U.S. Department of the Interior

GATEWAY NATIONAL RECREATION AREA
FIRE MANAGEMENT PLAN
DRAFT Environmental Assessment/Assessment of Effect

May 2012

Environmental Assessment

FIRE MANAGEMENT PLAN
Gateway National Recreation Area
2012

SUMMARY

National Park Service (NPS) policy requires that any NPS unit with combustible vegetation must prepare a Fire Management Plan. Policy also directs the management of hazardous wildland fuels.

Three alternatives were considered and fully analyzed for the Gateway National Recreation Area Fire Management Plan:

Alternative 1. No Action (Current Management)

> This alternative represents a continuation of current management actions; it does not mean an absence of active management of fire and fuels. Current management consists of full suppression of all fires, using aggressive initial attack and suppression techniques to limit fire size to the smallest possible acreage. There is no use of prescribed fire, and there is no mechanical fuel reduction, other than mowing around certain cultural resources and park facilities.

Alternative 2. Suppression and Mechanical Fuels Treatment

> This alternative involves suppression of all unplanned ignitions considering a full range of suppression strategies available during the response. This allows fire managers to consider fire suppression goals other than simply limiting fire size to the smallest possible acreage. Aggressive suppression techniques may, in some cases, cause more resource damage than the fire being suppressed, and may also place firefighting personnel in hazardous situations. Fire managers can weigh the risks and benefits of aggressive suppression against those of allowing a fire to progress to a point where it may be more easily suppressed. This alternative includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, but does not include prescribed fire.

Alternative 3. Suppression, Mechanical Fuels Treatment, and Prescribed Fire (NPS Preferred Alternative)

> This alternative involves suppression of all unplanned ignitions considering a full range of suppression strategies available during the response (see Alternative 2). It also includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, as well as the use of prescribed fire to achieve natural resource, cultural landscape, and fuels management objectives.

This environmental assessment (EA) analyzes impacts and cumulative effects from each retained alternative to the following topics:

- firefighter, employee and public safety
- coordination with cooperating fire management agencies
- geology, including soils
- air quality
- water quality and quantity
- floodplains and wetlands
- unique ecosystems and rare or unusual vegetation
- unique or important wildlife and wildlife habitat
- species of special concern, including threatened or endangered species, or their habitat
- non-native species
- visitor activities
- visitor experience,
- recreation resources, and aesthetic resources
- cultural resources

None of the direct, indirect, or cumulative impacts of the proposed action are considered major for any of the impact topics.

Public Comments

NOTE TO REVIEWERS AND RESPONDENTS:
We welcome your comments on this EA. The preferred method is to submit your comments electronically through the NPS Planning, Environment, and Public Comment (PEPC) web site at http://parkplanning.nps.gov/gate. Once you have accessed the web page, please follow the links to submit your comments. You may also mail comments to the name and address below.

If you choose to submit comments, before including your address, phone number, e-mail address or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

This environmental assessment will be open for public review for 30 days.

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Fire Management Plan Comments
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CHAPTER 1: PURPOSE AND NEED

Purpose

The purpose of taking action at this time is to provide guidance for a fire management program at Gateway National Recreation Area. More specifically, the FMP will guide both the operational and the conceptual aspects of fire management for the park. The scope of the FMP is confined to areas within the boundaries of Gateway National Recreation Area.

As part of that planning process, this Environmental Assessment (EA) analyzes fire and fuels management program alternatives and their direct, indirect, and cumulative impacts. It will also ensure that the resulting FMP will comply with all applicable laws, policies, and regulations, and meet resource management needs through appropriate goals and objectives.

Additional compliance may be necessary for site-specific actions where the potential for sensitive resources exists (i.e. threatened and endangered species surveys for a specific proposed prescribed burn area or the presence of cultural resources) or which involve an area or action of public concern. The public would be notified of any such proposals prior to implementation.

Need for the Fire Management Plan

The *National Park Service's Management Policies (2006)* and Director's Order 18 – Wildland Fire Management – require that each park area with vegetation capable of sustaining fire develop a plan to manage fire and hazardous fuels on its lands. The Fire Management Plan (FMP) must directly relate to the Natural Resource Management Plan and the Cultural Resource Management Plan, and must help achieve resource management objectives.

Gateway National Recreation Area does not presently have such a plan. Several Fire Management Plans (FMP's) were drafted for review and comment in 1983, 1992, and 2005; however, due to staffing changes, none of the plans progressed beyond that point. In order to comply with NPS policy, Gateway NRA must develop a Fire Management Plan and implement a comprehensive fire management program that protects natural and cultural resources, the public, employees and park facilities.

In addition to bringing the park into compliance with NPS policy, the preparation of an FMP will allow the park to explore opportunities to use fire as a resource management tool, and to systematically address other issues relating to fire. The development and implementation of the FMP will be coordinated with the public, neighboring land owners, and land management agencies; it will also comply with all applicable laws, policies, and regulations.

Goals and Objectives

The development of a Fire Management Plan for Gateway NRA requires the development of new goals and objectives specific to the FMP. These new goals and objectives should also complement any relevant existing goals and objectives from other park planning documents.

Gateway NRA has an existing mission statement that states:

> *Gateway encompasses the largest collection of natural systems, wildlife habitats, historic resources, and recreational activities in the New York City/New Jersey metropolitan area. The National Park Service and its partners maintain, improve, and make these resources and opportunities available to the public for inspiration, education, and recreation. These areas include numerous sites of critical natural and cultural importance: to the health of local ecosystems; to the life of migratory and native species; and to the military, navigational, and aviation history of the region and the nation, especially in the context of the coastal defenses of New York Harbor. The responsibilities and attendant activities are inescapably shaped by the intense urban culture and value systems of the region. The park in turn endeavors to incorporate the National Park Service conservation ethic into those values. Established with the express purpose of bringing the "National Park Service Experience" to the urban population, we are truly the gateway to all National Parks for millions of people.*

The park is in the process of revising its general management plan (GMP), and is expected to have it completed by 2013. Until the revision is approved, Gateway NRA will continue to use the current general management plan, prepared in 1979, to guide the development of the park. This plan described several objectives that shed additional light on the purpose of the park; those objectives that have relevance to fire management include:

- To develop and manage Gateway National Recreation Area for outdoor recreational use, and to appropriately care for the park's natural and historic resources.

- To make Gateway NRA a great park for all people where innovation and experimentation in park and recreation management, design, and programming may tap the large reservoir of talent, including volunteers, in the region.

- To forge an effective and compatible link between the value systems of urban development that characterized the New York/New Jersey area, and the natural systems at Gateway NRA.

- To manage and use existing facilities and resources at the park to realize maximum recreational and educational benefits, without causing adverse impacts on area resources or jeopardizing the development and implementation of long-range plans for Gateway NRA.

- To involve the public in planning for Gateway NRA, and to work closely with adjacent neighborhood and governmental entities, the states of New Jersey and New York, and other federal agencies in planning for the park and its surrounding region, and in addressing mutual problems of land use, pollution, and transportation.

- To identify, preserve, and provide for visitor appreciation of the important fish, wildlife, and other natural resources of Gateway NRA.

- To identify, evaluate, and appropriately preserve and/or use the significant historic structures and other resources of Gateway NRA.

The GMP explained that "a primary justification for national parks in urban areas should be the demonstration that…harmonious and mutually supportive relationships between people and nature

are possible, even under conditions of intensive use, where the primary environmental dilemma of development versus nature is more acute because of population pressure."

It is the policy of the NPS to allow, when practical, natural processes to occur while meeting park unit management objectives. *NPS Management Policies (2006)* state:

> *"Wildland fires may contribute to or hinder the achievement of park management objectives, and management response to each wildland fire is determined by whether or not the fire occurs within prescription as identified in the park's fire management plan…Fire management consists of a program of activities designed to meet management objectives for protection of resource values, life, and property and, where appropriate, for using naturally ignited and human-ignited wildland fires as management tools."*

The current Gateway NRA Resource Management Plan (RMP) was completed in 1981; it defines major land management issues, describes past and current activities, and establishes actions that will be taken in the future. The RMP is now somewhat dated and in need of revision, but the goals of the resource management program are consistent with the GMP, as well as applicable laws, regulations and NPS policies and guidelines. The RMP is scheduled for revision following the completion of the park GMP in 2013. It will most likely be called a Resource Stewardship Strategy in accordance with current direction from regional and national levels.

Before the completion of the current RMP, relatively little management consideration had been given to fire problems within Gateway NRA, as fire was not originally conceived as a problem in an urban area park such as Gateway NRA. However, since its creation, Gateway NRA is among the top four National Park Service units for fire occurrence.

Table 1. Number of total National Park Service suppression and natural out fires from 1975-2010

Park	Fires
Yosemite National Park	2977
Biscayne National Preserve	2080
Grand Canyon National Park	1709
Gateway National Recreation Area	1676

As a response to this, the park's Resource Management Plan discusses fire management in length and has developed an objective for fire management. It states:

- To provide procedures of fire management and to implement the resource management plans as described in the General Management Plan.

This is in accordance with *NPS Management Policies (2006)*, Chapter 4, and "Natural Resource Management." It states:

- Fires that burn natural or landscaped vegetation in parks are called wildland fires. Wildland fires occur from both natural and human sources of ignition. Wildland fires may contribute to or hinder the achievement of park management objectives, and management response to each wildland fire is determined by whether or not the fire occurs within prescription as identified in the park's fire management plan.

Wildland fire use is the application of an appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined areas outlined in fire management plans. Prescribed fires are the deliberate ignition of fires under prescribed circumstances to accomplish resource management objectives in predefined areas outlined in approved fire management plans.

- Fire management consists of a program of activities designed to meet management objectives for protection of resource values, life, and property and, where appropriate, for using naturally ignited and human-ignited wildland fires as management tools. Park fire management programs designed specifically to meet park resource management objectives—including allowing fire to perform its natural role as much as practicable—will ensure that firefighter and public safety are not compromised.
- Parks with vegetation capable of burning will prepare a fire management plan that is consistent with federal law and departmental fire *Management Policies*, and that includes addressing the need for adequate funding and staffing to support the planned fi re management program. The plan will be designed to guide a program that:
    - responds to the park's natural and cultural resource objectives;
    - provides for safety considerations for park visitors, employees, and developed facilities;
    - addresses potential impacts on public and private neighbors and their property adjacent to the park; and
    - protects public health and safety.
- All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options as guided by the park's fire management plan. These options will be selected after comprehensive consideration of the resource values to be protected, firefighter and public safety, costs, availability of firefighting resources, weather, and fuel conditions. Naturally ignited and human-ignited fires managed to achieve resource management and fuel treatment objectives, and the smoke they produce, will both be managed to comply with applicable local, state, and federal air quality regulations. Such fi res will also include monitoring programs that record fire behavior, smoke behavior, fire decisions, and fire effects to provide information on whether specific objectives are met and to improve future fire management strategies.
- The fire management plan will address strategies for preventing the accumulation of hazardous fuels in specific areas and for eliminating hazardous conditions that may have developed over time due to past fire suppression programs or ongoing development activities. These strategies will entail strategic planning, interdisciplinary coordination, and interorganizational collaboration as needed to provide appropriate treatment using adaptive management practices that range from site specific to landscape level. Although prescribed fi re remains the preferred and most widely used NPS tool for managing the accumulation of hazardous fuels, the strategies will incorporate other activities, such as manual, mechanical, biological and, rarely, chemical treatments (applying integrated pest management principles), that may be appropriate in specific instances, as guided by NPS and DOI policies and legal requirements.

The fire management program will continue to be guided by resource management objectives to protect cultural resources and perpetuate the natural resources and their associated natural processes. The new FMP will help achieve the objectives and directions described in the parent document, the RMP, both presently, and when it is revised.

New Fire Management Goals and Objectives

New fire management objectives have been drafted to meet the specific purposes of the FMP, and to accomplish the resource management and other park goals. These are:

- Maintain the highest level of firefighter and public safety in all fire and fuels management operations.

- Protect human life, park natural and cultural resources, park structures and facilities, and urban interface boundaries from adverse impacts attributable to wildland fires, hazardous fuels, and hazard trees, commensurate with values at risk and firefighter and public safety.

- Foster and maintain interagency fire management partnerships to improve initial attack suppression response capabilities.

- Ensure that fire management activities do not adversely affect residential communities adjacent to the park.

- Assist local agencies as fire management resources allow in the suppression of wildland fires adjacent to the park boundary to prevent the spread of unwanted fires into federal lands and to protect property on private lands.

- Stimulate biodiversity, reduce exotic plants, restore protected species and disturbed lands, and improve native plant communities.

- Utilize minimum impact suppression techniques to reduce or avoid effects of fire suppression on natural, cultural, or historic resources, and neighboring communities.

- Ensure smoke production from prescribed fires does not violate State and/or federal standards; minimize smoke impacts to park neighbors.

- Utilize fire prevention and interpretive programs to increase public awareness, understanding, and acceptance of fire and fuels management programs and to reduce the incidence of human-caused ignitions.

- Identify and assess hazardous fuels that have the potential to adversely impact natural and cultural resources. Utilize prescribed fire and/or other methods (e.g., mechanical or chemical) to reduce threats posed by hazard fuels conditions.

The fire management program will utilize hazard fuel reduction, fire prevention, and limited prescribed fire as both research and management tools to accomplish the fire management goals:

- Make firefighter and public safety the highest priority of every fire management activity.
- Suppress all unwanted and undesirable wildland fires, regardless of ignition source, to protect the public, private property, and natural and cultural resources of the park.
- Manage wildland fires in concert with federal, state, and local air quality regulations.
- Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.
- Reduce wildland fire hazard around developed areas and areas adjacent to cultural resource sites.
- Use prescribed fire as a method of restoring and maintaining habitat to meet resource objectives of the park.
- Develop cooperative agreements with communities concerning wildland fire management.

Gateway National Recreation Area, by its enabling act of October 27, 1972 (Public Law 92-592, Stat. 1308), was established to "Preserve and protect for the use and enjoyment of present and future generations an area possessing outstanding natural and recreational features…"

Committee reports submitted to the House of Representatives and the Senate suggested that Gateway NRA would be the only recreation area of its kind that can be reached by the overwhelming majority of its potential visitors via public transportation. "Gateway will offer an outdoor recreation opportunity easily accessible by public transportation at a modest cost." It "represents a unique opportunity to provide a meaningful outdoor recreation area for the millions of people living within the greater New York metropolitan region. For many of these people, Gateway will offer the only real hope that they might ever have to visit a unit of the national park system."

Bordering the Greater New York/New Jersey metropolitan region, Gateway National Recreation Area currently comprises 26,607 acres of coastal barrier beaches, natural and man-made islands, bay, and ocean (17,031 acres of open water) in the lower New York Harbor Estuary. This park encompasses some of the last remaining open space surrounding New York Harbor, and has the potential for more visitors than any other in the National Park System. According to the National Park Service Public Use Statistics Office, Gateway NRA is one of the top 5 most visited National Park Service units in the country since 2001, receiving an average of 8.7 million visitors per year.

To serve these visitors and to carry out its mission, the park is working to protect ecosystems, and where appropriate, to restore them. Though some of the lands and waters of Gateway NRA have been altered and degraded in the past, they are, to quote the park's General Management Plan, "virtually priceless because they represent the last remnants of the original shoreline and a valuable

recreational resource". The existence of Gateway NRA therefore protects the inherent value of the park's natural and cultural features, as well as the recreational values these features provide.

Description of Gateway National Recreation Area

Gateway National Recreation Area consists of developed play areas, historic fortifications and defensive sites, and undeveloped land, including beaches, dunes, grasslands, and coastal woodlands.

Annual precipitation averages around 40 inches, fairly evenly spread throughout the year. March through May is usually the wettest period. Temperatures are highly variable; with summer highs sometimes ranging over 100° F and winter lows occasionally dipping into the single digit readings. The annual mean high temperature is 61° F, and the mean low temperature is 47° F. Storms generally approach from the west except for Northeasters and tropical storms. The afternoon onshore/ morning offshore breeze is a coastal wind that occurs year-round. The proximity of Gateway NRA to the Atlantic Ocean moderates its weather markedly and the "heat island" effect of Greater New York means that temperatures can be from 10°-20° more moderate than the adjacent suburbs.

The park is divided into three administrative units: Jamaica Bay and Staten Island in New York, and Sandy Hook in New Jersey. Neighboring landowners include the states of New York and New Jersey, New York City, the Port Authority of New York and New Jersey, the U.S. Coast Guard, and private citizens. A map of the park is included as Appendix A.

Jamaica Bay Unit

The Jamaica Bay unit includes Breezy Point, Plumb Beach, Floyd Bennett Field, Jacob Riis Park, Fort Tilden, the Jamaica Bay Wildlife Refuge, Canarsie Pier, Hamilton Beach Park, Dead Horse Bay, and Frank Charles Memorial Park.

Historic sites include Ft. Tilden Historic District, Floyd Bennett Field Historic District and Jacob Riis Park Historic District. Ft. Tilden Historic District was established as a permanent post in the Coast Defenses of Southern New York in 1917, and transferred to the New York Harbor Defenses in 1921, Fort Tilden served, with Fort Hancock in Sandy Hook, as the outer defenses of the New York City area from World War I through the Cold War era. In the years of its active service Fort Tilden reflected the several changes in the tactics and technology or modern warfare especially harbor defense. Armament installed at Fort Tilden has ranged from the massive 16-inch guns emplaced at Battery Harris in 1924, to the Nike missiles installed in underground silos in the 1950s.

Floyd Bennett Field Historic District was constructed as the first municipal airport of the City of New York between 1928-1931. Following the opening of Idlewild Airport in 1939, Bennett Field was closed to" commercial use and eventually conveyed to the U.S. Navy in 1941. The airport was renamed the Naval Air Station, New York or the Brooklyn Naval Air Station, New York, and it was enlarged from 387 acres to 1,288 acres. The Navy continued to operate the field for thirty years. In 1971 it became a Naval Air Reserve Training Detachment where ground crews received technical training.

Jacob Riis Historic District Jacob is significant as an excellent example of New York City's municipal recreational planning of the 1930s. The park contains an eclectic assemblage of architectural styles,

from Byzantine/Moorish (1932) to Moderne (1937). Finally, the park was completed by the Works Progress Administration (WPA) under the guidance of Robert Moses, of New York City's Park Commission.

Visitor activities are varied, and include hiking, canoeing, kayaking, boating, sailing, swimming, birdwatching, biking, fishing, and various sports. Inholdings within this unit include Broad Channel, a community surrounded by the Jamaica Bay Wildlife Refuge; Breezy Point Cooperative, a community of summer homes located on leased land, and numerous rights-of-way.

The Breezy Point area's "Tip" is primarily a dune/beachgrass/bayberry thicket/*Phragmites* association. West Beach contains beachgrass-covered dunes on the oceanfront and a mixed grassland community to the north. On the bayside north of West Beach is a *Spartina* marsh with a small primary dune system.

