

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

This “Purpose of and Need for Action” chapter describes what this plan intends to accomplish and explains why the National Park Service (NPS) is taking action at this time. This White-tailed Deer Management Plan and Environmental Impact Statement presents three action alternatives for managing white-tailed deer, and it assesses the impacts that could result from continuation of the current management framework (alternative A) or implementation of any of the three action alternatives. Upon conclusion of the plan and decision-making process, one of the four alternatives will be selected and become the white-tailed deer management plan, which will guide future actions for a period of 15 years. Brief summaries of both purpose and need are presented here. Additional information is available in the “Park Background” section of this chapter.

PURPOSE OF THE PLAN / ENVIRONMENTAL IMPACT STATEMENT

The purpose of this action is to develop a deer management plan that supports forest regeneration and provides long-term protection, conservation, and restoration of native species and cultural landscapes in Catoctin Mountain Park.

NEED FOR ACTION

Significant changes have occurred across Maryland’s landscape in recent years, including the landscape in and around Catoctin Mountain Park. Among the most dramatic of these changes is the resurgence of white-tailed deer (*Odocoileus virginianus*). Extremely rare at the turn of the 20th century, deer populations in Maryland have not only rebounded, but are now higher than at any other time in their history. The white-tailed deer is an adaptable animal that has favorably exploited changes in habitat brought about by agricultural changes and the land use patterns associated with suburban development (Maryland Department of Natural Resources [MD DNR] 1998).

Action is needed at this time to address declining forest regeneration and to ensure that natural processes (including the presence of deer) support native vegetation, wildlife, and the cultural landscape. The following statements further define the need for action:

- Excessive deer browsing reduces forest regeneration, resulting in adverse changes to the forest structure, composition, and wildlife habitat.
- Excessive deer browsing in Catoctin Mountain Park could adversely affect the natural distribution, abundance, and diversity of native species, including species of special concern.

The White-tailed Deer Management Plan and EIS will provide Catoctin Mountain Park with a management plan addressing forest regeneration and protection, conservation, and restoration of native species and cultural landscapes for the next 15 years.



A browse line, a visible delineation at approximately six feet above the ground below which most or all vegetation has been uniformly browsed, is caused by excessive deer browsing.

- Excessive deer browsing has impacted native shrubs, trees, and forest systems that comprise the natural vegetation component of the Camp Misty Mount and Camp Greentop cultural landscapes.
- Greater cooperation is needed with state and local governments currently implementing deer management actions to help achieve mutual deer management goals.

OBJECTIVES IN TAKING ACTION

Any plan the park develops must be consistent with the laws, regulations, and policies that guide the National Park Service. Objectives are “what must be achieved to a large degree for the action to be considered a success” (NPS 2001b). All alternatives selected for detailed analysis must meet all objectives to a large degree, and they must resolve the purpose of and need for action. Objectives for managing deer populations must be grounded in the park’s enabling legislation, purpose, significance, and mission goals, and they must be compatible with direction and guidance provided by the park’s *Statement for Management* (NPS 1996b). The following objectives related to deer management were developed for this plan.

VEGETATION

- Reduce adverse effects of deer browsing pressure to ensure tree regeneration sufficient to reach the desired condition of a sustainable eastern hardwood forest with a native and diverse forest structure.
- Provide protection for threatened, endangered, and sensitive plant species and their habitats (e.g., the large purple-fringed orchid, *Platanthera grandiflora*) from adverse impacts related to deer browsing.
- Maintain, restore, and promote a mix of native herbaceous plant species, and reduce the competitive advantage of invasive exotic plant species over native plant species through effective deer management.

WILDLIFE AND WILDLIFE HABITAT

- Maintain a viable white-tailed deer population within the park while protecting other park resources. (See “Desired Conditions” in this chapter for a definition of “viable white-tailed deer population” as it relates to this plan.)

- Protect lower canopy and ground-nesting bird and other wildlife habitat from adverse impacts from deer browsing.

CULTURAL RESOURCES

- Ensure that vegetation contributing to the park's cultural landscape is protected from the adverse effects of deer behavior (browsing, trampling, seed dispersal).

VISITOR EXPERIENCE

- Educate the public regarding the deer population and the forest regeneration process and diversity, including the role of deer as part of a functioning park ecosystem.
- During implementation of any management action, minimize disruption to visitor use and experience or adverse impacts to visitor and community safety.

PROJECT SITE LOCATION

Catoctin Mountain Park is part of the Blue Ridge Mountains, which are part of the Appalachian Mountains. The Blue Ridge Mountains stretch 500 miles from Georgia to a point just north of Catoctin Mountain Park (NPS 2005d).

Along with neighboring Cunningham Falls State Park, Gambrill State Park, and the Frederick and Thurmont watersheds, Catoctin Mountain Park is part of the area known as Catoctin Mountain. Catoctin Mountain forms the easternmost section of the Blue Ridge and extends 50 miles from Emmitsburg, Maryland, to Leesburg, Virginia (NPS 2005d).

Catoctin Mountain Park is in Frederick and Washington counties west of the town of Thurmont (see "Park Location Map" on page 7). U.S. Highway 15 provides the most direct access to the park. Encompassing 5,810 acres, Catoctin Mountain Park is bordered by the town of Thurmont to the east, Cunningham Falls State Park to the south, and rural and agricultural areas to the west and north. Maryland Route 77 heads west of US 15 at Thurmont and delineates Catoctin's southern boundary, providing access to Catoctin's Park Central Road, which traverses most of the park. Maryland Highway 550 roughly follows the park's northern boundary.

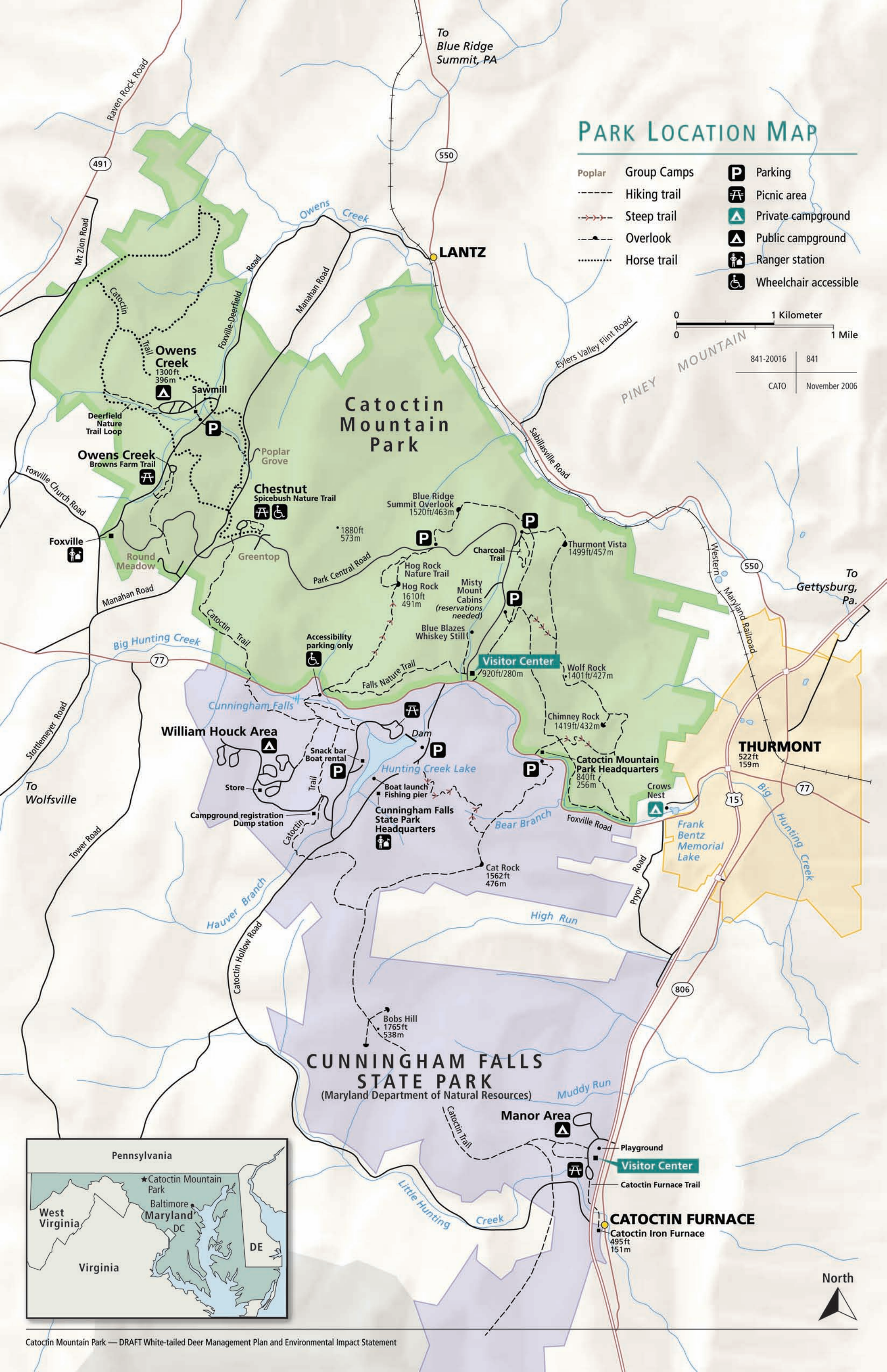
PURPOSE OF AND NEED FOR ACTION

PARK LOCATION MAP

- Poplar
- Hiking trail
- - - - Steep trail
- - - - Overlook
- Horse trail
- P** Parking
- PA** Picnic area
- ▲** Private campground
- ▲** Public campground
- 👮** Ranger station
- ♿** Wheelchair accessible

