have been developed. Within these strategies, the resource stewardship strategy describes 110 total activities (including 57 for natural resources; 51 for cultural resources; and 2 that are common to natural and cultural resources) to implement these strategies.

Strategies and their associated activities address one of three needs:

* + filling data gaps necessary to define and evaluate indicators and targets for park resources
  + monitoring park resources and visitor activity and managing these resources to ensure that targets for each indicator are achieved
  + managing natural and cultural resources to preserve, protect, and maintain their condition and enhance the visitor experience

## STRATEGIES INTEGRAL TO THE SUCCESS OF OTHER STRATEGIES AND ACTIVITIES

The National Park Service is pursuing several strategies that have budgetary implications that underlie the success of all the strategies and activities described in the resource stewardship strategy. These are not discrete projects but general ways of doing business that should be addressed on an ongoing basis:

* + **Conduct periodic strategic program reviews**. Periodically review the park’s staffing needs in order to identify potential or impending deficiencies or strengths. Identify activities, make appropriate budget plans, and form strategic partnerships to augment staffing needs. Fill identified staffing needs to accomplish the strategies and activities that have been identified.
  + **Provide adequate staff training, development, and learning opportunities**. Maintain a high level of expertise and professionalism among resource management, law enforcement, and interpretive / educational staff. Provide multiple opportunities for staff to learn, develop new skills, acquire new knowledge, familiarize themselves with new equipment or techniques, and distribute the results of research.
  + **Collaborate with other agencies and institutions**. Collaborate with other agencies— federal, state, nonprofit, or private biologists, archeologists, physical scientists, ethnographers, and universities—to maintain high standards of inventory and management activities.
  + **Engage external research partners**. Develop and circulate information on important knowledge gaps and research needs to facilitate and attract research projects.
  + **Ensure accountability for mitigation prescribed through environmental analysis**. Monitor compliance and effectiveness of mitigation measures prescribed through environmental analysis (environmental impact statements, environmental assessments) of new development projects.

## FUNDING THE PARK’S RESOURCE STEWARDSHIP

One purpose of the resource stewardship strategy is to guide NPS investment (both human and fiscal) in the stewardship of natural and cultural resources. The resource stewardship strategy assigns funding needs for implementing RSS strategies (via activities and projects) to base and project funding and also provides a measure of accountability for funds used to attain and maintain reference conditions.

The resource stewardship strategy does not address all the resource stewardship activities that could enhance management of the park but instead focuses on the needs that are critical to maintaining the reference conditions of the park as well as its legal mandate defined in the enabling legislation.

# OVERVIEW

The resource stewardship strategy serves as a bridge between the qualitative statements of desired conditions established in a general management plan (or similar guiding document, such as the foundation document for planning and management) and the measureable goals and strategies determined through park strategic planning.

## PURPOSE AND NEED FOR A RESOURCE STEWARDSHIP STRATEGY

The resource stewardship strategy is an analytical document that focuses on

* + identifying and tracking indicators of reference conditions
  + recommending comprehensive strategies to achieve and maintain reference conditions over time
  + assessing and updating these comprehensive strategies periodically based on new information and the results of completed activities

The resource stewardship strategy provides Catoctin Mountain Park with a strategy for investing both human and fiscal resources in the stewardship of natural and cultural resources. It identifies a reasonable range of strategies to attain and maintain reference conditions. These activities will be subject to appropriate environmental planning and compliance documentation. Incorporating strategies will proceed as funds are made available.

## RSS RELATIONSHIP TO OTHER PARK PLANS

In the NPS planning hierarchy, the general management plan typically serves as the overarching document that sets the long-term, qualitative goals (stated as desired conditions) for a national park unit. Catoctin Mountain Park does not have a current general management plan. The park uses its foundation document (NPS 2013a), long-range interpretive plan (NPS 2008a), and relatively recent environmental compliance documents such as the white-tailed deer management plan (NPS 2009) and fire management plan (NPS 2012a) to provide strategic guidance (see table 1).

The resource stewardship strategy provides a bridge between the broad direction provided in guiding documents such as the foundation document and comprehensive strategies that need to be taken to achieve or maintain the reference condition. Specific activities are typically laid out in a park’s 5-year and annual strategic plans. The resource stewardship strategy provides a defensible and logical rationale for park management and priorities regarding the allocation of financial and human resources for resource management.

Because Catoctin Mountain Park does not derive desired conditions for its natural and cultural resources from the general management plan, such conditions were identified during the preparation of the resource stewardship strategy and are called reference conditions and include management targets.

**TABLE 1. RELATED CATOCTIN MOUNTAIN PARK PLANS**

|  |  |
| --- | --- |
| **Park Plans** | **Status** |
| Park master plan | 1936 |
| General management plan | 1976 |
| Statement for management | 1996 |
| Foundation document for planning and management | 2013 |
| **Program Management Plans** | |
| Resource stewardship strategy | 2013 |
| Long range interpretive plan | 2008 |
| Trail management plan | 2007 |
| Fire management plan | 2012 |
| Oral history program and plan | In progress |
| **Development Concept Plan** | |
| Camp Round Meadow | 1980 |
| **Strategic Plan** | |
| Park strategic plan | 2012 |
| **Implementation Plans** | |
| Integrated pest management plan | 2004 (currently being updated as of 2012) |
| White-tailed deer management plan | 2009 |
| Climate Friendly Parks action plan | In progress |
| Cabin and campground facilities management plan | Needed |
| Watershed management plan | Needed |
| Collections management plan | Needed |
| Partnership enhancement plan | Needed |
| Scenic byway corridor management plan | Needed |
| Vegetation management plan | Needed |
| Cultural landscape report or other treatment plan | Needed |
| Preservation maintenance plan for historic structures | Needed |

## PARK PURPOSE

The purpose statement identifies why Congress and/or the president established Catoctin Mountain Park as a unit of the national park system. Based on a review of park legislation and previous park management documents, a foundation planning team consisting of park staff and key stakeholders generated the following purpose statement for Catoctin Mountain Park:

*The purpose of Catoctin Mountain Park is to provide quality recreational opportunities in the Catoctin Mountains and serve as a setting and buffer for the Presidential Retreat, while protecting and conserving the park’s natural and cultural environments in the spirit of New Deal conservation programs.*

## PARK SIGNIFICANCE STATEMENTS

Drawing from this purpose statement, statements of significance define what is most important about the park’s associated resources and values. Significance statements help to guide planning and management decisions by focusing attention on those qualities that Congress wanted preserved and interpreted.

The following significance statements have been identified for Catoctin Mountain Park:

**Significance Statement 1:** Catoctin Mountain Park is significant because it was one of 46 recreational demonstration areas developed in the 1930s and represents an outstanding example of New Deal-era programs that established rural areas for conservation and recreation purposes.

**Significance Statement 2:** Catoctin Mountain Park is significant because it is an early and continuing example of conservation practices resulting in the regeneration of an eastern deciduous forest.

**Significance Statement 3:** Catoctin Mountain Park is significant because it provides outstanding scenic values at the transition of the Monocacy River Valley and the Catoctin Mountains in the Piedmont Plateau and Blue Ridge geologic provinces.

**Significance Statement 4:** Catoctin Mountain Park is significant because it provides diverse outdoor recreation opportunities in a mountain setting near the population centers of the mid- Atlantic region.

**Significance Statement 5:** Catoctin Mountain Park is significant because it provides exceptional aquatic habitat.

**Significance Statement 6:** Catoctin Mountain Park is significant because it serves as the setting where international leaders convene to discuss world peace and international diplomacy and serves as the Presidential Retreat.

**Significance Statement 7:** Catoctin Mountain Park is significant because it is the location of cabin camps that have served both as the oldest operating camps for persons with disabilities in the nation as well as one of the original locations where the Office of Strategic Services, forerunner of the Central Intelligence Agency, trained in World War II.

**Significance Statement 8:** Catoctin Mountain Park is significant because it preserves a cultural heritage that dates back more than 3,500 years and ranges from stone tool making, to agriculture, to charcoal production.

# RESOURCES, VALUES, REFERENCE CONDITIONS, AND MANAGEMENT TARGETS

Defining fundamental resources and values, along with other important resources and values (also known as “priority resources” in this resource stewardship strategy), help focus planning and management for Catoctin Mountain Park. Once the park’s priority resources are identified, indicators of condition are assigned to each priority resource. The reference condition and management target are defined next to provide quantifiable values to compare the current resource condition to the acceptable value. The management target may be set as a value “better” or “worse” than the reference condition.

## FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values comprise the resources and experiences (i.e., specific features, systems, processes, practices, stories, scenes, etc.) that are critical for achieving Catoctin Mountain Park’s purpose and maintaining its significance. Identifying and understanding these FRVs helps focus planning and management on what is truly important about the park. Because the park does not use a current general management plan, it defines its FRVs from the foundation document, completed in 2013. In addition, the NPS Denver Service Center (DSC), park, and regional staff met early in the RSS process to confirm the park’s FRVs, which include the following:

##### Eastern deciduous forest

The second-growth eastern deciduous forest is a direct result of the legacy of New Deal legislation, which recast the Catoctin landscape from an industrial and agricultural landscape to one of a native forest. The forest is therefore fundamental to improving both the natural environment the New Deal programs intended to create, as well as the symbolic values of contemporary resource stewardship.

##### Geological resources

The park’s geological resources are integral components of the Catoctin Mountains’ natural systems. The park’s unique geological features date back 500 million years and provide the foundation for its rich, regenerated environment while preserving recreational values and outstanding opportunities for education and scientific study.

##### Wildlife communities

Catoctin Mountain Park’s second growth forest and unique geology also host a wide range of habitat conditions that are fundamental to supporting diverse wildlife communities.

Development pressure near the park’s boundaries and its proximity to suburban and developed areas of Frederick, Maryland, makes the park an even more important sanctuary for native wildlife communities.

##### Views and vistas

Catoctin Mountain Park topography (at the transition zone of the Piedmont Plateau and Blue Ridge geologic provinces) provides picturesque views from surrounding valleys and panoramic vistas from the ridgelines within park boundaries. Maryland’s mountainous front range comes to life within these viewsheds. Views and vistas are fundamental to visitor experience at the park—offering snapshots of valley farmland, tree-lined ridges, night skies, and a sense of nature near the population centers of the mid-Atlantic region.

##### Cabin camps (Camp Greentop and Camp Misty Mount)

Illustrative of the New Deal movement to introduce outdoor recreation to children living in urban areas, the park’s cabin camps were the beginning of organized youth recreational use of the area. Camp Greentop remains the longest operating cabin camp for persons with disabilities in the United States. Given the physical setting and recreational activities associated with the mountain, stream, and valley topography of the park, the cabin camps (Greentop and Misty Mount) are the most symbolic and enduring resources associated with the park purpose to provide high quality recreational opportunities.

##### Fish communities

The park’s cold water streams—particularly Big Hunting Creek and Owens Creek—provide some of the best brook trout habitat in the region. These streams also provide remarkable recreational opportunities for fishing enthusiasts. Big Hunting Creek was the State of Maryland’s first fly fishing-only designated stream and later became Maryland’s first catch- and-return trout stream.

##### Ethnographic resources

Establishment of the recreational demonstration area by the federal government in 1936 at the area that would become Catoctin Mountain Park altered the existing landscape and left a tangible record of the New Deal era. The CCC and WPA buildings and landscape restorations exemplify the mission of the RDA program, which used the labor of these groups to conserve natural resources and create recreational areas for the enjoyment of the public. Ethnographic resources associated with these New Deal programs emanate from the oral histories of the people who participated in these programs, but also could include the camps, trails, and landscapes built by these groups. There are no identified contemporary tribal associations with park resources. The park’s museum collection contains artifacts from prehistoric people.

##### Cultural landscapes

The cultural landscapes of the park encompass the region’s prehistoric period of human history through the present. The park has three identified cultural landscape inventory units. The overarching parent landscape consists of the entire acreage of Catoctin Mountain Park. Camp Greentop and Camp Misty Mount have been identified as component landscapes.

## OTHER IMPORTANT RESOURCES AND VALUES

Catoctin Mountain Park contains other important resources and values that are not fundamental to the park’s purpose and significance but have been determined (through the same process that identified the fundamental resources and values) to be important to park management and are significant in their own right. These other important resources and values include:

##### Natural sounds / air quality / night skies

In contrast to the urban environments of the mid-Atlantic population centers, the park offers visitors an important refuge from city sounds and scenes. Visitors often tell park staff, for example, how much they appreciate the forest’s tranquil qualities, the blazing color of autumn leaves, or the sounds of birds singing in the deciduous canopies. Similarly, managing the park’s relatively clean air quality is important for maintaining its unique views. Due to the relatively low development patterns near the Catoctin Mountains, night

skies vantages elicit much darker, clearer views of the cosmos than those experienced in the region’s urban areas.

##### Water quantity and quality

Associated with the park’s stream and associated riparian habitats, Catoctin’s water quantity and quality are important resources, which supports abundant angling opportunities and the overall health of the multiple watersheds.

##### Other historic structures

The park manages numerous historic structures other than the historic cabin camps that contribute to the national register-listed Catoctin Mountain Park Historic District. These include a blacksmith shop, camp office, an oil building, and stone retaining walls at Round Meadow that were built in 1935 by the Works Progress Administration for the Catoctin Recreational Demonstration Area and later modified by the Civilian Conservation Corps after 1939. Other historic structures determined to be contributing to the historic district include the 1950 Ike Smith Pumphouse, a 1939 log structure, and various sections of stone walls built by the Civilian Conservation Corps, as well as 19th century farm-era stone walls. The List of Classified Structures will expand to include the additional historic structures identified in the pending national register nomination update (Horner 2011).

##### Archeology

Archeological resources include 131 prehistoric and historic archeological sites documented at Catoctin Mountain Park. Prehistoric sites include short-term campsites along stream terraces, special-use sites such as rock shelters, and small artifact scatters. The abundance of metarhyolite, a type of stone that was used for making arrowheads and spear points, was a primary resource harvested by ancient peoples who lived near Catoctin Mountain. Historical archeological resources include sites associated with farmsteads established by European settlers in the late 18th and 19th centuries. Industrial-related archeological sites associated with the Catoctin Mountain history of logging and the Catoctin Iron Furnace include numerous collier huts, which were temporary tipi-like dwellings used by colliers who burned the mountain’s timber into charcoal to fuel the Iron Furnace. Archeological survey has identified 50 collier hut sites and associated charcoal hearths at the park. Other archeological sites are associated with late 19th and early 20th century tourism on Catoctin Mountain, the federal activities during the park’s RDA era, and its use by President Roosevelt and the Office of Strategic Services (OSS) during World War II.

##### Museum collections

The park’s museum collection contains artifacts, objects, specimens, documents, photographs, maps, plans, and manuscripts representing the archeology, history, archives, and natural resources of the park. Numerous artifact assemblages collected from archeological surveys are maintained in the collection. The collection also includes taped oral history interview audio recordings. A small portion of the collection is exhibited in the park visitor center, while the majority of the collection is housed at the National Capital Region’s Museum Resource Center.

## REFERENCE CONDITIONS

Reference conditions are intended to represent an acceptable resource condition, with appropriate information and scientific or scholarly consensus. The reference condition might be based on a regulatory or program standard, historical data, data from relatively undisturbed sites, predictive

models, or expert opinion. Reference conditions for Catoctin Mountain Park were generated by park managers in consultation with subject matter experts.

## Fundamental Resources and Values

##### Natural resources

* 1. *Eastern deciduous forest*: The eastern deciduous forest is protected and restored where appropriate. Park staff prevents the introduction and spread of nonnative species and provides for their control to minimize the economic, ecological, and human health impacts that these species cause. Priority is given to managing nonnative species that have or could potentially have a substantial impact on park resources, and that can be reasonably controlled.
  2. *Geologic resources:* The park’s geologic processes are preserved and protected as integral components of the park’s natural systems. These resources are managed to sustain recreational values and provide outstanding opportunities for education and scientific study.
  3. *Wildlife communities:* Species richness is maintained such that habitat and populations of small mammals and species such as raccoon, opossums, striped skunk, and flying squirrels continue to improve. Deer management continues to follow park protocol and best management practices for reducing the deer population to targets documented in the park’s white-tailed deer management plan (NPS 2009).
  4. *Views and vistas:* Natural visibility conditions exist in the park and scenic views of the landscape are protected from visibility degradation for the enjoyment of current and future visitors.
  5. *Fish communities:* Cold water temperatures and adequate water quality and quantity to support the park’s fisheries will be promoted through strategic restoration and conservation techniques. State of Maryland Department of Natural Resources standards will be met or exceeded to the extent possible. Coordination with adjacent land owners and sewage treatment operators will be undertaken to encourage best management practices to reduce erosion, sedimentation, and agricultural runoff within the areas’s watersheds.

##### Cultural Resources

* 1. *Cabin camps (Camp Greentop and Camp Misty Mount):* Structures listed or eligible for listing in the National Register of Historic Places are managed to ensure their long- term preservation and protection of character-defining features. All national register- listed or eligible properties continue to be treated and maintained. Historic structures will be maintained in good condition per the List of Classified Structures (LCS). Please see appendix B for condition definitions for historic structures, as defined by the List of Classified Structures.
  2. *Ethnographic resources:* All ethnographic resources determined to be significant to traditional cultural groups are protected and would be nominated to the National Register of Historic Places, where appropriate. NPS general regulations for access are applied in an informed and balanced manner that is consistent with the park’s purpose.
  3. *Cultural landscapes:* Character-defining features contributing to the national register significance of historic properties as cultural landscapes are appropriately preserved. Cultural landscapes will be maintained in good condition per the Cultural Landscape

Inventory. Please refer to appendix B for condition definitions for cultural landscapes.

## Other Important Resources and Values

##### Natural Resources

* 1. *Natural sounds / air quality / night skies:* Natural sounds are preserved. Visitors have opportunities in most areas of the park to hear natural sounds. The sounds of civilization are generally confined to developed areas (and limited to specific hours of the day). Unreasonable noise from motorized equipment, including motor vehicles, considering such factors as the purposes of the park and the impact on other park users, is discouraged and minimized. Noise-generating activities that could adversely affect park wildlife populations are also prevented or minimized to the greatest extent possible.

Air quality and air quality indicators in the park are maintained at levels that protect the most sensitive resources. Natural visibility conditions exist in the park, and scenic views of the landscape are protected from visibility degradation for the enjoyment of current and future visitors. The quality of visitor experience and visitor health is protected through attainment of the National Ambient Air Quality Standards.

Visitors have opportunities to view the night skies within park boundaries. Artificial light sources do not impair night skies viewing opportunities or adversely affect wildlife populations. Intrusion of artificial light is minimized when practicable.

* 1. *Water quantity and quality:* Park should restore adequate water quantity through partnerships and memorandums of understanding (MOUs) with state and local agencies. Federal, state, and local water quality regulations should be met through frequent monitoring. Utilities should be updated to eliminate water waste, and monitored accordingly.

##### Cultural Resources

* 1. *Naval Support Facility – Thurmont:* The National Park Service’s reference condition for this site is to continue consultation and coordination with the Department of the Navy concerning environmental compliance and the ongoing protection of natural and cultural resources.
  2. *Other historic structures:* Structures listed or eligible for listing in the National Register of Historic Places are managed to ensure their long-term preservation and protection of character-defining features. All national register-listed or eligible properties continue to be treated and maintained. Historic structures will be maintained in good condition per the List of Classified Structures. Please see appendix B for condition definitions for historic structures, as defined by the List of Classified Structures.
  3. *Archeology:* Archeological resources are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. Historic and prehistoric archeological resources are identified and inventoried and their significance is determined and documented. Information on the

condition of archeological resources is kept current. Archeological investigations may also be authorized on a case-by-case basis to support research and cultural resource management objectives. Please see appendix B for condition definitions for archeological resources, as defined in the Archeological Sites Information Management System (ASMIS).

* 1. *Museum Collections:* All museum collections and archives and their component artifacts, objects, specimens, documents, photographs, maps, plans, and manuscripts are properly inventoried, accessioned, catalogued, curated, documented, protected, and preserved. Adequate provision is made for their access by NPS staff and other researchers and for their use in exhibits, interpretation, and research.

## INDICATOR SELECTION AND CONDITION ASSESSMENT FOR REFERENCE CONDITIONS

A methodical process was used to develop a matrix linking each priority resource and its reference conditions to a set of measurable indicators and goals from which comprehensive strategies could be developed for Catoctin Mountain Park. The steps in this process included:

1. Consideration of the beneficial influences and detrimental influences that impact the resource condition. (A summary of influences is provided in appendix B.)
2. Determination of indicators—components of a priority resource that are particularly “information rich” and that “indicate” the overall condition of the resource.
3. Assignment of specific measures to quantify or qualitatively evaluate the condition of an indicator at a particular place and time. There may be one or more specific measures of condition for each indicator.

Specification of a reference condition for each indicator that corresponds to acceptable conditions:

1. Determination of a management target value relative to the reference condition. The management target may be set as a value “better” or “worse” than the reference condition.
2. Measurement of current condition using the indicators.
3. Comparison of management target and current condition to determine if “*Target Met?”*

A synopsis of the results of these steps appears on the following pages in tables 2–17.

Indicators were selected by the natural and cultural resource division staff from current research and indices in consultation with the subject matter experts identified for each reference condition (see appendix B). Once indicators were identified, a reference condition and a management target were defined based on current scientific knowledge and in consultation with the subject matter experts. For details on indicators, reference conditions, and management target selection, see appendix B.

This process also involved assessing the status of each resource against these indicators to determine whether or not the management targets had been met. In some cases, not enough information was available to establish targets for some resources.