A mixed conifer woodland comprised of japanese black pine, american yew, american holly, black cherry and redcedar exists within Fort Tilden, where an advanced dune system shelters the maritime forest from off-shore winds. Individual plantings of Japanese black pines, London plane trees and white poplar are scattered around the maintained lawns of Fort Tilden's developed areas.

Extensive Japanese black pine plantings occurred within Jacob Riis Park, but most of these trees are dead or dying from insect infestation. Many have been replaced with plantings of other species, and additional new plantings are planned.

Neponsit field is a mixed grassland community with scattered groves of Japanese black pines.

An intensely managed grassland is the center of Floyd Bennett Field. A grove of eastern white pine abuts the grasslands on its southern edge. Floyd Bennett Field is highly developed with extensive lawns and scattered trees around its edges bordering Jamaica Bay. The North 40 Environmental Area is dominated by *Phragmites*, with bayberry thickets and black cherry, eastern red cedar, japanese black pine and cottonwood scattered throughout. Located on the west side of Floyd Bennett Field, Dead Horse Bay contains a small dune/beachgrass community closest to the shore with *Phragmites* dominating the back dune areas. Other common species at Dead Horse Bay include bayberry, *Ailanthus*, black cherry, and poison ivy.

The North Shore stretches from Plumb Beach eastward to Hamilton Beach. This area, south of the Belt Parkway, is a series of bay-front dune/beachgrass/bayberry thicket communities. A *Spartina* marsh is present at Plumb and Bergen Beaches, Spring Creek, and Hamilton Beach. A mixed woodland occurs at Bergen Beach similar to that at the North 40 Environmental Area. The landfills at Pennsylvania and Fountain Avenues are closed areas with emerging *Spartina* marsh, *Phragmites*, and mixed grasslands present. Spring Creek has extensive stands of *Phragmites* with areas of mixed grassland and developing woodland throughout its southern half. Frank Charles Park and Hamilton Beach are developed parcels with small beachgrass areas south of the maintained ball-field areas.

Spartina marshes surround the islands of the Wildlife Refuge. The islands contain dune/beachgrass/ bayberry thicket communities. Ruler's Bar Hassock is the most intensely managed island in the bay with numerous plantings, mixed grasslands, and open shrubland. Also present are extensive stands of *Phragmites*, groves of willow, gray birch, japanese black pine, willow oak, red maple, eastern red cedar, and black cherry, scattered cottonwoods and eastern white pine, and abundant oriental

bittersweet and poison ivy. Manicured lawns are maintained near the Visitor Center and near the Congressman Joseph Addabbo Bridge (formerly the North Channel Bridge).

Sandy Hook Unit

The Sandy Hook unit is a 1665-acre barrier beach peninsula at the northern tip of the New Jersey shore. The unit includes seven miles of ocean beaches, salt marshes, hiking trails, and a maritime holly forest. Historic sites include the Sandy Hook Lighthouse, the oldest lighthouse in continuous operation in the United States and the Ft. Hancock and Sandy Hook Proving Grounds Historic District National Landmark. There have been forts on Sandy Hook since the 1800's to guard the entrance to New York Harbor, including historic Fort Hancock, which defended the harbor from 1895 until 1974. Over 200 historic structures remain standing in the park with approximately 120 of these located within the Fort Hancock Area. Sandy Hook was also the site of the first U.S. Army Proving Ground. Visitor activities include swimming, wading, birding, hiking, windsurfing, fishing, and exploring the park's natural and cultural resources.

Spartina marshes grow along the western side of the unit and beach grasses grow on the dunes on the eastern and northern edges. Back dune areas contain beach plum, black cherry, sumac and tree-of-heaven. A small "heathland" is located on the eastern side; beach heather, grasses and small shrubs dominate this sensitive area. Bayberry thickets, beach plum, sumac, hackberry, and black cherry characterize the uplands. A locally unique and regionally rare American holly forest, with deciduous trees interspersed, is present on the western side. The 274-acre forest contains the greatest concentration of American holly on the East Coast; some trees are over 170 years old.

Staten Island Unit

The Staten Island unit includes Miller Field, Great Kills Park, Crooke's Point, Hoffman and Swinburne Islands, and Fort Wadsworth. Historic sites include Fort Wadsworth Historic District, Miller Field Historic District and Hoffman & Swinburne Islands. Fort Wadsworth is one of the oldest military sites in the United States, and contains many historically significant examples of 19th century military architecture, including Fort Tompkins and Battery Weed. Miller Field is a post-World War I military aircraft support facility. Hoffman & Swinburne Islands are two man-made islands created in the 1870's as quarantines for arriving immigrants. In 1938, the US Maritime Service opened a training station on the island, which existed into the mid-1940's. Both islands served as naval defense points during World War II.

Great Kills Park is home to the full range of marine coastal or barrier island habitats, including sub-tidal sandy bottoms, beaches, dunes, grasslands, upland woods, and tidal salt marshes. This productive ecosystem serves as an important stop for migrating shore birds, and as breeding ground for many species of animals, including sport fishes. Crooke's Point is a permit-restricted natural area that preserves barrier island habitats and features beaches, extensive dune systems, and woodland hiking trails. Crooke's Point also preserves a tradition of conservation and nature study that dates back to its mid-19th century namesake owner, John Crooke, who bought the land to study wildlife. Miller Field also offers a rare commodity to the city in the form of substantial open spaces for sports, kite-flying, and other leisure activities.

Staten Island's northernmost site, Fort Wadsworth, is highly developed with extensive manicured lawns. A small forest/thicket area containing black cherry, red maple, sumac, and bayberry is located along the southern edge.

Great Kills Park is dominated by *Phragmites* with scattered thickets of shrubs and trees; sweetgums, elms, red cedars and tulip poplar are present in the wooded area along Hylan Boulevard. The tidal salt marsh on the northeast corner of Great Kills Park is the last remnant of the vast system of salt marshes that once spanned from Crooke's Point to the Narrows. Crooke's Point contains beachgrass along the dunes and thickets characterized by bayberry, poplar, beach plum, black cherry, and sumac in the uplands.

Miller field is dominated by a manicured playing field; a small dune system with beachgrass occurs on the southern edge. A locally unique 9-acre swamp white oak forest occurs in the northern part of the area.

Fire at Gateway National Recreation Area

In order to meet the goals and objectives of existing plans and those proposed for the new FMP, it is important to understand the role of fire at Gateway NRA. This section will provide some background on fire and fuels history, ecology, management, and planning at the park.

Fire History

Knowledge of the fire history of Gateway NRA and examination of the present vegetation suggests that fire, natural and otherwise, has not been an extremely important factor in shaping and maintaining Gateway NRA's native ecosystems, with the possible exception of the grassland areas. Although little is known about the role that fire played at Gateway NRA prior to the arrival of Native Americans, knowledge of weather conditions and ignition sources suggests that it was very likely limited. The arrival of Native Americans in the area would almost certainly have brought an increased number of accidental, and possibly intentional, ignitions. As the density of settlement of the area increased, it is likely that the number of ignitions increased, as did the effectiveness of fire suppression.

Almost all present-day fires are human-caused, and in most cases are considered to be detrimental to the park objective of restoring native plant and animal species, as well as being a threat to human life and property. For these reasons, aggressive suppression has been the usual approach to managing fire in the park. The exclusion of fire by aggressive control policies has allowed forest succession to progress toward the mixed-mesophytic forest type. As the shade intolerant species die, they are largely being replaced by more shade tolerant species.

Since 1975, an average of 47 wildland fires have occurred annually (range 0-154 fires), burning a total area annually of about 150 acres. Average fire size was approximately 3.0 acres, with 94% of wildland fires limited to 10 acres or less. Of the larger fires, 93 reached the 10 to 100 acre size class and 8 fires reached the 100 to 300 acre size class (Table 1). These few large fires have been limited to grassy fuels in which rapid growth was possible.

Predicting the future average annual acreage of unwanted wildland fire is quite uncertain, dependent as it is on climatic conditions, fuels conditions, locations, and other factors. However, the annual

average of about 47 fires per year places Gateway NRA among the top four National Park Service units for fire occurrence, behind Yellowstone National Park, Big Cypress National Preserve, and Grand Canyon National Park since 1975. Similar occurrence of fire is expected to continue; this expectation was used in the development of this EA.

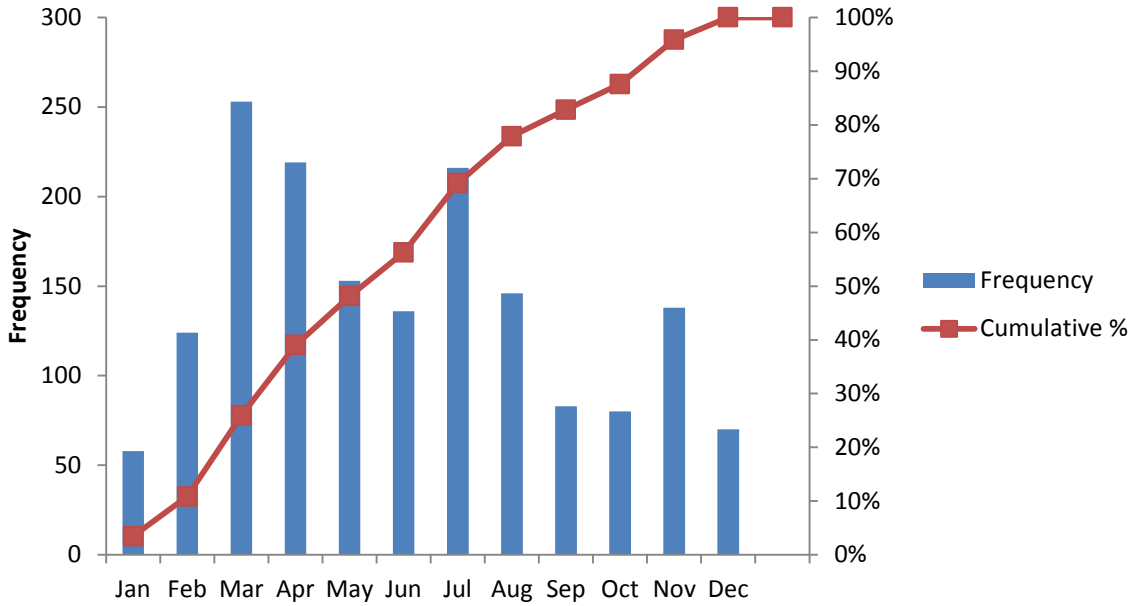
Table 2. Distribution of fire sizes at Gateway NRA, 1975 through 2010.

	0 to 0.2 acres	*0.3 to 9.9 acres*	*10 to 99.9 acres*	*≥ 100 acres*	*TOTAL*
Number of fires	834	741	93	8	1676
Total acres	90.5	1295.2	2540.2	1020	4945.9
% of total fires	49.76%	44.21%	5.55%	0.48%	100.00%
% of total acres	1.83%	26.19%	51.36%	20.62%	100.00%

A limited amount of prescribed fire has taken place at Gateway NRA. At Floyd Bennett Field, two experimental burns were conducted in the Grassland Restoration and Management Project area in 1993. Natural resource management personnel reported that after extensive post-event monitoring, the burn had had a positive impact on the study area. No further burns were conducted due to the lack of an approved FMP.

A typical fire season at Gateway NRA runs from about February to November. It is during this period that weather conditions and fuel moistures are conducive to fire or that human visitation provides for the greatest number of ignitions. The spring months are often very dry and very windy and many fires occur during this period. The summer months are typically characterized by hot and humid weather. However, given the proper ignition source and any relatively drier day, grasslands and *Phragmites* are susceptible to burning. Figure 1 clearly indicates that July has almost as many fires as March and April. The fall and winter months along the coast are generally characterized by relatively cool and dry weather with occasional brief rainy periods. Grass fuels are completely cured and will support ignitions readily if dry, and windy conditions can produce fire behavior approaching that seen during spring wind events.

Figure 1. Gateway National Recreation Area fire occurrence frequency by month 1975-2010



Fuels

Gateway NRA has a variety of vegetation types, and therefore, a variety of fuel types for wildland fires. These can be classified into fuel models based on fire behavior; use of these models is helpful in understanding wildland fire. The Northern Forest Fire Laboratory (NFFL) Fuel Models (Anderson 1982) are a set of commonly used models, 7 of which may be found at Gateway NRA:

- Fuel Model 1: Short Grass
  - This is a grass model, typically found immediately inland from the beaches and in the abandoned fields. Fire behavior in this model is characterized by high rates of spread, moderate intensity, low resistance to control, and a tendency to burn out rather quickly. The fine, continuous herbaceous fuels that are cured or are nearly cured govern fire spread. Fires are surface fires that move rapidly through the grass and associated materials; the rate of spread will increase significantly when there is a slope. This fuel model describes salt marsh, beachgrass, and beachgrass-beach heather vegetation communities.
  - Under normal conditions (slopes less then 40%, 1 hr fuel moisture 6%, and midflame wind speeds of 4 mph), rates of spread could reach 10 chains per hour (11 feet/minute), with flame lengths of 3.5'.
  - Under extreme conditions (slopes greater then 41%, 1 hr fuel moisture 3%, and midflame wind speeds of 10 mph), rates of spread could reach 126 chains per hour (140 feet/minute), with flame lengths of 5.6'.

- Fuel Model 3: Tall Grass
  - This is also a grass model, though fuel bed depth is greater than in Fuel Model 1. *Phragmites* stands are the sole example of this fuel model at Gateway NRA. The model is based on grasses up to 3 feet in height and may under-predict fire behavior in 6-12 foot stands of cured *Phragmites*. Fire behavior in this model is

similar to that of Fuel Model 1, although rates of spread are faster. This is potentially the most dangerous fuel model from the fire behavior perspective. Given a 0% slope, 3% 1-hour fuel moisture and a midflame wind speed of 12 miles per hour, a 490 chain per hour rate of spread (greater than 6 miles per hour) should be expected with flame lengths up to 15 feet given constant fuel availability.

- Fuel Model 5: Brush
  - This is a shrub model; usually shrubs are short and almost totally cover the area. It is used to describe eastern hardwood forest with understory vegetation where live fuel moisture influences fire ignition and spread. Fire behavior in this model is characterized by moderate to fast rates of spread and moderate flame lengths. Residence time is rather short as the larger woody fuels burn out fairly quickly; fires would tend to be stand replacement in nature. This fuel model describes bayberry, beach plum, and bayberry-chokecherry communities, as well as areas with dense vines, such as poison ivy or Virginia creeper. Because fuels in these vegetation types are usually not continuous, rates of spread and flame length will usually be lower than the model predicts.
  - Under normal conditions, rates of spread could reach 28 chains per hour (31 feet/minute), with flame lengths of 6.9'.
  - Under extreme conditions, rates of spread could reach 88 chains per hour (100 feet/minute), with flame lengths of 11.8'.

- Fuel model 6: Dormant Brush
  - This is also a shrub model; is typically found on abandoned fields where the shrubs or vines have largely encroached. Fire behavior in this model generally exhibits moderate to high intensities. Torching and spotting may occur under normal burning conditions. Moderate winds (greater than 8 mph mid-flame wind spread) are required to carry fire through the shrub layer. Fire will drop to the ground at low wind speeds.

- Fuel model 8: Closed Timber Litter
  - This is a timber model characterized by low rates of spread, short flame length, and fairly low resistance to control. It describes closed canopy stands of hardwoods that have leafed out, little undergrowth is present. Fires are supported in a compact litter layer comprised mainly of leaves, twigs, and needles. Slow burning ground fires are typical with occasional flare-ups caused by heavy fuel concentrations. This fuel model describes shadbush-highbush blueberry communities, pitch pine woodlands, maritime forests, and oak forests. Under severe weather conditions involving high temperatures, low relative humidities and high winds, moderate fire behavior may occur and pose fire hazards.
  - With a 5 mph wind, contiguous vegetation, and typical fuel moistures, rates of spread in this fuel model may be 2-3 feet per minute and flame lengths may be 2-3 feet.

- Fuel Model 9: Hardwood Litter

- This is another timber model characterized by higher rates of spread, longer flame lengths, and higher resistance to control. It generally exhibits faster rates of spread (greater than 10 chains per hour) and longer flame lengths (greater than 4 feet) than fuel model 8. It can describe hardwood stands after leaf fall, and is the primary fuel model describing oak forests throughout the fall fire season and during periods of late summer drought. These fires would usually tend to be ground fires, but high winds, closed canopies, or concentrations of dead and down material could contribute to torching of trees, spotting, and crowning. If the fire became a crown fire through the stand, spread rates could increase markedly, resulting in a hot, fast moving fire that would be stand replacement in nature.
- Under normal conditions, rates of spread could reach 10 chains per hour (11 feet/minute), with flame lengths of 3.5'.
- Under extreme conditions, rates of spread could reach 40 chains per hour (44 feet/minute), with flame lengths of 6.5'.

- Fuel Model 11: Hardwood Slash
  - This is another timber model describing Eastern hardwood forest where slash and herbaceous material are intermixed. This fuel model would also represent fuels from a hazard fuel reduction project. The spacing of the rather light fuel loading, shading from overstory, or aging of fine fuels can contribute to lowering fire potential. This model generally exhibits moderate rates of spread, approximately 5-9 chains per hour, with average flame lengths of 3-4 feet. Fires are fairly active in both the "dead-and-down" fuel component and in the herbaceous material intermixed with the slash. Rates of spread greater than 9 chains per hour and flame lengths greater than 4 feet are possible where fuels are continuous or influenced by the wind.

Fire Ecology

In addition to classifying vegetation by fuel model in order to better understand fire behavior, it is also important to develop an understanding of the fire ecology of the vegetation being managed.

One important aspect of fire ecology is fire regime, which refers to the history of fire in an ecosystem based on fire return intervals (or fire frequency) and fire severity. Fire regimes have been classified as follows:

- Fire Regime I: 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced)
- Fire Regime II: 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced
- Fire Regime III: 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced)
- Fire Regime IV: 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced)
- Fire Regime V: 200+ year frequency and high (stand replacement) severity

Vegetation communities vary in their ability to tolerate alterations to their natural fire regimes. Within ecosystems, both plant and animal species vary in their response to increases or decreases in fire frequency or severity, with some species favored and others not. One way of evaluating this response is through the use of *Condition Class* rating, a method developed by fire managers and used by federal fire management agencies to characterize both general wildland fire risk and resulting ecosystem condition.

Condition Classes are defined in terms of the relative risk of losing one or more key components that define an ecological system, based on five ecosystem attributes: disturbance regimes (patterns and frequency of insect, disease, fire, etc.), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow, etc.), and vegetative attributes (composition, structure, and resilience to disturbance agents). Condition Class definitions are as follows:

- Condition Class 1: Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as prescribed fire.