0 1 Kilometer
0 1 Mile

841-20016 841
CATO November 2006



PARK BACKGROUND

HISTORY OF CATOCTIN MOUNTAIN PARK

Catoctin Mountain Park is an example of a cooperative effort between state and federal officials who participated in a New Deal era lands program to help the local community rehabilitate “sub-marginal” farm and forest land for use as recreation areas (NPS 1998b), known as recreational demonstration areas. The original authority to acquire lands now included in Catoctin Mountain Park began with the *Emergency Relief and Construction Act of 1932*. That legislation authorized the acquisition of land for “emergency construction of public building projects outside the District of Columbia,” with the intention that such projects would “be used in furnishing relief and work relief to needy and distressed people and in relieving the hardship resulting from unemployment.” The *National Industrial Recovery Act of 1933* re-emphasized the original legislation and created the concept of “recreational demonstration areas.” In the fall of 1934 Dr. Thomas Symons, director of the Maryland Extension Service, proposed the purchase of 10,000 acres of land in the Catoctin region of Frederick and Washington counties to be used in the creation of a Catoctin Recreational Demonstration Area. Approval was granted for the project on January 7, 1935, and Catoctin was designated on February 7, 1935. Executive Order 7027, signed April 30, 1935, defined the “Establishment of the Resettlement Administration,” stating that projects under this jurisdiction would focus on “reforestation and forestation” (among other ecological considerations). In 1936 the National Park Service took over full responsibility for the Recreational Demonstration Areas, which were transferred from the Resettlement Administration by Executive Order 7496 (NPS 1998b).



Catoctin Mountain Park is an example of a “Recreational Demonstration Area” and was designated as such in 1935.

The purpose of Recreational Demonstration Areas was stated in Public Law 594 of June 6, 1942. This law provides authority to the Secretary of the Interior to convey or lease to states or their political subdivisions “recreational demonstration projects and lands, improvements, and equipment.” The act stipulates, “the grantee or lessee shall use the property exclusively for public park, recreational, and conservation purposes.” During World War II, Catoctin Mountain Park served as a training area for the Office of Strategic Services, as well as a retreat for President Franklin Roosevelt, who called it Shangri-La (NPS 1998b).

Because the original intent of the federal government was to transfer the Catoctin Recreational Demonstration Area to the State of Maryland once development was completed, Governor Herbert O’Conor wrote to President Harry S. Truman on November 16, 1945, requesting this transfer. President Truman replied on December 4, 1945, in part stating:

I have decided, because of the historical events of national and international interest now associated with Catoctin Recreation Area, this property should be retained by the Federal Government and made a part of the National Capital Park

System under the administration of the National Park Service of the Department of the Interior. This action is in accord with the position expressed by the late President Roosevelt before his death.

This letter also stated that “Maryland residents will be urged to enjoy the many recreational opportunities which that beautiful area affords” when the area is again made available for public use under the policies of the National Park Service (NPS 1996b).

After long negotiations, a compromise was worked out in 1954, resulting in the transfer of 4,446 acres in the southern half of the recreational area to Maryland. This deed provided an affirmative responsibility to protect the watershed and free-flowing waters of Hunting Creek for camps and recreational areas within the established boundary. This section of land became Cunningham Falls State Park (NPS 1996b). At the same time, an NPS memorandum renamed the northern half of the recreational area as Catoctin Mountain Park, a unit of the National Capital Region of the National Park Service. Although the park had been established by legislation, no unit designation was conferred by legislation (NPS 1998b).

Catoctin’s properties were acquired with stipulations for the conservation of natural resources, specifically reforestation and forestation. Therefore, the park is required by this original legislation to protect reforestation processes.



Camp Misty Mount and Camp Greentop are cultural landscapes and are available for public use.

EVOLUTION OF THE PUBLIC PARK CONCEPT

Recreation and conservation have always been overriding objectives since the establishment of the Recreational Demonstration Area as a public park. Consequently, several specific areas were established for public park and camping purposes.

CAMP MISTY MOUNT

Camp Misty Mount was completed in 1937 and occupied during the summer by 64 campers of the Maryland League for Crippled Children. The camp was used during World War II as a garrison post for U.S. Marines to protect the presidential retreat of Shangri-La.

During the summer of 1946 it was again opened to the public. Over the years, cabin camping facilities have been provided to various groups, including the Washington County Public Schools District, 4-H Clubs, Girl and Boy Scouts, and families (NPS 1996b).

CAMP GREENTOP

Camp Greentop was completed in 1938 and used by the Baltimore League for the Handicapped until 1940. Because of the area’s involvement with military training during World War II, the camp did not reopen to the public until 1947. Since

then it has provided recreational experiences for thousands of Maryland residents, with special emphasis on youth and people with physical disabilities (NPS 1996b).

CAMP ROUND MEADOW

Since the Catoctin Recreational Demonstration Area was transferred to the National Park Service in 1936, Camp Round Meadow served as the headquarters and maintenance area for the Work Projects Administration and later for the Civilian Conservation Corps. In 1965 the camp was converted to a Job Corps camp, the first in the United States; this camp closed in 1969. A folk culture center was opened during weekends in 1970, with demonstrations of mountain crafts; this center was closed in 1979. Beginning in 1972, buildings at Camp Round Meadow were used in an environmental education program for District of Columbia schoolchildren, and this program continues each summer. The camp is now used for organized group camping. A maintenance facility, NPS housing, and some park offices are also located within the camp (NPS 1996b).

THE PRESIDENTIAL RETREAT—On April 4, 1942, special use permits were issued to the War Department for portions of the recreational demonstration area north of Maryland Route 77. On April 24, 1942, President Roosevelt selected Camp Hi Catoctin as his wartime presidential retreat, with maintenance and operational responsibility assigned to the crew of the presidential yacht *Potomac*. Camp Misty Mount was assigned to the Marine Corps as a barracks and garrison area. In December 1946, President Truman ensured that some portion of the Catoctin Recreational Demonstration Area would remain in federal control (NPS 1996b).

A memorandum of agreement commencing October 25, 1948, defines the relationship between the National Park Service and the Department of Navy. Under this agreement and continuing administrative policy, NSF receives priority in matters of facility use, access, and protection. Due to the increased use of NSF as a recreation retreat and the location of state and diplomatic functions for the President, the level of service provided by park staff has increased dramatically in recent years.

HISTORY OF CATOCTIN’S FORESTS

Catoctin Mountain Park is characterized by an eastern deciduous forest habitat, including over 60 species of trees. Nearly 97% of Catoctin Mountain Park is forested today, but this has not always been the case. Before the land became part of the National Park System, it had been extensively logged for agricultural and charcoal-making practices. The mountains were interlaced with logging roads; Park Central Road follows what used to be an old logging road. Frank Mentzer, former park superintendent, said that “in 1936 there was barely a tree over the size of a fence post.” When this area became a park and these practices stopped, the forest began to regenerate. Natural tree regeneration was helped by the Civilian Conservation Corps, which planted more than 5,000 trees in 1939 and 1940.

Catoctin Mountain

Park is

characterized by an

eastern deciduous

forest habitat that

includes over 60

species of trees.

The forest at Catoctin is a maturing, mid-latitude deciduous forest. The primary cover types in the park include chestnut oak (*Quercus prinus*), white oak (*Q. alba*), tulip poplar (*Liriodendron virginiana*), sugar maple (*Acer saccharum*), and black locust (*Robinia pseudoacacia*), with a hemlock/birch (*Tsuga* spp./*Betula* spp.) mix along stream drainages. A few scattered sparse stands of pine (*Pinus* spp.) also exist, some of which are remnant plantations (Hickey 1975).

CATOCTIN MOUNTAIN PARK'S PURPOSE AND SIGNIFICANCE

All units of the National Park System were formed for a specific purpose (its reason for being) and to preserve significant resources or values for the enjoyment of future generations. The purpose and significance identify uses and values that individual NPS plans should support.

PURPOSE

Catoctin Mountain Park provides outdoor recreation opportunities for the Baltimore-Washington metropolitan areas (NPS 2001d) and visitors from throughout the nation and the world. The park operates under the purpose that has been applied to the area since 1936 (NPS 1998b). Accordingly, Catoctin is administered:

- as a public park
- for recreational purposes
- to conserve all resources
- as a buffer to the Presidential Retreat
- to record and protect historically significant resources such as the camp facilities at camps Misty Mount, Greentop, and Round Meadow (NPS 1998b).

SIGNIFICANCE

Catoctin Mountain Park is significant for the following reasons (NPS 2001d):

- Catoctin Mountain Park was one of 46 Recreational Demonstration Areas established in the 1930s. Only 17 remain as part of the National Park System.
- Catoctin Mountain Park represents an outstanding example of a New Deal era program initiated in the 1930s to recast the landscape for recreation and conservation purposes. Camp Misty Mount and Camp Greentop are listed on the National Register of Historic Places as historic districts representing a significant legacy of the New Deal era, as developed by the Civilian Conservation Corps and the Works Progress Administration.