## STATUS, TREND, AND CONFIDENCE LEVEL

The status, trend, and confidence level symbols used in the resource condition table are summarized in the following key. The background color represents the current condition status, the direction of the arrow summarizes the trend in condition, and the thickness of the outside line represents the degree of confidence in the assessment. For some specific measures trend analysis is not possible to indicate due to insufficient data; these measures do not include a trend arrow.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Condition Status** | | **Trend in Condition** | | **Confidence in Assessment** | |
|  | Warrants Significant Concern |  | Condition is Improving |  | High |
|  | Warrants Moderate Concern |  | Condition is Unchanging |  | Medium |
|  | Resource is in Good Condition |  | Condition is Deteriorating |  | Low |

## Resource Conditions – FRVs

**TABLE 2. NATURAL RESOURCES: EASTERN DECIDUOUS FOREST**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Deer browsing is monitored  White-tailed deer management plan is being implemented  Plantings in riparian areas in past few years helped regenerate native species (i.e., sycamore, hickory)  Spraying for gypsy moth has controlled outbreaks  Park staff and the exotic plant management team control invasive plants | Deer browsing  Fire regime is suppressed Nonnative plant species Gypsy moth cycles  Other forest diseases and pests  Potential impacts due to climate change, such as a decline in oak and hemlock populations  Hemlock woolly adelgid  Park is now within quarantine area for emerald ash borer | **Forest cover** | Percent cover (satellite imagery and aerial photography) |  | 95% of the area within the park is covered by forest, and 75% of the area within a buffer that is five times the size of the park is forested (Monahan et al. 2012, Thomas et al. 2013).  Current condition is very good both within the park and at the scale of the park plus 5X buffer. Note: forest cover was analyzed at an additional scale for reference but was not included in the current assessment. No trend analysis was possible (Fry et al. 2011; NPS 2010). | 95% forest cover (maintain as rationale indicates)  Note: Reference condition would be determined by satellite imagery and aerial photography and would include all vegetation, including saplings, that resemble forest cover | No lower than 95% forest cover within park boundaries | Yes |
| **Alien understory species** | Percentage of forest monitoring plots with alien species in the understory |  | 69% of plots have alien herbaceous plants (Schmit, Parrish, and Campbell 2012a). | 0% alien | 0% alien | No |
| Percent cover of Japanese stiltgrass *(Microstegium vimineum)* |  | 14% Japanese stiltgrass cover (Schmit, Parrish, and Campbell 2012a). | 0% alien | No |
| Percent cover of Japanese barberry (*Berberis thunbergii*) |  | 2.1% Japanese barberry cover (Schmit, Parrish, and Campbell 2012a). | 0% alien | No |
| **Alien trees and saplings** | Percent cover |  | ≤ 5% of total basal area (Schmit, Parrish, and Campbell 2012a).  Current condition for basal cover of alien trees and saplings is very good. Trend analysis was not possible. | 0% alien trees and saplings | 0% alien; continue to monitor and remove new infestations | Yes |
| **Forest Pest Species** | Number of serious pest species (e.g. gypsy moth *Lymantria dispar*) |  | 29.7% of all trees were infested with an insect pest between 2006 and 2009 (Schmit, Parrish, and Campbell 2012a).  Current condition for forest pests at Catoctin Mountain Park is moderate. Note: a gypsy moth outbreak was brought under control during this time period. | 0% alien forest pest species | Monitor and remove new infestations | No |
| **Native Species** | Number of state-listed rare, threatened and endangered species |  | 28 species that are listed by the State of Maryland as rare, threatened, endangered, or watch-list species are known to occur in the park (Schmit, Parrish, and Campbell 2012b; Maryland DNR 2010).  Note: Park has data for purple-fringed orchid as well (1989–2012). Park has begun to monitor long-bracted orchid. | Maintain known rare species in park (no loss of state listed species) | Maintain known rare species in park (no loss of state listed species) | TBD |
| **Tree Seedling Regeneration** | Seedlings per hectare |  | Native seedling regeneration at Catoctin Mountain Park was 398 per hectare in 2006–2009 (Schmit, Parrish, and Campbell 2012b).  Note: Only one 1 of 49 plots had adequate forest stocking based on the standard adopted by the park for deer management (Schmit, Parrish, and Campbell 2012b).  Note: Catoctin Mountain Park has the lowest rate of tree | 14,000 seedlings per hectare (Nortrup 2012a) | 14,000 seedlings per hectare | No |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
|  |  |  |  |  | seedling generation among 39 national parks in the Northeast and National Capital regions between Virginia and Maine (Nortrup 2012a). |  |  |  |

**TABLE 3. NATURAL RESOURCES: GEOLOGICAL RESOURCES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: low**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Trees hold soil and rock | Loss of hemlock trees | **Rates of erosion** | Number of feet of |  | Big Hunting Creek and Owens Creek were monitored | 0 feet of eroding bank, which also protects | 0 feet of eroding bank | No |
| in place | along creek banks  Dead and downed trees |  | eroding bank along Owens Creek and Big Hunting Creek | in 2010 for erosion extent and severity along a designated 75 meter sample segment (Morgan 2010). | roads and structures against stream encroachments and landslides |  |  |
|  | may alter stream channels |  |  | In Big Hunting Creek, erosion extent was measured as 15m on the left bank and 10m on the right bank.  Severity was minor. In Owens Creek, erosion extent |  |  |  |
|  | Highway maintenance practices |  |  | was measured as 20m on the left bank and 25m on the right. Severity was minor (Morgan 2010). |  |  |  |
| **Sedimentation loading in streams** | Amount of accrued sedimentation in the creeks | TBD | TBD | TBD | TBD | TBD |
|  | Extended trail crossings |
|  | of areas of mid-slope |
|  | instability |
|  | Landslides and rockfalls |
|  | on high angle slopes |

**TABLE 4. NATURAL RESOURCES: WILDLIFE COMMUNITIES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: condition is improving** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| White-tailed deer | Deer browsing | **Bird communities** | Species richness |  | 164 species of birds have been documented at CATO. | ≥ 164 species | ≥ 164 species | Yes |
| management plan is |  |  |  | Number of migratory species = 109. Nonmigratory |  |  |  |
| being implemented | Development adjacent to |  |  | species (seen in park all year) = 55 (NPS 2013d) |  |  |  |
|  | park is a threat to bears; |  |  |  |  |  |  |
|  | also a threat to other |  |  |  |  |  |  |
| Bird community index (BCI) |  | BCI = mean of 52.06, according to the 2011 bird community index for Catoctin Mountain Park. This index indicates medium integrity. BCI scores have remained stable at Catoctin Mountain Park over the past five years (Ladin and Shriver 2013; O’Connell, Jackson, and Brooks 1998). | BCI ≥ 52, which equates to medium integrity | BCI ≥ 52, which equates to medium integrity | Yes |
|  | small wildlife species |  |
|  | Vehicle fatalities |  |
|  | Incidences of lyme |  |
|  | disease |  |
| **White-tailed deer** | Deer density (number per square mile) |  | 87 deer per square mile in 2010 (estimate). Note that the pre-cull density was 123 deer per square mile (NPS, Donaldson, pers. comm. 2012). | Approximately 15–20 deer per square mile (NPS 2009) | Approximately 15–20 deer per square mile (NPS 2009) | No |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Reptiles and amphibians** | Species richness |  | 17 species of amphibians and 13 species of reptiles have been documented at Catoctin Mountain Park (NPS 2013d; Valencia and Donaldson 2011; Pauley, Watson, and Mitchell 2005). | ≥ 30 species | ≥ 30 species | Yes |
| Rattlesnake abundance |  | 219–238 rattlesnakes (total population at park estimate) (Martin 2013). | Maintain rattlesnakes in the area at current population levels | Maintain rattlesnakes in the area at current population levels | Yes |

**TABLE 5. NATURAL RESOURCES: FISH COMMUNITIES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Big Hunting Creek and Owens Creek are two of the most renowned trout streams in the state.  Angling and conservation groups support park efforts to protect the resources.  Maryland Department of Natural Resources catch- and-release and fly- fishing regulations  Maryland Department of the Environment restriction on May– October work in streams | Loss of forest near stream banks (primarily hemlock and oak)  Lack of riparian buffers along streams on agricultural lands  Warmer stream temperatures due to lower flows during warm summer days  Substantial erosion with flood events—trout eggs may get washed away  Agriculture outside the park can affect Owens Creek as it re-enters park (reduction in number of species and warmer temperatures on private lands)  Fish passage barriers  *Didymosphenia geminata* (rock snot) invasive algae discovered in Big Hunting Creek in 2012 | **Fish index of biotic integrity (IBI)** | Index of biotic integrity |  | The median fish index of biotic integrity for four stream sites at Catoctin Mountain Park in 2006 and 2010 was 3.8, which is rated as fair based on the criteria of M.T. Southerland and associates (2007). | IBI ≥ 4 | IBI ≥ 4 | Yes |
| **Brook Trout** | Standing stock:  Total biomass (kg/ha) |  | **Site kg/ha trout/ha YOY/ha Owens**  **(Camp)** Good Poor Fair  **Owens**  **(Lower)** Fair Fair Fair  **BHC**  **(Hwater)** Fair Poor Poor  The 33rd and 66th percentiles were calculated for each of three sites based on data collected 1989–2011.  Three-year averages were calculated for each site based on 2009 and 2011 data, which were then compared to the percentiles. Three-year averages below the 33rd percentile were poor, between the 33rd and 66th percentiles were fair, and above the 66th percentile were good (Maryland DNR 2012a). | ≥ 66th percentile  (sites have a good rating) | ≥ 33rd percentile  (none of the sites would have a poor rating) | Yes |
| Standing stock:  adult trout abundance (trout/ha) | ≥ 66th percentile  (sites have a good rating) | ≥ 33rd percentile  (none of the sites would have a poor rating) | No |
| Standing stock: young of year (YOY) | ≥ 66th percentile  (sites have a good rating) | ≥ 33rd percentile  (none of the sites would have a poor rating) | Yes |
| **Benthic index of Biotic integrity (BIBI)** | Index of biotic integrity |  | Owens Creek: 4.3 (44 taxa were found)  Big Hunting Creek: 4.3 (41 taxa were found) (Nortrup 2012b).  Note: food source for fish populations will show changes sooner than fish providing for earlier management of impacts. | BIBI ≥ 4 | BIBI ≥ 4 | Yes |

**TABLE 6. INTERDISCIPLINARY RESOURCES: VIEWS AND VISTAS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: low**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Current agricultural | Air quality is declining | **Views and** | Increasing population |  | Park viewsheds have been mapped and a viewshed | TBD | TBD | TBD |
| easements are in place with the State of | for ozone and impacting views on hot and humid | **overlooks** | density as determined by dwellings/acre. | analysis needs to be completed. Park is regularly engaged and involved with neighboring landowners, |  |  |  |
| Maryland | days |  |  | developers, and local governments regarding potential |  |  |  |
|  |  |  |  | development. |  |  |  |
| Design elements on state | Minor visitor crowding at |  |  |  |  |  |  |
| roads—there is an effort | some vistas on certain |  |  | Note: the park’s viewshed analysis will inform indicators |  |  |  |
| to change guard-rails | days |  |  | and specific measures when it is completed. |  |  |  |
| from metal to wood (the |  |  |  |  |  |  |  |
| park wants elevated | Existing vegetation |  |  |  |  |  |  |
| design standards for | creates obstructed views |  |  |  |  |  |  |
| scenic byways) | at several popular |  |  |  |  |  |  |
| Trail count data |  | Current condition: TBD  The park needs to understand the number of visitors that visit overlooks. Visible development outside park boundaries may be decreasing overlooks as visitor destinations. | TBD | TBD | TBD |
|  | overlooks |  |
| Scenic byways, such as |  |  |
| park roads through | Alien vegetation |  |
| Catoctin Mountain Park | obstructs views and |  |
| are increasingly | hinders understory |  |
| important within the | growth (e.g., alien |  |
| region | species in historic |  |
|  | districts) |  |
| Park regrowing forest |  |  |
| cover at campsites | Graffiti on rocks |  |
| Land purchase authority | Agricultural areas north |  |
| exists at the park without the need for legislation  Existing trail system provides access to iconic views | and south of park are being developed  County has up-zoned adjacent properties, which would allow increased development |  |
| Width of the viewing angle as determined by repeated photopoint studies |  | Current condition: TBD  This is currently measured according to the degree of clarity of sight lines at selected overlooks, such as Chimney Rock, Hog Rock, Thurmont Vista, and Blue Ridge Summit. | Sight lines are 100% clear of overgrowth and other visual obstructions. | TBD | TBD |
|  | Existing design elements |  |  |  |  |  |  |
|  | on state roads impact |  |  |  |  |  |  |
|  | views (i.e., guardrail |  |  |  |  |  |  |
|  | design) |  |  |  |  |  |  |

**TABLE 7. CULTURAL RESOURCES: HISTORIC STRUCTURES IN CAMP GREENTOP AND CAMP MISTY MOUNT**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: high**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Volunteers assist in vandalism (graffiti) removal  Check-in/check-out procedures for cabins and bill collection for damages helps discourage vandalism and supports clean-up  Most structures are used as historically intended  Section 106 of the National Historic Preservation Act (NHPA) provides an accepted process to ensure cultural resources are protected  Park makes an effort to minimize impact of modern systems to be sympathetic to character-defining features and historic materials  Proper maintenance and upkeep; park has historic carpentry skills in-house  Repairs made with historically appropriate (or sympathetic) materials and techniques  Most park structures are located in areas not likely to be impacted by flooding  Animal infestation management uses established integrated pest management plan  National register eligibility has been established for all structures  All buildings are fire | Deferred maintenance leads to slow rate of rehabilitation overall; current budget capacity limits rehabilitation activities to one cabin per year  Lack of attention to stormwater damage at some cabin camp buildings  Historic masonry skills gap  Vandalism in cabin camps (graffiti and carvings)  Minor structural changes (widened doors and showers, exterior ramps) have occurred to meet law and policy requirements for visitor accessibility  Source for original building materials (e.g., chestnut) is finite  General wear and tear due to visitor use  Several structures are located in areas where flooding could occur (e.g., Blue Blazes Creek near Misty Mount)  Vegetation (e.g., trees, saplings, shrubs) needs to be kept away from structures  No permanently assigned cultural resource professionals on staff at park | **Completeness of documentation** | 1. Completed percentage of LCS database 2. Completed percentage of national register nominations and determinations of eligibility for all potentially eligible structures 3. Completed percentage of historic structures reports for all historic structures |  | 1. LCS database is 100% complete for the historic structures in Camp Greentop and Camp Misty Mount (NPS 2012b). 2. National register nomination for Camp Greentop and Camp Misty Mount is 100% complete (Horner 2011). 3. 0% complete: Historic structures at Camp Greentop and Camp Misty Mount do not have historic structure reports or historic structure assessment reports (based on park and region staff knowledge). | 1. The park’s LCS inventory is 100% complete. 2. National register nominations and determinations of eligibility are 100% complete. 3. 100% of representative historic structures have historic structures reports or historic structure assessment reports. | 1. Same as reference condition. 2. Same as reference condition. 3. A representative sample of historic structures (percentage to be determined) has historic structures reports or historic structure assessment reports. The rationale is that there are numerous buildings that are variations of a type using similar materials and building design/construction, thus one historic structure report may be used for multiple similar buildings. | 1. Yes 2. Yes (the national register nomination is expected to be accepted by the Keeper in early 2013) 3. No |
| **Assessment of Condition** | LCS condition assessment (good, fair, poor) |  | Of the 64 structures listed in the List of Classified Structures, Camp Greentop and Camp Misty Mount, 51 (79%) are assessed to be in good condition, 11 (17%) are in fair condition, and 2 (3%) are in poor condition. Park is repairing/stabilizing cabins at a rate of only approximately one cabin per fiscal year, but the need is greater (NPS 2012b). | 100% of historic structures are in good condition. | 79% (51 structures) currently in good condition continue to be in good condition. Remaining 13 structures currently assessed to be in fair or poor condition are improved at some level. | No |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: high**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| protected and have adequate water damage protection  Accessibility changes to cabin buildings (ramps) are reversible  Facility Management Software System tracks building condition assessments |  |  |  |  |  |  |  |  |



**TABLE 8. CULTURAL RESOURCES: ETHNOGRAPHIC RESOURCES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants significant concern Confidence: high**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Opportunity for | Loss of oral history | **Completeness of** | Completed percentage |  | Documentation is 25% complete based on the number | 100% documentation of ethnographic | This target will be | No |
| community engagement | subjects over time plus their geographic | **documentation** | of documentation of people with traditional | of interviews and social history reports at the park (based on park and region staff knowledge). | resources | quantified after baseline ethnographic inventory is |  |
| Contributes to improved | dispersion makes its hard |  | associations the with |  |  | completed. |  |
| education and | to locate interview |  | New Deal programs | There is no ethnographic overview or systematic |  |  |  |
| interpretation | subjects |  | (Works Progress | understanding of information. Some information exists |  |  |  |
|  |  |  | Administration and | but needs transcription and analysis of the |  |  |  |
| Supports research | Park staff note that |  | Civilian Conservation | respondents’ interviews for potential identification of |  |  |  |
| partnership connections | documentation |  | Corps) at the Catoctin | ethnographic resources. |  |  |  |
|  | opportunities are |  | Recreational |  |  |  |  |
| Understanding of | decreasing because oral |  | Demonstration Area |  |  |  |  |
| ethnographic resources contributes to improved stewardship of natural and cultural resources | history subjects are being lost to aging  Deterioration of recorded archival media/primary source preservation (e.g., audio tapes) |  | Completed percentage of documentation of people with traditional associations with World War II period (OSS activities, Presidential Retreat – Hi-Catoctin) |  | Documentation is 10% complete based on the number of interviews and social history reports at the park (based on park and region staff knowledge).  There is no ethnographic overview or systematic understanding of information. | 100% documentation of ethnographic resources | This target will be quantified after baseline ethnographic inventory is completed. | No |
| Completed percentage |  | Documentation is 25% complete based on the number | 100% documentation of ethnographic | This target will be | No |
|  | General lack of information due to lack of ethnographic overview and assessment per section 110 |  | of documentation of camp users from 1930s to present and their traditional associations at the park | of interviews and social history reports at the park (based on park and region staff knowledge).  There is no ethnographic overview or systematic understanding of information.  Potential groups and camp users that may identify | resources | quantified after baseline ethnographic inventory is completed. |  |
|  |  |  |  | associated ethnographic resources include League for |  |  |  |
|  |  |  |  | People with Disabilities, Frederick County Outdoor |  |  |  |
|  |  |  |  | School, Latter Day Saints, scouting group, and others. |  |  |  |
|  |  |  |  | (Wehrle 2000). |  |  |  |
|  |  |  | Completed percentage |  | Documentation is 20% complete (based on park and | 100% documentation of ethnographic | This target will be | No |
|  |  |  | of documentation of | regional staff’s assessment). | resources | quantified after baseline |  |
|  |  |  | pre-park groups with |  |  | ethnographic inventory is |  |
|  |  |  | traditional associations | There is a study of morel gathering at Catoctin |  | completed. |  |
|  |  |  | (land owners, early | Mountain Park, “Protecting Resources: Assessing Visitor |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants significant concern Confidence: high**  **Trend: condition is deteriorating** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
|  |  |  | tourism, mushroom and |  | Harvesting of Wild Morel Mushrooms in Two National |  |  |  |
| morel gathering as | Capital Region Parks,” by Elizabeth Barron and Marla |
| cultural foodways, and | Emery (2009). |
| other yet-to-be- |  |
| identified groups) | More information regarding the breadth of these |
|  | potential resources is needed to determine future |
|  | activities. |
| Completed percentage |  | Documentation is 5% complete. This information is | 100% documentation of ethnographic | This target will be | No |
| of documentation of | based on availability of personnel records, videos, and | resources | quantified after baseline |  |
| people with traditional | photographs at the park (based on park and region |  | ethnographic inventory is |  |
| associations with the | staff knowledge). |  | completed. |  |
| Job Corps Center |  |  |  |  |
| period at Catoctin |  |  |  |  |
|  |  | **Ethnographic** | Condition of |  | Resource condition of potential ethnographic resources | Condition of documented ethnographic | This target will be | TBD |
| **Resource Condition** | ethnographic resources, based on professional opinion in coordination | is unknown for all resource types because they have not yet been identified. After ethnographic resources are identified, the resource condition will be assessed | resources is assessed to be good | quantified after baseline ethnographic inventory is completed. |  |
|  | with condition | and monitored. No servicewide ethnographic condition |  |  |  |
|  | assessments included in | database exists (the NPS Ethnographic Resources |  |  |  |
|  | other resource | Inventory is currently not supported). |  |  |  |
|  | databases. |  |  |  |  |



**TABLE 9. CULTURAL RESOURCES: CULTURAL LANDSCAPES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: high**  **Trend: condition is improving** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Comprehensive | No permanently | **Completeness of** | Completed percentage |  | Cultural landscape inventory is less than 33% complete | 100% of identified cultural landscapes are | Same as reference | No |
| understanding of Catoctin Mountain Park | dedicated cultural resource professionals to | **documentation** | of cultural landscape inventory database | because two of the six potential cultural landscapes, parent or component, have been documented in the | inventoried in the cultural landscape inventory database. | condition |  |
| landscape and | help manage cultural |  |  | cultural landscape inventory database (based on park |  |  |  |
| component landscapes | landscapes |  |  | and region staff knowledge). |  |  |  |
| Landscape maintenance | Lack of cultural |  |  | The parent cultural landscape inventory for the |  |  |  |
| practices, primarily | landscape information |  |  | Catoctin Mountain Park cultural landscape is complete |  |  |  |
| vegetation, trails, views, | for newly acquired |  |  | (NPS 2008b), and the cultural landscape inventory for |  |  |  |
| and vistas | properties and other |  |  | one component landscape, Camp Misty Mount, is |  |  |  |
|  | identified component |  |  | complete (NPS 2006). The Camp Greentop component |  |  |  |
| History of human | landscapes |  |  | landscape still needs to be documented in a cultural |  |  |  |
| interaction with |  |  |  | landscape inventory. Additionally, three potential |  |  |  |
| landscape connects | Social trails |  |  | component landscapes, Camp Round Meadow, the |  |  |  |
| history and prehistory |  |  |  | Braestrup Tract, and Mission 66 areas (Owens Creek |  |  |  |
|  | Recent development and |  |  | Area and Chestnut Area), might need cultural |  |  |  |
| Cultural landscape | structural intrusions (cell |  |  | landscape inventories if a preevaluation of these areas |  |  |  |
| context information | towers) |  |  | determines that cultural landscape inventory |  |  |  |
| provides resource |  |  |  | documentation is necessary. The Misty Mount cultural |  |  |  |
| education with another | Due to need for more |  |  | landscape inventory may also need to be updated to |  |  |  |
| aspect of historical | regulatory information |  |  | include Mission 66 features (based on park and region |  |  |  |
| interpretation | (signage), additional site |  |  | staff knowledge). |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: high**  **Trend: condition is improving** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
|  | furnishings and small- | **Documented** | Cultural landscape |  | The Catoctin Mountain Park parent cultural landscape | 100% of cultural landscapes are in good | Same as reference | No |
| Fire management plan completed in January 2012 | scale features have been added to cabin camp(s) | **condition assessments** | inventory condition assessment | is in fair condition (NPS 2008b); the Camp Misty Mount component landscape is in good condition (NPS 2006). However, not all component landscape conditions have | condition | condition |  |
|  | Vegetation (trees, vines, |  |  | been documented or assessed for condition. |  |  |  |
|  | shrubs) on the dry-stack stone walls  Trails, circulation to trails at park perimeter  Possible climate change impacts include erosion, | **Views and vistas**  **–**  **completeness of documentation contributing to the cultural landscape** | Cultural landscape inventory condition assessment |  | Cultural landscape inventory documentation of views and vistas is less than 33% complete overall because two out of six identified and potential cultural landscapes, parent or component, have cultural landscape inventories that identify views and vistas (based on park and region staff knowledge). | 100% of views and vistas that contribute to cultural landscapes are documented in cultural landscape inventories | Same as reference condition | No |
|  | flooding, changes in |  |  |  |  |  |  |
|  | character of vegetation, |  |  |  |  |  |  |
|  | such as tree hazards, |  |  |  |  |  |  |
|  | increased freeze-thaw |  |  |  |  |  |  |
|  | cycle impacts to masonry |  |  |  |  |  |  |
|  | Wildlife affects character |  |  |  |  |  |  |
|  | of vegetation (including |  |  |  |  |  |  |
|  | deer) |  |  |  |  |  |  |



## Resource Conditions – OIRVs

**TABLE 10. NATURAL RESOURCES: NATURAL SOUNDS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants significant concern Confidence: low**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Visitors can hear natural | Large groups of | **Baseline natural** | TBD |  | Current condition: TBD | TBD | TBD | TBD |
| sounds most of the year in most parts of the park | motorcycle riders on Maryland State Route 77 and sometimes on Park | **sound measurement** |  | Considered important park element by those interviewed in the visitor survey report (Le and |  |  |  |
| Alcohol bans at both | Central Road |  |  | Littlejohn 2002). Traffic sounds are audible from most |  |  |  |
| Cunningham Falls State |  |  |  | areas within park, especially traffic near Maryland State |  |  |  |
| Park and Catoctin | Sounds associated with |  |  | Route 77. Only a few valley areas are out of range from |  |  |  |
| Mountain Park have | intermittent helicopter |  |  | highway noise. |  |  |  |
| decreased noise and | and other overflights can |  |  |  |  |  |  |
| rowdy behavior | be intrusive |  |  |  |  |  |  |