- Condition Class 2: Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This departure results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as prescribed fire and hand or mechanical treatments, to be restored to the historical fire regime.

- Condition Class 3: Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.

Relevant Laws, Policies, and Planning Documents

A multitude of laws, regulations, and policies influence development and implementation of a Fire Management Plan for Gateway National Recreation Area. The following relate directly to preparation of the Fire Management Plan and this Environmental Assessment:

NPS Organic Act of 1916 – Congress directed the U.S. Department of the Interior and NPS to manage units "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). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS 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. § 1 a-1).

National Environmental Policy Act (NEPA) – The purpose of NEPA is to encourage productive and enjoyable harmony between man and his environment; to promote efforts which would prevent or eliminate damage to the environment and stimulate the health and welfare of mankind; and to enrich the understanding of the ecological systems and natural resources important to the Nation. NEPA requirements are satisfied by successful completion of an EA or EIS, in addition to a decision document.

National Historic Preservation Act (NHPA) – The purpose of NHPA is to ensure the consideration of historic properties in the planning and implementation of land use and development projects. Section 106 requires federal agencies to assess the effects of their undertakings on historic properties and provides for review of those undertakings by the public and by the Advisory Council on Historic Preservation.

Director's Order-12 (DO-12) – DO-12 is the NPS guidance for Conservation Planning, Environmental Impact Analysis, and Decision Making. DO-12 states the guidelines for implementing NEPA according to NPS regulations. DO-12 meets all Council on Environmental Quality (CEQ) regulations for implementing NEPA. In some cases, NPS has added requirements under DO-12 that exceed the CEQ regulations.

Director's Order-18 (DO-18) – DO-18, the NPS guidance for Wildland Fire Management, states that "every NPS unit with burnable vegetation must have an approved Fire Management Plan." DO-18 defines what an approved FMP must include, stressing that "firefighter and public safety is the first priority" and promoting "an interagency approach to managing fires on an ecosystem basis across agency boundaries." Director's Order 18 also directs parks to identify, manage, and reduce, where appropriate, accumulations of hazardous fuels. Procedures for completion, review, approval, and required contents for FMPs are provided in Reference Manual-18 (RM-18). Until an FMP is approved, NPS units must take aggressive suppression action on all wildland fires.

Other documents that provide specific guidance on fire policy, planning, and implementation include the Federal Wildland Fire Management Policy and Program Review (1995), the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (1998), Managing

Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – a Cohesive Strategy (2000), and A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan (2001). A more complete listing of relevant laws, Executive Orders, and policies is provided in Table 1 by impact topic.

NPS Management Policies 2006, Section 1.4: The Prohibition on Impairment of Park Resources and Values

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of Interior and the NPS to manage units "to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations" (16 USC § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that NPS 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 USC 1a-1).

NPS Management Policies 2006, Section 1.4.4, explains the prohibition on impairment of park resources and values:

> While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the Nation Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The NPS has discretion to allow impacts on Park resources and values when necessary and appropriate to fulfill the purposes of a Park (NPS 2006 sec. 1.4.3). However, the NPS cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006 sec 1.4.3). An action constitutes an impairment when 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 NPS 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). At the time that an alternative is selected for implementation, a written impairment determination will be appended to the decision document.

Compliance with Section 106, National Historic Preservation Act

In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (36 CFR Part 800, *Protection of Historic Properties*), impacts to cultural resources and the cultural landscape were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural

resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources which are unevaluated, listed in, or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

CEQ regulations and the NPS's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, for example, reducing the intensity of an impact from major to moderate or minor. However, any resultant reduction in intensity of impact resulting from mitigation is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* also must be made for affected National Register-eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register, e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by an alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). As noted earlier, although adverse effects under Section 106 may be mitigated, the effect remains adverse. A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

This document serves as a combined Environmental Assessment and and Assessment of Effect on Cultural Resources. A Section 106 summary is included in the impact analysis section for cultural resources. The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

Compliance with Section 7, Endangered Species Act

Letters and Copies of this Environmental Assessment were sent to the U.S. Fish & Wildlife Service Long Island and New Jersey Field Offices seeking their concurrence with the park's determination by the park's Chief of Natural Resources.

Compliance with State Laws and Regulations

National Park Service planned fire management activities which result in discharge of pollutants are subject to, and must comply with, all applicable federal, state, interstate, and local air pollution control requirements. A permit from the State of New York is required for the release of smoke from prescribed fire. The park applies to the New York State Department of Environmental Conservation for this permit annually and will continue to operate within the conditions of this permit. The State of New York also requires that a permit for open burning be obtained prior to any prescribed burning. The National Park Service would submit an application that includes plans to manage emissions, shows model results of predicted air quality impacts in the area, and identifies smoke mitigation techniques.

Relationship to Other Plans

Other ongoing or upcoming plans at Gateway NRA, which may affect the FMP include: the development of a new General Management Plan (GMP) presently underway; a Grassland Management Plan scheduled to drafted in the fall of 2011, and a draft Invasive Vegetation Management Plan, scheduled for compliance review in early 2012. A Business Management Plan is being contemplated and this plan also may affect this project. All of the above plans, in one form or another, could impact this planning project by restructuring the current management zones, i.e., development, recreation, preservation or use by reservation.

Alternatives for Fire Management at Gateway NRA

Using existing knowledge about fire at Gateway NRA, NPS staff developed a selection of three fire management alternatives; these are introduced here, and discussed further in the next chapter. Each alternative outlines a possible program for meeting the various goals and objectives relating to fire management. Together, the alternatives cover the range of what is physically possible, acceptable by policy, and feasible for local managers (i.e., all reasonable alternatives).

In compliance with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act of 1966, as amended; this Environmental Assessment analyzes the potential effects of implementing these various alternatives. The details of this analysis, as well as the identification of a preferred alternative, make up most of the remainder of this document. The alternatives are as follows:

Alternative 1. No Action (Current Management)

This alternative represents a continuation of current management actions; it does not mean an absence of active management of fire and fuels. Current management consists of full suppression of all fires, using aggressive initial attack and suppression startegies to limit fire size to the smallest possible acreage. There is no use of prescribed fire, and there is no mechanical fuel reduction, other than mowing around certain cultural resources and park facilities.

Alternative 2. Suppression and Mechanical Fuels Treatment

This alternative involves suppression of all unplanned ignitions considering a full range of suppression stretegies available during the response. This allows fire managers to consider fire suppression goals other than simply limiting fire size to the smallest possible acreage. Aggressive suppression strategies may, in some cases, cause more resource damage than the fire being suppressed, and may also place firefighting personnel in hazardous situations. Fire managers can weigh the risks and benefits of aggressive suppression against those of allowing a fire to progress to a point where it may be more easily suppressed. This alternative includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, but does not include prescribed fire.

Alternative 3. Suppression, Mechanical Fuels Treatment, and Prescribed Fire (NPS Preferred Alternative)

This alternative involves suppression of all unplanned ignitions considering a full range of suppression strategies available during the response (see Alternative 2). It also includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, as well as the use of prescribed fire to achieve natural resource, cultural landscape, and fuels management objectives.

This EA is being made available to the public for a 30-day review. Upon completion of the public review, the National Park Service will assess public comments and modify the preferred alternative accordingly. If appropriate, a Finding of No Significant Impact (FONSI) would then be prepared finalizing the decision, or, if the potential for significant impacts is identified, a Notice of Intent (NOI) would be issued in the Federal Register for preparation of an Environmental Impact Statement (EIS).

At the conclusion of the NEPA process, an operational Fire Management Plan will be completed and implemented in accordance with the selected alternative. The Fire Management Plan will identify Fire Management Units, values to be protected, and individual management actions in conformance with NPS fire management policies.

Fire Management Units

As part of the internal scoping process and development of the alternatives, NPS staff discussed proposed Fire Management Units (FMU). These would be administrative divisions of the park in which different fire management strategies might be applied. It was decided that it would be best to retain the option to apply all of the selected techniques involved in the preferred alternative in any area of the park. For this reason it was decided to use a single Fire Management Unit to encompass the entire park. This will preserve the maximum number of fire management options for the park, while at the same time simplifying fire planning efforts.

Issues and Impact Topics

Following development of the alternatives, issues were identified that might be affected by fire management activities. These issues were distilled into distinct topics to facilitate the analysis of environmental consequences, which allows for a standardized comparison between alternatives based on the most relevant information. The impact topics were identified on the basis of federal

laws, regulations, and orders; *NPS Management Policies (2006)*; and NPS knowledge of limited or easily impacted resources. These are introduced here; they will be evaluated in Chapter 3 in detail, by issue and by alternative.

Issues and Impact Topics Selected for Additional Analysis

Firefighter, Employee, and Public Safety

Fire management activities can present hazards to fire management personnel, other NPS employees, and to the public, both inside and outside the park. Fire management safety concerns at Gateway NRA include not only those typically expected, but also special hazards which are somewhat unique to Gateway NRA, including the presence of unexploded ordnance and landfills, with the associated potential for the presence of hazardous materials, sinkholes, and methane.

Coordination with Cooperating Fire Management Agencies

Fire management at Gateway NRA relies heavily on cooperating fire management agencies, particularly the New York City Fire Department (FDNY). While the park has formal agreements with local firefighting agencies, these need to be reviewed to assure that issues of concern to the park are clearly expressed.

Geology, including Soils

Fire management activities at Gateway NRA would have very little potential to be affected by geohazards, or to affect the geology of the area, with the exception of soils. Possible effects on soils will be evaluated.

Air Quality

Gateway NRA is a Class II airshed, and is located in a large metropolitan area in which air quality is often an issue. Fire and fire management activities have the potential to affect air quality through smoke production.

Water Quality & Quantity

Fires and fire management activities at Gateway NRA have some limited potential to affect water quality and quantity.

Floodplains and Wetlands

Floodplains and wetlands do exist at Gateway NRA, and fire management activities do have some potential to affect them.

Unique Ecosystems and Rare or Unusual Vegetation

Gateway NRA does contain some unique native vegetation types, including a maritime American holly forest, a remnant of swamp white oak forest, as well as

examples of native grasslands. Management and restoration of disturbed areas and native plant communities, and control of invasive non-native plants are aspects of vegetation management at Gateway NRA which may be affected by fire management activities.

Unique or Important Wildlife or Wildlife Habitat

Gateway NRA provides habitat for a wide variety of wildlife, including both migratory species and year-round residents. Fire management activities have the potential to affect some of these species and their habitat.

Non-Native Species

Fire management activities at Gateway NRA have some potential to promote the introduction, existence, or spread of invasive species.

Visitor Experience, Recreation Resources & Aesthetic Resources

Fire management activities at Gateway NRA have limited potential for affecting aesthetic resources, but do have some potential for affecting visitor experiences.

Cultural Resources

Gateway NRA contains numerous valuable cultural resources, including cultural landscapes, archeological resources, ethnographic resources, and historic structures. Fire management activities have the potential to affect all of these.

Impact Topics Dismissed from Further Consideration

NEPA and CEQ regulations direct agencies to "avoid useless bulk…and concentrate effort and attention on important issues" (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents for other kinds of proposed actions or projects have been judged not to be substantively affected by any of the fire and fuels management alternatives considered in this EA. These topics are listed below, and a rationale is provided for dismissing specific topics from further consideration.

Species of Special Concern, including Threatened or Endangered Species, or their Habitat

One federally listed endangered species, the roseate tern (*Sterna dougallii dougallii*), and three threatened species -- the piping plover (*Charadrius melodus*), the Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), and seabeach amaranth (*Amaranthus pumilus*) – occur at Gateway NRA. There are several state-listed species (New York and New Jersey) and species of special concern that may be affected by fire management activities.

The piping plover, roseate tern, northeast beach tiger beetle, and seabeach amaranth occupy beach habitats where vegetation is absent or too sparse and discontinuous to support fire. Therefore, wildland fire would have no direct or indirect adverse effects on these species. Because the listed species are all associated with the ocean beaches and its related environs, fire management activities have limited potential to affect them.

The potential direct and indirect adverse effects of fire suppression under any of the alternatives could include disturbance by firefighting vehicles. However, off-road travel by firefighting vehicles is prohibited except in extreme emergencies. Further, there would also be no need to take firefighting vehicles along the beaches these species occupy, as fire would stop when it reached the edge of continuous fuels. Therefore, as the potential impacts noted above could readily be avoided, wildland fire suppression activities would have no direct or indirect adverse impacts on these species. In the context of the Endangered Species Act, the impacts of wildland fire and fire suppression operations on the piping plover, roseate tern, northeast beach tiger beetle, and seabeach amaranth would be *no effect.*

A fuels treatment program ranging from simple hazard tree removal and mowing and to an extensive mechanical fuel reduction would have no direct or indirect adverse impacts on any of these species as the areas treated are unsuitable habitat for the species. In the context of the Endangered Species Act, the impacts of this aspect of the fire management program on these species would be: *no effect.*

The addition of a prescribed fire would not generate any direct or indirect adverse effects on the listed species, as they occupy beach habitats where vegetation is absent or too sparse and discontinuous to support fire. In the context of the Endangered Species Act, the impacts of a prescribed fire program on the piping plover, roseate tern, northeast beach tiger beetle, and seabeach amaranth would be *no effect.*

Copies of this Environmental Assessment were sent to the U.S. Fish & Wildlife Service Long Island and New Jersey Field Offices seeking their concurrence with the park's determination.

Marine or Estuarine Resources and Unique or Important Fish or Fish Habitat

Gateway NRA contains over 17,000 acres of open water which support numerous recreational activities, and in which fish and other aquatic wildlife abound. The potential for fire management activities to affect these resources is slight, but should be considered. Any potential effects would relate to water quality and quantity and to wildlife; these effects will be considered in the analyses of those impact topics, and this will be dismissed as a separate topic.

Wilderness

No proposed or designated wilderness exists at Gateway NRA.

Soundscape

NPS Management Policies (2006) and Director's Order #47, Sound Preservation and Noise Management, direct the protection of the natural ambient soundscape. NPS policy is to minimize and manage dissonant human-caused sounds. Fire and fuels management activities can all involve the use of noise-generating equipment, such as chainsaws, trucks, and aircraft. Each of these fire management tools, especially chainsaws and helicopters, is quite loud (in excess of 100 decibels), but the use of such equipment would be relatively infrequent in light of the fuel types at Gateway NRA (hours or days per decade). This is not frequent enough to substantively interfere with human activities in the area or with wildlife behavior. Further, as the park is bounded by urban areas and the ocean, the ambient noise levels from the surrounding lands are often temporarily high; any noise generated by fire management activities would not greatly exceed ambient levels. Noise would be quickly dissipated in the open environments of Gateway NRA and would have a negligible impact for all alternatives.

Lightscape

In accordance with *NPS Management Policies (2006)*, the park strives to conserve natural landscapes including limiting the use of nighttime lights. No effects on natural or artificial lighting are anticipated from any of the alternatives.

Waste Management

None of the fire management alternatives would generate noteworthy quantities of either hazardous material or solid wastes that would require disposal in hazardous waste or general sanitary landfills.

Transportation

None of the fire management alternatives would substantively affect road, water-based, or aerial transportation in and around the park. One exception may be the temporary closure of nearby roads during fire suppression or prescribed burning activities or from dense smoke from such fires. However, as evidenced by recent fire history, such closures would be very infrequent and would not substantially impinge on local transportation. Therefore, this impact topic is dismissed from further analysis.

Utilities

None of the fire and fuels management alternatives would be expected to have any effect on telephone, electrical, natural gas, water, or sewer service.

Land Use

None of the fire management alternatives would result in any effects of a magnitude that would affect land uses, occupancy, income potential, values, or ownership within the park or in areas adjacent to it.

Socioeconomics, including Urban Quality & Gateway Communities

NEPA requires an analysis of impacts to the "human environment" which includes economic, social, and demographic elements in the affected area. Implementation of the proposed action, particularly prescribed burning, may require temporary closures of project areas. This may, in turn, inconvenience some park visitors, but such closures, are likely to be small in size and of very short duration, and would be very unlikely to have any effect on the local economy. Some fire and fuels management activities may bring a short-term need for additional personnel in the park, but that would not substantially affect local businesses. No aspects of any of the proposed fire management alternatives would be expected to affect any other socioeconomic factors, such as employment, occupation, income changes, tax base, infrastructure, population, housing, community services and infrastructure, or social conditions.

Environmental Justice, including Minority and Low-income Populations

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Executive Order 13045 requires federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the fire and fuels management alternatives would have disproportionate health or environmental effects on children, or on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998).

Prime and Unique Agricultural Lands

In August of 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seeds; unique farmland produces specialty crops such as fruits, vegetables, and nuts. No prime or unique farmlands occur at Gateway NRA.

Wild and Scenic Rivers

NPS Management Policies (2006) direct that proposed actions which have the potential to impact wild and scenic rivers must be evaluated in accordance with NPS procedures for implementing NEPA. Neither Gateway NRA nor adjacent lands contain any proposed or designated wild, scenic, or recreational rivers.

Indian Trust Resources

Indian Trust Assets are owned by Native Americans, but held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order 3206, "American Indian Tribal Rites, Federal – Tribal Responsibilities, and the Endangered Species Act," and Secretarial Order 3175, "Departmental Responsibilities for Indian Trust Resources". Indian trusts do not occur within Gateway NRA.

Energy Resources & Resource Conservation Potential

The NPS Guiding Principles of Sustainable Design provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. None of the fire management alternatives would affect resource conservation or pollution prevention in the park. Similarly, none of the alternatives would be expected to affect any type of energy resources.

Biosphere Reserves, World Heritage Sites, National Natural Landmarks

No portions of Gateway NRA are proposed for, or have received, any of these designations.

Agency or Tribal Land Use Plans or Policies

None of the proposed fire management alternatives would be expected to have any effect on any other known agency or tribal land use plans or policies.

Long-term Management of Resources and Land or Resource Productivity

Fire management activities at Gateway NRA could potentially affect long-term management of resources and land or resource productivity. However, this issue will be covered in the analysis of other natural and cultural resource topics, and will be dismissed as a separate topic.

CHAPTER 2: ALTERNATIVES CONSIDERED

This section provides further discussion of the alternatives introduced in the previous chapter.

Alternatives Considered and Selected for Evaluation

Alternative 1. No Action (Current Management)

> This alternative represents a continuation of current management actions; it does not mean an absence of active management of fire and fuels. Current management consists of full suppression of all fires, using aggressive initial attack and suppression strategies to limit fire size to the smallest possible acreage. There is no use of prescribed fire, and there is no mechanical fuel reduction, other than removal of hazard trees and mowing around certain cultural resources and park facilities.

Under the no-action alternative, the fire and fuels management program would consist of aggressive suppression of all wildland fires, and limited mechanical treatment of fuels.

Current wildland fire suppression techniques consist of depriving a fire of additional fuels (e.g., building a fireline that is cleared down to mineral soil) or cooling a fire sufficiently to prevent further combustion (e.g., applying water to the flaming front).