- Serving as a natural buffer zone, Catoctin Mountain Park protects the presidential retreat, NSF, where international leaders have convened to discuss world peace and international diplomacy since the 1940s.
- The diverse cultural resources at Catoctin Mountain Park provide examples of industries ranging from small-scale Native American tool production to a large charcoal/iron industry that supported Colonial America and the American Revolution.
- Camp Greentop is home to the oldest operating camp for the disabled in the nation.
- National Park System areas played many roles during World War II, and Catoctin can be included in that wartime effort as a place providing rest and relaxation opportunities for servicemen, and training facilities for the Office of Strategic Services.
- Catoctin Mountain Park hosted the first Job Corps camp in the nation at Camp Round Meadow.
- Catoctin Mountain Park is a prime example of a regenerated eastern deciduous forest that reflects the geology and wildlife of habitats in the Appalachian Mountains. Located at the transition of the Blue Ridge and Piedmont provinces, the park offers outstanding scenic beauty within 60 miles of the Baltimore, Maryland, and Washington, D.C., metropolitan areas.
- Catoctin Mountain Park's streams and wetlands play an important role as part of the watershed for the Monocacy River, the Potomac River, and the Chesapeake Bay. They serve as indicators of the park's overall ecosystem health.

MANAGEMENT GOALS

Catoctin Mountain Park's management goals were created to support the park's overall purpose and to protect the resources that define its significance. Of the several goals identified as important for managing park resources and providing for visitor use and enjoyment, the following relate to deer management (NPS 1996b, 1998b):

- Identify, protect, and enhance native species populations, natural features, and ecological processes of the park. Strive to maintain natural abundance, biodiversity, and ecological integrity of the wildlife and plant populations (NPS 1996b).
- Provide protection for rare plants that occur within the park, and that suffer population reductions as a result of overbrowsing by white-tailed deer or other natural or human-caused actions.

- Reduce adverse effects of deer browsing pressure to ensure that a diverse forest structure and species composition is perpetuated.
- Make available to the public traditional outdoor recreational opportunities that are not detrimental to the natural or cultural resources of the park, and provide for the protection and safety of visitors by exercising good judgment in planning, maintenance, administration, law enforcement, visitor information services, and employee training (NPS 1996b).
- Maintain and use all roadways, trails, buildings, facilities, and equipment in a manner such that deterioration will be reduced and safety increased for employees and visitors (NPS 1996b).
- Cooperate with state and local governments and adjacent landowners to ensure that lands adjacent to the park are used in a compatible manner to provide preservation and protection to the resources. Cooperate with state government and adjacent landowners in the implementation of programs aimed at the reduction of agricultural damage caused by white-tailed deer (NPS 1996b).
- Consistent with NPS policy and federal law, take positive action to perpetuate the cultural and archeological resources of the park to prevent adverse impacts on these resources (NPS 1996b).

SCIENTIFIC BACKGROUND: DEER AND VEGETATION MANAGEMENT

DEER MANAGEMENT ISSUES AND RESEARCH OVERVIEW

During the past five years park staff have been coordinating with several technical experts and researchers to develop methods and protocols for monitoring deer population size and forest regeneration within the park. When the park started to prepare this deer management plan, a number of the same scientists and technical experts were invited to become part of a science team to assist in providing technical background information and research references for this plan. The team participants were limited to persons with scientific background in deer management and research, NPS staff, and others with background experience with the park or park ecosystems. (Team participants are listed in “Chapter 5: Consultation and Coordination.”)

During the preparation of this plan, the team communicated five times over a six-month period, primarily by conference calls. Topics of discussion included existing conditions at the park, deer population monitoring methods, initial deer density goals, monitoring methods for vegetation and regeneration, alternatives for implementing management actions, thresholds for determining when actions should be taken, and adaptive management.

REGIONAL LANDSCAPE-LEVEL CHANGES

Significant changes have occurred across Maryland’s landscape in recent years. One of the most dramatic changes is the increasing white-tailed deer population. Over the past 100 years, deer populations have increased and are now higher than at any other time in their known history. Deer have adapted to landscape-level changes, such as land use patterns associated with suburban development, resulting in new roads, housing, and related enterprises that fragment forests and farms and create “edge” habitat that provides plenty of food (MD DNR 1998). Improved habitat conditions have resulted in increased deer reproduction and population growth. However, suitable hunting opportunities have been reduced due to safety concerns, particularly in Maryland’s growing suburban areas, and deer have found protection and shelter in landscapes such as Catocin where hunting is prohibited. Also, the number of hunters has steadily decreased since the 1980s (MD DNR 1998).

The deer population for the state of Maryland is now estimated to be in excess of 250,000 animals. A high deer population has resulted in increased instances of vehicle/deer collisions, greater damage to agricultural crops and landscape vegetation, and degraded natural ecosystems (MD DNR 1998).

In national parks in the eastern U.S., such as Catocin Mountain Park, landscapes have been managed to allow for the preservation and rehabilitation of scenic and historic landscapes. As a result of low mortality rates due to a lack of predators and increased availability of food and habitat, the deer population has increased greatly. Today the deer density in many areas exceeds 100 deer/square mile (40 deer per square kilometer) (Porter 1991), and researchers have established

Monitoring — A process of collecting information to evaluate if an objective and/or anticipated or assumed result of a management plan is being realized or if implementation is proceeding as planned.

that such high deer densities have negative impacts on plant and animal species (Alverson 1988; Anderson 1994; Augustine and Frelich 1998; deCalesta 1994; McShea 2000; McShea and Rappole 2000).

DOCUMENTATION OF DEER DAMAGE AT CATOCTIN

When Catoctin Mountain Park was established in 1936, it is likely that no white-tailed deer existed within its boundaries. By the 1970s problems related to an overabundance of deer were suspected. The park's natural resource management staff first raised the issue of adverse impacts from deer browsing in the early 1980s, voicing concerns that the deer population might cause a long-term decline in both the abundance and diversity of native plant species (see appendix A). Park staff researched information on the interactions between deer and plant communities, and park vegetation was inventoried in a preliminary assessment of the existing status. Catoctin Mountain Park's 1988 *Resource Management Plan* mentions concerns about the potential loss of long-term forest regeneration, changes in water quality that might arise from the loss of vegetation, and the potential transmission of disease and parasites from deer to humans (NPS 2000f).



*White-tailed deer
at Catoctin
Mountain Park.*

A 1990 memorandum noted damage to “some of the rarest plant occurrences in the park” due to deer browsing. In particular, impacts were noted to birch-leaved spiraea (*Spiraea betulifolia*) and American ginseng (*Panax quinquefolius*). Substantial differences were noted between plants growing within exclosures (areas surrounding by fencing to keep deer out) erected in the mid 1980s and plants outside the exclosures (Langdon, pers. comm. 1990).

In an effort to define the extent of the impact deer were having on the park ecosystem, NPS staff and other researchers have conducted a number of monitoring studies to document the size of the park's deer population, as well as plant growth in the understory of the mature forest canopy. Generally, data indicate that forest regeneration is nearly absent within the majority of the park due in large part to high deer numbers (Langdon 1985; Fuller 1991; Backer and Boucher 1997; Boucher and Kyde 1999; Russek-Cohen 2003; Pavek 2000).

POPULATION AND ECOLOGICAL CHARACTERISTICS OF WHITE-TAILED DEER AT CATOCTIN MOUNTAIN PARK

A 1990 report documented the population and ecological characteristics of white-tailed deer at Catoctin Mountain Park between 1988 and 1989 (Warren and Ford 1990). Deer movements were monitored by telemetry throughout the year; population numbers, age and sex ratios, and doe-to-fawn ratios were estimated; the condition and health of the deer herd were evaluated, along with general

habitat characteristics and the relationship of the herd to the habitat's carrying capacity. In addition, the overwinter mortality of radio-collared fawns was estimated, and management alternatives for the deer herd were recommended (Warren and Ford 1990).

According to the study, "There is no doubt that there are too many deer at Catoctin Mountain Park. Significant habitat alterations from overbrowsing by deer in the park have already occurred and are likely to intensify in the future. If this situation continues to remain unmanaged, it will likely jeopardize the natural character of the park's forested ecosystem for centuries to come." The study also noted "numerous plant species, some of which are considered highly rare by the Maryland Department of Natural Resources' Natural Heritage Program, have already been threatened by deer overbrowsing." In addition, "numerous bird species have already declined significantly in number or vanished from the park because of the effect of overbrowsing by deer on the understory and shrub cover in the forest." The report concluded, "It is infeasible to expect natural ecological forces alone to balance the deer herd within the limits of the park's carrying capacity" (Warren and Ford 1990).

In 1994–95 the park conducted a telemetry study to investigate the home range of does living within the park near the boundary. The study found that home ranges vary by individual deer and by season, with the largest ranges (77 to 242 acres) occurring in the fall and the smallest (2 to 46 acres) in the spring. The study also found that the collared deer, although originally captured very close to the boundary, spent very little time outside the park.