**TABLE 11. NATURAL RESOURCES: AIR QUALITY**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants significant concern Confidence: medium**  **Trend: condition is improving** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition2** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Catoctin Mountain Park | Hazy in the summer— | **Wet deposition** | Wet sulfur deposition |  | For 2005–2009, estimated sulfur wet deposition was | < 1 kg/ha/y indicating good condition (NPS | Same as reference | No |
| is an active participant in | noxious air blows in from |  | (kg/ha/yr) | 5.4 kilograms per hectare per year (kg/ha/yr), which | ARD benchmarks) | condition |  |
| the Climate Friendly | time to time (i.e., the |  |  | warrants significant concern based on NPS Air |  |  |  |
| Parks program and is | park has observed that |  |  | Resources Division (ARD) benchmarks. The park may be |  |  |  |
| reducing greenhouse gas | nitrogen and sulfur drift |  |  | very highly sensitive to acidification effects (Sullivan et |  |  |  |
| emissions | into park boundaries |  |  | al. 2011a; Sullivan et al. 2011b) relative to all I&M |  |  |  |
|  | from the west) |  |  | parks, including changes in water chemistry that impact |  |  |  |
| Frederick County is an |  |  |  | aquatic vegetation, invertebrate communities, |  |  |  |
| ozone nonattainment | Development in general; |  |  | amphibians, and fish. No trend information is available |  |  |  |
| area; the county has a | more cars and more |  |  | because there is no on-site or nearby wet deposition |  |  |  |
| goal to reduce | travel |  |  | monitor (NPS 2013b). |  |  |  |
| commuting trips |  |  |  |  |  |  |  |
| Most factories are |  |  | Wet nitrogen deposition (kg/ha/yr) |  | For 2005–2009, estimated wet nitrogen deposition was  4.6 kilograms per hectare per year, which warrants significant concern based on NPS ARD benchmarks. No trend information is available because there is no on- site or nearby wet deposition monitor (NPS 2013b). | < 1 kg/ha/y indicating good condition (NPS ARD benchmarks) | Same as reference condition | TBD |
| relatively far from the |  |  |
| park |  |  |
| The park is involved in a |  |  |
| climate initiative—it is |  |  |
| using more hybrid |  |  |
| vehicles and making |  |  |
| facilities more efficient in |  |  |
| general |  |  |
| Park has an inventory of |  |  |
| lichens, a biological |  |  |
| indicator of air quality |  |  |
| (Lawrey 2011) |  |  |
|  |  | **Ozone** | Annual 4th-highest  8-hour concentration |  | The estimated ozone level 2005–2009 at Catoctin Mountain Park was 75.9 parts per billion (ppb). This level usually indicates a condition that warrants moderate concern based on NPS ARD benchmarks. However, at Catoctin Mountain Park the condition is elevated to warrants significant concern because the park falls within a county designated by the U.S. Environmental Protection Agency (EPA) as “nonattainment” (not meeting) for the ground-level ozone standard of an 8-hour average concentration of 75 ppb. A risk assessment concluded that plants in at Catoctin Mountain Park were at high risk for ozone damage (Kohut 2007; Kohut 2004). No trend information is available because there is no on-site or nearby ozone monitor (NPS 2013b). | ≤ 60.0 ppb indicating good condition (NPS ARD benchmarks) | Same as reference condition | TBD |
| **Visibility** | Haze index |  | For 2005–2009, estimated average visibility was 13.0 deciviews (dv) above natural conditions, which warrants significant concern based on NPS ARD benchmarks.  For 2005–2009, visibility at the monitoring site representing Catoctin Mountain Park improved both on the 20% clearest days and 20% haziest days (NPS 2013b). | ≤ 2 dv above natural conditions indicating good condition (NPS ARD benchmarks) | Same as reference condition | TBD |

1. With the exception of the NADP monitoring site within the park (MD07, wet sulfur deposition), none of the air quality indicators and specific measures is measured within the park, so the activities taken by the park are unlikely to influence these measurements, even if the activities improve conditions on the ground (NPS, Schmit, pers. comm. 2012d).

**TABLE 12. NATURAL RESOURCES: NIGHT SKIES**

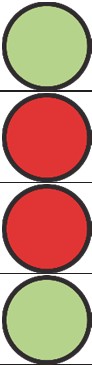
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: low**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Park actively replacing | Lighting from adjacent | **Baseline night** | TBD |  | Current condition: TBD | TBD | TBD | TBD |
| flood lights with down- facing lights | residential areas  Camp Greentop is | **skies measurement** |  | Baseline night skies measurements are needed (i.e., there is a lack of night skies data, however increased |  |  |  |
| Low wattage lighting at | currently on a dusk to |  |  | development activity near the park may reduce night |  |  |  |
| cabin camps | dawn cell that will be |  |  | skies visibility). Dark skies are considered an important |  |  |  |
|  | eliminated when new |  |  | park element by those interviewed in the visitor survey |  |  |  |
| Lighting in park is being | motion- |  |  | report (Le and Littlejohn 2002); Catoctin Mountain Park |  |  |  |
| modified to include | activated and shielded |  |  | is one of the darker areas in the broader urban area. |  |  |  |
| shields and motion | lights are installed. |  |  |  |  |  |  |
| sensors |  |  |  |  |  |  |  |
|  | The park can’t be |  |  |  |  |  |  |
| Overnight stay visitors | appreciated by many |  |  |  |  |  |  |
| can enjoy night skies | visitors at night (night |  |  |  |  |  |  |
|  | closures to general |  |  |  |  |  |  |
|  | public) |  |  |  |  |  |  |
|  | Major light source at |  |  |  |  |  |  |
|  | park’s highest elevation |  |  |  |  |  |  |

**TABLE 13. NATURAL RESOURCES: WATER QUALITY AND QUANTITY – OWENS CREEK**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| General water quality is | Sediment load is | **Water chemistry3** | pH |  | Only 0.6% of pH measurements fall outside the 6.5 to | 6.5–8.5 | Same as reference | Yes |
| excellent | increasing (i.e., |  |  | 8.5 range designated by the State of Maryland as the |  | condition |  |
|  | numerous storms) |  |  | standard for trout streams (COMAR 2010). | Meet or exceed State of Maryland Tier III |  |  |
| Fully forested stream |  |  |  |  | standards for water bodies. |  |  |
| channel in park | Seasonal variability in precipitation |  | Dissolved oxygen |  | Only 1.9% of measurements fall below the 6.0 mg/l level designated by the State of Maryland as adequate | ≥ 6.0 mg/l | Same as reference condition | Yes |
|
|  | Potential loss of trees along streams due to forest pests |  |  | for trout streams (COMAR 2010). | Maintain at least 6.0 mg/l level designated by the State of Maryland as adequate for trout streams. |  |  |
| Water temperature |  | 24.8% of maximum daily summer temperatures are above 23°C which can cause mortality to juvenile trout (Grande and Anderson 1991). | ≤ 20°C (average annual temperature) | ≤ 20°C (summer temperatures) | No |
|  | Headwaters are largely |  |
|  | outside the park |  |
| Specific conductance |  | 20% of the measurements were above 171 μS/cm threshold for impacts on fish in the State of Maryland (Morgan, Kline, and Cushman 2007). | ≤ 171 μS/cm | Same as reference condition | No |
|  | Headwater streams are |  |
|  | sometimes reduced to |  |
|  | trickles |  | Turbidity |  | 18.2% of measurements were above the 2.3 NTU recommended by the Environmental Protection Agency (EPA) (EPA 2000). | < 2.3 NTU | Same as reference condition | No |
|
|  | Sewage treatment plant |  |

1. Additional management targets include compliance with the Clean Water Act and Maryland Department of the Environment water withdrawal permit regulations. As of the date of this RSS publication, the park is not fully meeting these targets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
|  | is located in the park |  | Acid neutralizing |  | All measurements were above the 200 μeq/L minimum | > 200 μeq/L | Same as reference | Yes |
| (operated by other | capacity | as recommended by the Maryland DNR (COMAR 2010; |  | condition |  |
| agencies) and in |  | Southerland et al. 2007). |  |  |  |
| headwaters of Owens |  |  |  |  |  |
| Nitrates |  | All measurements were above the 0.31 mg/L maximum recommended by the EPA (EPA 2000). | < 0.31 mg/L | Park will set precise management target for each stream | No |
| Creek; discharges have |
| exceeded standards on |
| occasion |
| Phosphates |  | 97.3% of measurements were above the maximum  .01mg/L recommended by the EPA (EPA 2000). | < 0.01mg/L | Same as reference condition | No |
| Development outside |
| park boundaries, which |
| increases run-off |
| **Aquatic macroinvertebrates** | Benthic index of biotic integrity (BIBI) |  | Owens Creek has a 4.3 (good) rating as measured by this NCRN biological stream survey (Nortrup 2012b). | ≥ 4 (good rating) | Same as reference condition | Yes |
| impacts—especially in |
| headwaters |
| Adjacent railroad use creates solid waste and run-off impacts and is a barrier to recreational use | **Physical habitat index (PHI)** | Physical habitat index  Note: PHI scores range from 0–100. (81–100)  is minimally degraded and (66–80) is partially |  | The physical habitat index for Owens Creek was 72 in 2010, which is rated as partially degraded using criteria from the Maryland biological stream survey&&& (Paul et al. 2003). | Maintain PHI rating of 66–80 (minimally to partially degraded rating) | Maintain PHI rating of 66– 80 (minimally to partially degraded rating) | Yes |
| Adjacent residences on |  | degraded. |  |  |  |  |
| Maryland State Route 550 may have failing | **Stream flow** | Number of days stream flows drop below 1.5 |  | Current condition – TBD | 0 days stream flows drop below 1.5 ft3/sec. Note: reference condition derived per COMAR | 0 days stream flows drop below 1.5 ft3/sec. | TBD |
| septic systems |  | ft3/sec | Stream flow that brook trout can withstand depends | 2010. |  |  |
|  |  | Note: this is the State of Maryland standard for Big Hunting Creek, | on other related factors such as temperature, sedimentation, and physical habitat (Maryland DNR 2012b). |  |  |  |
|  |  | which the park can use |  |  |  |  |
|  |  | as a measure for Owens |  |  |  |  |
|  |  | Creek as well. |  |  |  |  |
|  |  | Note: I&M installed |  |  |  |  |
|  |  | continuous depth |  |  |  |  |
|  |  | loggers on Owens |  |  |  |  |
|  |  | Creek and Big Hunting |  |  |  |  |
|  |  | Creek in 2013. Once |  |  |  |  |
|  |  | sufficient data are |  |  |  |  |
|  |  | collected and correlated |  |  |  |  |
|  |  | with desired fish |  |  |  |  |
|  |  | presence, a revised |  |  |  |  |
|  |  | specific measure can be |  |  |  |  |
|  |  | developed. |  |  |  |  |



**TABLE 14. NATURAL RESOURCES: WATER QUALITY AND QUANTITY – BIG HUNTING CREEK**



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| General water quality | Sediment loading is | **Water chemistry** | pH |  | Only 0.4% of pH measurements fall outside the 6.5 to | 6.5–8.5 | Same as reference | Yes |
| is excellent | increasing (i.e., numerous |  |  | 8.5 range designated by the State of Maryland as the |  | condition |  |
|  | severe storms) |  |  | standard for trout streams (COMAR (26.08.02.08P(4)(e) | Meet or exceed State of Maryland Tier III |  |  |
| Macroinvertebrate |  |  |  | 2010). | standards for water bodies. |  |  |
| stream studies have | Seasonal variability in |  | Dissolved Oxygen |  | Only 0.9% of measurements fall below the 6.0 mg/l level designated by the State of Maryland as adequate for trout streams (COMAR 26.08.02.03-3 E(2)(a) (2) 2010). | ≥ 6.0 mg/l  Maintain at least 6.0 mg/l level designated by Maryland as adequate for trout streams. | Same as reference condition | Yes |
| been recently | precipitation |  |
| completed by the |  |  |
| state and they show | Development outside park |  |
| healthy populations | boundaries, which |  |
| Water Temperature |  | 11% of maximum daily summer temperatures are above 23°C which can cause mortality for juvenile trout (Grande and Anderson 1991). | ≤ 20°C (average annual temperature) | ≤ 20°C (summer temperatures) | No |
|  | increases run-off impacts; |  |
|  | especially in headwaters |  |
|  | (i.e., commuter parking |  |
| Specific conductance |  | 7.2% of the measurements were above 171 μS/cm threshold for impacts on fish in Maryland (Morgan, Kline, and Cushman 2007). | ≤ 171 μS/cm | Same as reference condition | No |
|  | lot in headwaters) |  |
|  | Land with commercial |  |
|  | zoning available for |  | Turbidity |  | 7.2% of measurements were above the 2.3 NTU recommended by the EPA (EPA 2000). | < 2.3 NTU | Same as reference condition | No |
|  | development in |  |
|  | headwaters area |  |
|  | Release volume of water |  | Acid neutralizing capacity |  | All measurements were above the 200 μeq/L minimum as recommended by the Maryland DNR (COMAR 2010; Southerland et al. 2007). | > 200 μeq/L | Same as reference condition | Yes |
|  | from Hunting Creek Lake |  |
|  | fluctuates due to lack of |  |
| Nitrates |  | 94.6% of measurements were above the 0.31 mg/L maximum recommended by the EPA (EPA 2000). | < 0.31 mg/L | Park will set precise management target for each stream | No |
|  | volume monitoring by |  |
|  | Cunningham Falls State |  |
|  | Park or Catoctin |  |
|  | Mountain Park |  | Phosphates |  | 91.5% of measurements were above the maximum 0.01mg/L recommended by the EPA (EPA 2000). | < 0.01mg/L | Same as reference condition | No |
|  |  | **Aquatic macroinvertebrates** | Benthic index |  | Big Hunting Creek has a 4.3 (good) rating as measured by this index (Nortrup 2012b). | ≥ 4 (good rating) | Same as reference condition | Yes |
|  |  | **Physical habitat** | Physical habitat index |  | PHI = 65 (score documented in 2010). This is a | Raise to PHI rating of 66–80 (minimally to | Raise to PHI rating of 66– | No |
|  |  | **index (PHI)** | Note: PHI scores range | degraded rating using the criteria from the Maryland Biological Stream Survey (Paul et al. 2003). | partially degraded rating). | 80 (minimally to partially degraded rating) |  |
|  |  |  | from 0–100; (81–100) |  |  |  |  |
|  |  |  | is minimally degraded | Note: in 2006, a site further upstream but within park |  |  |  |
|  |  |  | and (66–80) is partially | boundaries scored 67 (partially) degraded). It may be |  |  |  |
|  |  |  | degraded | difficult to raise the PHI for Big Hunting Creek because |  |  |  |
|  |  |  |  | it scores poorly in the category of remoteness and |  |  |  |
|  |  |  |  | because the stream is located adjacent to Maryland |  |  |  |
|  |  |  |  | State Route 77 within much of the park. |  |  |  |
|  |  | **Stream Flow** | Number of days stream |  | Current condition – TBD | 0 days that stream flows drop below 1.5 | Same as reference | TBD |
|  |  |  | flows drop below 1.5 ft3/sec | Stream flow that brook trout can withstand depends | ft3/sec. | condition |  |
|  |  |  | Note: this is the State of Maryland standard for Big Hunting Creek | on other related factors such as temperature, sedimentation, and physical habitat (Maryland DNR 2012b). | Note: reference condition derived per COMAR 2010. |  |  |
|  |  |  | Note: I&M installed |  |  |  |  |
|  |  |  | continuous depth |  |  |  |  |
|  |  |  | loggers on Owens |  |  |  |  |
|  |  |  | Creek and Big Hunting |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: medium**  **Trend: unknown** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
|  |  |  | Creek in 2013. Once sufficient data are collected and correlated with desired fish presence, a revised specific measure can be developed. |  |  |  |  |  |



**TABLE 15. CULTURAL RESOURCES: OTHER HISTORIC STRUCTURES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: resource is in good condition Confidence: high**  **Trend: condition is unchanging** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Volunteers assist in vandalism (graffiti) removal  Most structures are used as historically intended  NHPA Section 106 provides an accepted review process to insure historic structures are protected  Park makes an effort to minimize impact of modern systems to be sympathetic to character-defining features and historic materials  Proper maintenance and upkeep; the park has historic carpentry skills in-house  Repairs are made with historically appropriate materials and techniques  Animal infestation management using established integrated pest management plan  All buildings are fire protected and have adequate water damage | Deferred maintenance leads to slow rate of rehabilitation  Current budget capacity limits rehabilitation activities to one cabin per year  Buildings unoccupied due to mold and other public health issues  Vegetation is too close to buildings and threatens structural damage, in addition to mold on roofs and inside structures  Delays occur due to executing section 106 processes  No dedicated cultural resource professional staff  Lack of attention to effects of storm water to structures (e.g., Quarter 1, possibly visitor center bridge)  Historic masonry skills gap  Minor structural changes | **Completeness of Documentation** | 1. Completeness of List of Classified Structures (LCS) database 2. Completeness of national register nominations and determinations of eligibility for all potentially eligible structures 3. Completeness of historic structures reports for all historic structures |  | 1. LCS database is 100% complete (NPS 2012b). Note: the List of Classified Structures may need to be updated if buildings and structures at Braestrup Tract and Mission 66 areas (Owens Creek Area and Chestnut Area) are found to be national register-eligible (Horner 2011). 2. The national register nomination for other historic structures is 100% complete, per nomination update (Horner 2011). 3. 0% complete: none of the other historic structures have historic structure reports (based on park and region staff knowledge) | 1. The park’s LCS inventory is 100% complete 2. National register nominations for all other historic structures are 100% complete. 3. 100% of representative historic structures have historic structures reports or historic structure assessment reports | 1. Same as reference condition 2. Same as reference condition 3. Same as reference condition | 1. Yes 2. Yes (the national register nomination is expected to be accepted by the Keeper in early 2013) 3. No |
| **Assessment of condition** | List of Classified Structures  condition assessment (good, fair, poor) |  | Of the 3 other historic structures listed in the List of Classified Structures, 2 (66%) are in good condition and 1 (33%) is in fair condition (NPS 2012b).  However, at least six other historic structures need to be included in the List of Classified Structures and assessed for condition. This includes structures at Braestrup Tract and Mission 66 areas (Owens Creek Area and Chestnut Area) that were found national register-eligible but are not yet entered into the List of Classified Structures (Horner 2011). | 100% of structures are in GOOD condition per the List of Classified Structures. | To be determined following a condition assessment of historic structures that will be added to the List of Classified Structures. | No |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: resource is in good condition Confidence: high**  **Trend: condition is unchanging** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| protection | (widened doors and |  |  |  |  |  |  |  |
|  | showers, exterior ramps) |
| All Americans with | have occurred to meet |
| Disabilities Act changes | law and policy |
| (ramps) are reversible | requirements for visitor |
|  | accessibility |
|  | Source for original |
|  | materials is finite |
|  | (chestnut) |
|  | Visitor use wear and tear |
|  | Several structures are |
|  | located in areas where |
|  | flooding could occur |
|  | (e.g., Ike Smith |
|  | Pumphouse, bridge near |
|  | visitor center, overflow |
|  | parking lot) |
|  | Unoccupied buildings |
|  | (Mission 66 residences) |
|  | Vegetation (trees, |
|  | saplings, shrubs) need to |
|  | be kept away from |
|  | structures |
|  | Lack of structural fire |
|  | management plan |
|  | National register |
|  | eligibility not established |
|  | for some structures (i.e., |
|  | Mission 66 or Braestrup |
|  | Property structures) |



**TABLE 16. CULTURAL RESOURCES: ARCHEOLOGICAL RESOURCES**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: resource is in good condition Confidence: high**  **Trend: condition is unchanging** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Minimal ground- | Lack of Archeological | **Completeness** | Percentage of |  | 100% of the known archeological sites (currently 131 | 100% of known archeological sites are listed in | Same as reference | Yes |
| disturbing activities | Resources Protection Act training for park staff | **of inventory** | archeological sites entered in ASMIS | sites) are listed in ASMIS database (LBG 2011; Colby 1992; NPS 2011). | ASMIS database | condition |  |
| Minimal erosion and |  |  | database |  |  |  |  |
| human disturbance  Minimal public awareness of archeological resources and remote location of some archeological sites protects them  Archeological inventory completed in 2011 per ASMIS standards | Not all areas with high probability for archeological resources have been identified  Disturbance from potential alien vegetation removal and associated erosion  Lack of coordination | **Completeness of documentation** | Percentage of parkwide archeological survey coverage for areas with high potential for archeological sites |  | 100% survey coverage has been completed for park areas with high probability for archeological sites (this translates to 43% of the park). More survey and inventory is needed on a selective basis for future projects or other ground-disturbing activities (LBG 2011; Colby 1992; NPS 2011). | 100% of the areas identified as having high probability for archeological resources are surveyed | Same as reference condition | Yes |
| **Site condition** | Percentage of sites in good condition, as noted in ASMIS database |  | 100% of the archeological resources listed in the ASMIS database are in good condition (NPS 2011) | 100% of archeological sites recorded in ASMIS database remain in good condition | Same as reference condition | Yes |
|  | with trail maintenance |  |  |  |  |  |  |
| NHPA section 106 | activities to ensure |  |  |  |  |  |  |
| provides an accepted | resource protection |  |  |  |  |  |  |
| review process to ensure |  |  |  |  |  |  |  |
| archeological resources | Climate change could |  |  |  |  |  |  |
| are protected | lead to changes in |  |  |  |  |  |  |
|  | intensity and frequency |  |  |  |  |  |  |
|  | of storms, which could |  |  |  |  |  |  |
|  | increase the potential for |  |  |  |  |  |  |
|  | artifact exposure or |  |  |  |  |  |  |
|  | disturbance |  |  |  |  |  |  |

**TABLE 17. CULTURAL RESOURCES: MUSEUM COLLECTIONS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Status: warrants moderate concern Confidence: high**  **Trend: condition is unchanging** | | | | | | | | |
| **Beneficial Influences** | **Detrimental Influences** | **Indicators of Condition** | **Specific Measures** | **Condition Status/Trend** | **Current Condition / Rationale** | **Reference Condition / Rationale** | **Management Target / Rationale** | **Target Met?** |
| Environmental monitoring (humidity and temperature) included in park storage facility  Collections locked in secure location, under alarm  2007 scope of collections statement  Timely curation of archeology for recent projects (archeology- beetles)  Research partnership connections  Access to support from Museum Resource Center, Center for Urban Ecology  Collateral duty staff has received basic training  Park has all representative collections (archeology, history, natural resources) | Substandard climate control, lack of humidity control, dysfunctional environmental control of existing system  Insect infestation  Lack of adequate park facility and dedicated staff prevents expansion of collection (i.e., OSS collection)  Lack of fire suppression system  Not all collections are adequately curated or completely catalogued (primarily the archives) | **Museum facility condition** | Percentage of the annual Interior Collection Management System (ICMS) facility checklist standards met |  | 82% of the ICMS checklist standards are currently being met (NPS 2013e).  Facility conditions are inadequate because the room containing the collection is not climate controlled (based on park and region staff knowledge). | 100% of checklist standards are met. | 100% of the ICMS checklist standards are met. | No |
| **Completeness of inventory** | 1. Percentage of objects catalogued 2. Percentage of automated checklist for all annual reporting requirements met |  | 1. 100% of objects are catalogued, except for archeological artifacts recently obtained by the park. Backlog is minimal, consisting of archival objects (photographs, drawings, transcripts, interview transcripts). Accessioning process is static, stable. Large amount of new items expected to expand the collection in the future (NPS 2013e). 2. 100% of annual reporting requirements have been met (NPS 2013e). | 1. 100% of objects are catalogued per Interior Collection Management System and the museum handbook. 2. 100% of annual reporting requirements are met | 1. Same as reference condition 2. Same as reference condition | Yes |
| **Collection condition** | Percentage of archeological artifacts that meet the condition standards in the Interior Collections Management System |  | 99% of the archeological artifacts (stored at the Museum Resource Center) are in good condition, less than 1% are in fair condition, less than 1% are in poor condition (NPS 2013e). | 100% of the archeological artifacts meet the standard for good condition | 99% of the archeological artifacts (stored at Museum Resource Center) are in good condition, less than 1% are in fair condition, less than 1% are in poor condition. | Yes |
| Percentage of natural resource specimens that meet the condition standards in the Interior Collections Management System |  | 1. 100% of the natural resource specimens stored at the park museum at the visitor center are in poor condition because they are affected by the building’s uncontrolled environment (NPS 2013e). 2. 93% of the natural resource specimens stored at museum resource center are in good condition, 7% are in fair condition, and less than 1% are in poor condition (NPS 2013e). | 1. 100% of the natural resource specimens in the park museum meet the standard for good condition 2. 100% of the natural resource specimens in the Museum Resource Center meet the standard for good condition | 1. 100% of the natural resource specimens stored at the park museum at the visitor center are in poor condition because they are affected by the building’s uncontrolled environment. 2. 93% of the natural resource specimens stored at Museum Resource Center are in good condition, 7% are in fair condition, and less than 1% are in poor condition. | No |
|  |  |  | Percentage of historical resources that meet the condition standards in the Interior Collections Management System |  | 70% of historical resources in the collections meet the standard for good condition, 29% are in fair condition, and less than 1 % are in poor condition (NPS 2013e). | 100% of the museum items meet the standard for good condition | 70% of historical resources in the collections meet the standard for good condition, 29% are in fair condition, and less than 1  % are in poor condition. | No |
|  |  |  | Percentage of archival resources that meet the condition standards in the Interior Collections Management System |  | The condition of archival resources that is not known because the majority of the archival resources has not been accessioned or evaluated (based on park and region staff knowledge). | 100% of the archival resources meet the standard for good condition | TBD | No |

# CONTEXT OF THE PARK’S RESOURCES

Catoctin Mountain Park comprises 5,748 acres and is located west of the Town of Thurmont in Frederick County, Maryland. The park’s second growth forest, mountain ridges, and cascading streams provide the current setting for Catoctin’s cabin camps, facilities, and diverse outdoor recreation resources. Maryland State Route 77 bisects Catoctin Mountain Park and Cunningham Falls State Park, its 3,452-acre neighbor to the south, while Maryland State Route 550 runs adjacent to a portion of Catoctin’s eastern boundary. Lands adjacent to the park’s western and northern boundaries are primarily agricultural, although residential, commercial, and industrial uses continue to proliferate in these areas.