Mechanical treatment would involve removing individual hazard trees in selected areas, and mowing herbaceous vegetation near structures, cultural resources, park boundaries, and visitor use areas to reduce potential fire intensity, increase defensible space and human safety, minimize risk to private and public property, and facilitate visitor use activities.

Based on current fire occurrence at Gateway NRA, a typical 5-year fire and fuels management program would consist of:

- Suppression of about 55 wildland fires per year, totaling approximately 150 acres per year.
- Mowing herbaceous vegetation around park facilities and cultural resources annually.
- Mechanical removal of individual hazard trees as needed.

Alternative 2. Suppression and Mechanical Fuels Treatment

> This alternative involves suppression of all unplanned ignitions considering a full range of suppression strategies available during the response. This allows fire managers to consider fire suppression goals other than simply limiting fire size to the smallest possible acreage. Aggressive suppression strategies may, in some cases, cause more resource damage than the fire being suppressed, and may also place firefighting personnel in hazardous situations. Fire managers can weigh the risks and benefits of aggressive suppression against those of allowing a fire to progress to a point where it may be more easily suppressed. This alternative includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, but does not include prescribed fire.

Under Alternative 2, the fire and fuels management program would consist of suppression of wildland fires using the full array of suppression strategies, and expanded treatment of fuels using a variety of mechanical methods.

Wildland fire suppression considering a range of suppression strategies would allow fire managers to choose to utilize natural or man-made barriers in a confine strategy, increase firefighter safety, or minimize the impacts of suppression action. The acreage burned by wildland fires could increase slightly from that seen under current management (Alternative 1), as fire managers would have the option of selecting from a full range of suppression strategies. The expanded range of options allowed by this approach can help fire managers avoid creating situations in which more resource damage occurs from the effects of fire suppression than would have occurred from the fire itself.

Director's Order 18 directs parks to identify, manage, and reduce, where appropriate, accumulations of hazardous fuels. An expanded program of mechanical treatment of hazard fuels could be used not only to reduce fuels around structures, cultural resources, park boundaries, and visitor use areas as in Alternative 1, but also to manage fuels away from developed areas. This would reduce fire spread potential, create defensible space, and provide increased public and firefighter safety.

Firefighting personnel using hand-held tools and power tools (e.g. chainsaws, brushcutters, etc.) would be the primary means of mechanical fuel management used in historic districts, forest, woodland, and shrub habitats at risk from wildland fires. Vegetation may be removed from historic structures within districts in order to prevent adverse effects of fire should this vegetation burn if the fire management staff deems such vegetation to pose a threat to an historic structure. Methods might include sawing, chopping, limbing, chipping, and other similar activities. In areas with grasslands, mowing machines would be the primary means of treatment. Lightweight low ground pressure tired or tracked vehicles would be appropriate in areas where impact, slope, aspect, vegetation type and structure, and distance from developed areas dictate their use. Park personnel and/or contractors would perform mechanical fuel reduction work in the treatment areas.

If appropriate, fuel reduction work may utilize NPS approved herbicides for the chemical treatment of vegetation.

These techniques could be applied to address a variety of hazardous fuel management needs, including removal of non-native invasive species and protection of cultural resources. Herbaceous and woody debris resulting from these treatments would be scattered or hand-piled for later removal.

Based on current fire occurrence at Gateway NRA, a typical 5-year fire and fuels management program would consist of:

- Suppression of about 55 wildland fires per year using a response considering a range of suppression strategies, totaling about 200 acres per year.
- Mowing herbaceous vegetation around all park facilities and cultural resources annually.
- Mechanical and/or chemical removal of hazardous fuels on average would equal 200 acres annually.
- Mechanical removal of individual hazard trees as needed.

Alternative 3. Suppression, Mechanical Fuels Treatment, and Prescribed Fire (NPS Preferred Alternative)

> This alternative involves suppression of all unplanned ignitions considering a full range of suppression techniques available during the response (see Alternative 2). It also includes the expanded use of mechanical fuels treatment to achieve a variety of fuels management objectives, as well as the use of prescribed fire to achieve natural resource, cultural landscape, and fuels management objectives.

Under Alternative 3, the fire and fuels management program would consist of suppression of wildland fires using a range of suppression strategies, expanded treatment of fuels using a variety of mechanical methods, and the use of prescribed fire to achieve a variety of resource management objectives.

Wildland fire suppression and mechanical fuels treatment would be conducted as described under Alternative 2.

Prescribed fire and mechanical treatments may be used individually or in combination (including sequence) to achieve natural resource, cultural landscape, and fuels management objectives. Prescribed fires would be planned and approved consistent with the method and format required by NPS policy, including compliance with smoke management regulations or guidelines. Each treatment would involve developing an implementation plan and obtaining appropriate permits and approvals.

Prescribed fire may be used on those areas where mechanical treatments are not effective in reducing medium to fine fuels and/or further reduction of fuels is needed. In addition, prescribed fire would be used where effective mechanical removal of medium to fine fuels would require heavy machinery and cause ground disturbance. Prescribed fire may be used to maintain reduced levels of wildland fuel and remove ladder fuels within treatment areas. Prescribed fire could also be applied in the management of fire-dependent vegetation communities or for management of non-native invasive plant species.

Prescribed fire will only be implemented after additional consultation with regulatory and fire management agencies to address any site specific concerns.

Thus, based on current fire occurrence at Gateway NRA, a typical 5-year fire and fuels management program would consist of:

- Suppression of about 55 wildland fires per year using a response considering a range of suppression strategies, totaling about 200 acres per year.
- Mowing herbaceous vegetation around all park facilities and cultural resources annually.
- Mechanical removal of hazardous fuels on average would equal 200 acres annually. These actions will be undertaken in all units of the park.
- Implementation of prescribed fires, totaling up to about 500 acres over a typical 5-year period. These would be planned for all units of the park.
- Pile burning may also occur in various locations during 2 or 3 years of a typical 5-year period to dispose of removed biomass from hazard fuels reduction projects.

Measures Undertaken to Reduce Adverse Impacts

Measures to reduce adverse impacts would be incorporated into the implementation of the various alternatives. Some techniques are specific to certain fire management activities (e.g., prescribed fire, mechanical fuels treatment), and so would only apply to those alternatives which include those particular activities.

Safety

- Park neighbors, park visitors, and local residents would be notified of all planned fire and fuels management activities with the potential to affect them. The public would be notified about treatment activities through procedures identified in project-specific work plans. These methods could include, but are not limited to press releases, park entrance postings, local radio broadcasts, television broadcasts, and direct mailings.
- In known hazardous landfill areas, firefighters will not conduct direct attack without the appropriate level hazardous materials training and the use of appropriate personal protective equipment.

Resource Protection

- All fire management activities at Gateway NRA would rely on tactics which do a minimum amount of resource damage, while maintaining the safety of firefighters, personnel and the public as the highest priority.
- Fire suppression apparatus would not be driven on salt or freshwater marshes, dunes, archeological sites, or other sensitive areas unless there was a direct threat to human life.
- Fire suppression apparatus would not be operated in areas known to contain threatened or endangered species except when there was a direct threat to human life.
- Fire suppression apparatus would not be operated in areas known to contain archeological resources except when there was a direct threat to human life.
- Fireline location would avoid sensitive areas wherever possible.
- Earthmoving equipment such as tractors, graders, bulldozers, or other tracked vehicles would not be used for fire suppression or prescribed fire. If special circumstances warrant extreme measures to ensure protection, the Superintendent (or his/her designee) may authorize the use of heavy equipment.
- Machinery used in hazard fuels and hazard tree management activities, such as mowers and brush hogs, would be used only when soils were sufficiently dry to minimize soil compaction and erosion.
- The Chief, Cultural Resource Management Division or their designated representative will be contacted for clearance before using heavy equipment (bulldozers, tractor-plows) to minimize the chance of damaging cultural resources or unexploded ordnance, except where there was a direct threat to human life.
- The Chief,Natural Resource Management Division or their designated representative will be contacted for clearance before using heavy equipment to ensure that disturbance and direct mortality to park flora and fauna are minimized or avoided (as would be the case if a

threatened or endangered species is identified in the project area), except where there was a direct threat to human life.

- Hand tools and chainsaws would be used considering the minimum impact (vegetation cutting and fire-line scraping) necessary to stop the spread of fire.
- Whenever possible, low ground pressure tired or tracked vehicles would be used for fire management activities to minimize the potential for disturbing natural and cultural resources.
- Whenever possible, water and/or natural barriers would be used instead of constructed handlines to contain wildland and prescribed fires to minimize the potential of disturbing natural and cultural resources.
- Whenever possible, the potential effect of wildland fires and suppression actions on historic structures would be reduced by burning out around the structures, treating the structures with fire retardant foam, wrapping the structures with heat reflective materials, and establishing sprinkler systems on and around structures as needed.
- Hazard fuels removal around historic structures would mitigate the potential for impacts from wildland fires.
- The Chief, Cultural Resource Management Division or their designated representative will be contacted upon the detection of wildland fires and during planning stages of fuels management projects to ensure avoidance, to the greatest extent possible, of cultural resources.
- Fire and hazard fuels management activities would be monitored and work halted if previously unknown resources are located; the Chiefs of Natural and Cultural Resources will be notified and newly discovered resources would be protected and recorded.
- All visiting and local fire and fuels management personnel would be briefed on protection measures for natural and cultural resources.
- In fire suppression operations, protection of structures and features will be more important than minimizing acres burned.
- Coordination would be achieved with other fire suppression agencies and resources to ensure that the best management practices would be used in all fire, hazard tree, and hazard fuels management activities.
- Rehabilitation of firelines and other disturbed areas would be coordinated with natural and cultural resource specialists.
- Safety protocols would be established for all hazard tree, hazard fuels, suppression, and prescribed fire activities.
- Fire retardant, if used, must be on the approved list of retardants used by the U.S. Forest Service and USDI Bureau of Land Management.
- Due to potential rapid rates of fire spread and the emergency nature of fires near the boundary, off-road use of motorized equipment, such as all-terrain vehicles and wildland fire engines, may be authorized by the Superintendent.
- All extended attack and prescribed fire operations will have a qualified park employee designated and available to assist as a Resource Advisor. If qualified employees are not available, a Resource Advisor will be ordered through the interagency dispatch system.
- Helicopters may be used to transport personnel, supplies, and equipment. Improvement of landing sites would be kept to a minimum and would be coordinated with the assigned Resource Advisor.

- Suppression actions would avoid aerial and ground applications of retardant or foam within 300 feet of identified water sources.
- Except for spot maintenance to remove obstructions, no modifications would be made to roadways, trails, water sources, or clearings. All sites where modifications are made or obstructions removed would be rehabilitated to pre-fire conditions to the extent reasonably possible.
- Prior to implementing hazard fuel reduction projects or prescribed burning, including pile burning, the Chief, Cultural Resource Management Division or their designated representative will be contacted for clearance and to complete Section 106 consultation with the New York State or New Jersey Historic Preservation Officer (SHPO) or NPS staff with delegated responsibility, complete an inventory of previously unsurveyed areas using an archeologist who meets the Secretary of the Interior's standards, and develop a plan to protect character-defining elements of cultural resources.
- Prior to implementing hazard fuel reduction projects or prescribed burning, including pile burning, the Chief, Natural Resource Management Division or their designated representative will be contacted for clearance and to complete NEPA compliance.
- Any slash generated by treatment activities would be disposed of in areas lacking cultural sites, and ground disturbance would be avoided in areas containing known cultural sites.
- Prescribed fires would be scheduled for periods when ventilation is adequate to disperse smoke, and smoke management reporting procedures for burning in New York and New Jersey would be followed. All of these mitigation measures would be included in the prescribed fire burn plan.
- In the event that previously undetected cultural resources are found during fire management activities, the Chief, Cultural Resource Management Division or their designated representative will be contacted. Unless there is a direct threat to human life, fire management activities will be terminated in these areas until a proper survey of the cultural resource can be done and approval to proceed is given by the Chief, Cultural Resources Management Division.

Rehabilitation

- After each fire is declared out, all flagging, litter, and trash would be removed.
- Firelines would be obliterated and erosion control devices installed if necessary.
- Following fire suppression activities, firelines would be recontoured and water-barred.
- Stumps would be flush cut and camouflaged, and logs and brush would be chopped and scattered.
- Helibases, helispots, and drop points would be rehabilitated to prefire conditions to the maximum extent reasonably possible.
- As a matter of practice, burned areas would not be reseeded unless there are overriding concerns about establishment of invasive non-native species. Any reseeding would be with native species and occur only with the superintendent's prior approval.

Monitoring Effects of Fire Management Activities

- Gateway NRA Assistant Fire Management Officer along with the Chief of Resources Management will develop short and long term monitoring programs to assess

accomplishments and to determine effects of fire management activities on cultural and natural resources. Monitoring is essential for adaptive management, where the qualitative and quantitative changes to resources will be measured and used as a tool to guide modifications for subsequent prescription treatments and burn objectives.

- A fire effects monitoring program must be initiated with the prescribed fire program. Long term monitoring would include the installation of permanent plots to determine the effects of prescribed fire. Monitoring will determine if the quantifiable burn unit objectives have been achieved, such as the amount of tree and shrub mortality. Long term monitoring will also detect if the resource management objectives are being achieved, such as percent change in grass cover. Monitoring results would then be linked to adaptive management decisions.
- The NPS Fire Monitoring Handbook protocol will be implemented to fulfill monitoring plan requirements. Other valid monitoring strategies and protocols developed locally may be substituted for the standard monitoring protocols to meet specific management and information needs. Such monitoring programs would receive critical review prior to implementation.
- Photo points are a very valuable site-monitoring tool and should be required for prescribed fire monitoring. The establishment of permanent photo points prior to a prescribed fire should be the absolute minimum monitoring procedure. The use of both FMH plots and photo points are effective monitoring methods.
- All prescribed fires must include the appropriate number of prescribed fire monitors to record on site weather, smoke dispersal, fire behavior, and to collect data from FMH plots within the burn unit. A prescribed fire monitoring report would also be completed for each burn.
- Refer to RM-18 for prescribed fire documentation and reporting requirements.
- Critiques would also be accomplished after prescribed fire projects have been completed.

Preferred alternative

Alternative 3 (Suppression, Mechanical Fuels Treatment, and Prescribed Fire) has been selected by NPS staff as the preferred alternative. This alternative will best achieve fire management goals, meet resource management needs, and maintain firefighter and public safety by giving fire managers a broad range of feasible management options. The use of a range of suppression strategies in fire suppression, in combination with the use of both mechanical fuels treatment and prescribed fire, will allow fire managers a great degree of flexibility to meet the demands of various fire management situations.

Environmentally Preferable Alternative

In accordance with the DO-12 Handbook, the NPS identifies the environmentally preferable alternative in its NEPA documents for public review and comment [Sect. 4.5 E(9)]. The environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative (43 CFR 46.30).

The ***environmentally preferable alternative*** **is Alternative 3**, because it surpasses the other alternatives in realizing the full range of national environmental policy goals as stated in §101 of the National Environmental Policy Act. Although the no-action alternative may result in the least immediate disturbance of natural resources, it does result in increased risk to firefighters in comparison with the other two alternatives and it does not provide opportunities for maintenance of fire-dependent vegetation communities. Alternative 2 more closely meets the criteria of §101, but it also foregoes opportunities for maintenance of fire-dependent vegetation communities.

Table 3. The degree to which each alternative meets goals.

Goal	Alternative 1: No-Action (Current Management)	Alternative 2: Suppression and Mechanical Fuels Treatment	Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire
Maintain the highest level of firefighter and public safety in all fire and fuels management operations.	Implementing standard firefighting safety practices, using temporary area and road closures, and increasing public awareness would increase public and firefighter safety during suppression of wildland fires. The inability to utilize a range of suppression strategies could result in increased risk to firefighters.	Implementing standard firefighting safety practices, using temporary area and road closures, and increasing public awareness would increase public and firefighter safety during suppression of wildland fires. Use of a range of suppression strategies would allow greater flexibility in ensuring firefighter and public safety although the inability to use prescribed fire would make reduction of hazardous fuels less effective.	Implementing standard firefighting safety practices, using temporary area and road closures, and increasing public awareness would increase public and firefighter safety during suppression of wildland fires. Use of a range of suppression strategies would allow greater flexibility in ensuring firefighter and public safety. Ability to use prescribed fire would allow the greatest degree of flexibility and effectiveness in hazardous fuel reduction activities.

Protect human life, park natural and cultural resources, park structures and facilities, and urban interface boundaries from adverse impacts attributable to wildland fires, hazardous fuels, and hazard trees, commensurate with values at risk and firefighter and public safety.	Aggressive initial attack methods would be used for protection from wildland fire; these could occasionally result in some resource damage. Resources could become more vulnerable to fire as wildland fuels increase due to minimal hazard fuel reduction options. Hazard tree removal would improve safety and serve to protect cultural resources from damage due to falling trees.	A range of suppression strategies would be considered for protection from wildland fire; these would provide maximum flexibility to avoid resource damage from suppression activities. Some resources could become more vulnerable to fire as wildland fuels increase, but mechanical reduction of fuels would provide some ability to reduce risks from wildland fire. Hazard tree removal would improve safety and serve to protect cultural resources from damage due to falling trees.	A range of suppression strategies would be considered for protection from wildland fire; these would provide maximum flexibility to avoid resource damage from suppression activities. Some resources could become more vulnerable to fire as wildland fuels increase, but mechanical reduction of fuels and the use of prescribed fire would provide the greatest ability to reduce risks from wildland fire. Hazard tree removal would improve safety and serve to protect cultural resources from damage due to falling trees. Use of prescribed fire could help maintain the long-term stability and diversity of some ecosystems.
Foster and maintain interagency fire management partnerships to improve initial attack suppression response capabilities.	Suppression operations would be conducted cooperatively with other agencies.	All fire and fuels management activities would be coordinated with or conducted cooperatively with other agencies and landowners.	All fire and fuels management activities would be coordinated with or conducted cooperatively with other agencies and landowners.

Ensure that fire management activities do not adversely affect residential communities adjacent to the park.	Risk of adverse impacts to residential communities is reduced by direct attack in fire suppression, though direct attack may have additional risks for firefighters and for damage to park resources.	Risk of adverse impacts to residential communities is reduced by a range of suppression strategies which may also decrease risks to firefighters and park resources. Mechanical treatments of hazardous fuels would reduce risk to neighboring residential communities by reducing the likelihood of intense wildland fires.	Risk of adverse impacts to residential communities is reduced by a range of suppression strategies which may also decrease risks to firefighters and park resources. Mechanical treatments of hazardous fuels and the use of prescribed fire would provide the greatest flexibility in reducing risk to neighboring residential communities by reducing the likelihood of intense wildland fires.
Assist local agencies as fire management resources allow in the suppression of wildland fires adjacent to the park boundary to prevent the spread of unwanted fires into federal lands and to protect property on private lands.	All fire suppression activities would be coordinated with or conducted cooperatively with local agencies. Suppression assistance employing aggressive initial attack methods would be provided to the greatest extent possible.	All fire suppression activities would be coordinated with or conducted cooperatively with local agencies. Suppression assistance employing a range of suppression strategies would be provided to the greatest extent possible, possibly providing greater firefighter safety and improved protection of park resources.	All fire suppression activities would be coordinated with or conducted cooperatively with local agencies. Suppression assistance employing a range of suppression strategies would be provided to the greatest extent possible, possibly providing greater firefighter safety and improved protection of park resources.