A deer herd health check was conducted at Catoctin Mountain Park on August 21, 1988, by Dr. William Davidson. Five randomly chosen deer were examined. Herd health was "markedly deteriorated compared to vigorous deer herds." Results of the findings indicated that the herd exceeded the habitat's nutritional carrying capacity and suggested the potential for substantial losses due to disease and parasitism. Davidson concluded that the herd should not be allowed to increase, and he recommended "efforts at substantial herd reduction. Continuation of the current population density will undoubtedly lead to even further declines in both herd health and habitat quality" (Davidson 1988).

A second deer herd health check was conducted at Catoctin Mountain Park on August 27, 2002, by Dr. Davidson, who again examined five deer at random. The evaluation disclosed evidence of "significant deterioration of population health." Three of the five animals exhibited problems characteristic of a parasitism/malnutrition syndrome. The report noted that Catoctin Mountain Park's deer population was in much poorer health than the populations at the two nearby national park units also studied that same year — Antietam and Monocacy national battlefields. Part of the reason for this was the "markedly different habitat conditions where access to large amounts of agricultural grain or forage crops is very limited compared to Antietam or Monocacy." The report concluded, "the only effective option for addressing this type of problem is population management" (Davidson 2002).

In 1985 NPS staff initiated deer population density surveys to estimate the size of the herd within park boundaries. Between 1983 and 2000 aerial surveys were



Deer movements were monitored by telemetry from 1988 through 1989 and again from 1994 through 1995 in order to measure several characteristics of the deer population.

conducted over the park, finding the total number of deer observed per survey ranging from 70 to 320 (NPS 1999b). Aerial surveys of deer were conducted in years when adequate snow cover was available. These surveys did not use infrared detection, which was tested with the United States Park Police helicopter and found to have no benefits because variability of terrain makes it difficult to maintain proper flight altitudes, and rock outcroppings give infrared signatures.

Starting in 1989, spotlight surveys were conducted annually as well as aerial surveys (NPS 1999a). In 2000 the spotlight survey method was modified to use a distance sampling technique, which is more accurate in estimating the density of deer within the park. Aerial deer survey data and the original spotlight survey data represented indices of relative abundance, but not population density measurements. Research shows that using the traditional spotlight counting underestimates deer numbers. When compared to thermal imaging, uncorrected spotlight counts underestimate the number of deer groups 44 or 45 % (Roberts et al. 2006; Collier et al. 2007). Distance sampling models account for the deer that traditional spotlight counting misses.

The results from the distance sampling surveys have not been published to date, but the deer density was estimated to be 155 deer per square mile in 2002, 194 deer per square mile in 2003, and 104 deer per square mile in 2004, 75 deer per square mile in 2005, and 90 deer per square mile in 2006. The results from 2004 are used throughout this document as a baseline for analysis and testing.

EFFECTS OF WHITE-TAILED DEER ON VEGETATION STRUCTURE AND DIVERSITY AT CATOCTIN MOUNTAIN PARK

Between 1990 and 1994, 45 vegetation sampling plots within the park were surveyed to evaluate deer browsing impacts to tree regeneration, ground cover, and plant diversity (NPS 2000f). The results indicated a very heavy browsing impact and little forest regeneration. However, the sampling did not include any exclosures; therefore, impacts could not be directly linked to deer.

In 1997 vegetation within deer exclosures was monitored and compared to areas open to deer browsing (Backer and Boucher 1997). Results showed that species' richness and plant abundance were significantly higher in the exclosures. Browsing by white-tailed deer reduced diversity of spring ephemerals, tree seedlings, and summer herbs. The researchers concluded, "if deer herds are left uncontrolled, associated plant and animal communities could be adversely affected, and further reduction in biodiversity is possible" (Backer and Boucher 1997).

In 1999, 12 plots were surveyed in the spring and summer, and the data were compared with data from 1997 and 1998. This study confirmed and strengthened the findings of the previous two years, indicating that deer browsing had significantly decreased the abundance and diversity of plants in Catoctin Mountain Park (Boucher and Kyde 1999).

A 2003 study analyzed vegetation data collected during 1990–94 and during 2000–2002, specifically investigating possible impacts of white-tailed deer on vegetation within Catoctin Mountain Park (Russek-Cohen 2003). The report noted a "significant decline in the number of plant species and density over the

entire combined study period.” However, browsing damage declined significantly between the first and second studies, probably because the surviving vegetation was less desirable to deer (Russek-Cohen 2003).

Additional studies have also documented the effects of deer browsing on park vegetation. Tremendous maple seedling growth occurred in 1999. The park created three paired open and exclosure plots to monitor subsequent growth, and the wire mesh size excluded all herbivores. The open plots contained virtually no maple seedlings by 2001, but Japanese stilt grass (*Microstegium vimineum*) (an invasive exotic grass) was common. Within the exclosures, many of the young maple seedlings survived and continued to grow in 2003.

In general, plant diversity was higher within exclosures than in the paired plots outside the exclosures. Plots outside the exclosures typically had 90–99% leaf litter on the forest floor with limited plant cover. Between 1996 and 2003 exclosures were typically 100% covered with a variety of herbaceous, shrub, and tree seedlings (NPS 2003b).

The Nature Conservancy designated approximately 5 acres of the Owens Creek marsh as an outstanding Maryland natural area. While this designation provides no legislative protection, the National Park Service keeps track of plants in this area. Some individual rare plants have been fenced in this area to protect them from deer. A small wetland near Hog Rock has also been fenced to protect wetland vegetation. A 2000 summary report of white-tailed deer management at Catoctin Mountain Park listed browsing impacts to 24 species of plants, identifying foliage damage, reproductive impacts, and the population trend by species (NPS 2000e).



Species richness and plant abundance are significantly higher within exclosures that keep deer out.

CATOCTIN’S CURRENT DEER MANAGEMENT PLAN

Catoctin Mountain Park completed a *White-tailed Deer Management Environmental Assessment* in 1995 and subsequently issued a “Finding of No Significant Impact” that same year. This earlier planning document is now used to manage white-tailed deer at Catoctin. The preferred alternative includes “fencing for immediate protection of threatened and endangered plants, increasing legal harvest outside the park, and making no other changes in the current action of allowing the deer population to regulate itself naturally. Extensive monitoring of the deer population and its impact will be continued, and this plan remains open-ended to future modification as new information becomes available” (NPS 1995b). These actions constitute this plan’s no-action alternative, and details about the current plan are described in this document in “Chapter 2: Alternatives,” under alternative A.

RECOMMENDED REGENERATION THRESHOLD FOR TREES

Research has been conducted on tree regeneration and the impact of white-tailed deer on different forest types in the eastern United States. In cherry / maple forest

types in the Allegheny Plateau, deer density should be 20–40 animals per square mile in unmanaged areas and 15–18 in timber managed areas (Tilghman 1989). Marquis et al. (1992) suggest that tree regeneration fails with deer densities at 36 deer per square mile. The research also indicates that a species shift occurs in beech / birch / maple forests at 18 deer per square mile, while an oak / hickory forest is successful at 6 deer per square mile (Marquis et al. 1992). Research by deCalesta (1992, 1994) indicates that seedling richness begins to decline with just 10 deer per square mile, and that songbird habitat is negatively impacted with 20–39 deer per square mile in a cherry / maple forest. Horsley et al. (2003) showed that negative impacts began in cherry / maple forests at 20 deer per square mile, or at high deer density, within the Allegheny Plateau from 1979 to 1989. In a study in the Central Adirondacks in maple / beech / birch, hemlock / birch, and spruce / fir forest types, Sage et al. (2003) described good regeneration with a density of 13 deer per square mile from 1954 to 2001.

Research was conducted on the numbers of tree seedlings necessary for regeneration in eastern hardwood forest by Susan Stout (1999), and the following threshold has been suggested based on this research:

Acceptable tree seedling recruitment levels occur where 67% of open plots at low deer density have more than 51 seedlings per open plot, or at high deer density have more than 153 seedlings per open plot. Seedlings in each 20 by 20 meter open plot would be measured within four subplots, each 2 by 2 meters in size, for a total monitoring area of 16 m² or 0.0016 hectares in each open plot. The difference between the 51 and 153 seedling thresholds means that when deer densities are high, a higher density of seedlings is required to meet the seedling recruitment level to achieve regeneration.

Low deer density has been defined as 13 to 21 deer per square mile relative to levels observed in the Mid-Atlantic Region over time, and high deer density as 56 to 64 deer per square mile (Horsley et al. 2003).

OTHER DEER MANAGEMENT EFFORTS

Deer Management Efforts within the National Park Service

Other national park units have been involved in deer management planning efforts. Gettysburg National Military Park and Eisenhower National Historic Site completed a *White-tailed Deer Management Plan and Environmental Impact Statement* in 1995, and approved management strategies are now being implemented. Deer management planning and environmental review efforts are also being undertaken at Indiana Dunes National Lakeshore and Cuyahoga Valley National Park in Ohio. Rock Creek Park in the District of Columbia and Valley Forge National Historic Park in Pennsylvania are starting the scoping process for similar environmental studies and deer management plans.

Deer Management by State and Other Federal Agencies

The Wildlife Services program of the Animal and Plant Health Inspection Service (APHIS), within the U.S. Department of Agriculture (USDA), has been involved in the evaluation and/or implementation of a number of deer management plans on federal properties in the eastern United States. Studies

conducted for the states of New Jersey and Virginia concluded that direct reduction of the deer population was the preferred alternative (USDA 2000a, 2000b). In Pennsylvania the resulting management plan included a wide range of management options to assist landowners with damage control (USDA 2003).