## NATURAL RESOURCES

**Climate**

The park’s climate is characterized by the temperate, humid conditions that are typical of the mid- Atlantic states, with moderate amounts of precipitation. The prevailing wind is from the west, but the area is also influenced by large cool air masses from the north, and warm air masses from the south. Local precipitation is approximately 44 inches per year with a mostly even monthly distribution. Snowfall fluctuates from year to year, but averages 35 inches per year. Summer high temperatures average 80°F to 85°F. Winter low temperatures average 20°F to 25°F. Spring and fall seasons are more unpredictable, with milder temperatures and frequent gusts of wind (NPS 2012e).

## Physiography and Geology

Catoctin Mountain Park is located at the transition of the Piedmont and Blue Ridge geologic provinces. The Monocacy River Valley lies east of the park, while the Catoctin Mountains themselves represent Maryland’s “Front Range” at the far eastern edge of the Blue Ridge province. Catoctin Mountain extends 50 miles from Emmitsburg, Maryland, to Leesburg, Virginia.

The park is underlain by Precambrian metamorphic rocks. The western part of the park is underlain by the Catoctin Formation. The two main types of rocks comprising the Catoctin Formation are a greenish-gray metabasalt and a bluish-grayish metarhyolite. The eastern part of the park is underlain by the Loudoun Formation, which is composed of phyllite and conglomerate units (NPS 2007).

Landforms and topography in Catoctin Mountain Park are largely a function of the type of bedrock. The rock near the contacts between geologic units tends to be more fractured, and thus more easily eroded, than rock from the interior parts of the formations. Linear valleys that parallel the northeast-trending bedding and foliation planes of the bedrock have formed along the contacts between the Catoctin and Loudoun formations and between the metabasalt and metarhyolite comprising the Catoctin Formation (NPS 2007).

## Hydrology

Big Hunting Creek and Owens Creek represent the park’s two primary streams. Both creeks are sub-watersheds of the 126,107-acre Upper Monocacy watershed.

Owens Creek is a fairly high gradient stream with a boulder and cobble substrate throughout. Occasional large pools separate extensive fast runs and pocket water. Undercut banks and woody debris provide additional habitat. Summer and fall flows can be very low. Big Hunting Creek is characterized as a small, freestone stream. It is just 10 feet wide in the headwaters above Cunningham Falls and approximately 17 to 20 feet wide at the lower park boundary. Both creeks include shallow riffles, small plunge pools, long runs, and ample pocket water strewn with large boulders (Maryland DNR 2012b).

Groundwater in the park occurs in the regolith zone overlying unweathered bedrock and within fracture zones in the bedrock. It is estimated this zone extends to a depth of about 200 feet at Camp Round Meadow (NPS 2007).

## Flora

Catoctin Mountain Park is characterized by an eastern deciduous forest that hosts more than 750 species of vascular plants, including 60 species of trees. Although no federally listed rare or endangered plants occur within the park, there are numerous State of Maryland-listed threatened and endangered species (NPS 2012f). The resource stewardship strategy will focus on species given a ranking of S1 or S2 (State Highly Rare or State Rare), or on species with special conservation status.

Approximately 95% of Catoctin Mountain Park is forested, representative of the New Deal era regeneration efforts. This “maturing” forest includes common species such as chestnut oak (*Quercus prinus*), northern red oak (*Quercus rubra*), red maple (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), and sugar maple (*Acer saccharum*), with a hemlock/birch (*Tsuga canadensis/Betula spp*.) mix along stream drainages. A few scattered stands of pine (*Pinus spp.*) also exist, some of which are remnant plantations (Schmit, Parrish, and Campbell 2012b; NPS 2009).

Approximately 10 state-listed rare or threatened plant species potentially occur in or near the vicinity of the park, including large purple-fringed orchid (*Platanthera grandiflora*), leatherwood (*Dirca palustris*), Torrey’s mountain-mint (*Pycnanthemum torrei*), long-bracted orchid (*Dactylorhiza viridis*), largeleaved white violet (*Viola blanda*), and Herb-robert (*Geranium robertianum*). Based on professional judgement, an additional 13 plant species are of park concern, including nodding trillium (*Trillium cernuum*) and American ginseng (*Panax quinquefolius*)(NPS 2009).

## Fauna

The park’s diverse mix of vegetation, land use, and habitat types provides conditions conducive to hosting a wide range of fauna. Its proximity to rural areas of Frederick County makes it an even more attractive sanctuary for native fauna. The park is home to a number of resident vertebrates, including deer, bears, amphibians, brook trout, and birds. Catoctin is an important environment for bird species, and the NPSpecies certified bird list indicates 147 species have been documented at

the park. In addition, there are more than 12 species of mammals, 30 reptiles and amphibians, and approximately 16 fish species documented at the park (NPS 2009).

Mammals found in the park, in addition to white-tailed deer (*Odocoileus virginianus*), are fairly typical for this region and include striped skunks (*Mephitis mephitis*), woodchucks (*Marmota monax*), squirrels, chipmunks (*Tamias sciurus*), several species of mice, eastern cottontail rabbits (*Sylvilagus floridanus*), opossums (*Didelphis virginiana*), raccoons (*Procyon lotor*), red foxes (*Vulpes vulpes*), and gray foxes (*Urocyon cinereoargenteus*). Sightings of coyotes (*Canis latrans*), bobcats (*Lynx rufus*), beavers (*Castor canadensis*), mink (*Mustela vison*), and black bears (*Ursus americanus*) indicate that populations of these mammals are returning to the area (NPS 2009).

No federally listed species have been documented in the park, based on correspondence with the

U.S. Fish and Wildlife Service (NPS 2009). The Maryland DNR Wildlife and Heritage Service identifies the common raven (*Corvus corax*) as the single state-listed animal species at the park.

## CULTURAL RESOURCES

Catoctin Mountain Park has a wide range of prehistoric and historic cultural resources that reflect 3,500 years of human settlement and activity on the mountain. Cultural resources that convey this long history include historic structures, archeological resources, cultural landscapes, museum collections, and ethnographic resources.

## Historic Structures

The park’s List of Classified Structures, updated in 2010, identifies 67 historic structures. Of these, 64 structures belong to two WPA-era cabin camps: Camp Greentop and Camp Misty Mount.

Additionally, the 2012 National Register of Historic Places nomination for the Catoctin Mountain Park Historic District identified 64 buildings, 34 sites, 6 structures, and 6 objects that are all contributing to the district. The List of Classified Structures will expand to include these additional structures following the listing of the Catoctin Mountain Park as a historic district in the National Register of Historic Places (the national register nomination is expected to be accepted by the Keeper in early 2013).

**Cabin Camps.** Catoctin Mountain Park has two rustic revival-style cabin camps, Camp Greentop and Camp Misty Mount, both of which were listed in the National Register of Historic Places as historic districts in 1989. Both camps are significant as illustrative of the mission of the RDA program to use WPA and CCC labor to conserve natural resources, preserve historic sites, and create recreational areas for the enjoyment of the public, and as typical examples of NPS designs for rustic architecture, adhering to the guidelines for camp building and arrangement found throughout the national park system. Both Camp Greentop and Camp Misty Mount have a high degree of integrity, and have been in continuous use as cabin camps or housing since their completion in the late 1930s (Horner 2011).

Completed in 1937, Camp Misty Mount is a 72-acre area. The camp’s 37 structures are organized into three main units, each with six cabins housing two or four campers, plus the leader’s cabin, lodge, and latrine, plus a group dining hall and other supporting facilities. The Works Progress Administration constructed the camp buildings using locally harvested timber. The frame structures are typically built using oak while hewn chestnut logs were used for the log cabins.

Completed in 1938, Camp Greentop encompasses 40 acres and 27 structures divided into four units, each including cabins, latrines, an office, and a large lodge building. Similar to Camp Misty Mount, the buildings were built in the rustic revival style using timber found at the park. Planning for Camp Greentop was influenced by the Maryland League for Crippled Children, which petitioned the recreational demonstration area for a cabin campsite that would meet the organization’s needs for accessibility. To accommodate this, the recreational demonstration area designed larger cabins to house eight campers and two counselors and the distance between cabins was reduced.

**Other Historic Structures.** Outside of Camp Greentop and Camp Misty Mount, the park has numerous other historic structures, including buildings, objects, sites, and structures, that contribute to the national register-listed Catoctin Mountain Park Historic District. These include a blacksmith shop, camp office, an oil building, and stone retaining walls at Round Meadow that were built in 1935 by the Works Progress Administration for the Catoctin Recreational Demonstration Area and later modified by the Civilian Conservation Corps after 1939. Other historic structures determined to be contributing to the historic district include the 1950 Ike Smith Pumphouse, a 1939 log structure, and various sections of stone walls and boundary markers built by the Civilian Conservation Corps, as well as 19th century farm-era stone walls.

## Cultural Landscapes

The cultural landscapes of the park encompass the region’s prehistoric period of human history through the present. The park has three identified cultural landscape inventory units. The overarching parent landscape consists of the entire acreage of Catoctin Mountain Park. Camp Greentop and Camp Misty Mount have been identified as component landscapes.

The Catoctin Mountain Park cultural landscape encompasses the entire 5,748 acres of the park. Two periods of significance have been determined for this cultural landscape. The first period (1770–1903) is significant for the early iron industry when the forests of Catoctin Mountain were harvested for timber for the production of charcoal. Iron furnaces were introduced to the region in the 1760s. The Catoctin Iron Furnace (1775) significantly impacted the area that would become the park. Remnants of charcoal hearths that provided fuel for the iron furnaces dot the landscape as physical reminders of the Catoctin Mountain industrial heritage. Stone walls and historic building foundations remain as vestiges of the area’s agricultural history.

The second period of significance (1934–1942) encompasses the mountain’s history as a recreational demonstration area and describes the reforestation activities and the WPA-built camps established during this time, including Camp Hi-Catoctin, used by President Franklin D. Roosevelt during World War II. The component cultural landscapes of Camp Misty Mount and Camp Greentop consist of the camps’ buildings, spatial organization patterns, and circulation, including footpaths, and small-scale features such as campfire circles. Both component landscapes are significant for their recreational planning under the recreational demonstration area as landscapes for social programs promoting human conservation during the Great Depression and for campsite design and organization that embodies the development of the rustic revival design in architecture and landscapes.

## Archeological Resources

To date, there are 131 known prehistoric and historic archeological resources at Catoctin Mountain Park (LBG 2011). Prehistoric sites include short-term camp sites located along the park’s stream terraces, special-use sites, such as rock shelters, and small artifact scatters. The park’s abundance of metarhyolite, a type of stone that was used for making arrowheads and spearpoints, was a primary resource harvested by ancient peoples who lived near Catoctin Mountain. Historical archeological resources include sites associated with farmsteads established by European settlers in the late 18th and the 19th centuries. Industrial-related archeological sites associated with Catoctin Mountain’s history of logging and the Catoctin Iron Furnace include numerous collier huts, which were temporary tipi-like dwellings used by colliers who burned the mountain’s timber into charcoal for fuel for the iron furnace. Archeological survey has identified 50 collier hut sites along with charcoal hearths at the park. Other archeological sites are associated with late-19th and early 20th century tourism on Catoctin Mountain and the federal activities during the park’s RDA era and its use by President Roosevelt and the Office of Strategic Services during World War II.

## Ethnographic Resources

The park does not have an ethnographic overview, and as a result, the extent of ethnographic resources at Catoctin Mountain Park is not fully understood. However, park staff believes that the park probably contains resources associated with groups historically associated with the land before the Catoctin Recreational Demonstration Area was established in 1935. Such groups might include the descendants of the farming communities that once operated at the mountain toe and valleys, former members of the Works Progress Administration and Civilian Conservation Corps who were active at Catoctin during the 1930s, and members of the Office of Strategic Services that trained at Catoctin during World War II. Historians have also identified traditional mushroom gathering activities that have taken place for several generations within the park.

## Museum Collections

The park’s museum collection contains artifacts, objects, specimens, documents, photographs, maps, plans, and manuscripts representing the park’s archeology, history, and natural resources. Numerous artifact assemblages collected from archeological surveys are maintained in the collection. The collection also includes oral history interview audio recordings, housed on tape. A small portion of the collection is exhibited in the park visitor center, while the majority of the collection is housed at the National Capital Region’s Museum Resource Center in Landover, Maryland.

# STATUS OF RESOURCE KNOWLEDGE

Appropriate knowledge of Catoctin Mountain Park’s natural and cultural resources is essential for the National Park Service to effectively meet its resource stewardship responsibilities. This knowledge is provided through basic resource inventories, long-term monitoring of resource conditions, investigations and research, and integration or synthesis of scientific and scholarly resource information.

To meet new NPS resource stewardship responsibilities, information about park resources must be of sufficient quality and completeness to be used as the basis of decisions. Addressing shortfalls in resource knowledge is integrated into comprehensive strategies in this resource stewardship strategy. Specific, focused investigations may be required to provide the level of resource knowledge necessary to manage complex issues. When the need is identified, such investigations are integrated into the comprehensive strategies in the resource stewardship strategy.

This section of the resource stewardship strategy provides a summary of existing natural and cultural resource knowledge and gaps.

## NATURAL RESOURCES

**Eastern Deciduous Forest**

Satellite imagery was used to determine the percentage of forest cover at the park (Fry et al. 2011; NPS 2010) Forest cover is 95% within park boundaries. Forest cover trends are unknown.

Alien understory species are being monitored (Schmit, Parrish, and Campbell 2012a). Findings indicate 65% of forest plots have alien herbaceous plants. In addition, percent cover of two alien understory species in particular have been included as specific measures for this resource stewardship strategy: Japanese stiltgrass (*Microstegium vimineum*) and Japanese barberry (*Berberis thunbergii*).

Current forest pest species were studied and monitored between 2006 and 2009 (Schmit , Parrish, and Campbell 2012a). Studies indicated that 29.7% of all tree species were infested with an insect pest during that time frame.

Catoctin Mountain Park has the lowest rate of tree seedling regeneration among 39 national parks in the Northeast and National Capital regions between Virginia and Maine. Seedling regeneration at Catoctin Mountain Park was 398 per hectare in 2006–2009 (note that this figure does not include native seedlings) (Schmit, Parrish, and Campbell 2012b). Only 1 of 49 plots has adequate forest stocking based on the standard adopted by the park for deer management (Schmit, Parrish, and Campbell 2012b). However, a study conducted by Catoctin Mountain Park for purple-fringed orchid (1989–2012) indicates the presence of this state-listed species and provides an example species to monitor as a contributing measure of species richness.

The low rate of tree seedling regeneration is the result of excessive deer browsing, which causes adverse changes to the forest structure, composition, and wildlife habitat. The white-tailed deer management plan (NPS 2009) analyzed different combinations of nonlethal and lethal management

tools to reduce the deer population and address declining forest regeneration to ensure natural processes support the park’s native communities.

## Geological Resources

NPS I&M compiled both general and park-specific geological reports for this resource stewardship strategy that provide descriptions to aid potential strategies. *Geological Monitoring* (Young and Norby 2009) discusses active slope processes such as rockfall and solifluction (the slow downhill movement of rock and soil that formed the park’s stone stream beds), frost wedging, and other potential slope failure triggers. The evaluation can be further used to address the park’s erosional and fluvial issues, as well as hazard mitigation strategies.

Dr. Deborah Slawson (2010) discussed the relationship of sedimentation effects on water and stream quality (e.g., streambank erosion and sedimentation in streams). Slawson’s protocol can be used to monitor sedimentation at the park.

Trista Thornberry-Ehrlich (2009) prepared the *CatoctinMountain Park Geologic Resources Inventory Report*, which addresses issues such as channel morphology, changes in hydrologic regime, and the park’s relationships between geology and biodiversity. The report also discusses interrelated water resource issues at the park.

1. Berlejung (2012) prepared two geologic resources reports for the park. One report analyzed the suitability of soils for the park’s existing trails and the second report identified mitigation measures and provided recommendations to limit water erosion.

## Wildlife Communities

The NPSpecies certified bird list indicates that 147 species have been documented at the park. This figure indicates good wildlife richness at the park. The 2011 bird community index for the park showed high integrity. The BCI rating has improved over the past five years (Ladin and Shriver 2013; O’Connell, Jackson, and Brooks 1998).

The park’s white-tailed deer density was 87 deer per square mile in 2010 (NPS, Donaldson, pers. comm. 2012). The white-tailed deer management plan (NPS 2009), which analyzed impacts from reducing the park’s deer population to improve forest regeneration, recommends a density of fewer than 15–20 deer per square mile.

Currently, the park hosts 17 amphibian species and 13 reptile species (NPS 2013d; Valencia and Donaldson 2011; Pauley, Watson, and Mitchell 2005). The estimated rattlesnake abundance at the park is 218–239 rattlesnakes, based on field work conducted by a permitted researcher (Martin 2013).

## Views and Vistas

Park viewsheds have been mapped and a viewshed analysis needs to be completed. The park is regularly engaged with neighboring landowners, developers, and local governments regarding

potential development. The park needs trail counters to determine the number of visits to overlooks as well.

## Fish Communities

The fish index of biotic integrity is a numerical measure of the biological completeness of a system, which is measured for Owens Creek and Big Hunting Creek in this resource stewardship strategy. A parkwide fisheries inventory was completed (Southerland et al. 2007) through the NCRN I&M program. The study recorded 16 species of fish. The study also sought to provide a preliminary ecological assessment of water resources by calculating indexes of biotic integrity, which had a rating of 4 (good).

The National Capital Region Network also measures the benthic index of biotic integrity in six- year rotations at the park. The benthic index is another tool park managers can use to indicate changes to fish habitat.

In addition to I&M resources, the Maryland Department of Natural Resources has collected data for brook trout abundance in Owens Creek and Big Hunting Creek (1989–2011). Abundance parameters are classified as good, fair, and poor.

## Natural Sounds

Natural sounds were considered an important park element in the visitor survey report (Le and Littlejohn 2002). Sources of increased sound levels are prevalent throughout much of the park and a baseline natural sound measurement is needed.

## Air Quality

The NPS Air Resources Division identifies air quality baseline information for the following indicators at Catoctin Mountain Park:

* + wet deposition (sulfur and nitrogen)
  + ozone
  + visibility

In addition to ARD data, the National Park Service monitors wet deposition baseline information through the National Atmospheric Deposition Program (NADP). Sulfur and nitrogen deposition levels are documented at an NADP site within park boundaries.

## Night Skies

Dark skies were considered an important park element in the visitor survey report (Le and Littlejohn 2002). Catoctin Mountain is one of the darker areas in the broader urban area and a baseline night skies measurement is needed.

## Water Quality and Quantity

Per State of Maryland, title 26 Department of the Environment, subtitle 08 Water Pollution, chapter 02 Water Quality (2010), the purpose of water quality standards is to protect, maintain, and improve the quality of Maryland surface waters. Tier III waterbodies are defined by the Maryland Department of the Environment as “Outstanding National Resource Water.” Catoctin Mountain Park uses these standards for pH, dissolved oxygen, acid neutralizing capacity, and streamflow.

**EPA Ecoregion XI Standards (2000).** The Environmental Protection Agency’s ambient water quality criteria recommendations are used to reference Catoctin Mountain Park’s turbidity, nitrates, and phosphates.

**Physical Habitat Index (PHI).** The NPS I&M program identified PHI monitoring as a critical need for the parks of the NCRN (I&M Network). Physical habitat index is a measure of the physical characteristics of a stream reach that contribute to the riparian area’s function as habitat. Owens Creek and Big Hunting Creek are currently monitored to determine current conditions and track long-term trends in water resource condition.

Additional resource inventories and documentation are included for the following water resource components indicated in this resource stewardship strategy:

* + Grande and Anderson (1991) (water temperature)
  + Morgan, Kline, and Cushman. (2007) (specific conductance)
  + Southerland, M., et al. (2007) (acid neutralizing capacity)

## Inventory and Monitoring

As mentioned in the Executive Summary of this resource stewardship strategy, the NPS Inventory and Monitoring program provided guidance, funding, and technical assistance to complete natural resource inventories for parks. These inventories are a baseline for the long-term ecological monitoring conducted by the NCRN inventory and monitoring of numerous natural resources at Catoctin Mountain Park. Resources monitored are listed below.

**TABLE 18. NCRN I&M NATURAL RESOURCE MONITORING AT CATOCTIN MOUNTAIN PARK**

|  |  |
| --- | --- |
| **Resource Priority Resource** | |
| Forest birds | Wildlife communities |
| Forest vegetation, including invasive nonnative plants and forest pests and diseases | Eastern deciduous forest; views and vistas |
| Water resources | Fish communities; water quality and quantity |
| Fish | Fish communities |
| Stream macroinvertebrates | Fish communities; water quality and quantity |
| Stream habitat | Fish communities; water quality and quantity |
| Land use / land cover | Eastern deciduous forest; views and vistas; wildlife communities; fish communities; natural sounds; air quality; night skies; water quality and quantity |
| Ozone | Air quality |
| Visibility | Views and vistas; air quality; night skies |
| Wet deposition | Air quality; water quality and quantity |
| Mercury deposition | Air quality |
| Weather | (Multiple resources) |

SOURCE: NCRN reports and publications: <http://science.nature.nps.gov/im/units/ncrn>

## CULTURAL RESOURCES

Catoctin Mountain Park contains a variety of significant cultural resources, including historic structures, cultural landscapes, archeological resources, ethnographic resources, and museum collections. Catoctin’s historiography needs to be reinvigorated by new scholarship. The 1988 park administrative history is due for an update. This document would support the management of all cultural resources.