Stimulate biodiversity, reduce exotic plants, restore protected species and disturbed lands, and improve native plant communities.	Suppression would contribute little to maintaining long-term stability and diversity of natural resources. As fuels increase in the absence of frequent fire, the effects of an intense wildland fire could be outside the range of normal variability.	Mechanical reduction of hazardous fuels would protect wildlands from exposure to unusually intense fires with fire effects potentially outside the range of normal variability. Some projects may use mechanical treatments on invasive nonnative species that are also hazardous fuels.	Prescribed burning and mechanical reduction of hazardous fuels would protect wildlands from exposure to unusually intense fires with fire effects potentially outside the range of normal variability. Prescribed fire could help maintain the long-term stability and diversity of certain vegetation communities. Some projects may use prescribed fire and mechanical treatments on invasive nonnative species that are also hazardous fuels.
Utilize minimum impact suppression techniques to reduce or avoid effects of fire suppression on biotic systems, cultural or historic resources, and neighboring communities.	Some minimum impact suppression techniques could be employed in conjunction with aggressive initial attack methods to protect park resources and neighboring communities.	The greatest range of minimum impact suppression techniques could be used in conjunction with a range in suppression strategies to protect park resources and neighboring communities.	The greatest range of minimum impact suppression techniques could be used in conjunction with a range in suppression strategies to protect park resources and neighboring communities.

Ensure smoke production from prescribed fires does not violate State and/or federal standards; minimize smoke impacts to park neighbors.	Smoke production would be limited to that produced by unwanted wildland fires.	Smoke production would be limited to that produced by unwanted wildland fires. Mechanical treatments of hazard fuels may reduce potential smoke production by reducing vegetation available for consumption.	Prescribed fire burn plans would be designed to minimize smoke production. Smoke modeling would be included in prescribed fire planning to ensure smoke impacts are not unacceptable at sensitive receptors. Mechanical treatments of hazard fuels may reduce potential smoke production by reducing vegetation available for consumption.
Utilize fire prevention and interpretive programs to increase public awareness, understanding, and acceptance of fire and fuels management programs and to reduce the incidence of human-caused ignitions.	Educational programs for the public would improve understanding of fire management activities and possibly reduce human-caused ignitions.	Educational programs for the public would improve understanding of fire management activities and possibly reduce human-caused ignitions.	Educational programs for the public would improve understanding of fire management activities and possibly reduce human-caused ignitions.

Identify and assess hazardous fuels that have the potential to adversely impact natural and cultural resources. Utilize prescribed fire and/or other methods (e.g., mechanical) to reduce threats posed by hazard fuels conditions.	Hazardous fuels would not be significantly reduced by the no-action alternative.	Hazardous fuels in selected areas would be reduced by mechanical treatments.	Hazardous fuels in selected areas would be reduced by both prescribed fire and mechanical treatments.

Table 4. Comparison of alternatives by fire management program item.

Fire Management Program Item	Alternative 1: No-Action (Current Management)	Alternative 2: Suppression and Mechanical Fuels Treatment	Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire
Fire management	Continue aggressive suppression of all wildland fires.	A range of suppression strategies would be considered for all wildland fires. The full range of suppression strategies will be available to fire managers.	A range of suppression strategies would be considered for all wildland fires. The full range of suppression strategies will be available to fire managers.
Hazardous fuels management	Hazard tree removal and limited mechanical treatments would not contribute substantially to reduction of hazardous fuels.	Mechanical treatments will be used to reduce hazardous fuels.	Prescribed fire and mechanical treatments will be used individually or in combination to reduce hazardous fuels.
Maintenance of fire-dependent vegetation communities.	Hazard tree removal and limited mechanical treatments would not contribute substantially to vegetation management.	Mechanical treatment of hazardous fuels may reduce the potential for high-intensity fire and attendant abnormal fire effects, but will otherwise not contribute to maintenance of fire-dependent vegetation communities.	Prescribed fire may be used in selected locations to maintain or restore fire-dependent vegetation communities.

Table 5. Summary comparison of alternatives and impact topics.

Impact Topic	Alternative 1: No-Action (Current Management)	Alternative 2: Suppression and Mechanical Fuels Treatment	Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire
Firefighter, Employee, and Public Safety	A more aggressive suppression strategy will exposes firefighters to greater risk associated with fire suppression. Fires would be smaller in size and duration limiting employee and public exposure to smoke.	Allowing fuels to burn to existing barriers will reduce the risk firefighters are exposed to during fire suppression. At the same time, employees and the public may be subject to greater smoke exposure. Mechanical treatments will expose personnel to fumes associated with equipment. Mechanical treatments will reduce firefighter risk by creating marries prior to fire occurrence.	This alternative will have the same impacts as Alternative 2, but will increase firefighter, employee, and public exposure to smoke through prescribed burning. Regular prescribed burning may reduce fire behavior and intensity, overall increasing firefighter, employee, and public safety.
Coordination with Cooperating Fire Management Agencies	Coordination should improve to provide the most efficient aggressive fire suppression strategy.	Coordination should increase over Alternative 1, to ensure that all agencies are utilizing the same suppression strategies and to identify barriers that could be used to contain fires.	Coordination should increase over Alternative 2, due to additional cooperation needed to plan and implement a prescribed fire program.
Geology, including Soils	A more aggressive suppression strategy will increase vehicular and foot traffic in a given area, leading to a greater disturbance on soils.	Allowing fires to burn to existing barriers should decrease soil impacts from vehicular and foot traffic. Mechanical treatments may increase soil disturbance due to increased vehicular and foot traffic. Increase in burned acreage will expose more soils to erosion processes.	This alternative will have the same impacts as Alternative 2, with the exception that there will be greater exposure of soil to erosion due to prescribed burning.

Air Quality	An aggressive suppression strategy will have short term impacts on air quality. Limited mechanical treatments will adversely impact air quality due to equipment use.	Fires could burn for a longer duration decreasing air quality for a longer duration. Increased mechanical treatments will more adversely impact air quality due to increased equipment use. Impacts from fires and mechanical treatments will be localized.	This alternative will have potential for more incidence of decreased air quality with the introduction of prescribed burning. However, regular prescribed burning will decrease fire intensity in the long term and may have less negative impacts on air quality
Water Quality & Quantity	An aggressive suppression strategy should have minimal impact on water quality or quantity, unless the fires occur adjacent to water or water is drawn from sources using engines and portable pumps. Vehicular and foot traffic may destabilize shore edges leading to increase in turbidity.	Turbidity may increase in water bodies adjacent to burned areas although the impacts should be short term and negligible. Water quality may be degraded due to equipment fluid spills and leaks from vehicles and equipment.	Turbidity may increase in greater amounts than in Alternative 2 with the introduction of prescribed burning although the impacts should still be short term and negligible.
Floodplains and Wetlands	Floodplains and wetlands would be disturbed by vehicular and foot traffic with a more aggressive suppression strategy.	Disturbance would be minimized from vehicular and foot traffic. Aboveground vegetation would be burned possibly leading to increased runoff. Disturbance to floodplains and wetlands may occur from fuels treatments implemented adjacent to or on floodplains and wetlands.	An increase in burned aboveground vegetation would occur over Alternative 2 if prescribed burning were implemented on floodplains and wetlands possibly leading to increased runoff. Disturbance to floodplains and wetlands may occur from fuels treatments implemented adjacent to or on floodplains and wetlands.

Unique Ecosystems and Rare or Unusual Vegetation	Damage or destruction may result from more aggressive suppression in the form of fireline construction, and/or vehicular or foot traffic. However, more aggressive suppression may also prevent fire spread into these resources.	Damage or destruction would be limited from suppression activities. Fires allowed to burn to existing barriers may damage or destroy these areas. Fuel treatments may cause some damage to these areas, but can be directed to avoid or to protect these resources from fires.	Impacts would be similar to Alternative 2. However, there may be increased damage or destruction of these resources due to the introduction of prescribed fire. However prescribed burns can be directed to avoid or protect these resources.
Unique or Important Wildlife or Wildlife Habitat	Damage or destruction may result from more aggressive suppression in the form of fireline construction, and/or vehicular or foot traffic. However, more aggressive suppression may also prevent fire spread into these resources.	Damage or destruction would be limited from suppression activities. Fires allowed to burn to existing barriers may damage or destroy these areas. Fuel treatments may cause some damage to these areas, but can be directed to avoid or to protect these resources from fires.	Impacts would be similar to Alternative 2. However, there may be increased damage or destruction of these resources due to the introduction of prescribed fire. However prescribed burns can be directed to avoid or protect these resources.
Species of Special Concern, including Threatened or Endangered Species, or their Habitat	Damage or destruction may result from more aggressive suppression in the form of fireline construction, and/or vehicular or foot traffic. However, more aggressive suppression may also prevent fire spread into these resources.	Damage or destruction would be limited from suppression activities. Fires allowed to burn to existing barriers may damage or destroy these areas. Fuel treatments may cause some damage to these areas, but can be directed to avoid or to protect these resources from fires.	Impacts would be similar to Alternative 2. However, there may be increased damage or destruction of these resources due to the introduction of prescribed fire. However prescribed burns can be directed to avoid or protect these resources.
Non-Native Species	Damage or destruction may result from more aggressive suppression in the form of fireline construction, and/or vehicular or foot traffic. However, more aggressive suppression may also prevent fire spread into these resources.	Damage or destruction would be limited from suppression activities. Fires allowed to burn to existing barriers may damage or destroy these areas. Fuel treatments may cause some damage to these areas, but can be directed to avoid or to protect these resources from fires.	Impacts would be similar to Alternative 2. However, there may be increased damage or destruction of these resources due to the introduction of prescribed fire. However prescribed burns can be directed to avoid or protect these resources.

Visitor Experience, Recreation Resources, and Aesthetic Resources	Fires and fire suppression apparatus may impede travel to, from and around the park. Acreage would be limited with more aggressive fire suppression and fires should be of relative shorter duration. Minimal fuel treatments and no prescribed fire leads to increased fuel accumulation and an increased chance of a catastrophic fire severely affecting visitor experience and recreation.	Fires allowed to burn to existing barriers may burn for a longer duration requiring additional resources and possibly additional closures impeding travel to, around, and in the park. Smoke may diminish viewsheds and decrease air quality. Increased burned acres would diminish the aesthetic quality of the landscape although temporarily. Fuel treatments may require temporary closures of areas while work is being performed.	Impacts would be similar to Alternative 2 with the addition of increased burned acres and temporary closures due to the introduction of prescribed fire.
Cultural Resources	Soils would be disturbed from a more aggressive suppression strategy, possible damaging or exposing archeological resources. Historic structures could be damaged by fire management equipment or fire. Cultural landscapes may be altered by fireline construction, firefighting equipment, and the fires. Accumulation of fuels from a less active fuels management program could lead to more catastrophic fires increasing potential damage to cultural resources.	A less aggressive fire strategy would decrease soil disturbance limiting damage to or exposure of archeological resources. Historic structures may be damaged by fire management equipment or fire. However, fuel treatments may be performed around structures to lessen their impacts. Cultural landscapes may have more burned acres, but damage from equipment and personnel would be lessened. Fuels management activities would be directed to protect cultural resources and reduce fuel loads.	Impacts would be similar to Alternative 2. There would be an increase in burned acreage potentially exposing more archaeological resources or temporarily decreasing the quality of cultural landscapes. Prescribed fires could be used to reduce the fuel load, decrease fire intensity, and protect cultural resources in conjunction with mechanical fuels treatments.

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Park management has reviewed cultural and natural resources that may be impacted by this project. Impact topics have been selected on the basis of the potential for beneficial or adverse effects on natural and cultural resources by each alternative as required by law, regulation, and National Park Service policy.

Methodology for Assessing Impacts

Applicable and available information on known natural and cultural resources was compiled. Alternatives were evaluated for their effects on the resources and values identified during the scoping process. Information on the number of acres annually treated by prescribed fire and mechanical reduction of hazard fuels was used to estimate impacts. Wildland fire acreage was estimated based on recent fire occurrence and potential fire return intervals. The impact analyses were based on professional judgment using information provided by park staff, relevant references and technical literature citations, and subject matter experts. For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of effects. Potential impacts are described in terms of type (are the effects beneficial or adverse?), context (are the effects site-specific, local, or even regional?), duration (are the effects short-term or long-term?), and intensity (are the effects negligible, minor, moderate, or major). Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment.

Direct, indirect, and cumulative effects are discussed in each impact topic. Predictions about direct and indirect effects are based on previous studies, monitoring information, wildland fire effects that have occurred in Gateway NRA or similar vegetation communities, and the expertise and judgment of resource management specialists.

When appropriate, specific mitigation measures have been identified that may be employed to offset or minimize potential adverse impacts.

Definitions of types of effects vary by impact topic, but, for all impact topics, the following definitions were applied:

- *Beneficial:* A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

- *Adverse:* A change that moves the resource away from a desired condition or detracts from its appearance or condition.

- *Direct:* An effect that is caused by an action and occurs in the same time and place.

- *Indirect:* An effect that is caused by an action but is later in time or farther removed in distance but is still reasonably foreseeable.

- *Short-term:* An effect that within a short period of time would no longer be detectable as the resource is returned to its predisturbance condition or appearance. Short-term impacts, depending on impact topic, may range from a few hours up to five years (see table below).

- *Long-term:* A change in a resource or its condition that does not return the resource to predisturbance condition or appearance and for all practical purposes is considered permanent.

The following table defines impact thresholds, by impact topic, for each level of intensity included in this assessment.

Table 6. Impact threshold definitions.

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Firefighter, Employee, and Public Safety	An action that could cause a change in level of risk to human safety, but the change would be so small that it would not be of any measurable or perceptible effect.	An action that could cause a change in risk level, but the change would be small and have a localized effect. Mitigation would be a standard procedure and highly effective in minimizing risk.	An action that would cause change to levels of risk; however, mitigation to offset adverse effects would generally be of moderate complexity and would be effective.	An action that would cause a severe reduction or exceptional benefit to human safety related values. The change would have a substantial and possible permanent effect, and mitigation to offset adverse effects is not assured.	Short-term would refer to the duration of a fire management incident. Long-term refers to duration extending beyond the specific incident.
Coordination with Cooperating Fire Management Agencies	A change resulting from improved coordination with cooperating fire management agencies, but the change would be so small that it would not be of any measurable or perceptible effect.	A change resulting from improved coordination with cooperating fire management agencies, but the change would be small and have a localized effect. Mitigation would be a standard procedure and highly effective in improving coordination.	A change resulting from improved coordination with cooperating fire management agencies; however, mitigation to offset adverse effects would generally be of moderate complexity and would be effective.	A change resulting from improved coordination with cooperating fire management agencies. The change would have a substantial and possible permanent effect, and mitigation to offset adverse effects is not assured.	Short-term would refer to the duration of a fire management incident. Long-term refers to duration extending beyond the specific incident.

Geology, including Soils	Impacts to geology or soils would not be measurable or of any perceptible consequence.	Changes to character of geology or soils are detectable but small, localized, and of little consequence. Any mitigation needed to offset adverse effects would be standard, uncomplicated, and effective.	Changes to character of geology or soils would be readily apparent and of consequence. Changes may be evident over a large portion of park area. Mitigation measures to offset adverse effects would probably be necessary and likely successful.	Impacts to characteristics of geology or soils would be severe or of exceptional benefit over a wide area. Mitigation to offset adverse effects would be needed, but its success not assured.	Short-term refers to durations of less than 5 years. Long-term refers to durations in excess of 5 years.
Air Quality	Impact would be barely detectable and not measurable; if detected, would not be of any perceptible consequence.	Impact measurable but localized and of little consequence. No mitigation measures would be necessary.	Changes in air quality would have consequences to sensitive receptors, but effects would remain relatively local. Mitigation measures necessary and likely effective.	Changes in air quality would have substantial consequences to sensitive receptors. Mitigation measures necessary and success of measures not assured.	Short-term would refer to hours or days; i.e., the duration of the fire management incident. Long-term would refer to that substantially beyond the duration of the incident or action.

Water Quality and Quantity	Neither water quality nor hydrology would be affected, or changes would be either nondetectable or if detected, would have effects that would be considered slight.	Changes in water quality or hydrology would be measurable, although the changes would be small and would likely be localized. No mitigation measure associated with water quality or hydrology would be necessary.	Changes in water quality or hydrology would be measurable but would be relatively localized. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Changes in water quality or hydrology would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.	Short-term would refer to recovery in less than 5 years. Long-term would refer to recovery, following treatment, requiring longer than 5 years.
Floodplains and Wetlands	Impacts would be so small that they would not be of measurable or perceptible consequence. No substantial change to floodplain or wetland functions. A Section 404 permit from the U.S. Army Corps of Engineers would not be required.	Changes to floodplain or wetland functions would be measurable but small, localized, and of little consequence. Any adverse effects to function can be effectively mitigated. A Section 404 permit from the U.S. Army Corps of Engineers may or may not be required.	Changes to floodplain or wetland functions would be of consequence. Mitigation to offset adverse effects extensive but likely successful. A Section 404 permit from the U.S. Army Corps of Engineers would be required.	Changes to floodplain or wetland functions would be noticeable over a relatively large area and result in severely adverse or beneficial impacts. Loss of ecological function may be permanent. Mitigation to offset adverse effects is required and extensive, and success not assured. A Section 404 permit from the U.S. Army Corps of Engineers would be required.	Short-term refers to a period of 1-3 years. Long-term refers to a period longer than 3 years.