The Mason Neck National Wildlife Refuge (NWR), located in northeastern Virginia, has been conducting managed deer hunts since 1989. The refuge is managed as part of the Potomac River NWR Complex, which includes Mason Neck, Occoquan Bay, and Featherstone NWRs. The Occoquan Bay NWR also initiated its first managed deer hunt in 2002. The managed hunts at both NWRs are in response to overpopulation of white-tailed deer. The purpose of these hunting programs is to improve the quality of the habitat and protect the nesting habitat for bald eagles (Mason Neck) and migratory bird species (Occoquan). The Refuge hunting program facilitates this goal by reducing the local deer herd through removal of a higher percentage of females and young deer (USFWS 2005a, 2005b, 2005c).

The Maryland Department of Natural Resources has issued two permits to conduct reproductive control studies, one to the USDA Wildlife Services for research on the effectiveness of GonaCon™ immunocontraceptive vaccine (GCIV) on female white-tailed deer in the White Oaks Federal Research Center in White Oak, Maryland, and the second to the Humane Society of the United States to test the effectiveness of different forms of porcine zona pellucida (PZP) on female white-tailed deer in the National Institute of Standards and Technology site in Gaithersburg, Maryland.

Other state and local governments have also completed studies to develop deer management plans, including Fairfax County, Virginia, and Montgomery County, Maryland. The Fairfax County plan incorporates a combination of hunting and sharpshooting to manage the deer population (Fairfax County 2003). The Montgomery County plan includes a comprehensive management approach incorporating education, lethal means (sharpshooting, hunting), and non-lethal means (fencing, repellents) (Montgomery County 2004). The National Conservation Training Center in Shepherdstown, West Virginia, has a deer management plan that relies on managed hunts for deer management.

OTHER VEGETATION MANAGEMENT ISSUES

ROLE OF INVASIVE EXOTIC PLANT SPECIES

Invasive exotic plant species pose a serious threat to the natural environment of Catoctin Mountain Park. With no natural conditions to keep them in check, these plant species are able to outcompete native vegetation for sunlight, nutrients, and moisture. Exotic species tend to have relatively rapid growth rates and often survive in disturbed areas or drought conditions. However, not all exotic plant species are necessarily invasive. At Catoctin Mountain Park there are over 100 known exotic plants; 15 of these are designated as invasive species that require management (NPS 2005d).

Within Catoctin Mountain Park, exotic plant controls (mechanical and chemical) target the Owens Creek watershed, where several species of sensitive plants are found. Invasive exotic plants include the multiflora rose (*Rosa multiflora*), mile-



Japanese stilt grass, in the foreground, is an invasive exotic grass that spreads in areas that have been disturbed by natural or manmade events. Barberry, in the background, is another invasive exotic plant.

a-minute (*Polygonum perfoliatum*), Japanese stilt grass, tree-of-heaven (*Ailanthus altissima*), Japanese barberry (*Berberis thunbergii*), and beefsteak plant (*Perilla frutescens* (L.) Britt) (NPS 2003c). The results of a survey completed in 2004 show the locations and relative abundance of 15 invasive exotic species that were found along transect lines. Based on the survey, natural and man-made disturbance are expected to have a significant role in invasive exotic plant species distribution and propagation (NPS 2004g).

One such natural disturbance is caused by excessive deer browsing. Deer browsing impacts to the forest understory appear to have created a

niche for exotic vegetation to become established. Japanese stilt grass, a very prolific exotic grass, has replaced the native understory in many areas. Park staff have never observed deer eating this plant. Cunningham Falls State Park, to the south of Catoctin Mountain Park, does not seem to have as much Japanese stilt grass. The state park has more understory growth and also allows deer hunting each year. The state has taken several steps to encourage greater harvest of deer by extending the hunting season and increasing the bag limit of deer (NPS 2003d).

Catoctin’s exotic plant summary report concludes that “there is potential for extensive control efforts to be implemented in selected areas of the park, especially in areas of large infestations and where exotic species interfere directly with the natural and cultural resources of the park.... The plants controlled to date only make up a very small percentage of all invasive plants present in the park. Further control efforts will be necessary, including new areas and re-treatments of previous areas” (NPS 2004e).

ROLE OF PESTS AND DISEASE

In addition to exotic plants, the health of Catoctin’s forests is adversely affected by pests, such as insects, and disease, as described below.

- *Chestnut Blight* — A fungus (*Endothia parasitica*) was accidentally introduced into New York City in the early 1900s from trees imported from Asia, destroying its new host, the American chestnut (*Castanea dentate*), throughout its range from Maine to Alabama. The disease reached Catoctin in 1912 and by the 1940s had killed most of the large chestnut trees. Today, Catoctin’s chestnuts can only be found in the understory, as shoots from still

viable roots. By the time the trees reach about 20 feet in height, the blight attacks and eventually kills them. In response, Catoctin Mountain Park is investigating the use of a blight-resistant chestnut strain (NPS 2003d).

- *Dogwood Anthracnose* — Many of Catoctin’s native dogwood trees have succumbed to the dogwood anthracnose, a disease caused by the fungus *Discula destructiva*, which attacks flowering dogwood trees and was discovered in Catoctin in the early 1980s. In 1991 an estimated 79% of the park’s dogwoods were dead, with no sign of regeneration. At this rate, dogwoods would soon be eliminated from the park. This tremendous loss of dogwoods has altered both the forest scenery and ecology. However, a few dogwood trees have been discovered at Catoctin that show resistance to the disease. Research conducted by the University of Tennessee Dogwood Research Group has produced an anthracnose-resistant tree, the Appalachian Spring (*C. florida* ‘Appalachian Spring’), using clones from Catoctin trees. Some of these disease-resistant trees were planted in the Catoctin forest in 2001 in hopes of restoring the species, and park staff reintroduced 16 more specimens of the anthracnose-resistant dogwood in 2002 in four different locations, which were fenced to protect them from deer browsing (NPS 2003d, 2003b, 2005b).
- *Gypsy Moth* — Catoctin is predominantly covered with trees preferred by gypsy moths (*Lymantria dispar*), including chestnut oak (*Quercus prinus*) (the most dominant tree throughout the park), white oak (*Q. alba*), red oak (*Q. rubra*), black oak (*Q. velutina*), scarlet oak (*Q. coccinea*), American beech (*Fagus grandifolia*), and various hickories (*Carya* spp.) (NPS 2003b). Gypsy moth caterpillars feed on the leaves of these hardwood trees and can cause complete defoliation of a tree, affecting the vigor and general health of forests and shade trees and leading to tree death, and subsequently altering wildlife habitat and affecting water quality and quantity. The park experienced some tree mortality due to gypsy moths, but mortality has not been substantial to date. Some years the gypsy moths experience a population explosion. These natural cycles are known as outbreaks, and it is during these years that defoliation becomes a serious problem (NPS 2005d).
- In 1980 pheromone impregnated tape (Luretape®) was deployed in selected areas of Catoctin Mountain Park to disrupt mating. Plans were made to deploy Luretape® on a 33-foot (10-meter) grid throughout the park in 1981. The USFS Forest Pest Management staff from Morgantown, West Virginia, began working with Catoctin in 1981 to monitor and manage gypsy moth populations. That year’s activities included a larvae survey in April, a defoliation survey in July, and an egg mass survey and damage potential survey in August. An aerial application of insecticide was used at the park for the first time in 1982 to control gypsy moths. From 1991 to 1998, the egg mass density was so low (averaging less than 5 per acre) that no treatment



American chestnut was once a dominant tree in the park.

occurred. Treatment resumed in 2001 and 2002 because of increased egg mass density.

- In 2003 moth populations were sufficient to cause noticeable defoliation, which was heaviest in approximately 55 acres east of Chimney Rock. An environmental assessment for gypsy moth suppression was completed that same year (NPS 2003b). The park used a single application of a microbial insecticide (Gypcheck®) that has been found to not affect other species and has no known human health effects (NPS 2003b). The results of the application were successful. Gypsy moth eggs mass densities continue to be monitored. If the density in an area reaches the action threshold, treatment is implemented to keep the population from spreading through the park (Swauger, pers. comm. 2005e).
- *Hemlock Woolly Adelgid* — An estimated 50% of Catoctin's hemlock trees (*Tsuga canadensis*) are suffering from infestations of the hemlock woolly adelgid (*Adelges tsugae*), an exotic insect native to Japan (NPS 1996b). The hemlock woolly adelgid feeds by sucking sap from young needles, which causes them to drop prematurely. The current population is low, but there is potential for significant damage from this pest in the future (NPS 1994b). Extensive tree death is accompanied by detrimental environmental effects, such as the loss of ecological function, the loss of wildlife habitat (in the northeast United States, 96 bird and 47 mammal species are associated with hemlock forests for some critical component of their life cycle), soil erosion, changes in water quality, loss of aesthetics, and diminished recreational opportunities. There are more than 200 acres of eastern hemlock forest within Catoctin, primarily alongside Big Hunting Creek and Owens Creek (NPS 2003c). The loss of hemlocks along Big Hunting Creek and Owens Creek could change the water quality of the streams and in turn affect brook trout (*Salvelinus fontinalis*) that depend on its waters (NPS 2003c, 2005b).
- Park staff completed an environmental assessment for suppression of this pest in 2003, and the preferred alternative is to implement biological control by releasing ladybeetles (*Pseudoscymus tsugae*), which prey on hemlock woolly adelgid, onto approximately 40 acres of hemlock forest along one mile of Big Hunting Creek in the spring. However, the beetle was not released due to weather conditions (NPS 2004d). Ladybeetles have not since been released in the park, because the hemlock woolly adelgid population declined below the threshold identified to warrant release of the beetles (Swauger, pers. comm. 2005d). Also, individual large trees can be injected with a systemic pesticide (imidacloprid) if needed to save them (NPS 2003c). Ladybeetles may be used in combination with the systemic pesticide, which the park implemented on an experimental basis in 2002 by injecting 56 trees in developed areas. Although initial indications suggest that tree injection is somewhat effective in suppressing the pest, it can only be used on large trees, which would not aid the regeneration of young trees (NPS 2003c).