## Historic Structures

The LCS inventory is 100% complete. This means that 100% of the structures already determined national register-eligible are listed in the List of Classified Structures and have been assessed for their condition. The List of Classified Structures will substantially expand following approval of the national register nomination for the Catoctin Mountain Park Historic District. The park does not have historic structure reports for any of its historic structures. Historic structure reports might be needed for the preservation and management of historic structures such as the visitor center, Quarters 1, Ike Smith Pumphouse, and for representative buildings in Camp Greentop, Camp Misty Mount, Round Meadow, and the Braestrup Tract.

## Cultural Landscapes

A cultural landscape inventory for the parent landscape Catoctin Mountain Park was completed in 2002. A cultural landscape inventory for component landscape Camp Misty Mount was completed in 2008. An additional cultural landscape inventory is needed for Camp Greentop. The Braestrup Tract, Mission 66 areas (Owens Creek and Chestnut), and Round Meadow should be evaluated to determine the period of significance and integrity of these landscapes. If they are found to have integrity, cultural landscape inventories should then be completed. Treatment needs and the necessary treatment documents for each of these cultural landscapes will be guided by these findings.

## Archeological Resources

The Archeological Sites Management Information System lists 131 documented prehistoric and historic archeological resources at the park. This database will probably grow as areas not yet surveyed are inventoried for archeological resources. The ASMIS database also has a requirement for monitoring and performing condition assessments. The system allows the archeological staff to establish a monitoring schedule that can vary according to the type of site and its probability of threats and level of disturbance.

## Ethnographic Resources

The park’s 2000 historic resources study contributes some information to the knowledge of ethnographic resources at the park. It is estimated that 25% of documentation of the park’s 1930s programs has been completed and a few audio recordings exist. An estimated 10% of World War II resources have been documented, mostly due to a recently completed national context study of the Office of Strategic Services. There is little information collected on the history of the Job Corps at Catoctin and it is estimated that 5% of these resources have been documented. It is estimated that 20% of the pre-park affiliated resources have been documented. This mostly comes from a select number of oral histories completed in the 1970s but there is no systematic understanding of this collection. A historic resource study is also needed to obtain a better understanding of the history and resources associated with the story of Bessie Darling at the park.

## Museum Collections

One hundred percent of museum collection items have been catalogued, but several management plans are needed, including security/fire protection, collection management, collection condition survey, collection storage, housekeeping, and emergency operations plans. The park’s archives are currently being surveyed and will need a collections plan.

## RESOURCE KNOWLEDGE COMMON TO NATURAL AND CULTURAL RESOURCES

**Park Atlas (GIS base maps)**

The park has a current, working set of natural resource base map data, which includes information on springs, streams, fuel behavior models, wetlands, geologic cross section lines, geologic units, vegetation, and soils4. The park atlas was developed as part of Catoctin’s foundation document (NPS 2013a) and will need to be periodically updated.

1. The park atlas includes GIS base layers for other essential park resources, including cultural resources, visitor use, facilities, etc.

## Resource Protection

Catoctin Mountain Park’s location within an urbanizing region poses threats to natural and cultural resources. Threats to park resources will continue to increase as the area grows in population.

## Climate Change

One of the key components of the resource stewardship strategy incorporates climate scenarios planning in the park’s comprehensive strategies (addressed in the next section of this document). The goal of NPS scenario planning is to inform development of climate change adaptation strategies that best serve the park purpose, priority resources, and visitor experiences in a rapidly changing environment.

A climate scenario planning workshop was held at the park in June 2012. The planning team developed three scenarios to address possible activities, inventory, research, or monitoring relative for each scenario. Scenarios enable park managers to make better-informed decisions regarding what level of risk they are willing to take with future park investments. Below is a summary (North Wind 2012) of the Catoctin Mountain Park climate scenarios planning workshop, prepared by Don Weeks, NPS climate change resource planner.5

## CATOCTIN MOUNTAIN PARK, CLIMATE CHANGE SCENARIO PLANNING SUMMARY REPORT: HIGHLIGHTS FROM THE NORTH WIND, INC. 2012 DRAFT REPORT

**Introduction**

The purpose of this “highlights” summary is to provide some of the core informational needs for considering climate change during Catoctin Mountain Park’s (CATO) Resource Stewardship Strategy September 2012 workshop. This is an excerpt from the comprehensive report, “Catoctin Mountain Park, Climate Change Scenario Planning Summary Report,” prepared by North Wind, Inc., which is under review (August 17 – September 7, 2012). This “highlights” summary captures the important outcomes from the Catoctin Mountain Park’s Climate Change Scenario Planning workshop (June 26–28, 2012). For more details on the CATO climate change scenario planning project, please reference the North Wind, Inc. (2012) report.

## Recommendations for Using Outcomes from Climate Change Scenario Planning

The ultimate goal of scenario planning in the National Park Service is to inform development of climate change adaptation strategies that best serve the park purpose, resources, and visitors in a rapidly changing environment.

The three climate change futures (scenarios) generated during this project (Table 1) provide a view into the range of plausible future conditions to support development of management strategies, some of which may entail novel approaches. The scenarios (New Patchwork Quilt, Panting Forest,

1. The full report was prepared by North Wind, Inc. and can be referenced as:

North Wind, Inc. 2012. Review Draft - Catoctin Mountain Park Climate Change Scenario Planning Summary Report.

and Winter Waterland) represent a range of possible climate change futures at CATO that are relevant, challenging, and divergent.

When considering existing, or developing new management strategies at CATO, managers can use these scenarios to ask, “Do these strategies make sense under the scenarios?” Seen through the context of the scenarios, it may be apparent that continuing some current activities is an unwise expenditure of time/resources, while other activities may warrant additional effort. In some cases, entirely new approaches may also be prudent. Scenarios enable park managers to make better informed decisions regarding what level of risk they are willing to take with future park investments. The term used to describe this process is sometimes referred to as “wind tunnel” testing.

Table 2 describes “robust” or “no regrets” strategies that make sense for all three climate change scenarios. These actions provide good preparation for future events, and represent low risk with respect to influences from the three plausible climate change futures. The climate projections diverge more widely after the next 20–30 years, such that in the near term, a broader array of these “robust” strategies are available. Many of these are activities the park may already have underway, or planned – the scenarios can help to set priorities among them.

Lastly, “Monitoring,” is another critical element in scenario planning. Climate change scenario work is a living process that requires review of new information and understanding to further develop, validate, or potentially invalidate a given scenario(s). Monitoring the climate variables (temperature, precipitation, storm events, drought, extreme temperature events) as well as the effects that form the climate change scenarios is important in tracking how the future unfolds relative to the scenario projections, so that decisions use the most current information possible.

**TABLE 1. CLIMATE CHANGE SCENARIOS FOR CATOCTIN MOUNTAIN PARK.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | Variables and Projections (2100) | | | | | | |
| Temperature | Precipitation | Snow | Growing Season | Extreme Precipitation Events | Extreme Temperature Events | Extreme Events |
|  | Temperature | Precipitation | Mean | Growing | Extreme | Extreme temperature | Extreme |
|  | increase 1.7°C | increase 6% | annual | season | precipitation | events: average | events |
| Scenario 1 | (3°F) |  | snowfall: | increase | events: one in | annual maximum | cyclonic |
|  |  |  | decrease by | by 27 days | 20 year | temp > 19.4°C (67°F) | tropical |
| New |  |  | 10% |  | storms | might occur once | storms: no |
| Patchwork |  |  |  |  | occurring | every 3 years (vs. | change |
| Quilt |  |  |  |  | every 10 | current once every 20 | from |
| “Least |  |  |  |  | years | years); 15 more | present |
| Change” |  |  |  |  |  | days/year with temps | frequency |
|  |  |  |  |  |  | > 35°C (95°F) | and |
|  |  |  |  |  |  |  | intensity |
|  | Temperature | Same as least | Same as | Same as | Same as least | Extreme temperature | Same as |
|  | increase 5.3°C | change | least change | least | change | events: average | least change |
|  | (9.5°F) |  |  | change |  | annual maximum |  |
| Scenario 2 |  |  |  |  |  | temp of 19.4°C (67°F) |  |
|  |  |  |  |  |  | might occur once |  |
| Panting |  |  |  |  |  | each year (vs. current |  |
| Forest |  |  |  |  |  | once every 20 years); |  |
|  |  |  |  |  |  | 18 more days /year |  |
|  |  |  |  |  |  | with temps > 35°C |  |
|  |  |  |  |  |  | (95°F) |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | Variables and Projections (2100) | | | | | | |
| Temperature | Precipitation | Snow | Growing Season | Extreme Precipitation Events | Extreme Temperature Events | Extreme Events |
| Scenario 3 | Same as least change | Precipitation increase 17% | Mean annual | Same as least | Same as least change | Same as least change | Same as least change |
| Winter Waterland |  |  | snowfall: decrease by 50% | change |  |  |  |

## Scenario 1: New Patchwork Quilt

Parameters (variables) of “New Patchwork Quilt” represent the least change scenario, which Dr. Patrick Gonzalez (NPS Climate Scientist) provided for the workshop. This scenario represents a plausible climate future with the least change from existing climate conditions relative to other modeled projections.

The New Patchwork Quilt scenario represents a future with an average annual temperature increase of 3.0°F and a 6% increase in precipitation by 2100. Extreme storm events occur more frequently, along with extreme warm temperature events. Annual snowfall decreases by 10%. The need for fire preparedness is increasing as the landscape becomes dryer. Flash flood events are more frequent, contributing to erosion along developed areas and sensitive riparian habitat in the park, requiring more road closures in the park. Extreme temperature events strain brook trout habitat, with an increase in brown trout. The visitor shoulder seasons are slowly shifting due to warming conditions and changes in phenology (particularly spring flowering, and fall leaf colors) that attract visitors to the park. Winter recreational activities start to decline in the park due to a reduced snowpack. The threat of losing traditional and cultural knowledge of the region is an increasing concern as ecological changes reduce opportunity for interpretation of the New Deal era idealism.

**SELECTED IMPACTS AND IMPLICATIONS FOR THE NEW PATCHWORK QUILT SCENARIO.**

|  |  |
| --- | --- |
| Scenario 1: New Patchwork Quilt | |
| Impacts | * Dryer landscape * Increase in storms * Increase in wildfire * Decrease in brook trout habitat; increase in other trout species * Increase in flood events and erosion * Shifts in phenology * Less annual snowfall |
| Implications | * Increase need for fire preparedness * Increase maintenance costs for historic structures and park infrastructure * Increase trail maintenance * Need for water conservation measures * Changes in visitation seasons * Decrease in traditional winter recreation activities * Reduced opportunities for interpretation of regional cultural knowledge * Increase in pests (ants, termites, ticks) |

## Scenario 2: Panting Forest

Scenario 2, “Panting Forest” represents a scenario that was selected by the workshop participants using a card-based scenario planning synthesis process. Starting with the “New Patchwork Quilt” (least change) scenario, participants changed a select number of climate variables using different emission modeled projections to explore and create another plausible climate future.

The Panting Forest scenario represents a future with an average annual temperature increase of 9.5°F and a 6% increase in precipitation by 2100. Extreme storm events occur more frequently, along with extreme warm temperature events. Strict water conservation measures are in place as local groundwater aquifers experience lowering water levels with loss of some vernal pools, springs, and associated amphibians. Stream temperatures increase and the fishery changes from cold water to warm water species. Wildfires are an annual occurrence with a longer fire season, straining staff and financial resources at the park and affecting visitor use. Flash flood events are more frequent, contributing to erosion along developed areas, requiring more road closures and structural repairs in the park. There is a decline in oak and hemlock forests in the park and a decrease in bird diversity in this drying landscape. Due to the warming temperatures, a decrease in air quality affects viewsheds and quality of night skies in the park. Warmer temperatures, tree fall, wind, ice storms, and flooding due to more storms cause increased weathering and pest infestations which damage or deteriorate historic structures (cabin camps, Ike Smith Pumphouse), requiring structural repairs straining financial resources and calling for new ways to protect historic buildings in the park. Visitor use patterns continue to change as temperatures increase and some of the traditional uses are lost. Visitation from surrounding communities and metropolitan areas increase as the public seeks refuge from the heat at the relatively cooler environment of the park.

**SELECTED IMPACTS AND IMPLICATIONS FOR THE PANTING FOREST SCENARIO.**

|  |  |
| --- | --- |
| Scenario 2: Panting Forest | |
| Impacts | * Extremely dryer landscape * Declining groundwater aquifer supply * Increase in storms * Loss of vernal pools and springs * Increase in stream temperature * Increase in wildfire * Change from cold water to warm water fishery * Decline in oak and hemlock * Decrease in air quality and quality of viewsheds and night skies * Increase in invasive plants and pests * Big changes in timing of life cycles/phenology * Decrease in bird diversity |
| Implications | * Increase costs in fire prevention/suppression * Increase visitation from surrounding areas with warmer temperatures * Increase maintenance costs for historic structures and park infrastructure * Loss of traditional folkways (mushrooms) * Changes in visitation seasons * Increase in public health issues (pests, disease, heat, air quality) * Extreme water conservation measures * Drinking water shortages * Replacement of traditional winter recreation activities * Loss of partnerships with fishing groups (Friends of BHC, Potomac Valley Fly Fishing) |

## Scenario 3: Winter Waterland

Scenario 3, “Winter Waterland” represents a scenario that was also selected by the workshop participants using a card-based scenario planning synthesis process. Starting with the “New Patchwork Quilt” (least change) scenario, participants changed a select number of climate variables to create another climate future using the modeled climate variable projections.

The Winter Waterland scenario represents a future with an average annual temperature increase of 3.0°F and a 17% increase in precipitation by 2100. Extreme storm events occur more frequently, along with extreme warm temperature events. Annual snowfall decreases 50%. Increased park maintenance and operation costs are associated with the increased frequency in flood, ice storm, and wind impacts to park infrastructure, streams and trees. Stream habitat is degraded due to sedimentation from erosion, impacting macroinvertebrates, clams, mussels, and trout. New archeology sites are exposed from this increase in erosion on the landscape. Although the increase in annual precipitation is recharging local aquifers that supply the local drinking water, springs and streams in the park, overall warming and extreme warm events minimize this recharge. The visitor shoulder seasons are slowly shifting due to warming conditions and changes in phenology that attract visitors to the park. Traditional visitor winter recreational activities change with a 50% decrease in annual snowfall, while water sports like kayaking and tubing increase in the park.

Visitor safety issues and response also increase due to these new recreation activities and increased storm events.

**SELECTED IMPACTS AND IMPLICATIONS FOR THE WINTER WATERLAND SCENARIO.**

|  |  |
| --- | --- |
| Scenario 3: Winter Waterland | |
| Impacts | * Warming * Increase in precipitation * Increase in storms, including ice storms * Increase in flood events and erosion * Increase in stream sedimentation |

|  |  |
| --- | --- |
|  | * Loss of habitat for macroinvertebrates, clams, mussels, and fish * Shift in phenology * 50% decrease in annual snowpack * Change in fire regime * Erosional exposure of new archeology sites * Increase in pests (hemlock woolly adelgid) and invasives |
| Implications | * Increase maintenance costs for historic structures and park infrastructure * Increase trail maintenance * Change from traditional recreation activities (cross-country skiing, fishing) to other activities (kayaking, tubing) * Increase in visitor safety issues due to new recreation activities, flooding and tree fall * Changes in traditional fishery * Changes in visitation seasons * More space needed for expanding cultural resource collections |

**TABLE 2. ROBUST STRATEGIES IDENTIFIED FOR THE THREE SCENARIOS.**

|  |  |  |
| --- | --- | --- |
| Potential Management Considerations, common to all three scenarios | | |
| FRV/ OIRV | Category 1 | Management Considerations |
| FRV/  Other\* | A: Visitor Safety/ Facilities\*\*\* | Increase tree hazard maintenance/training and required funding. |
| Other | B: Communication/ Education | General climate change education:   * Develop information/education opportunities on climate change impacts for visitors. * Develop web-based interpretation plan. * Increase climate change understanding with park and Camp David staff. * Develop education materials regarding potential for increased human/wildlife conflicts. |
| Other | C: Partnership Coordination (Roads/Access) | Increased communication on closures related to Park Central Road. Coordination with state/county highways and ACOE on road erosion issues. Minimize use of salt for deicing roads. Monitor for flood control. |
| Both\*\* | D: Cultural Resources/ Facilities | Acquire more specialized skills to meet increased maintenance needs for historic structures and park facilities. Reinvigorate youth conservation programs, connect with vocational programs/schools and share specialized labor/expertise with other parks. |
| Both | E: Cultural Resources (Ethnographic, Archeology, Cultural Landscapes, Historic Structures) | Need baseline inventory of park cultural resources (cultural landscapes, archeological sites/collections, list of classified structures). Conduct and record oral histories to preserve ethnographies (e.g., mushroom collecting). Compare survey coverage and vulnerability maps for archeology and monitor sites for erosion issues. Incorporate digital media for collections/inventories |
| OIRV | F: Natural Resources (Water Use) \*\*\* | Define park water needs/usage and develop park water conservation plan. Increase reservoir capacity. Characterize local aquifer system(s) and monitor groundwater levels. Update park potable water distribution system, as needed. |
| OIRV | G: Naval Support Facility  - Thurmont\*\*\* | Work with Naval Support Facility – Thurmont staff to acquire data gaps (e.g., LCS). |
| FRV | H: Natural Resources (Fish Habitat) \*\*\* | Work with state on developing/changing stream management and fishing regulations. Research substitution fish species for recreational fishing. Monitor canopy gaps along streams and replant to maintain stream shading. Enforce catch & release. |
| FRV | I: Natural Resources (Forest) \*\*\* | Develop vegetation plan (including riparian vegetation plan). Increase inventory of resources in response to decrease in biodiversity. Prioritize what communities to monitor. Work with NRCS and other partners to develop a seed bank. |
| FRV | J: Natural Resources (Fire Management) | Update park Fire Management Plan and develop fuel reduction plan and wildland fire interface plan. Incorporate prescribed burning to reduce fuel loads. Increase wildland fire and all risk certifications in the Incident Command System. |
| FRV | K: Natural Resources (Invasives)\*\*\* | Manage park for forest invasives. Develop invasive plant management plan. Set priority areas in park for treating exotics (exotic plant management team).  Educate visitors about prevention of introducing exotics into the park. |
| Other | L: Partnership | Work with neighbors (LCC partners) to establish appropriate connectivity and |

|  |  |  |
| --- | --- | --- |
| Potential Management Considerations, common to all three scenarios | | |
| FRV/ OIRV | Category 1 | Management Considerations |
|  | Coordination (Landscape) | corridors. Evaluate alteration options to maintain species. Nurture partnerships to plan and develop appropriate communities/landuse around the park. |
| OIRV | M: Natural Resources (Stormwater Runoff) | Increase storm monitoring. Work with state on dam release management. Pursue partnerships focused on water management and erosion issues. Develop stream bank stabilization plan. |
| FRV | N: Viewshed | Communicate viewshed concerns to the public and complete a viewshed and vista analysis. Open more vistas. |
| Both | O: Natural Resources (Collections) | Increase capacity and partnerships to expand ability to preserve natural resource collections. |

* Other: Not directly associated with a Fundamental Resources and Values (FRV) or Other Important Resources and Values (OIRV).

\*\* Both: FRV and OIRV.

\*\*\* Identified in the workshop for all 3 climate change scenarios.

## Monitor

Park managers monitor climate drivers and/or indicators of effects to “calibrate” the three scenarios (New Patchwork Quilt, Panting Forest, and Winter Waterland) against reality, possibly adjusting or developing new scenarios as warranted, and revising strategies accordingly. This enables the park staff to recognize what climate future is unfolding or what new scenarios may be evolving.

**Monitoring**

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Temperature Precipitation Storm events Drought Snowfall

Extreme temperature events

Selected indicators of climate-driven effects

Monitoring selected indicators of climate-driven effects in the park will be necessary to evaluate the response of CATO priority resources and values to climate change, and to understand the evolving relationships between the climate drivers and ecosystem response.

(Note: This ends the North Wind excerpt.)

# COMPREHENSIVE STRATEGIES

Comprehensive strategies provide park management staff with methods to achieve and maintain reference conditions. Catoctin Mountain Park’s comprehensive strategies are presented in tables 19 and 20. Components of the comprehensive strategies table are outlined below.

A comprehensive strategy is designed to move a resource from its existing condition to the reference condition.





###### Existing Condition Reference Condition

Catoctin Mountain Park’s 36 comprehensive strategies address one of the following objectives:

* 1. Address gaps in knowledge identified in status of resource knowledge.
  2. Provide information necessary to inform or monitor the indicators identified in the previous sections.
  3. Manage natural and cultural resources to preserve, protect, and maintain their condition and enhance the visitor experience.

Each comprehensive strategy contains one or more activities that can be implemented when the necessary compliance procedures have been completed. Each activity is designed to move the condition of resources toward the reference condition.

**LIST OF STRATEGIES AND ACTIVITIES**

Catoctin Mountain Park’s comprehensive strategies focus on addressing the gaps in knowledge previously identified in status of resource knowledge. Each of the park’s comprehensive strategies are linked to management targets for priority resources and defined in narrative form in the following categories:

* + A. Base Knowledge
  + B. Management and Mitigation
  + C. Monitoring

A strategy, therefore, might be maintaining native forest cover for the park’s eastern deciduous forest (associated with FRV 1.1).

Within each comprehensive strategy, a list of activities is provided that addresses elements necessary to meet the strategy. While the activities within a strategy are numbered, this does not imply a priority order; rather, it is simply a reference mechanism.

## SEQUENCING / TIMEFRAME / COSTS

Following each set of strategies and associated activities, the comprehensive strategies table outlines sequencing, timeframe, costs, and the likely funding source.

## Sequencing

Strategies and activities presented in the resource stewardship strategy are intended to follow a logical sequence. That is, the first activity must be finished prior to the second one, as the results from the first are required as input for the other. Activities that are dependent on a sequential timing are numbered in ascending order (i.e., 1, 2, 3, etc.), while those that are not are indicated as “nondependent.”

## Timeframe

The estimated duration for each activity is documented by the number of years expected to implement the activity (i.e., 1 year; 1–3 years; ongoing; etc.).

## Costs

Costs for each activity reflect project team estimates and are provided in general terms. In most cases, costs are rounded to the nearest $5,000 to $10,000 range. The expected funding source and Project Management Information System (PMIS) number (if applicable), are also noted in the table.

## Priority Level

Priority indicates the importance of each activity. It is often evaluated according to criteria such as: urgency, relevance to park purpose and significance, legal requirements, community need, public interest, budget, and personnel.

* + *High priority* activities should be accomplished first. These activities are considered critically important to advancing the condition of priority resources. High priority activities are directly related to the accomplishment of other comprehensive strategies.
  + *Medium priority* activities are considered important, but not urgent, and meet a combination of other priority resource objectives.
  + *Low priority* activities are important, but not critical to advancing the condition of priority resources. Low priority activities do not have to be completed in the immediate future and primarily fulfill only one comprehensive strategy.

## FUNDAMENTAL RESOURCES AND VALUES

##### Eastern Deciduous Forest

1.1 *Strategy: Maintain native forest cover—Rationale:* Native forests play key roles in preserving ecosystem functionality, and help support the park’s recreational qualities. The preservation of the native, eastern deciduous forest is included in the foundation document, climate change scenarios, and white-tailed deer management plan*.* Future planning needs, including development of a burn plan, vegetation management plan, and watershed management plan, will also emphasize the need to maintain native forest cover.