Unique Ecosystems and Rare or Unusual Vegetation	The change in unique ecosystems or vegetation communities would be so small that it would not be of any measurable or perceptible consequence.	Changes in unique ecosystems or vegetation would be small, localized, and of little consequence. Response to fire and/or other treatments would be within the range of normal fire effects. Any adverse effects can be effectively mitigated.	A large segment of one or more unique ecosystems or vegetation communities would exhibit effects that are of consequence but would be relatively localized. Response to fire and/or other treatments would be within the normal expected range of normal fire effects. Mitigation could be extensive but likely effective.	Severely adverse and possibly permanent effects to unique ecosystems or vegetation communities would occur over a large area. Response to fire and/or other treatments would be outside the normal range of expected fire effects. Mitigation to offset adverse effects may be required and extensive, and success not assured.	Short-term refers to a period of less than 10 years. Long-term refers to a period longer than 10 years.
Unique or Important Wildlife or Wildlife Habitat	The change in unique or important wildlife populations and/or habitats would be so small that it would not be of any measurable or perceptible consequence.	Changes in unique or important wildlife populations or habitats would be measurable but small, localized, and of little consequence. Response to fire and/or other treatments would be within the range of normal fire effects. Any adverse effects can be effectively mitigated.	Changes in unique or important wildlife populations or habitats would be of consequence but would be relatively localized. Response to fire and/or other treatments would be within the normal expected range of normal fire effects. Mitigation to offset adverse effects to native species extensive but likely successful.	Severely adverse and possibly permanent effects to unique or important wildlife populations or habitats. Response to fire and/or other treatments would be outside the normal range of expected fire effects. Mitigation to offset adverse effects may be required and extensive, and success not assured.	Short-term refers to a period of less than 10 years. Long-term refers to a period longer than 10 years.

Non-Native Species	The change in populations and distribution of non-native species would be so small that it would not be of any measurable or perceptible consequence.	Changes in populations and distribution of non-native species would be small, localized, and of little consequence. Any adverse effects can be effectively mitigated.	Changes in populations and distribution of non-native species would be notable, exhibiting effects that are of consequence but still relatively localized. Mitigation could be extensive but likely effective.	Changes in populations and distribution of non-native species would be extreme, occur over a large area, and possibly be permanent. Mitigation to offset adverse effects may be required and extensive, and success not assured.	Short-term refers to a period of less than 10 years. Long-term refers to a period longer than 10 years.

Visitor Experience, Recreation Resources, and Aesthetic Resources	An action that could cause a change in visitors' activities, recreation resource values, or aesthetic resource values, but the change would be so small that it would not be of any measurable or perceptible effect. Few visitors or employees would be affected.	An action that would affect some visitors' activities, recreation resource values, or aesthetic resource values, but the change would be small and localized. Mitigation would not be necessary. Other areas in the park would remain available for similar visitor experience and use.	Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes. Mitigation including education measures would probably be necessary to offset adverse effects and would likely be successful. Other areas in the park would remain available for similar visitor experience, but visitor satisfaction might be measurably affected (visitors could be either satisfied or dissatisfied). Some visitors who desire to continue their use and enjoyment of the activity/visitor experience would be required to pursue their choice in other available local or regional areas.	An action that would cause a severe change or exceptional benefit to the activities of most park visitors. The change would have substantial and possibly permanent effects on visitor use. Recreation resources or aesthetic resources would be substantially degraded. Mitigation to offset adverse effects would be needed with success not assured. The change in visitor use and experience proposed in the alternative would preclude future generations of some visitors from enjoying park resources and values. Some visitors who desire to continue their use and enjoyment of the activity/ visitor experience would be required to pursue their choice in other available local or regional areas.	Short-term refers to a duration of days to a few months. Long-term refers to a duration in excess of a year.

Cultural Resources	Impacts to archeological resources or historic properties, either beneficial or adverse, which are at the lowest levels of detection, barely perceptible, and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.	The impact affects an archaeological or historic site or feature with little data potential. The historic context of the affected site(s) would be local. The impact would not affect the contributing elements of a listed structure eligible for the National Register of Historic Places. For purposes of Section 106, the determination of effect would be *no adverse effect*.	The impact affects an archaeological or historic site with modest data potential. The historic context of the affected site(s) would be state. For a National Register eligible site, the adverse impact would affect some of the contributing elements of the site, but would not diminish the integrity of the resource and jeopardize its National Register eligibility. For purposes of Section 106, the determination of effect would be *adverse effect* or *no adverse effect*.	The impact affects an archaeological or historic site with high data potential. The historic context of the affected site(s) would be national. For a National Register eligible or listed site, the impact would affect the contributing elements of the site by diminishing the integrity to the extent that it is no longer eligible for listing on the National Register. For purposes of Section 106, the determination of effect would be *adverse effect*.	Short-term refers to a transitory effect, one that largely disappears over a period of days or months. The duration of long-term effects is essentially permanent. For purposes of Section 106, the determination of effect would be *adverse effect*.

Cumulative Effects Methodology

From CEQ regulations (1508.7), a "cumulative effect" is the effect on the environment that results from the incremental effect of the action(s) when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such action.

Cumulative impacts will be determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other ongoing or reasonably foreseeable future projects in Gateway NRA and, if applicable, the surrounding area.

Other Past, Ongoing, and Proposed Projects in the Area

The following projects and project proposals may have cumulative effects on the environment relative to the park's Fire Management Plan:

- Formerly Used Defense Site (FUDS) project to remove unexploded ordnance from Sandy Hook (January 2011 – January 2012)
- Saltmarsh restoration / re-creation projects (Jamaica Bay is primary target area)
- Plumb Beach Shoreline Protection (Fall 2011)
- New York City Blue Belt Program
- Remediation of Great Kills Radiation Site (remediation plan in development)
- Eastern Shore Community Wildfire Protection Plan (plan development for Staten Island)

The FUDS project would have very low potential to affect the environment in conjunction with activities identified in this FMP since it is scheduled for completion by January 2012.

Saltmarsh and other aquatic ecosystem restoration projects will have no or negligible effects on the environment in conjunction with activities identified in this FMP. Staging areas for such projects are typically sited in areas that do not contain vegetation.

The Plumb Beach Shoreline Protection project is scheduled for implementation in the fall of 2011 and is limited to beach strand and bay ecosystems.

The New York City Department of Environmental Protection is proposing the construction of wetlands retention basins in the Oakwood Beach, New Creek, and South Beach areas under the Mid-Island Bluebelt Program. The Oakwood Beach area is adjacent to the park. The plan calls for the excavation of soil, the removal of common reed, and the conversion of much of the area to standing water. Efforts to provide connectivity of riparian resources would be closely coordinated with the park's Fire Management and Natural Resource Programs. These basins will act as buffers between the park and private property and enhances the safety of these properties from wildland fire. These basins should also reduce the numbers of wildland fires burning onto park land from outside the park.

Due to contamination in the Great Kills Radiation Remediation site, some fires originating within this area will be managed to minimize radiological exposure to firefighting personnel. This may lead to an increase in overall acres burned in the park.

The Staten Island Borough President's Office, in conjunction with the New York State Department of Conservation, the Fire Department of New York City, the New York City Department of Parks and Recreation, the New York City Department of Environmental Protection are developing the Staten Island Eastern Shore Community Wildfire Protection Plan (SIES CWPP) with the assistance of the National Park Service. This plan outlines several options to mitigate the effects of wildland fires that occur in areas dominated by common reed on lands outside of the National Park Service. The alternatives being considered involve the use of mechanical treatments, chemical treatments, and prescribed fire. As the SIES CWPP is considering the same alternatives as the Fire Management Plan, treatments implemented by this plan will serve to enhance projects developed under the Fire Management Plan.

Firefighter, Employee, and Public Safety

Affected Environment

Wildland fire management and fuels management programs have some level of inherent risk to both firefighters and the public. The desired level of safety within the fire management program is that firefighters and the public are protected from injury or undue threat from wildland fire management, prescribed burning, or fuels management projects. In the case of Gateway NRA, this issue becomes particularly important as the park units are adjacent to residences and commercial establishments, and local agencies respond to wildland fires within the park.

Potential risks to firefighter and public safety can be reduced or eliminated by following standard wildland firefighting safety practices such as adhering to the 10 Standard Firefighting Orders, being aware of potential Watch Out Situations, and employing Lookouts, Communications, Escape Routes, and Safety Zones (LCES). Ensuring that park neighbors, visitors, and employees, including firefighters, are adequately informed about the hazards associated with fire and fire management at Gateway NRA will also reduce risk. Special fire management hazards at Gateway NRA include unexploded ordnance, unauthorized dumping of hazardous materials, and landfills and dump sites, which may produce sinkholes or methane gas explosions when they burn.

In some situations, temporary closures of portions of the park or of roads in or around the park may be an important factor in maintaining the safety of visitors or employees. Conducting adequate preparedness and prevention activities, and providing opportunities for local employees to obtain wildland firefighting training and experience will further reduce risk. Finally, protecting the park's Wildland Urban Interface (WUI) areas, including neighboring properties, inholdings, and concessions, through appropriate fuels management will protect those areas and will also prevent fires from outside the park from burning into the park.

Impacts of Alternative 1: No-Action

Impact Analysis

Aggressive suppression activities would continue with over 50 fires per year occurring with an average of nearly 150 acres burned per year. Mechanical removal of hazard trees and mowing of herbaceous vegetation around all park facilities annually to increase defensible space and human safety and minimize risk to private and public property would continue.

One direct adverse effect of the no-action alternative is exposure of fire and fuels management personnel to the hazards typically associated with wildland fire suppression: burns, cuts, and abrasions from equipment, falls, smoke inhalation, and other injuries. Indirect adverse effects include long-term effects of smoke inhalation. Exposure to direct and indirect effects from fire suppression activities would be greatest with this alternative, as aggressive suppression methods may place firefighters at greater risk than a response that considers a range of suppression strategies.

Although there have been several injuries and fatalities nationally under these burning conditions, direct and indirect adverse effects to firefighters would be mitigated by application of standard firefighting safety practices. The direct and indirect adverse impacts to firefighters and the public would be localized, short-term to long-term, and minor.

Cumulative Effects

Firefighters, visitors, and park neighbors are exposed regularly to hazards associated with vehicle use and other work activities. Cumulative effects of this alternative include a slightly longer duration of exposure to hazards associated with fire suppression and fuels reduction activities. The cumulative effects on wildland firefighter and public safety are localized and minor.

Conclusion

The direct and indirect adverse impacts to firefighters and the public would be localized, short-term to long-term, and minor. The no-action alternative would not substantially impact firefighter and public safety.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

This alternative would reduce risks to wildland firefighters and visitors, a beneficial impact, by allowing a response to wildland fires that considers a range of suppression strategies. This response may include selecting control lines along natural or man-made barriers, which reduces the exposure of firefighters in unburned fuels adjacent to a fire perimeter.

An expanded program of mechanical fuel reduction would expose firefighters and other employees to some risks while performing the additional fuel reduction work; this increased risk would be offset by the reduced risk associated with the removal of hazardous fuels. Any firefighting or other work done in these areas after hazardous fuels have been removed would be somewhat less risky.

The direct adverse effect of this alternative is exposure of fire and fuels management personnel to the hazards typically associated with wildland fire suppression and hazardous fuel reduction: burns,

cuts, and abrasions from equipment, falls, smoke inhalation, and other injuries. Indirect adverse effects include the long-term effects of smoke inhalation. An indirect beneficial effect is the increased degree of safety resulting from the reduction of hazardous fuels. Exposure to adverse effects would be similar to the no-action alternative, and somewhat less than the preferred alternative because of the lack of prescribed burning. With standard safety practices in place, the adverse impacts of this alternative would be localized, short-term to long-term, and minor.

Cumulative Effects

Firefighters, visitors, and park neighbors are exposed regularly to hazards associated with vehicle use and other work activities. Cumulative effects of this alternative include a slightly longer duration of exposure to hazards associated with fire suppression and fuels reduction activities. The cumulative effects on wildland firefighter and public safety are localized and minor.

Conclusion

The impacts of this alternative to firefighters, fuel reduction personnel, and the public would be adverse or beneficial, short-term to long-term, localized, and minor.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

The preferred alternative would reduce risks to wildland firefighters and visitors, a beneficial impact, by allowing a response to wildland fires that considers a range of suppression strategies. This response may include selecting control lines along natural or man-made barriers, which reduces the exposure of firefighters in unburned fuels adjacent to a fire perimeter.

An expanded program of mechanical fuel reduction would expose firefighters and other employees to some risks while performing the fuel reduction work; this increased risk would be offset by the reduced risk associated with the removal of hazardous fuels. Any firefighting or other work done in these areas after hazardous fuels have been removed would be somewhat less risky.

The use of prescribed fire would also expose firefighters, other employees, and possibly the public to increased risk. Again, this risk would be offset by the increase in safety resulting from the successful reduction of hazardous fuels.

The direct adverse effect of the preferred alternative is exposure of fire and fuels management personnel to the hazards typically associated with wildland fire suppression, hazardous fuel reduction, and prescribed burning: burns, cuts, and abrasions from equipment, falls, smoke inhalation, and other injuries. Indirect adverse effects include the long-term effects of smoke inhalation. An indirect beneficial effect is the increased degree of safety resulting from the reduction of hazardous fuels. Exposure to adverse effects would be somewhat greater than the other alternatives because of the inclusion of prescribed burning. With standard safety practices in place, the adverse impacts of the preferred alternative would be localized, short-term to long-term, and minor.

Cumulative Effects

Firefighters, visitors, and park neighbors are exposed regularly to hazards associated with vehicle use and other work activities. Cumulative effects of this alternative include a slightly longer duration of exposure to hazards associated with fire suppression and fuels reduction activities. The cumulative effects on wildland firefighter and public safety are localized and minor.

Conclusion

With mitigation measures in place, the adverse impacts of the preferred alternative would be localized, short-term to long-term, and minor. The preferred alternative would not substantially impact firefighter and public safety.

Coordination with Cooperating Fire Management Agencies

Affected Environment

Fire suppression at Gateway NRA relies heavily on cooperating fire management agencies, including the following:

New York

- New York City Fire Department
- Broad Channel Volunteer Fire Department
- Oceanic Volunteer Fire Department
- Point Breeze Volunteer Fire Department
- Richmond Volunteer Fire Department
- Rockaway Point Volunteer Fire Department
- Roxbury Volunteer Fire Department
- West Hamilton Beach Volunteer Fire Department

New Jersey

- Highlands Volunteer Fire Department
- Middletown Volunteer Fire Department
- Naval Weapons Station Earle
- Sea Bright Volunteer Fire Department

Gateway NRA does not have any current agreements with any of the above or any other fire department or agency responsible for fire suppression. The park is in the process of updating and establishing new agreements cooperating agencies. These arrangements, and the fire suppression assistance obtained from other agencies requires that the park work closely with these agencies in planning, training, preparedness, and other fire management issues and activities. Improved coordination with these agencies could increase safety, streamline administrative matters, and enhance resource protection.

This improvement could take place in conjunction with any of the three alternatives, but would have somewhat different outcomes under each. For that reason, it was the results of the improved coordination under each alternative that were analyzed, rather than analyzing the effect of each alternative on coordination with cooperating agencies.

Maximizing safety of both cooperating firefighters and Gateway NRA employees is a critical issue for the fire management program at Gateway NRA. Firefighters from cooperating agencies coming into Gateway NRA to suppress fires may have limited familiarity and experience with wildland firefighting hazards and techniques. They may also be unfamiliar with hazards unique to Gateway NRA, such as unexploded ordnance, radioactive material, unauthorized dumping of hazardous materials, and landfills and dump sites, which may produce sinkholes or explosions when they burn. Coordination and communication with cooperating agencies will be critical to safe fire management operations.

Enhanced coordination with these agencies will also streamline fire management administration. Formalizing and refining cooperative agreements, including roles and responsibilities, would help to enhance coordination. Enhanced coordination would improve recordkeeping and other administrative procedures would increase the accuracy and usefulness of fire history records, and would facilitate funding fire management activities.

Resource protection could also be improved through better coordination with cooperating agencies. The use of a range of suppression strategies, if successfully communicated to, and implemented by the cooperating agencies could not only maximize protection of park resources, but also increase firefighter and public safety.

Impacts of Alternative 1: No-Action

Impact Analysis

Under the no-action alternative, aggressive fire suppression would continue, as would removal of hazard trees and mowing around park facilities. Under this alternative, improved coordination with cooperating agencies would enhance fire management administration and safety, with direct, short-term to long-term, minor to moderate beneficial effects. As aggressive fire suppression is already standard practice, improved coordination would have a negligible effect on protection of resources from suppression-related damage.

Cumulative Effects

No cumulative effects would be associated with this alternative.

Conclusion

Under the no-action alternative, improved coordination with cooperating agencies would have direct, short-term to long-term, minor to moderate beneficial effects.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Under this alternative, wildland fire suppression would continue, but would employ a potentially less aggressive range of suppression strategies. The program of mechanical reduction of hazardous fuels in the park would be expanded.

Under this alternative, improved coordination with cooperating agencies would enhance fire management administration and safety, with direct, short-term to long-term, minor to moderate beneficial effects. The use of a range of suppression strategies, if successfully communicated to and coordinated with cooperating agencies, could greatly reduce suppression-related resource damage. This would be a direct, negligible to moderate, short-term to long-term beneficial effect.

Cumulative Effects

No cumulative effects would be associated with this alternative.

Conclusion

Under this alternative, improved coordination with cooperating agencies would have direct, short-term to long-term, negligible to moderate, beneficial effects.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

Under the preferred alternative, wildland fire suppression would continue, but would employ a potentially a less aggressive range of suppression strategies. The program of mechanical reduction of hazardous fuels in the park would be expanded, and a prescribed fire program would be added to fire management activities in the park.

Under this alternative, improved coordination with cooperating agencies would enhance fire management administration and safety, with direct, short-term to long-term, minor to moderate beneficial effects. The use of a range of suppression strategies, if successfully communicated to, and coordinated with, cooperating agencies, could greatly reduce suppression-related resource damage. The ability to work with cooperating agencies on a prescribed fire program could enhance firefighter safety by providing local firefighters with additional experience working with the fuels found at Gateway NRA. These would be direct, negligible to moderate, short-term to long-term beneficial effects.

Cumulative Effects

No cumulative effects would be associated with this alternative.

Conclusion

Under this alternative, improved coordination with cooperating agencies would have direct, short-term to long-term, negligible to moderate, beneficial effects.

Geology, including Soils

Affected Environment

Gateway NRA is part of the Atlantic Coastal Plain physiographic province of the eastern United States. The area is comprised of thick sedimentary deposits from the eroding Appalachian Mountains, with landforms largely created by glacial activity. Coastal barrier beaches, man-made islands created from dredge spoil, and glacial tills are the dominant landforms.

Soils are recently deposited materials formed from accumulations of sand, gravel, silt, clay, organic sediments, and fill. Sandy Hook, most of Breezy Point, and the shoreline of Staten Island are composed of shore deposits of sand. The salt-marsh islands of Jamaica Bay are composed of organic materials intermixed with sands, silts, and clays. The north shore of the bay, virtually all of Floyd Bennett Field, parts of Breezy Point along Rockaway Inlet, and on Staten Island, most of Great Kills Park, and the area behind the beach from Great Kills to the Verrazano Bridge are composed of artificial fill. Glacial outwash deposits, consisting of sand and gravel, comprise the remainder of the Staten Island Unit, except for about 125 acres of Fort Wadsworth, which occupies a terminal moraine of unstratified clay, silt, sand, gravel, and boulders.