ROLE OF FIRE

Fire is known to be an extremely important event in the natural ecosystem. Fires maintain plant communities, aid in forest regeneration, and are necessary for certain seeds to germinate. Fire-dependent communities require high intensity fires that open the forest canopy and expose mineral soil. Some plants at Catoctin, such as the table mountain pine (*Pinus pungens*), depend on fire for their survival. Experts have dated fires at Catoctin back to 1876. Since then fires have occurred in intervals of 6 to 20 years.

In 1936 a 500-acre fire burned on the park's eastern ridge. As a result, forest fire protection was increased and a policy initiated to aggressively suppress all wildfires. The suppression of fire within the park over the past 60 years has allowed a hazardous buildup of dead trees and limbs. A heavy fuel load can be dangerous because it could potentially cause a wildfire to burn hotter, longer, and more intensely, resulting in significant damage to large trees and human structures (NPS 2005d).



The park's most recent fire occurred in November of 2001 in the Wolf Rock area. This 3-acre fire smoldered for nearly three days. After the burn, vegetation study plots were placed in the area to monitor tree regeneration. Within the first year many tree and herbaceous species regenerated (NPS 2005d).

The park's current *Fire Management Plan* requires that all wildfires be suppressed to protect the historic camps and adjacent private landowners (NPS 2004c). However, prescribed fire may be used for small research burns to study the impact on exotic species or to evaluate the restoration of fire-dependent species, such as table mountain pine. Goals of prescribed fire that support the vegetation protection objectives of this deer management plan, particularly the objective to attain a sustainable eastern hardwood forest with a native and diverse forest structure, are listed below (NPS 2004c).

- Use prescribed fire to clear and maintain selected forest understory.
- Use burn area rehabilitation techniques to control sedimentation and erosion.
- Propose, support, and carry out fire research that evaluates the effectiveness of fire as a control tactic for exotic vegetation.
- Use prescribed fire to control exotic vegetation if research demonstrates success.

In the future, Catoctin may use prescribed fire to study the impact on exotic species or to evaluate the restoration of fire-dependent species.

DESIRED CONDITIONS

This section defines the desired conditions for Catoctin Mountain Park, which are connected to this plan's purpose, need, and objectives. Two objectives were factored into the definition of desired conditions: attainment of a viable deer population, and attainment of a naturally regenerating and sustainable forest.

A VIABLE DEER POPULATION

Deer are a natural part of the ecosystem and play an important role in it. One of the objectives of this plan is to maintain a viable white-tailed deer population within the park, while protecting other park resources. Therefore, a definition of "viable white-tailed deer population" was needed to ensure that actions taken under this plan would meet objectives. For this plan, a viable deer population is defined as one that allows the forest to naturally regenerate, while maintaining a healthy deer population within the park.

A NATURALLY REGENERATING AND SUSTAINABLE FOREST



One of the objectives of this plan is to maintain a viable white-tailed deer population within the park.

One of the objectives of this plan is to reduce adverse effects of deer browsing pressure to ensure sufficient tree regeneration to reach the desired condition of a sustainable eastern hardwood forest with a native and diverse forest structure. Once such desired conditions are reached, deer management actions would focus on maintenance activities that would be designed to maintain a viable deer population within a forest that is naturally regenerating and sustainable. Therefore, a definition of a "naturally regenerating and sustainable forest" was needed to clearly identify when the goal is met and transition into maintenance activities can occur.

As defined for this plan, a naturally regenerating and sustainable forest is a forest community that has the ability to maintain plant and structural diversity and density by natural (non-human facilitated) tree replacement.

Several factors contribute to a naturally regenerating and sustainable forest. Although excessive deer browsing is one of those contributing elements, the roles of pests, exotic plant species, and fire have also helped shape and define Catoctin's current ecosystem and forest. Therefore, the effect of deer browsing on a naturally regenerating and sustainable forest cannot be evaluated in seclusion; the evaluation must also consider those factors included in the assessment of cumulative impacts in "Chapter 4: Environmental Consequences."

SCOPING PROCESS AND PUBLIC PARTICIPATION

NEPA regulations require an “early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.” To determine the scope of issues to be analyzed in depth in this plan, meetings were conducted with park staff and other parties associated with preparing this document. As a result of this scoping effort (see “Chapter 5: Consultation and Coordination” for additional information), several issues were identified as requiring further analysis in this plan. These issues represent existing concerns, as well as concerns that might arise during consideration and analysis of alternatives.

The issue statements developed by the interdisciplinary team are presented below. These issues formed the basis for the impact topics discussed in chapters 3 and 4 of this environmental impact statement.

ISSUES AND IMPACT TOPICS

VEGETATION

Factors affecting vegetation in Catoctin Mountain Park include diseases, parasites, air pollution (including ozone), drought, wind, storms, invasive exotic species, fire suppression, and deer. In addition, understory regeneration may also be further limited by canopy (overstory) cover. The park’s vegetation is characterized by an oak/hickory forest; however, few native species are regenerating. For example, spicebush (*Lindera benzoin*) (a native shrub) and pawpaw (*Asimina triloba*) (a native tree) are two of the few native plants regenerating. In fact, an analysis conducted in 2002 indicated a decline in the number of species of plants in the park, indicating a loss of species diversity (Russek-Cohen 2003). Deer browsing pressure on native vegetation has affected the natural regeneration success of the forest. Evidence indicates that only seedlings that are protected from deer browsing will likely reach maturity.

RARE OR UNUSUAL VEGETATION

The Nature Conservancy designated approximately 5 acres of Owens Creek marsh as an outstanding Maryland natural area. Excessive deer browsing in this area is affecting the ability of rare or unusual vegetation to regenerate. Some individual rare plants have been fenced in this area to protect them from deer browsing pressure. A small wetland near Hog Rock has also been fenced to protect wetland vegetation from deer browsing. No wetland areas would be destroyed or modified under this plan.

SOILS

Deer browsing pressure has resulted in changes to the shrub and ground cover vegetation within the park (NPS 2003d). If the park continues to lose ground cover, the potential for soil erosion increases, which could result in sedimentation within Owens and Big Hunting creeks. These creeks have high water quality and

*The National
Environmental Policy Act
of 1969 requires all
federal agencies to
examine the
environmental impacts of
their actions, incorporate
environmental
information, and utilize
public participation in the
planning and
implementation of all
actions.*

support populations of brook trout. Effective deer management that results in increased vegetative cover could improve soil retention, thereby reducing erosion, sedimentation in streams, and velocity of water from runoff.

WATER QUALITY

Water quality and quantity could be affected by the amount of ground cover within the park. As stated under soils, a reduction of ground cover by deer browsing could result in soil erosion and sedimentation, whereas increased cover from reduced browsing could improve or maintain water quality.

SPECIES OF SPECIAL CONCERN

There are no federally listed plant or animal species in Catoctin Mountain Park; eight state-listed plant species do occur, including the large purple-fringed orchid, leatherwood (*Dirca palustris*), and American chestnut. Park staff first recorded signs of deer damage to some of the state-listed species in 1985.

WILDLIFE AND WILDLIFE HABITAT

Based on a deer herd health study, the Catoctin Mountain Park deer are in poor health (Davidson, pers. comm. 2002). This implies that the habitat is stressed and is no longer supporting a healthy deer population. In addition, the deer population may be affecting other species, such as migratory birds and turkeys, which rely on understory plant species for food and cover. Studies have linked high deer densities to undesirable effects on other wildlife species, such as migratory birds (deCalesta 1994; McShea 2000; McShea and Rappole 2000). In addition, natural predation does not seem to be affecting the deer herd, even though potential predators, such as coyotes, have been observed more frequently over the past few years (NPS 2004e).

VISITOR USE AND EXPERIENCE

Visitors are attracted to Catoctin Mountain Park for various reasons. Camping, hiking, foliage and wild flower viewing, wildlife watching, mushroom hunting, cross-country skiing, and fly-fishing are all popular activities (NPS 2005d). By reducing native vegetation, deer have impacted many of these activities. For example, spring flowers have decreased in certain areas, songbirds have likely been affected, and forest regeneration has been reduced. Deer viewing has been made easier with higher deer densities; however, visitors may be viewing unhealthy individuals (NPS 2004e).