##### Activities

* 1. Develop vegetation management plan.
  2. Develop burn plan.
  3. Conduct riparian area plantings (restoration).
  4. Develop seed banks for native vegetation.
  5. Conduct forest monitoring.
  6. *Strategy: Build partnerships for regional action—Rationale:* Preserve forested corridors to obtain landscape-level conservation. The park has ongoing opportunities, for example, to develop landscape-level partnerships with the State of Maryland.

##### Activities

* + 1. Build landscape level partnerships (e.g., park works with State of Maryland on woolly adelgid treatments). Suggestions: (1) identify friends groups; (2) identify partnership objectives; (3) develop partnerships over 10 years; (4) formulate plans with Frederick and Washington counties.
    2. Perform hemlock plantings and trunk injections.
  1. *Strategy: Improve native forest regeneration—Rationale:* Reduce deer density so that sufficient seedlings survive to replace canopy trees. Strategy would include implementation of recommendations in white-tailed deer management plan (NPS 2009), including monitoring for chronic wasting disease and conducting herd health survey.

##### Activities

* + 1. Conduct deer management, including herd reduction and monitoring.
  1. *Strategy: Limit new forest pest infestations and reduce percentage of nonnative species— Rationale:* Pest infestation and nonnative species degrade ecological integrity of native forests (from CATO management goals—desired conditions). Strategy would be implemented in cooperation with the exotic plant management team and NPS Inventory and Monitoring program. Future planning needs, including development of a vegetation management plan, will also emphasize the need to limit new forest pest infestations and reduce the park’s percentage of nonnative species.

##### Activities

* + 1. Establish clear objectives for alien and nonnative species management.
    2. Conduct early pest detection.
    3. Provide active management. Select specific parts of the park to treat and complete activities such as barberry and microstegium removals. Engage in restoration and education initiatives to complement active management efforts.

##### Geological Resources

* 1. *Strategy: Characterize local aquifer systems—Rationale:* The park is dependent on local aquifers for drinking water and other needs and information on these aquifers is vital for park planning. Maintaining adequate groundwater flow would ameliorate temperature issues that may affect brook trout and other coldwater species. Similar management issues would be addressed in a future watershed management plan, which would also identify management practices to ensure adequate baseflow for specific park streams.

##### Activities

* + 1. Make technical request to NPS Geological Resources Division (GRD).
    2. Monitor groundwater levels.
    3. Find a researcher to characterize local aquifer systems.
  1. *Strategy: Reduce erosion—Rationale:* Uncontrolled erosion will damage water quality by increasing sedimentation to streams, according to Berlejung (2012) and Slawson (2010).

##### Activities

* + 1. Assess trail system in context with geological background.
    2. Develop engineering strategy to address severe erosion problems near visitor center and Ike Smith Pumphouse.
    3. Protect and promote native vegetation in riparian buffers, which stabilize banks.
    4. Monitor sedimentation.

##### Wildlife Communities

* 1. *Strategy: Develop strategic partnerships and enhance habitat connectivity—Rationale:* Protect upper portions of the Frederick watershed, whose land uses affect park resources, including wildlife.

##### Activities

* + 1. Continue to work with Maryland State Parks and Frederick County to protect strategic land parcels in the Frederick watershed.
  1. *Strategy: Inventory and monitor certain wildlife populations, including birds, bats, reptiles, amphibians, and invertebrates—Rationale:* Small mammals are important contributors to the ecological integrity of the park. Bat and small mammal population surveys, for example, would provide baseline figures and fill moderate data gaps to assess overall ecological health at the park (NPS 2013a). Birds are important contributors to ecological integrity as well, and the park seeks to maintain species richness and continue to improve its bird community index. Similarly, reptiles and amphibians contribute to forest ecological integrity. Obtaining baseline turtle data, for example, assists monitoring and future wildlife management efforts.

In addition to small mammal communities, bird communities, and reptile and amphibian indicators, invertebrates are also good indicators of ecological health. Invertebrate inventories help establish baselines for long-term monitoring.

##### Activities

* + 1. Monitor small mammals such as mice, voles, and shrews.
    2. Continue I&M bird surveys.
    3. Complete climate change vulnerability assessment for birds.
    4. Complete turtle survey.
    5. Maintain research relationship with W.H. Martin, volunteer rattlesnake researcher.
    6. Continue amphibian and reptile monitoring.
    7. Complete comprehensive inventory for invertebrates of ecological or management significance, such as bees and certain aquatic macroinvertebrates.
    8. Complete amphibian and reptile disease study.
    9. Continue bat surveys.

##### Fish Communities

* 1. S*trategy: Stream habitat protection and restoration—Rationale:* Streams are a fundamental resource for the park both as a natural resource and for recreational fishing (NPS 2013a). Note that Didymo (*Didymosphenia geminata*), an invasive algae, is a threat to park fish communities and regional ecosystems. Once established, didymo is difficult to control or eradicate. Didymo is probably causing ecological impacts to stream systems in eastern North America, but they are not yet well documented (Pieper and Watts 2012).

It is also important to note that current canopy gaps on park streams can allow waters to become excessively warm in the summer, which harms trout (North Wind, Inc.

2012; Allan and Castillo 2007).

##### Activities

* + 1. Develop control strategy for didymo.
    2. Monitor canopy gaps along streams (i.e., number of gaps per stream segment).
    3. Replant native species to maintain stream shading and provide invasive species control (i.e., conduct plantings in specific canopy gaps to reduce bank erosion; then reduce a certain to-be-determined number of gaps over time).
  1. *Strategy: Monitor indicator species; continue to collect fish community data, and research and monitor habitat dynamics—Rationale:* These indicator species allow the park to determine the status of animal communities in streams. Obtaining this data assists monitoring and improves future fish communities’ management.

##### Activities

* + 1. Continue to monitor trout populations, macroinvertebrates, water chemistry, temperature, and water level.
  1. *Strategy: Resource protection (enforcement)—Rationale:* The park needs ongoing, frequent law enforcement presence on park streams (especially Owens Creek).

##### Activities

* + 1. Continue to enforce catch and release.
  1. *Strategy: Educate park staff to use best fisheries management practices—Rationale:* Incorporate best management practices described in the course handbook for the “dirt and gravel roads” course (referenced below).

##### Activities

* + 1. Send staff to dirt and gravel roads course (Pennsylvania State University / The Nature Conservancy).
  1. *Strategy: Shift fishing activity into Lewis Pond (property) and Braestrup Pond (potential future recreation location; future project)—Rationale:* A pond management plan could be included separately or as part of the comprehensive watershed management plan.

##### Activities

* + 1. Develop pond management plan for Lewis Pond and Braestrup Pond.

##### Views and Vistas

* 1. *Strategy: Document baseline conditions—Rationale:* It is important that the park interprets viewpoints from various visitor perspectives.

##### Activities

* + 1. Define, review, and update identified views and vistas (from the cultural landscape inventory, cultural landscape report, the national register, and ethnographic overview [to be completed]).
    2. Complete a viewshed analysis.
  1. *Strategy: Develop local partnerships and participate in local planning initiatives— Rationale:* Developing local partnerships to preserve views and vistas would build on similar efforts indicated in other sections of this document, such as landscape-level forest preservation and watershed protection

##### Activities

* + 1. Work with Frederick and Washington counties and surrounding communities to preserve views and vistas.
  1. *Strategy: Document and monitor trends and changes in views and vistas over time— Rationale:* The park can target specific views to preserve across the landscape (reference cultural landscape inventory, cultural landscape report, and national register documents).

##### Activities

* + 1. Record trends using historic photos and collect current photo points to compare photography over time.
    2. Conduct interviews with park visitors.
    3. Conduct mapping activities.
    4. Conduct aerial photography activities and postcards.
  1. *Strategy: Maintain designed access to overlooks—Rationale:* Overlooks provide one of the fundamental components to the visitor experience at the park and can be managed to improve visitor satisfaction.

##### Activities

* + 1. Perform routine maintenance to clear vegetation to maintain views / vistas / overlooks
    2. Include views and vistas in vegetation management plan and/or watershed management plan
    3. Include one question in visitor use survey related to views and vistas experience
    4. Gather photopoints and conduct panoramic viewshed sight line monitoring
    5. Develop interpretive media for certain views and vistas

##### Historic Structures in Camp Greentop and Camp Misty Mount

6.1 *Strategy: Preserve and maintain historic structures in cabin camps—Rationale:* This strategy will allow cabin camp structures to meet the management target for 100% documentation, and the condition assessment target to maintain 51 structures in good condition. It will also improve the condition of the 13 structures in fair or poor condition.

**Note:** this strategy includes NHPA section 106 and/or National Environmental Policy Act compliance for development and implementation of the treatment plan, which will meet *The Secretary of Interior’s Standards for the Treatment of Historic Properties* requirements and consider implementation of green initiatives. Because this strategy addresses multiple cabin camp structures, it is intended to be comprehensive for Camp Greentop and Camp Misty Mount. It is also adaptive, to respond to the resource knowledge as it is gleaned over the course of the strategy. For example, structures found to have the most immediate needs in the structural assessment of step 1 will be prioritized in the implementation of treatment in step 3.

##### Activities

* + - 1. Prepare detailed condition assessments, including as-built architectural drawings, for all historic structures in Camp Greentop and Camp Misty Mount.
      2. Develop a comprehensive treatment plan for all structures.
      3. Implement treatment plan.
      4. Prepare preservation maintenance plan, including future preventative maintenance treatments.
      5. Monitor and maintain condition, assess and modify treatment as necessary (ongoing).
  1. *Strategy: Manage cabin camps facilities while allowing for continued visitor use— Rationale:* The cabin camp facilities management plan will address both historic and nonhistoric structures (restroom facilities, etc.), and incorporate the preservation maintenance plan prepared in the above strategy for preserving and maintaining historic structures in cabin camps.

##### Activities

* + 1. Prepare cabin camp facilities management plan.

##### Ethnographic Resources

* 1. *Strategy: Develop a park ethnography program by initiating research and documentation, prioritizing identified ethnographic resources directly associated with park FRVs—Rationale:* Development of an ethnography program through research and documentation will allow the park to meet Director's Order 28: *Cultural Resource Management* (NPS-28) for managing ethnographic resources and other law and

policy requiring the identification of cultural resources. Documentation will also improve community and park engagement. The strategy represents a best management practice, and meets NPS *A Call To Action* initiatives (NPS 2013f).

##### Activities

* + 1. Complete ethnographic overview and assessment.
    2. Complete ethnographic study of all groups listed below, prioritizing activities 3–6 because they are park FRVs, and to make working with the oldest populations a priority. Note: this activity will be guided by the ethnographic overview and assessment.
    3. Complete ethnohistory and cultural affiliation of camp users from 1930s to present, including members of the Maryland League for People with Disabilities (historically known as the League of Crippled Children).
    4. Obtain oral history and transcription information from John Whiteclay Chambers II’s OSS history (Chambers 2008) and evaluate the information to identify potential ethnographic resources.
    5. Complete ethnohistory with OSS Society members and other OSS alumni and evaluate the information to identify potential ethnographic resources.
    6. Complete ethnohistory with the CCC alumni association.
    7. Develop oral history plan (ongoing) coordinated with interpretation and resource management.
    8. Complete ethnographic research / traditional use study on mushroom collection in coordination with natural resource staff and evaluate the information to identify potential ethnographic resources.
    9. Transcribe pre-park landowner oral histories, and evaluate the information to identify potential ethnographic resources.
  1. *Strategy: Develop plan to monitor the condition of ethnographic resources—Rationale:* Developing a plan for monitoring ethnographic resources will ensure the protection and preservation of ethnographic resources per NPS-28, and meet the management target for developing an ethnographic resources program at the park. Certain potential ethnographic resources, such as those associated with Civilian Conservation Corps, Works Progress Administration, Office of Strategic Services, or cabin camp users, have been identified as FRVs.

##### Activities

* + 1. Note: extent of which monitoring would need to occur would be determined by the ethnographic overview and assessment and subsequent identification of ethnographic resources (see comprehensive strategy above) through research, interviews, and documentation. Monitoring protocols would be developed through consultation with associated ethnographic groups, depending on the resource.

##### Cultural Landscapes

* 1. *Strategy: Conduct historical research and documentation—Rationale:* Review all component cultural landscapes that do not currently have a completed cultural landscape inventory for the period of significance and integrity. For those found to have integrity to their period of significance prepare a cultural landscape inventory, which is necessary per NPS-28. Documenting areas that are currently unknown, such as recent land acquisitions, are a priority because changes may be planned at these areas in the near future. For example, the Braestrup Tract may have significance and

integrity as a cultural landscape, but this needs to be determined through research and documentation.

At the same time, while Camp Greentop is an important cultural landscape that is also an FRV, documentation of Camp Greentop in a cultural landscape inventory is lower priority because (1) many of its features are similar to those documented in the Misty Mount cultural landscape inventory, and therefore this cultural landscape inventory may be partly applicable to Camp Greentop; (2) the cultural landscape inventory for Catoctin Mountain Park addresses Camp Greentop, but does not include newly acquired properties, such as the Braestrup Tract; and (3) the Camp Greentop cultural landscape is relatively stable and park management is able to effectively manage it in the absence of a cultural landscape inventory.

##### Activities

* + 1. Evaluate undocumented, potential component landscapes for integrity: Camp Round Meadow, Braestrup Tract, Mission 66 areas (Owens Creek Area and Chestnut Area), Lewis Property.
    2. Update existing cultural landscape inventory for Catoctin Mountain Park after the national register nomination is accepted by the Keeper.
    3. Complete cultural landscape inventory for Camp Greentop.
    4. If the research supports it, update Camp Misty Mount cultural landscape inventory to include the new period of significance relating to Mission 66. Add Mission 66 landscape features as contributing. Evaluate Camp Round Meadow landscape for integrity; document with a cultural landscape inventory if integrity is sufficient.
    5. Braestrup Tract: if determined to have integrity in activity 1, then complete cultural landscape inventory. If landscape does not have integrity, then complete a treatment plan to preserve features accordingly.
    6. Mission 66 areas (Owens Creek, Chestnut), to be determined following activity 1.
    7. Lewis Property, to be determined following activity 1.
  1. *Strategy: Preserve and maintain important cultural landscapes—Rationale:* Cultural landscape reports are necessary for the maintenance, management, and if required, rehabilitation of cultural landscapes.

##### Activities

* + 1. Prepare cultural landscape reports or other treatment plans for selected cultural landscapes, as determined following identification of cultural landscapes through documentation and inventory. Prepare cultural landscape reports or other treatment plans for selected cultural landscapes. The specific cultural landscape report or treatment plan would be determined following the identification of cultural landscapes through appropriate documentation and inventory.

## OTHER IMPORTANT RESOURCES AND VALUES

##### Natural Sounds

* 1. *Strategy: Obtain baseline sound measurements—Rationale:* Visitors enjoy the park’s natural soundscape. Follow Natural Sounds Program guidance or the research team’s recommendations.

##### Activities

* + 1. Make technical request to NPS Natural Sounds Program.

##### Air Quality

* 1. *Strategy: Develop strategic partnerships and collect and document baseline air quality data—Rationale:* A partnership enhancement plan would address the overall viewshed (including air quality), as well as park watersheds and land protection. This plan was indicated as a medium level planning need in the park’s foundation document (NPS 2013a). Monitoring and documenting data to prove baseline condition was also noted as a data need in the foundation document.

##### Activities

* + 1. Continue to develop partnerships with state, local, and nongovernmental organizations to build support to improve local air quality.
    2. Continue to monitor and document air quality indicators.

##### Night Skies

* 1. *Strategy: Reduce light pollution within the park to enhance the night skies as seen from the park. Obtain baseline night skies measurements—Rationale:* Neighbors and visitors appreciate the park’s dark skies. Park campers, in particular, would be the target audience to reach regarding night skies values. Initiatives would also provide a good model for the park’s neighbors. The park can take advantage of permitting and compliance opportunities to suggest night skies best management practices and should follow Night Skies Program recommendations.

##### Activities

* + 1. Make technical request to NPS Night Skies Program.
    2. Provide outreach and education to park neighbors and visitors by including night skies in future interpretation activities.
    3. Continue to incorporate technological improvements at the park, such as installing motion sensors, bulbs, and light shields.

##### Water Quality and Quantity

* 1. *Strategy: Protect watersheds within park boundaries—Rationale:* Good water quality is crucial for maintaining healthy fish populations, a fundamental resource at the park. Maintain or improve overall watershed quality and quantity within park boundaries and identify specific management targets.

##### Activities

* + 1. Develop watershed management plan.
  1. *Strategy: Pursue watershed partnerships and create a monitoring-based agreement to monitor watershed impacts—Rationale:* Developing a more effective working agreement with partners, including the State of Maryland, will help meet interagency watershed management objectives.

##### Activities

* + 1. Balance water volume release regimes to protect fish communities and recreational qualities, particularly during the dry months of July and August.
    2. Develop a stream gauge monitoring system that continuously measures stream levels. Develop a joint fisheries agreement with Cunningham Falls State Park to mitigate flows on Hunting Creek Dam.
    3. Work with private landowners to protect land and plant trees near streams, especially near watershed headwaters.
  1. *Strategy: Minimize leaks from wells and holding tanks—Rationale:* The park needs an adequate water supply for visitors and operations. Visitor water use practices and behaviors should be studied to determine system adequacy and management strategies.

##### Activities

* + 1. Study and determine if the park has adequate water capacity and an adequate distribution system.
    2. Increase holding tank capacity and renovate park’s water system capacity.
    3. Monitor water quality.
    4. Groundwater study.

##### Other Historic Structures

* 1. *Strategy: Update historical research and documentation—Rationale:* This strategy will document all potentially eligible park historic structures and bring the List of Classified Structures to 100% completion per NPS policy and the National Historic Preservation Act. Section 110 of the act requires the National Park Service to identify and nominate to the National Register of Historic Places all structures and other properties under its jurisdiction that appear eligible.

##### Activities

* + 1. Conduct determinations of eligibility for newly acquired properties not included in the national register update.
    2. Update the List of Classified Structures with structures newly determined national register-eligible.
  1. *Strategy: Preserve and maintain historic structures—Rationale:* This strategy will allow historic structures to meet the management target for 100% documentation as well as the condition assessment target. This strategy would address conditions of conduct under NHPA section 106 and/or the National Environmental Policy Act for development and implementation of the treatment plan. The plan will meet the requirements in *The Secretary of Interior’s Standards for the Treatment of Historic Properties* and consider implementation of green initiatives. Because this strategy deals with multiple structures, it is more adaptive and comprehensive than a single historic structures report.

##### Activities

* + 1. Prepare historic structure reports and/or detailed condition assessments, including as-built architectural drawings for national register-eligible structures such as the Blacksmith Shop, visitor center, Quarters 1, Ike Smith Pumphouse, CCC Dining Hall, and Infirmary. Potentially include Mission 66 buildings, Great Society resources, stone wall at Round Meadow, dry-stack stone walls, culverts, Braestrup buildings and structures, and others.
    2. Develop a treatment plan when necessary, as determined by condition assessments.
    3. Implement treatment plan.
    4. Develop preservation maintenance plan, including future preventative maintenance treatments.
    5. Monitor and maintain condition, assess and modify treatment as necessary (ongoing).

##### Archeological Resources

* 1. *Strategy: Update archeological research and documentation—Rationale:* Activities for this strategy allow the park to meet NPS policy and federal law requirements for archeology. These activities would be adaptive to climate change impacts through monitoring.

##### Activities

* + 1. Update ASMIS database for site condition and monitor identified sites.
    2. Add newly identified sites to ASMIS database.
    3. Identify unsurveyed areas with high probability for archeological resources (see LBG 2011 for specific recommendations).
    4. Conduct site evaluation studies (see LBG 2011 for specific recommendations).
    5. Examine threats and develop management plans if the park determines that certain archeological resources are threatened.
    6. Develop Archeological Resources Protection Act strategy for law enforcement rangers, maintenance staff, resource managers, and other park staff.
    7. Conduct additional phase I or phase II archeological survey for future ground- disturbing activities (per NHPA section 106).

##### Museum Collections

* 1. *Strategy: Preserve and protect park museum collections—Rationale:* This strategy will allow the park to meet NPS standards and policies for its museum collections.

##### Activities

* + 1. Accession backlog of museum objects and evaluate archival collection.
    2. Improve storage and exhibit of museum collections.
    3. Improve storage condition of archival collection; put objects, such as historic drawings, photos, film, etc., into improved, protected file folders, fireproof cabinets, etc.
    4. Evaluate objects from the craft center / living history program for deaccession.
    5. Review and update scope of collections statement.
    6. Prepare collections management plan.
    7. Digitize relevant archival material.
    8. Accession new items as needed.

##### All Cultural Resources

* 1. *Strategy: Update historical research and documentation of Catoctin Mountain Park’s historic context and historiography in support of important cultural resource types— Rationale:* Many of the park’s historic contexts, theme studies, and other histories are out of date. This information will support a variety of cultural resource needs for documentation and will enhance management, mitigation, monitoring, resource protection, as well as interpretation and education programs.

##### Activities

* + 1. Complete and submit final national register nomination for Catoctin Mountain Park to the Keeper of the National Register of Historic Places for listing.
    2. Prepare historic resource study on OSS history at Camp Greentop to support potential ethnographic resources associated with OSS groups, as well as OSS artifacts in the museum collection and archives, or possibly in yet-to-be-discovered archeological sites.
    3. Update the park’s administrative history, completed in 1986.
    4. Incorporate new historical information gleaned from cultural resources documentation into park interpretive programs.
    5. Update all cultural resources GIS data to serve as a cultural resources base map. As appropriate, make this information available to law enforcement rangers to better protect important resources in the field.

##### Common to All Resources

* 1. *Strategy: Conduct comprehensive interdisciplinary resource management training, integrating natural and cultural resource law and policy, for improved protection of all park resources—Rationale:* This training will enable park staff to better manage, protect, and provide stewardship for all resources. This will also fulfill NPS *A Call to Action* initiatives (NPS 2013f).

##### Activities

* + 1. Engage park staff in interdisciplinary training that includes a primer on cultural resource law and policy (e.g., NHPA section 106, Archeological Resources Protection Act, database, ethnographic resources, preventative maintenance training, etc.).
  1. *Strategy: Develop climate change action plan—Rationale:* This plan will enable park staff to better manage, protect, and provide stewardship for all resources. This will also fulfill NPS *A Call to Action* initiatives (NPS 2013f).

##### Activities

* + 1. Prepare climate change action plan, which would incorporate all activities in the Climate Friendly Parks action plan. The climate change action plan would also use climate scenario planning knowledge from the 2012 workshop and include consultation with impacted groups.