In addition to native (relatively undisturbed) soils, Gateway NRA contains man-made soils comprised of dredged material (mostly sand), solid waste landfill materials, remnants of buildings, and other non-natural materials mixed with native substrates. A USDA Natural Resource Conservation Service Soil Survey of the park was completed in 2001 and is used extensively for research and management purposes.

Fire intensity, ambient temperature, vegetation type, and soil moisture influence the effects of fire on the soil. The desired result is that fire management activities do not decrease soil stability and fertility over time. Fire management activities would not be expected to have any effect on any other aspects of the park's geology.

Impacts of Alternative 1: No-Action

Impact Analysis

Most fires in the fuel models represented at Gateway NRA would exhibit surface spread and relatively low severity. The effects of unplanned wildland fires on soils at Gateway NRA would be well within the range of normal fire effects; i.e., release of soil nitrogen, localized short-term sterilization of soils under heavy fuels, and retention of soil structure. Effects outside the range of normal effects, e.g., destruction of soil structure over wide areas, would not be anticipated. Because fire severity is generally low with grass fuel models and surface burning in leaf litter layers, the direct effects to soils by wildland fire itself would be adverse or beneficial, limited to the area burned, short-term, and negligible to minor. Indirect adverse impacts, such as erosion, would be localized, short-term to long-term, and minor.

Direct impacts of aggressive fire suppression include soil surface disturbance from fireline construction, and erosion from heavy localized use of water. Construction of firelines could exacerbate erosion and use of heavy equipment could compact soils, adversely affecting plant regrowth. As the average size of wildland fires is less than 3 acres, the direct adverse impacts of fire

suppression are considered localized, short-term, and negligible to moderate. Indirect effects could include increased erosion on firelines, soil compaction, and increased sedimentation, but that potential will be mitigated by rehabilitation of firelines in areas of erosive soils.

Hazard tree removal and mowing of herbaceous fuels also has the potential to disturb soil surfaces. The type and magnitude of potential disturbance is substantially reduced by use of hand-held tools and low ground pressure tired or tracked vehicles. With reasonable care to minimize ground disturbance during these projects, the potential adverse impact would be localized, short-term, and negligible to minor.

Cumulative Effects

No other major soil disturbing activities are planned within the park in the foreseeable future which would compound the minimal soil disturbance attributed to wildland fire suppression, hazard tree removal, and mowing of herbaceous vegetation in visitor use areas. The loss of soil due to construction activities outside the park contributes to soil loss and sedimentation in streams and rivers in the region, though these impacts would be localized and minor. Cumulative effects on soils, then, are anticipated to be localized and minor.

Conclusion

The direct and indirect effects of the no-action alternative on soils would be adverse or beneficial, localized, short-term to long-term, and negligible to moderate. The no-action alternative would not produce any major adverse impacts to soil resources or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Effects to soils from wildland fire under this alternative would be almost identical to those under the no-action alternative. The major difference would be that the average size of wildland fires might be slightly larger with a range of suppression strategies. Direct effects to soils from fire, however, would remain adverse or beneficial, negligible to minor, short-term to long-term, and limited to the area burned.

Effects to soils from fire suppression would be somewhat less than under the no-action alternative, as a range of suppression strategies is expected to result in reduced soil disturbance. Direct effects to soils from fire suppression activities would be expected to be adverse, localized, short-term, and negligible to minor.

An expanded program of mechanical fuel reduction would be expected to have effects similar to those expected under the no-action alternative, only on a broader scale. Again, the type and magnitude of potential disturbance is substantially reduced by use of hand-held tools and low ground pressure tired or tracked vehicles. With reasonable care to minimize ground disturbance during these projects, the potential direct adverse effects to soils would also be localized, short-term, and negligible to minor.

Overall, the direct and indirect impacts of the preferred alternative would be adverse or beneficial, localized, short-term, and negligible to minor.

Cumulative Effects

No other major soil disturbing activities are planned within the park in the foreseeable future which would compound the minimal soil disturbance attributed to wildland fire suppression, hazard tree removal, and mowing of herbaceous vegetation in visitor use areas. The loss of soil due to construction activities outside the park contributes to soil loss and sedimentation in streams and rivers in the region, though these impacts would be localized and minor. Cumulative effects on soils, then, are anticipated to be localized and minor.

Conclusion

Overall, the direct and indirect impacts of the preferred alternative would be adverse or beneficial, localized, short-term, and negligible to minor. Alternative 2 would not produce any major adverse impacts to soil resources or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

Effects to soils from wildland fire under the preferred alternative would be the same as those described for Alternative 2. Direct effects to soils from fire would be adverse or beneficial, negligible to minor, short-term to long-term, and limited to the area burned.

Effects to soils from fire suppression under the preferred alternative would also be the same as those described for Alternative 2. Direct effects to soils from fire suppression activities would be expected to be adverse, localized, short-term, and negligible to minor.

Effects to soils from an expanded program of mechanical fuels reduction under the preferred alternative would also be the same as those described for Alternative 2. Direct adverse effects to soils would also be localized, short-term, and negligible to minor.

The difference between this alternative and Alternative 2 is the addition of a prescribed fire program, which would have the potential to affect soils. Prescribed burns would generally be planned to be low-intensity, with rapid regrowth and minimal erosion problems expected following the fire. In many cases, the surface fuels – often only leaf litter – would be consumed with no effect to the soil itself. Low-intensity prescribed fires have few, if any, adverse effects on soil properties, even on steep slopes. Losses of nitrogen are often offset by increased activity of nitrogen-fixing soil microorganisms after the fire. Low-intensity, prescribed fire would have direct, minor, local, beneficial impacts on soil fertility.

Prescribed burns in grasslands could generate intense fast-moving fire. High-intensity prescribed fires in these areas could have a short-term negligible to minor adverse local effect on soil nutrients

due to volatilization of nitrogen and sulfur, plus some cation loss due to ash convection. However, burning when soils are moist would help mitigate this.

Other direct effects of prescribed burning may include more elevated soil temperatures as the result of consumption of dead and down woody material. Prescribed burns could also result in some ground disturbance where control lines are needed, but careful planning for burns would utilize natural barriers and other mitigation measures to minimize ground disturbance.

Pile burning may also occur occasionally to dispose of removed biomass from hazard fuels reduction projects. This would take place in the mechanical fuels treatment areas a year or two following the mechanical treatments during periods when soils were moist and cool. Although there would be increased heating of soils directly below the piles, the direct adverse impact to soils from pile burning should be short-term, minor, and localized.

Overall, the direct and indirect effects of prescribed burning on soil characteristics would be adverse or beneficial, localized, short-term, and negligible to minor, as would the effects of the preferred alternative as a whole.

Cumulative Effects

No other major soil disturbing activities are planned within the park in the foreseeable future which would compound the minimal soil disturbance attributed to wildland fire suppression, hazard tree removal, and mowing of herbaceous vegetation in visitor use areas. The loss of soil due to construction activities outside the park contributes to soil loss and sedimentation in streams and rivers in the region, though these impacts would be localized and minor. Cumulative effects on soils, then, are anticipated to be localized and minor.

Conclusion

Overall, the direct and indirect impacts of the preferred alternative would be adverse or beneficial, localized, short-term, and negligible to minor. The preferred alternative would not produce any major adverse impacts to soil resources or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Air Quality
Affected Environment

Gateway NRA's air quality is dependent upon influences from metropolitan New York and New Jersey. Pollution is evident and there are "Ozone Alert Days" during the summer when it is advised that those with respiratory problems spend little time outdoors. Ideally, fire management activities at Gateway NRA would have minimal effect on air quality and would not result in the violation of federal or state air quality standards.

The Clean Air Act requires federal land managers to protect air quality, and *NPS Management Policies (2006)* address the need to analyze air quality during park planning. The Clean Air Act established national ambient air quality standards (NAAQS) to protect the public health and welfare from air pollution, and states are responsible for the attainment and maintenance of these standards. These NAAQS have been established for several pollutants: inhalable particulate matter, sulfur dioxide, nitrogen oxides, ozone, carbon monoxide, and lead. Elevated concentration of these pollutants can have adverse impacts on park resources and visitors.

During a wildland fire, carbon monoxide, other gases, and particulate matter can be released, affecting air quality, and potentially resulting in adverse health effects. In addition to health effects, smoke from wildland fires could affect visibility on roads within and in the vicinity of the park, negatively affecting public safety.

National Park Service planned fire management activities which result in discharge of pollutants are subject to, and must comply with, all applicable federal, state, interstate, and local air pollution control requirements. A permit from the State of New York is required for the release of smoke from prescribed fire. The park applies to the New York Department of Environmental Conservation for this permit annually and will continue to operate within the conditions of this permit. The State of New York also requires that a permit for open burning be obtained prior to any prescribed burning. The National Park Service would submit an application that includes plans to manage emissions, shows model results of predicted air quality impacts in the area, and identifies smoke mitigation techniques.

Three air quality categories are established for the national park system areas: Class I, Class II, and Class III. Gateway National Recreation Area is in a Class II area, meaning that the state may permit a moderate amount of new air pollution as long as neither ambient air quality standards, nor the maximum allowable increases over established baseline concentrations are exceeded. Class I airsheds have more stringent standards; there are no Class I airsheds in the park or the region surrounding the park.

Impacts of Alternative 1: No-Action

Impact Analysis

Wildland fires would be suppressed at as small an acreage as possible. Although it is not possible to accurately predict the number of acres burned and amount of smoke generated, recent history suggests that about 150 acres would burn in an average year. Under the no-action alternative, smoke production would be minimized, as would the direct adverse impacts to air quality from wildland fire. These direct adverse impacts would include release of particulates and smoke into the airshed

and the potential for a slight increase in fugitive dust from suppression activities. On a local basis, there may be an intermittent and short-term exceeding of air quality standards (especially particulates) resulting in short-term, localized, negligible to minor adverse impacts to air quality and visibility. Mitigation would include rapid suppression and extinguishing of remaining smoke from heavy fuels. On a regional basis, effects to air quality would generally include minor short-term adverse impacts as quantities of pollutants, primarily particulates, are released to the atmosphere and travel beyond park boundaries. Indirect adverse effects from these air emissions would include reduced visibility along roadways, reductions in recreation values due to visibility limitations, smoke and odors, and possible health effects to sensitive residents and visitors. These adverse indirect effects would be short-term, localized, and minor.

This alternative does not alter the hazardous fuel loads in the park. As fuel loads increase over time, the risk of wildfire would increase. Air quality could be affected by smoke production related to wildland fire, as few methods exist for mitigating smoke and air quality impacts during suppression events. A large fire would produce short-term, adverse, minor to moderate, regional effects to air quality as large quantities of pollutants were released. Indirect effects would include impaired visibility along roadways, reductions in recreational values, and potential health effects to residents and visitors with respiratory difficulties. This alternative would not control when the burning occurred, and could not plan it when smoke could be dispersed.

Under the no-action alternative, power equipment would be used for hazard tree removal and management of herbaceous vegetation near park facilities. The direct effects on air quality would be the release of pollutants from power equipment. However, due to the relatively small number of acres treated, this would result in a negligible impact to air quality. Indirect effects would include associated smoke and odors. The direct and indirect adverse effects of hazard tree removal and management of herbaceous vegetation near visitor use areas would be localized, short-term, and negligible to minor.

Overall, the direct and indirect adverse impacts of the no-action alternative would be short-term and negligible to moderate on a local scale and on a regional scale.

Cumulative Effects

Primary contributions to cumulative impacts are from the metropolitan area. Growth in the New York City metropolitan area may result in moderate air pollution increases over time. Burning of firewood, debris, and woody material by private citizens can result in minor to moderate increases in air pollution regionally. Air quality in the park would continue to be impacted from daily vehicle emissions and management activities. Current and expected future visitor and employee use patterns and levels as well as external sources such as traffic on major highways, recreational user traffic, aircraft overflights, and the local residential communities would continue to impact air quality in the park over the long-term. Both direct and indirect adverse impacts of the no-action alternative would be short-term and minor on a local scale and nearly negligible on a regional scale. The cumulative effects on air quality from this alternative would be localized and minor to moderate.

Conclusion

The direct and indirect adverse impacts of the no-action alternative to air quality would be localized, short-term, and negligible to moderate. The no-action alternative would not produce any major adverse impacts to air quality or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Under this alternative, wildland fires would be suppressed using a range of suppression strategies. Some additional smoke would be generated from utilization of a range of suppression strategies. Direct adverse impacts to air quality would be greater than under the no-action alternative. These direct adverse impacts to air quality from wildland fire under this alternative would include the release of particulates and smoke into the airshed and the potential for a slight increase in fugitive dust from suppression activities. On a local basis, there may be an intermittent and short-term exceeding of air quality standards (especially particulates) resulting in short-term, localized, negligible to minor adverse impacts to air quality and visibility. Mitigation would include rapid suppression and extinguishing of remaining smoke from heavy fuels. On a regional basis, effects to air quality would generally include minor short-term adverse impacts as quantities of pollutants, primarily particulates, are released to the atmosphere and travel beyond park boundaries. Indirect adverse effects from these air emissions would include reduced visibility along roadways, reductions in recreation values due to visibility limitations, smoke and odors, and possible health effects to sensitive residents and visitors. These adverse indirect effects would be short-term, localized, and negligible to minor.

Under this alternative, an expanded program of mechanical fuel reduction would be implemented. Power equipment would be used for hazard tree removal and management of herbaceous vegetation throughout the park. The direct effects on air quality would be the release of pollutants from power equipment. The total number of acres treated would still remain relatively small, so this would result in a negligible impact to air quality. Indirect effects would include associated smoke and odors. The direct and indirect impacts of an expanded program of mechanical fuel reduction would be localized, short-term, and negligible to minor.

This alternative would alter the hazardous fuel loads in the park. Reducing fuel loads would reduce the risk of wildfire and of the associated adverse effects on air quality. Although this alternative would reduce the risk of wildland fire, it would not control when burning occurred, and could not plan for the dispersal of smoke.

Overall, the direct and indirect adverse impacts of this alternative would be short-term and negligible to minor on a local scale and on a regional scale.

Cumulative Effects

Primary contributions to cumulative impacts are from the metropolitan area. Growth in the New York City metropolitan area may result in moderate air pollution increases over time. Burning of

firewood, debris, and woody material by private citizens can result in minor to moderate increases in air pollution regionally. Air quality in the park would continue to be impacted from daily vehicle emissions and management activities. Current and expected future visitor and employee use patterns and levels as well as external sources such as traffic on major highways, recreational user traffic, aircraft overflights, and the local residential communities would continue to impact air quality in the park over the long-term. Both direct and indirect adverse impacts of the no-action alternative would be short-term and minor on a local scale and nearly negligible on a regional scale. The cumulative effects on air quality from this alternative would be localized and minor.

Conclusion

The direct and indirect adverse impacts of this alternative to air quality would be localized, short-term, and negligible to minor. This alternative would not produce any major adverse impacts to air quality or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

Under the preferred alternative, wildland fires would be suppressed using a range of suppression strategies. Some additional smoke would be generated from utilization of a range of suppression strategies. Direct adverse impacts to air quality would be greater than under the no-action alternative. These direct adverse impacts to air quality from wildland fire under the preferred alternative would include the release of particulates and smoke into the airshed and the potential for a slight increase in fugitive dust from suppression activities. On a local basis, there may be an intermittent and short-term exceeding of air quality standards (especially particulates) resulting in short-term, localized, negligible to minor adverse impacts to air quality and visibility. Mitigation would include rapid suppression and extinguishing of remaining smoke from heavy fuels. On a regional basis, effects to air quality would generally include minor short-term adverse impacts as quantities of pollutants, primarily particulates, are released to the atmosphere and travel beyond park boundaries. Indirect adverse effects from these air emissions would include reduced visibility along roadways, reductions in recreation values due to visibility limitations, smoke and odors, and possible health effects to sensitive residents and visitors. These adverse indirect effects would be short-term, localized, and minor.

Under the preferred alternative, an expanded program of mechanical fuel reduction would be implemented. Power equipment would be used for hazard tree removal and management of herbaceous vegetation throughout the park. The direct effects on air quality would be the release of pollutants from power equipment. The total number of acres treated would still remain relatively small, so this would result in a negligible impact to air quality. Indirect effects would include associated smoke and odors. The direct and indirect impacts of an expanded program of mechanical fuel reduction would be localized, short-term, and negligible to minor.

The preferred alternative would also include a prescribed fire program for vegetation management and hazardous fuel reduction. Smoke production associated with prescribed fires would be short-lived, ranging from a few hours to a few days. Ignition design and timing would minimize smoke

production, although burning in the most common fuel models at Gateway NRA would not generate much smoke. Pile burning to remove debris from mechanical fuels treatments would be scheduled for the winter or spring and conducted on days of good smoke dispersion. The impact of wind direction, planned fire duration, expected smoke volume, and expected smoke cloud persistence on the park viewshed and local communities would be considered in planning and conducting prescribed fire activities.

The park would comply with all federal, state, and local air quality laws and regulations, specifically the Clean Air Act and State of New York regulations. Smoke modeling using any of the smoke modeling programs will be completed to ensure sensitive receptors are not unduly impacted. Permits would be obtained, as required, for all prescribed burning. Park staff would notify the New York State Department of Environmental Conservation and the Fire Department, City of New York regarding the date and location of the proposed burn and comply with any state burning restrictions. If the state suspends burning because of poor air quality on the scheduled burn date, the park would not ignite any fuels. The influence of smoke on health and safety and the scenic viewshed would be kept to a minimum by following smoke management prescriptions listed in the Fire Management Plan.

The direct adverse impacts of the preferred alternative on air quality include short episodes of increased particulates and decreased visibility. These direct adverse impacts would be short-term, localized, and negligible to minor. Indirect and longer-term adverse impacts include contributions to regional haze and the possibility of wind-blown dust (e.g., from dust devils) near the burned areas. The indirect long-term adverse impacts on air quality are regarded as short-term and negligible to minor in a regional context.

This alternative would allow the greatest reduction in hazardous fuel loads in the park. Reducing fuel loads would reduce the risk of wildfire and of the associated adverse effects on air quality. This alternative would reduce the risk of wildland fire, and to some extent, could also control when burning occurred, and could plan for the dispersal of smoke.

Overall, the direct and indirect adverse impacts of this alternative would be short-term and negligible to minor on a local scale and on a regional scale.