CULTURAL LANDSCAPES

Catoctin Mountain Park is considering nominating the entire park as a cultural landscape, and the forest is an important element of this designation. The park is planting trees in two historic districts to replace trees lost from storm and insect damage. Park staff are also manually removing exotic plant species in selected cultural resource areas. However, the forest will continue to lose its ability to naturally regenerate due to excessive deer browsing.

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
 exhibiting other
 cultural or aesthetic
 values.

ARCHEOLOGICAL RESOURCES

Some sites in Catoctin Mountain Park were used by Native Americans as quarries for stone tools. No information currently exists on any prehistoric settlements in the park, and the park has not completed an archeological survey. Deer have not impacted any known sites, but some actions taken under the alternatives considered, particularly fence installation, could damage or disturb archeological resources.

SOCIOECONOMIC CONDITIONS

Impacts from deer have resulted in complaints from local residents. These complaints primarily relate to the perceived damage caused by deer moving from park lands onto private property. Damage has been reported for homeowner landscaping and crops, including orchards on the park's eastern boundary (NPS 2004e).

VISITOR AND EMPLOYEE SAFETY

The safety of both the public and park employees is a concern in the implementation of any deer management activities in the park.

PARK MANAGEMENT AND OPERATIONS

Park management and operations refers to the current staff available to adequately protect and preserve vital park resources and provide for an effective visitor experience. Deer management activities have the potential to impact staffing levels and the operating budget necessary to conduct park operations.

OTHER ISSUES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

Park staff have determined that the following issues could be dismissed from further analysis, as explained below.

- *Geohazards* — No effects related to deer management would occur from geohazards because no such hazards exist in the park.
- *Air Quality* — No impacts to air quality would occur under this plan, as none of the proposed actions would affect air quality.
- *Marine or Estuarine Resources* — No marine or estuarine resources exist in Catoctin Mountain Park.
- *Energy Resources* — No impacts to energy resources are anticipated under this plan, because none of the proposed actions would affect energy resources.
- *Prime or Unique Farmland* — No prime or unique farmland exists with Catoctin's boundaries. Impacts to agricultural lands that border the park are addressed under the socioeconomic discussion.

- *Geothermal Resources* — No geothermal resources exist within Catoctin’s boundaries.
- *Paleontological Resources* — No known paleontological resources exist within Catoctin’s boundaries.
- *Floodplains* — No occupancy, modification, or development of floodplains is expected under this plan.
- *Historic Structures* — Although Catoctin does contain several historic structures, they would not be affected by deer browsing impacts or by proposed actions related to managing deer.
- *Museum Collections* — None of the proposed actions would affect museum collections.
- *Ethnographic Resources* — No ethnographic resources or issues have been identified at Catoctin Mountain Park.
- *Indian Sacred Sites* — Because no tribes ever settled within Catoctin and no tribes make claims to the area, this plan would not restrict access to Indian sacred sites for ceremonial use.
- *Environmental Justice* — The actions under this plan are not expected to have a disproportionate or significant adverse effect on any low income or minority populations in the area (Bell, pers. comm. 2003b).
- *Deer/Vehicle Collisions* — Although some deer/vehicle collisions have occurred in or adjacent to Catoctin Mountain Park, this issue is not a primary focus for deer management due to the low number of such collisions. The park lowered speed limits in the 1960s to protect visitors, wildlife, and property. The road design also includes numerous curves and turns to ensure reduced vehicle speeds. Since impacts relating to deer/vehicle collisions would be negligible, this topic was dismissed from further analysis.
- *Soundscapes* — Management strategies that might include sharpshooting as a means of controlling the deer population could affect visitors and wildlife because of firearm noise. It is unlikely that firearm noise would be substantial, although at night, with background noise reduced, firearm discharges would be audibly noticeable. Therefore, suppressors would be used to reduce noise from firearm discharges. Deer management resulting in increased vegetative cover could create sound barriers, improving solitude in the park. Because impacts to soundscapes are not expected to be more than negligible under any of the proposed deer management alternatives, this impact topic was dismissed from further analysis.
- *Nonnative (Exotic) Species* — Although the role of exotic plant species is important to deer management for the reasons described above (see “Role of Invasive Exotic Plant Species” under “Other Vegetation Management Issues” in this chapter on page 21), this problem is being addressed separately by the park’s exotic plant management plan. Actions proposed in that plan will be performed as management

actions or with selected actions considered in this document. Exotic plant management actions are evaluated in this plan as a cumulative effect in “Chapter 4: Environmental Consequences.”

- *Adjacent Land Users* — Actions taken under this plan have the potential to affect adjacent land users, including farmers and orchard growers, residence owners, and Cunningham Falls State Park. Impacts to neighboring land users were determined to be primarily financial; therefore, such impacts are discussed in this plan under the socioeconomic discussion.
- *Impacts to Soils from Construction or Trampling* — Any deer management actions that would involve construction, such as erecting exclosures under alternative B digging pits for waste and/or carcass disposal, or trampling in limited areas under alternatives C or D, could potentially impact soils. However, it was determined that such impacts would be no more than negligible because of the small area disturbed for fence construction, and because disposal pits would be located in previously disturbed locations. Therefore, this issue was dismissed from further analysis.
- *Water Quality Effects other than Sedimentation* — Although there would be other effects on water quality from deer droppings or from application of repellents, the impacts would be so minor and/or localized that these aspects of water quality were not carried through for detailed analysis.
- *Socioeconomic Impacts Related to Tourism* — Deer management activities have the potential to affect tourism around Catoctin, particularly the town of Thurmont. However, any impacts to tourism are expected to be no more than negligible. Therefore, this topic was dismissed from further analysis.
- *Impacts to the Common Raven* — The common raven (*Corvus corax*), a state-listed species, is found in Catoctin Mountain Park. Impacts from deer management activities could include disturbance and noise during the implementation of reproductive control or lethal control methods or the construction of exclosures. However, these activities would have minimal, short-term, very localized, adverse impacts, since the raven would likely vacate the immediate vicinity of the disturbance and return following completion of the activity. The raven is a scavenger that could indirectly benefit from any waste or carcasses that were left to decompose. However, this would be a very minimal and sporadic addition to the raven’s food source, resulting in a negligible beneficial impact. Because impacts to the raven could be no more than negligible to minor and very short term, this issue was dismissed from further analysis.
- *Wetlands* — Wetlands in the park are discussed and assessed under “Sensitive and Rare Species, Including Rare Plant Habitats,” since the wetlands are habitat for many of the species of concern. Therefore, no separate wetlands topic is included.

RELATED LAWS, POLICIES, PLANS, AND CONSTRAINTS

NPS ORGANIC ACT

By enacting the NPS *Organic Act of 1916*, Congress directed the U.S. Department of the Interior and the National Park Service to manage units of the National Park System “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 U.S.C. 1). The *Redwood National Park Expansion Act of 1978* reiterates this mandate by stating that the National Park Service must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 U.S.C. 1a-1).

Despite these mandates, the *Organic Act* and its amendments afford the National Park Service latitude when making resource decisions. By these acts Congress “empowered [the National Park Service] with the authority to determine what uses of park resources are proper and what proportion of the parks’ resources are available for each use” (*Bicycle Trails Council of Marin v. Babbitt*, 82 F.3d 1445, 1453 (9th Cir. 1996)).

Yet, courts have consistently interpreted the *Organic Act* and its amendments to elevate resource conservation above visitor recreation. In *Michigan United Conservation Clubs v. Lujan* (949 F.2d 202, 206 (6th Cir. 1991)) the court stated, “Congress placed specific emphasis on conservation.” In *National Rifle Ass’n of America v. Potter* (628 F.Supp. 903, 909 (D.D.C. 1986)) the court stated, “In the *Organic Act* Congress speaks of but a single purpose, namely, conservation.” The NPS *Management Policies 2006* (NPS 2006) also recognize that resource conservation takes precedence over visitor recreation. The policy dictates, “when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant” (NPS 2006, sec. 1.4.3).

Because conservation remains predominant, the National Park Service seeks to avoid or to minimize adverse impacts on park resources and values; however, the agency has discretion to allow negative impacts when necessary (NPS 2006, sec. 1.4.3).

While some actions and activities cause impacts, the National Park Service cannot allow an adverse impact that constitutes resource impairment (NPS 2006, sec. 1.4.3). Actions that impair park resources are prohibited unless a law directly and specifically allows for such actions (16 U.S.C. 1a-1). An action constitutes an impairment when, in the professional judgment of the responsible manager, its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006, sec. 1.4.5). To determine impairment, the Park Service must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect

effects of the impact; and the cumulative effects of the impact in question and other impacts” (NPS 2006, sec. 1.4.5). Therefore, this plan assesses the effects of the management alternatives on park resources and values, and it determines if these effects would cause impairment.

An impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major adverse effect on a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park’s general management plan or other relevant NPS planning documents

NPS MANAGEMENT POLICIES 2006

Several sections from the *NPS Management Policies 2006* (NPS 2006) are relevant to deer management in Catoctin Mountain Park, as described below.

The *Management Policies* instruct park units to maintain as parts of the natural ecosystems of parks all native plants and animals. The National Park Service will achieve this maintenance by “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur” (NPS 2006, sec. 4.4.1)

Furthermore, the National Park Service “will adopt park resource preservation, development, and use management strategies that are intended to maintain the natural population fluctuations and processes that influence the dynamics of individual plant and animal populations, groups of plant and animal populations, and migratory animal populations in parks” (NPS 2006, sec. 4.4.1.1).