**TABLE 19. NATURAL RESOURCES COMPREHENSIVE STRATEGIES**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
| **Eastern Deciduous Forest – FRV** | **Strategy 1:** Maintain native forest cover | 1. Develop vegetation management plan | A, B, C | Nondependent | Yes  167280A: *Gathering Information on Table Mountain Pine in Catoctin Mountain Park* | 1–3 years | 75,000 | Operation of the National Park Service (ONPS) | High - monitoring; High - planning |
|  |  | 2. Develop burn plan | A, B, C | 1 (Park has to enter request through regional fire management officer. Dependent on existing fire management plan) | Yes 167279A:  *Measuring fuel loading in Catoctin Mountain Park* | 1–3 years | 25,000 | ONPS | High |
|  |  | 3. Riparian area plantings (restoration) | B, C | Nondependent | Yes 168614:  *Support natural resource volunteer program at Catoctin Mountain Park* | Ongoing | 25,000 total spent  since 2010 (for management only, includes deer exclosures, ex.) | Project / Partner | Medium |
|  |  | 4. Develop seed banks for native generation | B | 2 |  | 1 year to develop initial seed bank, then ongoing | 25,000 | ONPS / Partner | High (high initially, then medium) |
|  |  | 5. Forest monitoring | C | Nondependent | Yes 66915A:  *Conduct Vegetation Monitoring/Management Program* | Ongoing | 50,000 | ONPS / Project (opportunity for partner funding as well) | High |
|  | **Strategy 2:** Build partnerships for regional action | 1. Build landscape level partnerships (e.g., park work with U.S. Forest Service and State of Maryland on woolly adelgid treatments.) Suggestions: (1) identify friends groups; (2) identify partnership objectives; (3) develop partnerships over 10 years; (4) formulate plans with Frederick and Washington counties | C | Nondependent | Yes 168610:  *Control Exotic Plants to Protect Natural and cultural Resources with SCA Partner (YPP)* | Ongoing | 25,000 | Project / Partner | Medium |
|  |  | 2. Hemlock plantings and trunk injections | B, C | Nondependent |  | Ongoing | 25,000 for annual planting. Up to 50,000 if injections are conducted | Partner | Medium |
|  | **Strategy 3:** Improve native forest regeneration | 1. Deer management, including herd reduction and monitoring | B, C | Nondependent | Yes 168756A:  *Assess White-tailed Deer Herd Health* | Ongoing | Approximately 200,000 per year total.  Approximately 100,000 per year (for 4 years, not including park staff salary). 100,000 per year for other activities | ONPS | High |

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| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  | **Strategy 4:** Limit new forest pest infestations and reduce percentage of nonnative species | 1. Establish clear objectives for alien and nonnative species management | A, B, C | 1 (Government Performance and Results Act goal) | Yes 138157:  *Two seasonal biotechs to treat invasive exotic plants* 129455:  *Create a Protocol for the Analysis of Deer Browse Data at Catoctin Mountain Park* 41425A:  *Prepare EIS for Deer Mgmt at Catoctin Mountain Park* | Ongoing | Up to 50,000 (Hard costs only.  Volunteer and some project money spent to date. Actual costs will be higher.) | ONPS / Project / Partners | High |
|  |  | 2. Early pest detection | B, C | 2 | Yes 168610:  *Control Exotic Plants to Protect Natural and cultural Resources with SCA Partner (YPP)* | Ongoing | 50,000 | Project | Medium |
|  |  | 3. Provide active management. Select specific parts of the park to treat and complete activities such as barberry and microstegium removals. Engage in restoration and education initiatives to complement active management efforts. | B | 3 |  | 4-10 years | 80,000 for fuel  reduction. 85,000 for forest management.  70,000 for nonnative plant management and tree disease response. Deer management costs listed under “Wildlife Communities”) | Project | High |
| **Geological Resources – FRV** | **Strategy 1:** Characterize local aquifer systems | 1. Make technical request to Geological Resources Division | A | 1 |  | 1 year | 75,000 | ONPS (GRD personnel base) | High |
|  |  | 2. Monitor groundwater levels | A | 2 |  | Ongoing | 75,000 | ONPS | High |
|  |  | 3. Find a researcher to characterize local aquifer systems | A | 3 |  | 1 year | More than 75,000 | Project / Partner | High |
|  | **Strategy 2:** Reduce erosion | 1. Assess trail system in context with geological background | A | 1 | Yes 167278 B:  *Improve Catoctin Mountain Park Trail System*  *Involving Youth 2012 (YPP)* | Ongoing (continuous monitoring and activities) | 75,000 | Project / ONPS | High |
|  |  | 2. Develop engineering strategy to address severe erosion problems near visitor center and Ike Smith Pumphouse | A, B | 2 |  | Ongoing | 75,000 | ONPS | High |
|  |  | 3. Protect and promote native vegetation in riparian buffers, which stabilize banks | B | 3 |  | Ongoing | 150,000 (including work around bridge and/or Ike Smith Pumphouse) | Project / Facilities | High |

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| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 4. Monitor sedimentation | C | 4 | Yes 81311A:  *Supplement Water Quality Monitoring Project Funding To Sample All Park Streams* | 4–10 years | 25,000 | Project | Medium |
| **Wildlife Communities – FRV** | **Strategy 1:** Develop strategic partnerships and enhance habitat connectivity | 1. Continue to work with Maryland State Parks and Frederick County to protect strategic land parcels in the Upper Monocacy watershed | A, B, C | Nondependent |  | Ongoing | < 25,000 | Partners | High |
|  | **Strategy 2:** Inventory and monitor certain wildlife populations, including birds, bats, reptiles, amphibians, and invertebrates | 1. Monitor small mammals such as mice, voles, and shrews | C | 2 | Yes 193965A:  *Monitoring Bats to Assess Impacts of*  *White-Nose Syndrome at Catoctin Mountain Park* | Ongoing (recurring inventory) | 25,000 | ONPS / Project - possible  / Partner -possible | Medium |
|  |  | 2. Continue I&M bird surveys | C | 1 |  | Ongoing (I&M conducting since 2007) | 75,000 (annual) | ONPS (I&M) | High |
|  |  | 3. Complete climate change vulnerability assessment for birds | A | Nondependent |  | 1–2 years | Unknown | Unknown | N/A |
|  |  | 4. Complete turtle survey | A | Nondependent |  | 2 years | 75,000 | Project / Partner | Medium |
|  |  | 5. Maintain research relationship with W.H. Martin, volunteer rattlesnake researcher at park | A, B, C | Nondependent |  | Ongoing | None | N/A (volunteer) | High |
|  |  | 6. Continue amphibian and reptile monitoring | B | Nondependent |  | Ongoing (activity is complete every few years) | 500 (materials) | ONPS / Volunteer | Medium |
|  |  | 7. Complete inventory for invertebrates of ecological or management significance, such as bees and certain aquatic macroinvertebrates | A | Nondependent | Yes 159239A:  *Survey of beetles of Catoctin Mountain Park*  164555A:  *Survey of the Bees of Catoctin Mountain Park* | Ongoing | 75,000 | Project / Partner | Medium |
|  |  | 8. Complete amphibian and reptile disease study | A | Nondependent | No | ongoing | TBD | Proposed by U.S. Geological Survey, funding TBD | Medium |
|  |  | 9. Continue bat surveys | A | Nondependent | Yes 193965:  *Monitoring Bats to Assess Potential Impacts of White- Nose Syndrome at Catoctin Mountain Park* | 1 year | 25,000 | ONPS / Partner | Medium |
| **Fish Communities – FRV** | **Strategy 1:** Stream habitat protection and restoration | 1. Develop control strategy for didymo | B, C | 1 |  | Ongoing (park and state monitoring) | 25,000 | ONPS / Partner | High |

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| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 2. Monitor canopy gaps along streams (i.e., number of gaps per stream segment) | C | 2 | Yes 66915A:  *Conduct Vegetation Monitoring/Management Program*  165899C:  *Restore the Big Hunting Creek watershed* | Ongoing | 25,000 | Partner | High |
|  |  | 3. Replant native species to maintain stream shading / provide invasive species control (i.e., conduct plantings in specific canopy gaps to reduce bank erosion; then reduce a to- be-determined number of gaps over time) | B | 3 | Yes 168614:  *Support Natural Resource Volunteer Program at Catoctin Mountain Park* | Ongoing | 75,000 (if hemlock treatment is associated). 25,000 (if hemlock treatment is not included) | Partner / Future Project | High |
|  | **Strategy 2:** Monitor indicator species; continue to collect fish community data, and research and monitor habitat dynamics | 1. Continue to monitor trout populations, macroinvertebrates, water chemistry, temperature, and water level | A, C | Nondependent | Yes 156497:  *Establishing a Baseline of Critical Data Impacting Brook Trout at Catoctin Mountain Park* | Ongoing | 25,000 (includes I&M funds) | ONPS (I&M) | High |
|  | **Strategy 3:** Resource protection (enforcement) | 1. Continue to enforce catch and release | B | Nondependent |  | Ongoing | 25,000 | ONPS | Low–Medium |
|  | **Strategy 4:** Educate park staff to utilize best fisheries management practices | 1. Staff attend “Dirt and Gravel Roads” course (Pennsylvania State / The Nature Conservancy) | A, B | Nondependent |  | 1–3 years | 25,000 | ONPS / Partner (Nature Conservancy) | High |
|  | **Strategy 5:** Expand fishing activity into Lewis Pond (property) and Braestrup Pond (potential future recreation, future project) | 1. Develop Pond Management Plan for Lewis Pond and Braestrup Pond | A, B, C | Nondependent |  | 1–2 years to develop pond plans | 75,000 (includes research and plans) | ONPS / Partner | Medium |
| **Natural Sounds – OIRV** | **Strategy 1:** Obtain baseline sound measurements | 1. Make technical request to NPS Natural Sounds Program | A, B | Nondependent |  | 1 year | 50,000 | ONPS (Natural Sounds Program base) | Low |
| **Air Quality – OIRV** | **Strategy 1:** Develop strategic partnerships, collect, and document baseline air quality data | 1. Continue to develop partnerships with state, local, and nongovernmental organizations to build support to improve local air quality | B | Nondependent |  | Ongoing | < 50,000 (for  possible purchase of electric vehicle) | Clean Cities Grant | Medium |
|  |  | 2. Continue to monitor and document air quality indicators | C | Nondependent |  | Ongoing | 35,000 - 40,000 | ONPS (Air Resources Division) | Medium |

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| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
| **Night Skies – OIRV** | **Strategy 1:** Reduce light pollution within the park to enhance the night skies as seen from the park. Obtain baseline night skies measurements | 1. Make technical request to NPS Night Skies Program | A | Nondependent |  | 1–2 years | 50,000 | ONPS / Partner | Medium |
|  |  | 2. Provide outreach and education to park neighbors and visitors by including night skies in future interpretation activities | B | Nondependent |  | 4–10 years | 25,000 | Project | High |
|  |  | 3. Continue to incorporate technological improvements at the park, such as installing motion sensors, bulbs, and light shields | B | Nondependent | Yes 167959:  *Develop Phase II of the Climate Friendly Parks Program At Catoctin Mountain Park with Youth* | Ongoing | More than 75,000 | ONPS | Medium |
| **Water Quality / Quantity - OIRV6** | **Strategy 1:** Protect watersheds within park boundaries | 1. Develop watershed management plan | A, B, C | Nondependent |  | Approximately 5 years to obtain funding; 6 more years to complete environmental impact statement | More than 75,000 | Project | High |
|  | **Strategy 2:** Pursue watershed partnerships and create a monitoring- based agreement to monitor watershed impacts | 1. Balance water volume release regimes to protect fish communities and recreational qualities, particularly during the dry months of July and August | B, C | Nondependent |  | 1–3 years | 5,000 (for automatic monitoring equipment) | Project / Partner | High |
|  |  | 2. Develop a stream gauge monitoring system that continuously measures stream levels. Develop a joint fisheries agreement with Cunningham Falls State Park to mitigate flows on Hunting Creek Dam | C | 1 |  | 1 year to develop monitoring system. Joint fisheries agreement will take more than 1 year to implement | 25,000 | Project / Partner | High |
|  |  | 3. Work with private landowners to protect land and plant trees near streams, especially near watershed headwaters | B | Nondependent |  | Ongoing | 5,000 (for possible tree plantings) | Partner | High |
|  | **Strategy 3:** Minimize leaks from wells and holding tanks | 1. Study and determine if the park has adequate water capacity and an adequate distribution system | A | 1 | Yes 172146A:  *Study to Determine Adequate Water Reservoir*  *Capacity and Placement* | 5 years | 50,000 | ONPS (Facilities) | High |

1. Overall strategy for water quality and quantity: obtain technical assistance from NPS Water Resources Division to assist maintaining the integrity of this resource.

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| **Natural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS?**  **If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 2. Increase holding tank capacity and renovate park’s water system capacity | B | 2 | Yes 168428A:  *Install New Water System at Camp Greentop*  154469A:  *Waste Water System Upgrade (West)* | 10 years | 500,000 | ONPS (Facilities / Repair / Rehabilitation) | High |
|  |  | 3. Monitor water quality | C | 3 |  | Ongoing | 25,000 | ONPS (I&M) / Partner | High |
|  |  | 4. Groundwater study | A | Nondependent | No | 1 year | TBD | ONPS / WASO | Medium |

**TABLE 20. CULTURAL RESOURCES COMPREHENSIVE STRATEGIES**

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
| **Historic Structures in Camp Greentop and Camp Misty Mount – FRV** | Preserve and maintain historic structures in cabin camps | 1. Prepare detailed Condition Assessments, including as-built architectural drawings, for all historic structures in Camp Greentop and Camp Misty Mount | A | 1 |  | 1–3 years | 100,000 | Cultural Resources ONPS (CRONPS) | High |
|  |  | 2. Develop a comprehensive treatment plan for all structures | B | 2 |  | 1–2 years | 50,000 | CRONPS |  |
|  |  | 3. Implement treatment plan | B | 3 |  | 2–4 years | 500,000 | Repair/rehabilitation, or cyclic, line item |  |
|  |  | 4. Prepare Preservation Maintenance Plan, including future preventative maintenance treatments | B | 4 |  | 1–2 years | 25,000 | CRONPS/ONPS |  |
|  |  | 5. Monitor and maintain condition, assess and modify treatment as necessary (ongoing) | C | 5 |  | Ongoing | 10,000 per annum (TBD) | ONPS |  |
| **Historic Structures in Camp Greentop and Camp Misty Mount – FRV** | Manage cabin camps facilities while allowing for continued visitor use | Prepare Cabin Camp Facilities Management Plan | B |  |  | 1–2 years | 50,000 | ONPS | Medium |
| **Ethnographic Resources – FRV** | Develop a park  ethnography program by initiating research and documentation, prioritizing identified ethnographic resources directly associated with park FRVs | 1. Complete ethnographic overview and assessment | A | 1 | 197250A | 2–3 years | 79,000 | CRONPS | High |
|  |  | 2. Complete ethnographic study of all groups listed below, prioritizing activities 3–6 because they are park FRVs, and to make working with the oldest populations a priority. This will be guided by the ethnographic overview and assessment. | A | 2 |  | 5–10 years | 500,000 | CRONPS |  |
|  |  | 3. Complete ethnohistory and cultural affiliation of camp users from 1930s to present, including members of the Maryland League for People with Disabilities (historically known as League of Crippled Children). | A | 2 |  | 1–2 years | 60,000 | CRONPS |  |

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 4. Obtain oral history and transcription information from John Whiteclay Chambers II‘s OSS report (2008) and evaluate the information to identify potential ethnographic resources | A | 2 |  | 1 year | 2,000 | ONPS |  |
|  |  | 5. Complete ethnohistory with OSS society members and evaluate the information to identify potential ethnographic resources | A | 2 |  | 1–2 years | 35,000 | CRONPS |  |
|  |  | 6. Complete ethnohistory with CCC alumni association | A | 2 |  | 1–2 years | 25,000 | CRONPS |  |
|  |  | 7. Develop oral history plan (ongoing) coordinated with interpretation and resource management | A | 3 | 168752 | 1–2 years | 100,000 | ONPS |  |
|  |  | 8. Complete ethnographic research / traditional use study on mushroom collection in coordination with natural resource staff and evaluate the information to identify potential ethnographic resources. | A | 3 |  | 1–2 years | 40,000 | CRONPS |  |
|  |  | 9. Transcribe pre-park landowner oral histories, and evaluate the information to identify potential ethnographic resources | A | 3 |  | 1–2 years | 75,000 | CRONPS |  |
| **Ethnographic Resources – FRV** | Develop plan to monitor condition of ethnographic resources | Extent of which monitoring would need to occur will be determined by the ethnographic overview and assessment and subsequent identification of ethnographic resources (see comp. strategy above) through research, interviews, and documentation. Monitoring protocols would be developed through consultation with associated ethnographic groups, depending on the resource. | B, C | 4 |  | Ongoing | TBD | ONPS | Low |
| **Cultural Landscapes – FRV** | Conduct historical research and documentation | 1. Evaluate undocumented, potential component landscapes for integrity: Camp Round Meadow, Braestrup Tract, Mission 66 areas (Owens Creek Area and Chestnut Area), Lewis Property. | A | 1 |  | 1–2 years | 10,000 | CRONPS | High |

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 2. Update existing cultural landscape inventory for Catoctin Mountain Park after the national register nomination is accepted by the Keeper. |  | 1 |  | 2–3 years | 10,000 | CRONPS | Low |
|  |  | 3. Complete cultural landscape inventory for Camp Greentop. | A | 1 | Yes 15004 | 1–2 years | 35,000 | CRONPS | Low |
|  |  | 4. Update Camp Misty Mount cultural landscape inventory to include periods of significance, including Mission 66 era features. | A | 1 |  | 1 year | 35,000 | CRONPS | Low |
|  |  | 5. Evaluate Camp Round Meadow landscape for integrity; document with a cultural landscape inventory if integrity is sufficient | A | 2 |  | 1 year | 35,000 | CRONPS | High |
|  |  | 6. Braestrup Tract: if determined to have integrity in activity 1, then complete cultural landscape inventory. If landscape does not have integrity, then complete a treatment plan to preserve features accordingly | A | 2 |  | 1 year | 35,000 | CRONPS | Low |
|  |  | 7. Mission 66 areas (Owens Creek, Chestnut), to be determined following step 1. | A | 2 |  | 1 year | 35,000 | CRONPS | Low |
|  |  | 8. Lewis Property, to be determined following step 1. | A | 2 |  | 1 year | 35,000 | CRONPS | Low |
| **Cultural Landscapes – FRV** | Preserve and maintain important cultural landscapes | Prepare cultural landscape reports or other treatment plans for selected cultural landscapes, as determined following identification of cultural landscapes through documentation and inventory. Prioritize those cultural landscapes following documentation of undocumented cultural landscapes and more information is known concerning which, if any, landscapes need treatment plans. | B | 1 |  | 2–3 years | 80,000–110,000 for  each cultural landscape report, depending on complexity | CRONPS | Low |
| **Other Historic Structures – OIRV** | Update historical research and documentation | Conduct determinations of eligibility for newly acquired properties not included in the national register update | A | 1 |  | 1–2 years | 50,000 | CRONPS | Medium |
|  |  | Update List of Classified Structures with structures newly determined national register- eligible | A | 2 |  | 1–2 years | 10,000 | CRONPS |  |

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
| **Other Historic Structures – OIRV** | Preserve and maintain historic structures | 1. Prepare historic structure reports and/or detailed condition assessments including as-built architectural drawings for national register-eligible structures such as the Blacksmith Shop, Visitor Center, Quarters 1, Ike Smith Pumphouse, CCC Dining Hall, Infirmary, possibly Mission 66 buildings, Great Society resources, stone wall at Round Meadow, dry-stack stone walls, culverts, Braestrup buildings and structures, and others. | A | 1 |  | 1–3 years | 100,000 | CRONPS | High |
|  |  | 2. Develop treatment plan when necessary, as determined by condition assessments | B | 2 |  | 1–2 years | 50,000 | CRONPS |  |
|  |  | 3. Implement treatment plan | B | 3 |  | 2–4 years | 500,000 | Repair/rehabilitation, or cyclic, line item |  |
|  |  | 4. Preservation maintenance plan, including future preventative maintenance treatments | B | 4 |  | 1–2 years | 25,000 | CRONPS/ONPS |  |
|  |  | 5. Monitor and maintain condition, assess and modify treatment as necessary (ongoing) | C | 5 |  | Ongoing | 10,000 per annum (TBD) | ONPS |  |
| **Archeological Resources – OIRV** | Update archeological research and documentation | 1. Update ASMIS database for site condition and monitor identified sites | C | 1 |  | Ongoing | 10,000 | CRONPS | Low |
|  |  | 2. Add newly identified sites to ASMIS database | A | 2 |  | Ongoing | 2,000 | CRONPS |  |
|  |  | 3. Identify unsurveyed areas with high probability for archeological resources (see LBG 2011 for specific recommendations) | A | 3 |  | 1–2 years | 5,000 | CRONPS |  |
|  |  | 4. Conduct site evaluation studies (see LBG 2011 for specific recommendations) | A | 4 |  | 3–5 years | 400,000 | CRONPS |  |
|  |  | 5. Examine threats and develop management plans if it is determined that certain archeological resources are threatened | B | nondependent |  | Ongoing | 50,000 | ONPS |  |

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 6. Develop Archeological Resources Protection Act strategy for law enforcement rangers, maintenance staff, resource managers, and other park staff | B | nondependent |  | Ongoing (once every 2 years) | 2,000 | ONPS – Regional Support | High |
|  |  | 7. Conduct additional phase I or II archeological survey for future ground-disturbing activities (per section 106) | A, B | nondependent |  | Ongoing | 50,000 | Project |  |
| **Museum Collections – OIRV** | Preserve and protect park museum collections | 1. Accession backlog of museum objects and evaluate archival collection. | A | 1 |  | Ongoing | 10,000 | ONPS | Medium |
|  |  | 2. Improve storage and exhibit of museum collections | B, C | nondependent |  | 3–5 years | 100,000 | Project |  |
|  |  | 3. Improve storage condition of archival collection. Put objects, such as historic drawings, photos, film, etc., into improved, protected file folders, fireproof cabinets, etc. | B | 2 |  | 1–2 years | 10,000 | CRONPS |  |
|  |  | 4. Evaluate objects from the craft center/living history program for deaccession | A, B |  |  | 1 year | 2,000 | ONPS |  |
|  |  | 5. Review and update scope of collections statement | B | nondependent | 185465A | 1 year | 3,500 | CRONPS |  |
|  |  | 6. Prepare collections management plan | B | 3 | 185465B | 1–2 years | 35,000 | CRONPS |  |
|  |  | 7. Digitize relevant archival material | B | nondependent |  | Ongoing | 10,000 | CRONPS |  |
|  |  | 8. Accession new items as needed | A, B | nondependent |  | Ongoing | 5,000 | ONPS |  |
| **Views and Vistas – FRV** | **Strategy 1:** Document baseline conditions | 1. Define, review and update identified views and vistas (from the cultural landscape inventory, cultural landscape report, national register, and ethnographic overview - to be completed). 2. Complete a viewshed analysis | A | 1 |  | Ongoing | 10,000 | CRONPS | Medium |
|  | **Strategy 2:** Develop local partnerships and participate in local planning initiatives | 1. Work with Frederick and Washington counties and surrounding communities to preserve viewsheds | B | nondependent |  | Ongoing | 10,000 | Base (ONPS) | Medium |

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| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  | **Strategy 3:** Document and monitor trends and changes in views and vistas over time | 1. Record trends using historic photos and collect current photo points to compare photography over time. 2. Conduct interviews with park visitors. 3. Conduct mapping activities. 4. Conduct aerial photography activities and postcards | A, C | 2 |  | Ongoing | 10,000 | ONPS | Medium |
|  | **Strategy 4:** Maintain designed access to overlooks | 1. Perform routine maintenance to clear vegetation to maintain views / vistas / overlooks | B | nondependent |  | Ongoing | (check) | Base (ONPS) | Medium |
|  |  | 2. Include views and vistas in vegetation management plan and/or watershed management plan | A | 1 |  | 1 year | (see costs associated with plans) | Base | High |
|  |  | 3. Include one question in visitor use survey related to views and vistas experience | A | 2 |  |  |  |  |  |
|  |  | 4. Conduct panoramic viewshed sight line monitoring – photo points | A, C | 3 |  | Ongoing | 10,000 | ONPS | High |
|  |  | 5. Develop interpretive media for certain views and vistas | B | 4 |  | 3–4 years | 35,000 | ONPS | High |
| **All Cultural Resources** | Update historical research and documentation of Catoctin Mountain Park’s historic context and historiography in support of important cultural resource types | 1. Complete and submit final national register nomination for Catoctin Mountain Park to the Keeper of the National Register of Historic Places for listing | A | 1 |  | Underway | 0 |  | High |
|  |  | 2. Prepare historic resource study on OSS history at Camp Greentop to support potential ethnographic resources associated with OSS groups, as well as OSS artifacts in the museum collection and archives, or possibly in yet-to- be-discovered archeological sites | A |  |  |  | 40,000 |  |  |
|  |  | 3. Update the park’s administrative history, completed in 1986 | A |  |  |  | 40,000 |  |  |
|  |  | 4. Incorporate new historical information gleaned from cultural resources documentation into park interpretive programs | A |  |  |  | 10,000 |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultural Resources Comprehensive Strategies** | | | | | | | | | |
| **Priority Resource** | **Comprehensive Strategy** | **Activity, by Sequence (number activities, 1., 2., 3.)** | **Activity Category:**  **A = Base Knowledge, B = Management and Mitigation,**  **C = Monitoring** | **Sequencing** | **In PMIS? If yes, note PMIS #** | **Estimated Duration (Years)** | **Cost** | **Likely Funding Source** | **Priority (High, Medium, low)** |
|  |  | 5. Update all cultural resources GIS data to serve as a cultural resources base map. As appropriate, make this information available to law enforcement rangers to better protect important resources in the field. | C |  |  | Ongoing | 10,000 | ONPS |  |
| **Common to All Resources** | Conduct comprehensive interdisciplinary resource management training, integrating natural and cultural resource law and policy, for improved protection of all park resources | 1. Engage park staff in interdisciplinary training that includes a primer on cultural resource law and policy (e.g., section 106, Archeological Resources Protection Act, database, ethnographic resources, preventative maintenance training, etc.) | B |  |  | Ongoing |  | ONPS | High |
|  | Climate change plan | Prepare climate change plan using climate scenario planning knowledge from the workshop. Plan would include consultation with impacted groups. | B |  |  | 2–4 years | 50,000 | ONPS | Medium |
|  |  |  |  |  |  |  |  |  |  |
| **Legend** | **Purple shading indicates interdisciplinary strategies** |  |  |  |  |  |  |  |  |

## Activity Timelines and Funding

Each set of strategies and activities is depicted on a timeline and funding table (table 21). This table lists activities in rows and displays activity years in columns (numbered 1–10). Graphical bars associated with an activity provide a visual cue for when the activity will start and how long it is estimated to take. The bars also indicate the type of activity (e.g., inventory / survey, monitoring, plan / analyze, and manage / mitigate), and some activities may encompass more than one type.