Whenever the Park Service identifies a possible need for reducing the size of a park plant or animal population, the decision will be based on scientifically valid resource information that has been obtained through consultation with technical experts, literature review, inventory, monitoring, or research (NPS 2006, sec. 4.4.2.1). The Science Team, as previously discussed, was assembled to complete this task.

Section 4.4.2 of the *Management Policies* also states that:

Whenever possible, natural processes will be relied upon to maintain native plant and animal species, and to influence natural fluctuations in populations of these species. The Service may intervene to manage individuals or populations of native species . . . when at least one of the following conditions exists:

- Management is necessary

- because a population occurs in unnaturally high or low concentration as a result of human influences (such as loss of seasonal habitat, the extirpation of predators, the creation of highly productive habitat through agriculture or urban landscapes) and it is not possible to mitigate the effects of the human influences;
- to protect specific cultural resources of parks; . . .
- to protect rare, threatened, or endangered species.

Section 4.4.2.1 of the *Management Policies* states,

Where visitor use or human activities cannot be modified or curtailed, the Service may directly reduce the animal population by using several animal population management techniques, either separately or together. These techniques include relocation, public hunting on lands outside the park, habitat management, predator restoration, reproductive intervention, and destruction of animals by NPS personnel or their authorized agents. Where animal populations are reduced, destroyed animals may be left in natural areas of the park to decompose.

DIRECTOR’S ORDER #12: CONSERVATION PLANNING, ENVIRONMENTAL IMPACT ANALYSIS, AND DECISION-MAKING

NPS *Director’s Order #12* and its accompanying handbook (NPS 2001b) lay the groundwork for how the National Park Service complies with the *National Environmental Policy Act* (NEPA). *Director’s Order #12* and the handbook set forth a planning process for incorporating scientific and technical information and for establishing an administrative record for NPS projects.

Director’s Order #12 requires that impacts to park resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision makers to understand the implications of those impacts in the short and long term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists. *Director’s Order #12* also requires that an analysis of impairment to park resources and values be made as part of the NEPA document.

NATURAL RESOURCE REFERENCE MANUAL 77

The *Natural Resource Reference Manual 77*, which supersedes the 1991 *NPS 77: Natural Resource Management Guideline*, provides guidance for NPS employees responsible for managing, conserving, and protecting the natural resources found in National Park System units.

OTHER LEGISLATION, COMPLIANCE, AND NPS POLICY

In addition to the NPS *Organic Act*, the National Park Service is governed by other laws and regulations. Based on the scope of this plan, these include the following.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969, AS AMENDED

Section 102(2)(c) of the *National Environmental Policy Act* requires that an environmental impact statement be prepared for major federal actions that may significantly affect the quality of the human environment.

THE NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED

Section 106 of the *National Historic Preservation Act* requires that federal agencies consider the effects of their undertakings on properties listed on or potentially eligible for listing on the National Register of Historic Places. All actions affecting the parks' cultural resources must comply with this legislation.

CODE OF FEDERAL REGULATIONS, TITLE 43

Title 43 of the *Code of Federal Regulations* (CFR) part 24 describes the four major systems of Federal lands administered by the Department of the Interior. Section 24.4(f) states that "Units of the National Park System contain natural, recreation, historic, and cultural values of national significance as designated by Executive and Congressional action." In describing appropriate activities, it states that "[a]s a general rule, consumptive resource utilization is prohibited."

In addition, section 24.4 (i) instructs all Federal agencies of the Department of the Interior, among other things, to "[p]repare fish and wildlife management plans in cooperation with State fish and wildlife agencies and other Federal (non-Interior) agencies where appropriate." It also directs agencies to "[c]onsult with the States and comply with State permit requirements ... except in instances where the Secretary of the Interior determines that such compliance would prevent him from carrying out his statutory responsibilities."

CODE OF FEDERAL REGULATIONS, TITLE 36

Title 36 of the *Code of Federal Regulations* provides the regulations "for the proper use, management, government, and protection of persons, property, and natural and cultural resources within areas under the jurisdiction of the National Park Service" (36 CFR 1.1(a)).

EXECUTIVE ORDER 11990, "PROTECTION OF WETLANDS"

Executive Order 11990 directs federal agencies to avoid to the extent possible long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

MIGRATORY BIRD TREATY ACT OF 1918

The *Migratory Bird Treaty Act of 1918* implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the activities prohibited, unless permitted by regulations, to

pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird (16 U.S.C. 703).

Subject to limitations in the act, the Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting, or exporting of any migratory bird, part, nest, or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits, and migratory flight patterns.

Executive Order 13186 was signed in 2001 to define the responsibilities of federal agencies to protect migratory birds. This executive order directs executive departments and agencies to take certain actions to further implement the act. Each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within two years, a memorandum of understanding with the U.S. Fish and Wildlife Service that shall promote the conservation of migratory bird populations.

RELATIONSHIP TO OTHER PLANNING DOCUMENTS FOR CATOCTIN MOUNTAIN PARK

The following plans for Catoctin Mountain Park need to be considered in the development of this plan.

STATEMENT FOR MANAGEMENT (1996)

The *Statement for Management* contains information about the park's purpose and significance, park resources, legislative history, management, visitor use, land use, facilities and equipment, basic operation, and management goals. The management of abundant deer populations is mentioned under the park's first management goal.

STRATEGIC PLAN (2000)

The plan identifies the park's mission goals and long-term goals for October 2001 through September 2005. Long-term goals relating to maintaining the diversity of species and maintaining cultural landscapes in good condition relate to deer management as it affects park vegetation.

FY 2005 ANNUAL PERFORMANCE PLAN

This plan identifies annual goals toward achieving the long-term goals identified in the *Strategic Plan*, and therefore, the mission of the park and the National Park

Service. Each goal is objective, quantifiable, and measurable, with performance results built into each goal. For example, one goal is to reduce the amount of land impacted by exotic vegetation, which this deer plan could help achieve by reducing the amount of disturbed land that often gives such invasive species a foothold.

RESOURCE MANAGEMENT PLAN (1998 UPDATE)

Like the *Statement for Management*, the park's *Resource Management Plan* describes the present status of the park's resources, including natural and cultural resources. This report includes a natural resource problem statement addressing white-tailed deer management in relation to vegetation monitoring and population monitoring.

WHITE-TAILED DEER MANAGEMENT ENVIRONMENTAL ASSESSMENT (1995)

This plan is the basis for the park's current deer management activities, as well as the no-action alternative described in this plan in "Chapter 2: Alternatives."

FIRE MANAGEMENT PLAN (2004)

The park's *Fire Management Plan* defines current fire management methods, as described earlier under "Role of Fire" on page 25. Fire suppression and prescribed burn activities are evaluated in this deer management plan as a cumulative impact.

HEMLOCK WOOLLY ADELGID SUPPRESSION ENVIRONMENTAL ASSESSMENT (2003)

This environmental assessment describes actions to be taken to suppress the hemlock woolly adelgid, as described earlier under "Role of Pests and Disease," on page 22. Suppression actions are evaluated in this deer management plan as a cumulative impact.

INTEGRATED PEST MANAGEMENT PLAN (2003)

The *Integrated Pest Management Plan* defines how Catoctin will respond to and control various pests throughout the park, ranging from cockroaches to skunks. These activities are evaluated in this deer management plan as cumulative impacts.

RELATED LEGISLATION AND POLICIES

Plans and policies defined by other agencies or organizations could also affect actions proposed under this plan.

**MARYLAND DEPARTMENT OF NATURAL RESOURCES
DEER MANAGEMENT PLAN**

The Maryland Department of Natural Resources produced a 1998 document titled *Charting the Course for Deer Management in Maryland: A Management Plan for White-tailed Deer in Maryland* to “identify comprehensive new strategies to address Maryland’s rapidly growing white-tailed deer population.” The plan “is designed to facilitate first a stabilization of the deer population across Maryland, then gradually adjust populations (in most cases down) to an acceptable range for the social and environmental conditions of a given area, or ‘management unit.’” The state’s plan identifies specific deer management goals and strategies, such as “establish targeted deer population levels,” for those objectives. The plan also calls for implementation of special “managed hunts” on state lands that traditionally have not permitted hunting (MD DNR 1998).

CUNNINGHAM FALLS STATE PARK HUNTING REGULATIONS

Hunting of white-tailed deer at Cunningham Falls State Park, which is directly south of Catoctin Mountain Park, is permitted in accordance with Maryland hunting regulations (MD DNR n.d.). The state is divided into deer management zones for hunting purposes, and at Cunningham Falls deer may be hunted with bows, firearms, or muzzleloaders. Hunters are permitted to take more antlerless (female) deer than antlered (male) — 10 to 2, respectively — as their total bag limit (MD DNR 2004c).

Maryland’s *Management Plan for White-tailed Deer*, described above, applies to Cunningham Falls State Park. A specific deer management strategy identified in the plan is to “increase the efficiency and application of regulated hunting for deer population control, while maximizing recreational opportunities for hunters,” which could affect the deer population in Cunningham Falls. This could in turn affect the population in Catoctin to the north. The plan also calls for development of “incentives for hunters to increase antlerless deer harvest levels,” which could affect both state and national park units (MD DNR 1998).