**TABLE 21. PROJECT FUNDING TABLE**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year 1** | | | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** | **Year 7** | **Year 8** | **Year 9** | **Year 10** | **TOTAL** |
| **Natural Resources** | **ONPS7** | 1,019,850 | 907,350 | 863,850 | 738,000 | 738,000 | 688,000 | 688,000 | 688,000 | 688,000 | 688,000 | 7,707,050 |
| **Activity8** | 799,350 | 699,350 | 638,350 | 902,500 | 902,500 | 902,500 | 902,500 | 902,500 | 902,500 | 902,500 | 8,454,550 |
| **Other9** | 50,000 |  |  |  |  |  |  |  |  |  | 50,000 |
| **Cultural Resources** | **ONPS** | 51,000 | 90,000 | 87,000 | 85,000 | 87,000 | 85,000 | 87,000 | 85,000 | 87,000 | 85,000 | 829,000 |
| **CRONPS** | 762,832 | 577,832 | 365,332 | 152,000 | 152,000 | 72,000 | 72,000 | 72,000 | 72,000 | 72,000 | 2,369,996 |
| **Activity** | 320,000 | 295,000 | 320,000 | 320,000 | 70,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 1,575,000 |
| **Interdisciplinary Resources** | **ONPS** | 76,250 | 76,250 | 51,250 | 51,250 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 435,000 |
| **CRONPS** | 30,000 | 30,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 140,000 |
| **TOTAL** | **ONPS** | 1,147,100 | 1,073,600 | 1,002,100 | 874,250 | 855,000 | 803,000 | 805,000 | 803,000 | 805,000 | 803,000 | 8,971,050 |
| **Activity** | 1,119,350 | 994,350 | 958,350 | 1,222,500 | 972,500 | 952,500 | 952,500 | 952,500 | 952,500 | 952,500 | 10,029,550 |
| **Other** | 50,000 |  |  |  |  |  |  |  |  |  | 50,000 |
| **CRONPS** | 792,832 | 607,832 | 375,332 | 162,000 | 162,000 | 82,000 | 82,000 | 82,000 | 82,000 | 82,000 | 2,509,996 |
| **GRAND TOTAL** | | **3,109,282** | **2,675,782** | **2,335,782** | **2,258,750** | **1,989,500** | **1,837,500** | **1,839,500** | **1,837,500** | **1,839,500** | **1,837,500** | **21,560,596** |

1. Funding sources include: ONPS, National Capital Region, I&M, Facilities, WASO
2. Funding source includes: Partner
3. Funding source includes: Grant

## Expert Review of Comprehensive Strategies

Expert review, conducted by outside subject matter experts, ensures that the comprehensive strategies developed by park staff are the best management strategies based on current science and scholarship.

Although the resource stewardship strategy does not outline implementation procedures, it does address the process necessary to improve and maintain current conditions. Expert reviewers are asked to look at methods for determining current conditions, methods for measuring changes in condition, and the sequence of events that are needed to achieve reference conditions.

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## Projected Funding Needs to Implement the Resource Stewardship Strategy

The activities detailed in the previous sections may be summarized into natural and cultural resource management disciplines as well as others which cut across categories. The table below details the yearly funding needed to implement the resource stewardship strategy at Catoctin Mountain Park.

Figures 1 (Division Funds Over the Past 5 Years); 2 (Annual Funds Divided By Division); 3 (Annual Funds); and 4 (2012 Funds Divided By Division) are also included.

**Division Funds Over Past 5 Years**

$2,500,000

$2,000,000

$1,500,000

$1,000,000

$500,000

$0

Resource

Management/

Visitor

Protection &

Resource

Maintenance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Management | Administration | Resource  Education | Protection |  |
| 2008 | $599,347 | $560,585 | $337,397 | $747,294 | $1,235,315 |
| 2009 | $692,698 | $650,619 | $289,226 | $949,609 | $2,371,223 |
| 2010 | $680,370 | $639,938 | $306,420 | $947,156 | $1,637,434 |
| 2011 | $593,763 | $640,289 | $347,416 | $885,725 | $1,588,750 |
| 2012 | $817,108 | $604,911 | $309,707 | $849,748 | $1,746,344 |

**FIGURE 1. DIVISION FUNDS OVER PAST 5 YEARS**

**Annual Funds Divided by Division**

$2,500,000

$2,000,000

$1,500,000

$1,000,000

$500,000

$0

Resource Management Management / Administration Visitor Protection & Resource

Education

Resource Protection Maintenance

FY2008

$599,347

$560,585

FY2009

$696.70

$650,619

FY2010

$680,370

$650,619

FY2011

$593,763

$640,289

FY2012

$817,108

$604,911

$337,397

$289,226

$306,420

$347,416

$309,707

$747,294

$1,235,315

$949,609

$2,371,223

$947,156

$1,637,434

$885,725

$1,588,750

$849,748

$1,746,344

**FIGURE 2. ANNUAL FUNDS DIVIDED BY DIVISION**

**Annual Funds**

$6,000,000

$5,000,000

$4,000,000

$3,000,000

$2,000,000

Project

ONPS

$1,000,000

$0

2009

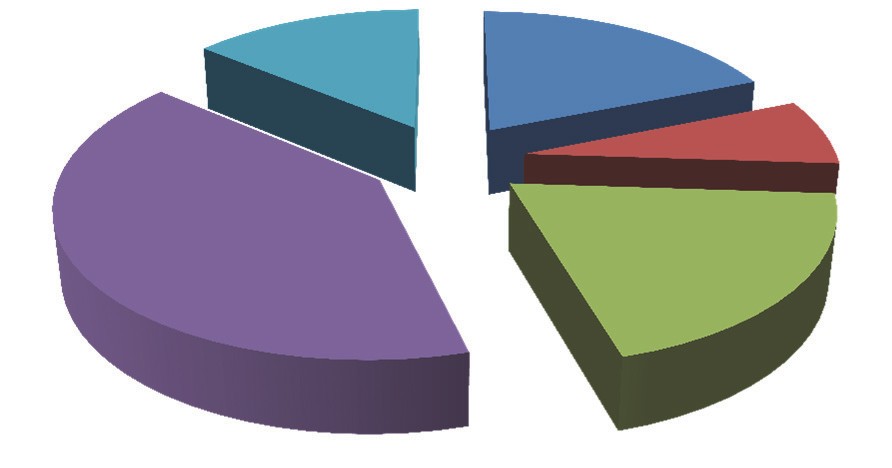
2010

2011

2012

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | |
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**FIGURE 3. ANNUAL FUNDS**



**2012 Funds Divided by Division**

Management and Administration

Resource Management

Visitor

Protection & Resource Education

Maintenance

Resource

Protection

**FIGURE 4. 2012 FUNDS DIVIDED BY DIVISION**

# APPENDIX: CONDITION DEFINITIONS (CULTURAL LANDSCAPE INVENTORY, LIST OF CLASSIFIED STRUCTURES, ARCHEOLOGICAL RESOURCES)

## CONDITION DEFINITIONS: CULTURAL LANDSCAPE INVENTORY

**Good:** indicates that the inventory unit shows no clear evidence of major negative disturbance and deterioration by natural and/or human forces. The inventory unit’s cultural and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

**Fair:** indicates that the inventory unit shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within 3–5 years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the character defining elements will cause the inventory unit to degrade to a poor condition.

**Poor:** indicates that the inventory unit shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural values.

## CONDITION DEFINITIONS: LIST OF CLASSIFIED STRUCTURES

For prehistoric or historic ruined structures, the assignment of condition should be based on the goal of maintaining the character, material, and stability of the structure as acquired, excavated, or existing.

For all other structures, condition is categorized and defined as follows:

**Good**: The structure and significant features are intact, structurally sound, and performing their intended purpose. The structure and significant features need no repair or rehabilitation, but only routine or preventive maintenance.

**Fair**: The structure is in fair condition if either of the following conditions is present:

a.) There are early signs of wear, failure, or deterioration though the structure and its features are generally structurally sound and performing their intended purpose, OR

b.) There is failure of a significant feature of the structure.

**Poor**: The structure is in poor condition if any of the following conditions is present: a.) The significant features are no longer performing their intended purpose, OR

b.) Significant features are missing, OR

c.) Deterioration or damage affects more than 25% of the structure, OR

d.) The structure or significant features show signs of imminent failure or breakdown.

## CONDITION DEFINITIONS: ARCHEOLOGICAL SITES MANAGEMENT INFORMATION SYSTEM (ASMIS)

**Destroyed** The site’s formal condition assessment resulted in a professional determination that the site was destroyed or so severely damaged that the data potential/scientific research value was deemed insufficient to warrant further archeological monitoring or investigation. A destroyed site is excluded from Government Performance and Results Act and other national level reporting requirements and is recorded in the ASMIS system in the “Local Resource Type” field.

**Fair** The site, at the first condition assessment or during the time interval since its last condition assessment, shows evidence of deterioration by natural forces and/or human activities. If the identified impacts continue without the appropriate corrective treatment, the site will degrade to a poor condition and the site’s data potential for historical or scientific research will be lowered.

**Good** The site, at the first condition assessment or during the time interval since its last condition assessment, shows no evidence of noticeable deterioration by natural forces and/or human activities. The site is considered currently stable and its present archeological values are not threatened. No adjustments to the currently prescribed site treatments are required in the near future to maintain the site’s present condition.

##### Inundated –

**Uncertain** The deposits and condition of an inundated site, formerly in a terrestrial setting, are obscured and cannot be accurately assessed due to factors such as water turbidity or natural lack of clarity, wave action, growth of aquatic vegetation, and other conditions. Application of standard methods to assess the condition of an inundated site is not possible in these circumstances.

##### Not Relocated –

**Unknown** The location where the site was last documented was visited, but the site could not be relocated. Based on best professional judgment that considers standard site types in the park, geography, topography, site documentation, and other pertinent factors, the area is deemed to most likely be the location of the site. Further testing may be required to determine the site location with certainty.

**Poor** The site, at the first condition assessment or during the time interval since its last condition assessment, shows evidence of severe deterioration by natural forces and/or human activities. If the identified impacts continue without the appropriate corrective treatment, the site is likely to undergo further degradation and the site’s data potential for historical or scientific research will be lost.

**Unknown** The current condition of the site is not known, or available information is not sufficient to professionally evaluate the site’s condition, or the validity of the assessment is questionable. An unknown site condition is excluded from Government Performance and Results Act and other national level reporting requirements.

# GLOSSARY

###### Activities

Components of a comprehensive strategy that produce a specific deliverable or outcome necessary to proceed with the next activity in the strategy’s sequence. Examples include data collection and monitoring. Time frame, costs, and priority level are identified for each activity in the resource stewardship strategy.

###### Alien Plant

A plant species not native to the region, ecosystem, or habitat.

###### Annual Performance Plan

An annual performance plan articulates a park’s annual goals for the fiscal year and includes an annual work plan that identifies activities to be performed, a budget, and the workload to achieve these goals.

###### Annual Work Plan

A comprehensive plan for allocating budget and personnel to accomplish work for the next year according to priority.

###### Approvals

The process in which an administrator reviews and indicates concurrence with the proposed strategy.

###### ASMIS

The Archeological Sites Management Information System. A servicewide database that provides management information on archeological sites in National Park Service parks. The database contains descriptive, significance, condition, threat, disturbance, bibliographic, locational, and management information for sites at a park/unit. The database information may be used as a source of condition assessment information.

###### Assessment of Condition

Analysis of the state of a resource intended for protection, preservation, or conservation. Usually refers to the resource’s current condition.

###### Basal Area

The amount of land that is occupied by the cross-section of tree trunks and stems at their base. The measurement of individual trees is taken at the diameter at breast height (1.3m or 4.5ft) of a particular tree above the ground and includes the complete diameter of each tree, including the bark.

###### Benthic

Located on the bottom of a body of water or in the bottom sediment, or pertaining to bottom dwelling organisms.

###### Best Management Practices (BMPs)

Practices that apply the most current means and technologies available to not only comply with mandatory environmental regulations but also to maintain a superior level of environmental performance.

###### Chronic Wasting Disease (CWD)

Chronic wasting disease is a neurological disease of deer and elk that produces lesions in the brains of infected animals. CWD-infected animals display loss of condition, behavioral abnormalities, and death.

###### Comprehensive Strategy

A logically organized, science/scholarship-based sequence of management activities with a consistent focus on achieving and maintaining the reference conditions of resources. A comprehensive strategy is well-documented and peer-reviewed.

###### CRONPS

Acronym: *Cultural Resources Operation of the National Park Service*.

###### Cultural Landscape

A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values. There are four nonmutually exclusive types of cultural landscapes: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

###### Cultural Landscape Inventory Database

The cultural landscape inventory database contains information on the historically significant landscapes within the national park system. This inventory identifies and documents each landscape’s location, size, physical development, condition, landscape characteristics, character- defining features, as well as other valuable information useful to park management. Cultural landscape inventories become approved inventory records when all required data fields are entered, the park superintendent concurs with the information, and the landscape is determined eligible for the National Register of Historic Places through a consultation process or is otherwise managed as a cultural resource through a public planning process.

###### Cultural Resource

An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for NPS management purposes.

###### Current Condition

The current quantifiable or otherwise objective value or range of values for an Indicator or Specific Measure of Condition based on scientific data or scholarly analysis.

###### Dependencies

Indicates that one activity must be finished prior to starting the second activity as the results from the first are required as input for the next.

###### Desired Conditions

A qualitative description of the integrity and character for a set of resources and values, including visitor experiences that park management has committed to achieve and maintain. These desired conditions are tied to the park’s foundation document and/or general management plan.

###### Ethnographic Resources

Objects and places, including sites, structures, landscapes, and natural resources, with traditional cultural meaning and value to associated peoples.

###### Expert Review

Review of a document by qualified experts to ensure the accuracy and currency of information as well as the consideration of current scientific and other scholarly information.

###### Facility Management Software System (FMSS)

An information system that provides consistent and quantifiable information on NPS assets. The Facility Management Software System allows managers to track asset condition and maintenance information as a tool for making management decisions and investment.

###### Foundation Document for Planning and Management

A formal statement of a park unit’s core mission that provides basic guidance for planning and management decisions. The foundation document describes the core mission of the park unit by identifying the purpose, significance, fundamental and important resources and values, interpretive themes, assessment of planning and data needs, special mandates and administrative commitments, and the unit’s setting in the regional context.

###### Fundamental Resources and Values (FRVs)

Those features, systems, organisms, processes, visitor experiences, stories, scenes, sounds, smells, or other attributes of the park that merit primary consideration during planning and management because they are essential to achieving park purpose and maintaining park significance. The shortcut name used for an FRV in this resource stewardship strategy is “priority resource.”

###### General Management Plan

A document that provides a qualitative understanding between NPS management and the public about the types of resource conditions and visitor experiences that will best meet the purpose of the park.

###### Government Performance and Results Act (GPRA)

A United States law enacted in 1993 (P.L. 103-62) designed to improve government project management. The act requires agencies to engage in project management tasks such as setting goals, measuring results, and reporting their progress. In order to comply with the act, agencies produce strategic plans, performance plans, and conduct gap analysis of projects.

###### Index of Biotic Integrity (IBI)

A score that 1) aggregates multiple characteristics of a biological assemblage; 2) establishes regional reference conditions; and 3) allows direct translation of raw data to narrative assessments of site conditions.

###### Implementation Plan

A detailed plan that describes high-priority actions that will be performed over a set time to achieve reference conditions for the park.

###### Indicator of Condition

A selected subset of components or elements of a priority resource (fundamental or other important resource or value) that are particularly “information rich” and represent or “indicate” the overall condition of the priority resource. There may be one or several indicators of condition for a particular priority resource.

###### Influences

Stressors—either beneficial or detrimental—that affect resource condition.

###### Interpretive Themes

Stories or concepts that define the most important ideas or concepts communicated to visitors about a park unit. Themes are derived from—and should reflect—park purpose, significance, resources, and values.

###### Integrated Pest Management (IPM)

A decision-making process that coordinates knowledge of pest biology, the environment, and available technology to prevent unacceptable levels of pest damage, by cost-effective means, while posing the least possible hazard to people, resources, and the environment.

###### Invasive Plant

An invasive is a nonnative plant that grows and spreads rapidly. These plants’ natural controls, such as herbivores, parasites, and diseases may not be present, permitting their unrestricted growth in new environments. This unrestricted growth allows an invasive to displace existing, native vegetation and thereby reducing biodiversity.

###### List of Classified Structures (LCS)

An inventory of all historic structures that have historical, architectural, or engineering significance in which the National Park Service has a legal interest. The List of Classified Structures assists park managers in planning, programming, and recording decisions of treatment and consists of a database, forms, and attachments. The List of Classified Structures also tracks assessments of condition and integrity of structures.

###### Management Target

Often set to the same value or range of values as the reference condition, but in some cases the park may set a different (better or worse) reference condition, based on park-specific mandates, NPS management policies, etc., against which to compare the current condition.

###### National Environmental Policy Act (1969) (NEPA)

The National Environmental Policy Act defines guidelines for environmental protection by requiring federal agencies to study and report all possible environmental impacts of a development project during the planning process.

###### National Historic Preservation Act (1966) (NHPA)

The act requires federal agencies to establish a preservation program to identify, evaluate, and nominate cultural resources to the National Register of Historic Places, and to protect historic properties. Federal agencies must also take into account the effect of a federal undertaking or action on any district, building, structure, or object that is included or eligible for inclusion on the National Register of Historic Places.

###### National Park Service Organic Act (1916)

The Organic Act established the National Park Service, developing a single system to manage all parks, monuments, and designated sites. The Organic Act also provided the National Park Service with the mandate to preserve and protect a park and its resources while also providing for the enjoyment of the resources by the public.

###### National Register of Historic Places (NRHP)

The National Register of Historic Places is the nation’s official list of historic places worthy of preservation. The national register was authorized by the National Historic Preservation Act of 1966 and is administered by the National Park Service.

###### ONPS

Acronym: *Operation of the National Park Service*.

###### Other Important Resources and Values (OIRVs)

Resources and values that may not be fundamental to the purpose and significance of the park, but are important to consider in planning and management decisions. The shortcut name used for an OIRV in this resource stewardship strategy is “priority resource.”

###### Physical Habitat Index (PHI)

A measure of the condition of a stream’s (or entire watershed’s) quality, aquatic communities, and aquatic habitats.

###### Priority Resource

An umbrella term for FRVs and OIRVs.

###### Reference Condition

A quantifiable or otherwise objective value or range of values for an indicator or specific measure of condition intended to provide context for comparison with the current condition values. The reference condition is intended to represent an acceptable resource condition, with appropriate information and scientific or scholarly consensus. The reference condition might be based on a regulatory or program standard, historical data, data from relatively undisturbed sites, predictive models, or expert opinion.

###### Resource Stewardship Strategy (RSS)

Guided by a park’s general management plan or foundation document, a resource stewardship strategy provides a set of strategies for how to advance the current condition of a natural or cultural resource to the reference condition. The resource stewardship strategy is designed to: (1) provide an objective (i.e., quantitative) basis for assessing the condition of natural and cultural resources relative to the qualitative reference conditions; and (2) document the science and scholarship- based comprehensive strategies to achieve and maintain those reference conditions.

###### RTE

Acronym: *Rare, threatened, or endangered*.

###### Specific Measure of Condition

One or more specific measurements used to quantify or qualitatively evaluate the condition of an indicator at a particular place and time. There may be one or more specific measures of condition for each indicator of condition.

###### Significance

Expresses why the resources and values of the park are important enough to justify national park designation and describe why an area is important within a global, national, regional, and systemwide context.

###### Soundscape

The aggregate of all the natural, nonhuman-caused sounds that occur in the park, together with the physical capacity for transmitting sounds.

###### Strategic Plan

A plan that describes how to advance current conditions identified in the park’s foundation document (or similar guiding document) to a management goal.

###### Subject Matter Experts (SMEs)

Technical experts in scientific or scholarly disciplines who are relevant to the resource stewardship strategy and to the park.

###### Target Met? (Y/N)

Comparison of the current condition value against the reference condition and management target to determine whether the management target has been met.

###### Viewshed

A viewshed is the area of land, water, or other environmental elements that are visible from a fixed vantage point or set of points.

###### Visitor

Anyone who physically visits the park for recreational, nonrecreational, educational, or scientific purposes.

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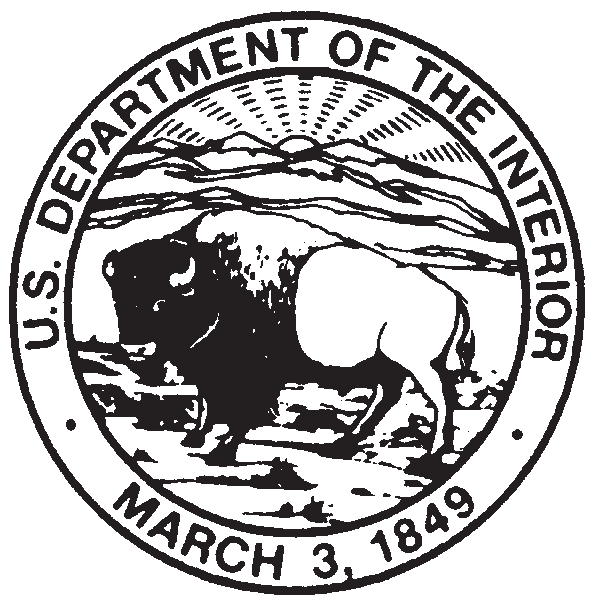
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