Cumulative Effects

Primary contributions to cumulative impacts are from the metropolitan area. Growth in the New York City metropolitan area may result in moderate air pollution increases over time. Burning of firewood, debris, and woody material by private citizens can result in minor to moderate increases in air pollution regionally. Air quality in the park would continue to be impacted from daily vehicle emissions and management activities. Current and expected future visitor and employee use patterns and levels as well as external sources such as traffic on major highways, recreational user traffic, aircraft overflights, and the local residential communities would continue to impact air quality in the park over the long-term. Prescribed fires, if done during times of stable air, could contribute to adverse regional air quality effects. With the proper scheduling of prescribed fires to coincide with maximum atmospheric instability and rigid burn parameters, the contribution of prescribed burning to cumulative effects on regional air quality would be adverse, short-term, and negligible to minor. Both direct and indirect adverse impacts of the no-action alternative would be short-term

and minor on a local scale and nearly negligible on a regional scale. The cumulative effects on air quality from this alternative would be localized and minor.

Conclusion

The direct and indirect adverse impacts of the preferred alternative to air quality would be localized, short-term, and minor. The preferred alternative would not produce any major adverse impacts to air quality or values whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Water Quality and Quantity

Affected Environment

Water quality at Gateway NRA is considered to be impaired. Given the location of Gateway NRA in the dense urban environment of New York City and northern New Jersey, it is not expected that unimpaired water quality will be achieved in the foreseeable future. Improved water quality remains an important goal, however, and fire and fuels management activities should not contribute to the degradation of water quality.

Most of Gateway NRA's water resources are saltwater or brackish; scattered freshwater ponds also exist. Fire and fuels management activities have the potential to affect all of these. Effects on saltwater and brackish waters are very likely to be negligible in all cases because of the expected size of fires and fuels treatments relative to the volume of water in question. More obvious effects on the freshwater features are possible.

Burning can change hydrologic processes. Short-term effects of wildland fire can include sedimentation whenever increased erosion occurs. Increased temperatures due to greater amounts of sunlight hitting the water source also occur; this can have indirect effects on the food chain as more green or blue-green algae are likely to grow in the sunlit areas. These algae can be less nutritious than diatoms found under shaded conditions. Nitrogen and phosphorus in fire retardant chemicals can cause temporary eutrophication. Water chemistry may be altered by wildland fire; changes in water chemistry can include increased nitrate concentrations, reductions in phosphate concentration, and variable patterns in other nutrients. These changes would have direct effects on bacteria, fungi, and algae; and indirect effects on insect or grazing fishes.

Mechanical removal of vegetation can alter the spatial distribution of water on the ground, the amount intercepted or evaporated by foliage, the amount of water that can be stored in the soil or transpired from the soil by vegetation, and the physical structure of the soil that governs the rate and pathways by which water moves to stream channels.

Impacts of Alternative 1: No-Action

Impact Analysis

Unwanted wildland fires have the potential to degrade water quality if ash, nutrients, and partially consumed organic matter that result from fire are carried into water sources by surface runoff. With the no-action alternative, aggressive initial attack would be made on every wildland fire, minimizing the number of acres burned annually. Only occasionally would a portion of burned area be immediately adjacent to water sources; most burned areas would be buffered by live vegetation and undisturbed surface materials. These surface materials will serve to filter ash and other runoff materials before they reach water sources, thus mitigating any direct effects. The direct adverse effects of fire itself on water resources – such as interrupting or otherwise modifying water flows and water chemistry – would be negligible. Indirect adverse effects may include slight increases in water temperature if shading vegetation is burned, slight increases in sediment if fire removes vegetation immediately adjacent to water sources, and slightly increased surface flow since there would be less vegetation and thus less transpiration on the burned areas. These indirect impacts would be localized, short-term, and negligible to minor.

The direct adverse effect of fire suppression efforts would be negligible unless water was drawn from ponds for firefighting. If this occurred, the direct adverse effects of diminished flow or storage would be localized, short-term (hours), and negligible to minor. Indirect adverse effects could include destabilizing pond shores due to off-road travel with fire engines and other equipment. Suppression activities that disturb the soil surface have the potential to contribute to pollution through erosion of exposed surfaces. Control lines that present this potential would be rehabilitated immediately after fire control. These indirect impacts would be localized, short-term, and minor.

Removal of hazard trees and mowing of herbaceous vegetation near park facilities would have negligible adverse effects on hydrology or water quality.

The adverse direct and indirect impacts of the no-action alternative on water resources would be localized, short-term, and negligible to minor.

Cumulative Effects

Water quality in the park may be affected by construction and runoff in the areas surrounding the park contributing to sedimentation. The adverse effects of these activities range in magnitude from negligible to minor. The cumulative effect of the no-action alternative on water resources, then, would be minor.

Conclusion

Direct adverse effects of the no-action alternative would be localized, short-term, and negligible to minor. Indirect effects would be short-term, localized, and negligible to minor. The no-action alternative would not produce any major adverse impacts to water quality or quantity whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

This alternative, in employing a range of suppression strategies to unwanted wildland fire, may result in a slight increase in acres burned, but less surface disturbance, as managers may choose to utilize natural and man-made barriers rather than aggressive suppression of fires. As with the no-action alternative, little of this acreage would be immediately adjacent to water sources, so there would be little increase in potential runoff as a result of utilizing a range of suppression strategies. The direct adverse effects of fire itself on water resources would be negligible. Indirect adverse effects may include slight increases in water temperature if shading vegetation is burned, slight increases in sediment if fire removes vegetation immediately adjacent to water sources, and slightly increased runoff as there would be less vegetation and thus less transpiration on the burned areas. These indirect impacts would be localized, short-term, and negligible to minor.

In aggressive fire suppression, engines are often driven off-road to control the fire perimeter. With implementation of a range of suppression strategies, there would be less fireline constructed and a

lowered likelihood of off-road use of engines, as natural barriers are used to confine wildland fires. The direct adverse effect of fire suppression efforts would be negligible unless water was drawn from ponds for firefighting. If this occurred, the direct adverse effects of reduced flow or storage would be localized, short-term (hours), and minor. Indirect adverse effects could include destabilizing pond shores due to off-road travel with fire engines and other equipment. They would be mitigated by reduced off-road travel and rehabilitation of any damaged pond banks. The indirect adverse effects would also be localized, short-term, and minor.

An expanded program of mechanical fuel reduction has the potential to produce adverse effects on water resources, but these effects can be mitigated. The most likely direct adverse impact of mechanical fuel reduction would be soil disturbance near water sources from human traffic or equipment use. This could be mitigated by avoidance, where possible, and immediate rehabilitation as part of the project. These direct adverse impacts would be localized, short-term, and negligible to minor. Indirect adverse effects of this type of project may be slight increases in water temperature if shading vegetation is removed and slightly increased runoff as there would be less vegetation and thus less transpiration on the treated area. These indirect impacts would be localized, short-term, adverse, and negligible to minor.

The direct adverse impacts of this alternative on water resources would be localized, short-term, and negligible to minor. The indirect adverse impacts would be short-term, localized, and negligible to minor.

Cumulative Effects

Water quality in the park may be affected by construction and runoff in the areas surrounding the park contributing to sedimentation. The adverse effects of these activities range in magnitude from negligible to minor. The cumulative effect of the no-action alternative on water resources, then, would be minor.

Conclusion

Direct adverse effects of this alternative would be localized, short-term, and negligible to minor. Indirect effects would be short-term, localized, and negligible to minor. The no-action alternative would not produce any major adverse impacts to water quality or quantity whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

The preferred alternative, in employing a range of suppression strategies to unwanted wildland fire, may result in a slight increase in acres burned, but less surface disturbance, as managers may choose to utilize natural and man-made barriers rather than aggressive suppression of fires. As with the other alternatives, little of this acreage would be immediately adjacent to water sources, so there would be little increase in potential runoff as a result of utilizing a range of suppression strategies. The direct adverse effects of fire itself on water resources would be negligible. Indirect adverse effects may include slight increases in water temperature if shading vegetation is burned, slight

increases in sediment if fire removes vegetation immediately adjacent to water sources, and slightly increased runoff as there would be less vegetation and thus less transpiration on the burned areas. These indirect impacts would be localized, short-term, and negligible to minor.

In aggressive fire suppression, engines are often driven off-road to control the fire perimeter. With implementation of a range of suppression strategies, there would be less fireline constructed and a lowered likelihood of off-road use of engines, as natural barriers are used to confine wildland fires. The direct adverse effect of fire suppression efforts would be negligible unless water was drawn from ponds for firefighting. If this occurred, the direct adverse effects of reduced flow or storage would be localized, short-term (hours), and minor. Indirect adverse effects could include destabilizing pond shores due to off-road travel with fire engines and other equipment. They would be mitigated by reduced off-road travel, re-establishing native plant communities, and rehabilitation of any damaged pond banks. The indirect adverse effects would also be localized, short-term, and minor.

An expanded program of mechanical fuel reduction has the potential to produce adverse effects on water resources, but these effects can be mitigated. The most likely direct adverse impact of mechanical fuel reduction would be soil disturbance near water sources from human traffic or equipment use. This could be mitigated by avoidance, where possible, and immediate rehabilitation as part of the project. These direct adverse impacts would be localized, short-term, and negligible to minor. Indirect adverse effects of this type of project may be slight increases in water temperature if shading vegetation is removed and slightly increased runoff as there would be less vegetation and thus less transpiration on the treated area. These indirect impacts would be localized, short-term, adverse, and negligible to minor.

The addition of a prescribed fire program under the preferred alternative has the potential to produce additional effects on water resources. These effects would be similar to those seen for wildland fire acres burned, but would even more likely be minimal, as prescribed fires would be planned to produce low-severity effects. Prescribed fire would also be managed to avoid or minimize the potential indirect impacts by maintaining, wherever possible, an unburned strip along any water source. Any control lines associated with prescribed fires would be quickly rehabilitated as part of the prescribed burn plan implementation. The direct adverse effects of prescribed fire itself on water resources would be negligible. Indirect adverse effects may include slight increases in water temperature if shading vegetation is burned, slight increases in sediment if fire removes vegetation immediately adjacent to water sources, and slightly increased runoff as there would be less vegetation and thus less transpiration on the burned areas. These indirect impacts would be localized, short-term, and negligible to minor.

The direct adverse impacts of the preferred alternative on water resources would be localized, short-term, and negligible to minor. The indirect adverse impacts would be short-term, localized, and negligible to minor.

Cumulative Effects

Water quality in the park may be affected by construction and runoff in the areas surrounding the park contributing to sedimentation. The adverse effects of these activities range in magnitude from negligible to minor. The cumulative effect of the no-action alternative on water resources, then, would be minor.

Conclusion

Direct adverse effects of the preferred alternative would be localized, short-term, and negligible to minor. Indirect effects would be short-term, localized, and negligible to minor. The no-action alternative would not produce any major adverse impacts to of water quality or quantity whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Floodplains and Wetlands

Affected Environment

The wetland habitats of Gateway NRA are varied, but include primarily saltmarshes and *Phragmites* marshes. The *Phragmites*-dominated areas may have native or non-native trees and shrubs interspersed. The invasive nature of *Phragmites*, as well as its flammability, makes these areas a special concern. Salt marshes are most common along bay edges where waters are calm. In some areas, they extend inland among the dunes as far as tidal waters reach. *Spartina* is the dominant species, and glasswort, salt hay, and sea lavender are also common. The desired result of the fire management program on the floodplains and wetlands of Gateway NRA is that the long-term stability and diversity of these communities are maintained.

Impacts of Alternative 1: No-Action

Impact Analysis

Some potential exists for wildland fires in floodplain and wetland communities. The direct impacts of fire itself on floodplains and wetlands would vary with fire intensity and size. Fire would reduce above ground vegetation, but would not have direct adverse impacts on floodplain and wetland structure or function. Resultant indirect impacts may include increased runoff into floodplains and wetlands. These impacts would be localized, short-term, and negligible to minor.

Aggressive initial attack would minimize the acres burned. Direct adverse impacts of suppression operations include physical disturbance of floodplains and wetlands. Any such physical disturbance should be minor and readily mitigated by common fire rehabilitation activities. Indirect adverse impacts would include potential new drainage routes from firelines or vehicle tracks. These also would be readily mitigated by common fire rehabilitation activities. The direct and indirect adverse impacts of wildland fire suppression would be localized, short-term, and negligible to minor.

The direct adverse impact of mechanical removal of hazard trees would be slight physical disturbances of floodplain and wetland surfaces due to foot or vehicle activity. Indirect adverse impacts would include potential new drainage routes from vehicle use. The indirect adverse impacts to floodplains and wetlands from hazard tree removal would be localized, short-term, and negligible.

Cumulative Effects

Activities which contribute to cumulative effects on floodplains and wetlands within the park include: residential development on adjacent areas, storm runoff from roads and other areas with reduced infiltration capacity, and hazardous waste spills. Some wetlands have already been modified by commercial or residential development. No construction or other substantial ground-disturbing activities are proposed on floodplains or wetlands. The cumulative impact on floodplains and wetlands would be localized and negligible to minor.

Conclusion

The direct adverse impacts of wildland fire and fire suppression under the no-action alternative would be localized, short-term, and negligible. The indirect adverse impacts would be localized,

short-term, and negligible to minor. The direct and indirect impacts of hazard tree removal would be localized, short-term, and negligible. The no-action alternative would not produce any major adverse impacts to floodplains and wetlands whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Some potential exists for wildland fires in floodplain and wetland communities. The direct impacts of fire itself on floodplains and wetlands would vary with fire intensity and size. Fire would reduce aboveground vegetation, but would not have direct adverse impacts on floodplain and wetland structure or function. Resultant indirect impacts may include increased runoff into floodplains and wetlands. These impacts would be localized, short-term, and negligible to minor.

Using a range of suppression strategies for controlling unwanted wildland fire under this alternative should reduce the potential impact of suppression activities on floodplains, wetlands, and their plant communities. In some cases, aggressive initial attack will reduce impact; in other cases, impact may be reduced by locating control lines and subsequent ground-disturbing activities outside the floodplain or wetland community. In either case, the impact of a range of strategies to suppress wildland fire would be localized, short-term, and negligible to minor.

The direct adverse impact of mechanical removal of hazard trees would be slight physical disturbances of floodplain and wetland surfaces due to foot or vehicle activity. Indirect adverse impacts would include potential new drainage routes from vehicle use. The indirect adverse impacts to floodplains and wetlands from hazard tree removal would be localized, short-term, and negligible.

Wetland areas would generally not be the object of mechanical hazard fuels treatment projects, though small wetlands may be entered in projects focused on wildland-residential interfaces. The direct adverse impact of mechanical removal of hazard fuels would be slight physical disturbances of floodplain and wetland surfaces due to foot or vehicle activity. The potential for these impacts would be mitigated by avoiding wetlands with machinery and avoiding wetlands in piling material for later removal or burning. The direct adverse impacts of mechanical reduction of hazardous fuels would be localized, short-term, and negligible to minor. Indirect adverse impacts would include potential new drainage routes from vehicle use. The indirect adverse impacts to floodplains and wetlands would be localized, short-term, and negligible.

Cumulative Effects

Activities which contribute to cumulative effects on floodplains and wetlands within the park include: residential development on adjacent areas, storm runoff from roads and other areas with reduced infiltration capacity, and hazardous waste spills. Some wetlands have already been modified by commercial or residential development. No construction or other substantial ground-disturbing activities are proposed on floodplains or wetlands. The cumulative impact on floodplains and wetlands would be localized and negligible to minor.

Conclusion

The direct adverse impacts of wildland fire and fire suppression under this alternative would be localized, short-term, and negligible to minor. The indirect impacts would be localized, short-term, adverse or beneficial, and negligible to minor. The direct and indirect impacts of hazard tree removal would be localized, short-term, and negligible. The adverse direct and indirect impacts of mechanical reduction of hazardous fuels would be localized, short-term, and negligible to minor. This alternative would not produce any major adverse impacts to floodplains and wetlands whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Some potential exists for wildland fires in floodplain and wetland communities. The direct impacts of fire itself on floodplains and wetlands would vary with fire intensity and size. Fire would reduce above ground vegetation, but would not have direct adverse impacts on floodplain and wetland structure or function. Resultant indirect impacts may include increased runoff into floodplains and wetlands. These impacts would be localized, short-term, and negligible to minor.

Using a range of suppression strategies for controlling unwanted wildland fire under this alternative should reduce the potential impact of suppression activities on floodplains, wetlands, and their plant communities. In some cases, aggressive initial attack will reduce impact; in other cases, impact may be reduced by locating control lines and subsequent ground-disturbing activities outside the floodplain or wetland community. In either case, the impact of a range of suppression strategies to wildland fire would be localized, short-term, and negligible to minor.

The direct adverse impact of mechanical removal of hazard trees would be slight physical disturbances of floodplain and wetland surfaces due to foot or vehicle activity. Indirect adverse impacts would include potential new drainage routes from vehicle use. The indirect adverse impacts to floodplains and wetlands from hazard tree removal would be localized, short-term, and negligible.

Wetland areas would generally not be the object of mechanical hazard fuels treatment projects, though small wetlands may be entered in projects focused on wildland-urban interfaces. The direct adverse impact of mechanical removal of hazard fuels would be slight physical disturbances of floodplain and wetland surfaces due to foot or vehicle activity. The potential for these impacts would be mitigated by avoiding wetlands with machinery and avoiding wetlands in piling material for later removal or burning. The direct adverse impacts of mechanical reduction of hazardous fuels would be localized, short-term, and negligible to minor. Indirect adverse impacts would include potential new drainage routes from vehicle use. The indirect adverse impacts to floodplains and wetlands would be localized, short-term, and negligible.

Some wetlands and floodplains within treatment areas may be burned by prescribed fire. Prescribed fire itself would not impact wetland and floodplain hydrologic functions. Removal of vegetation may result in secondary effects such as increased sedimentation. This would probably invigorate native species resulting in a more stable community. Most salt marsh species respond vigorously to low severity burns. High severity burns may kill or depress root systems, especially if fire occurs when marshes are dry. A combination of burning and chemical control (under separate NEPA compliance) may favor *Spartina* over *Phragmites*. The direct effects of prescribed fire on wetlands and

floodplains would be localized, short-term to long-term, minor to moderate, and adverse or beneficial; the indirect effects would be localized, short-term to long-term, minor, and adverse or beneficial.

Cumulative Effects

Activities which contribute to cumulative effects on floodplains and wetlands within the park include: residential development on adjacent areas, storm runoff from roads and other areas with reduced infiltration capacity, and hazardous waste spills. Some wetlands have already been modified by commercial or residential development. No construction or other substantial ground-disturbing activities are proposed on floodplains or wetlands. The cumulative impact on floodplains and wetlands would be localized and negligible to minor.

Conclusion

The direct adverse impacts of wildland fire and fire suppression under this alternative would be localized, short-term, and negligible to minor. The indirect impacts would be localized, short-term, adverse or beneficial, and negligible to minor. The direct and indirect impacts of hazard tree removal would be localized, short-term, and negligible. The adverse direct and indirect impacts of mechanical reduction of hazardous fuels would be localized, short-term, and negligible to minor. The direct effects of prescribed fire on wetlands and floodplains would be localized, short-term to long-term, minor to moderate, and mainly beneficial; the indirect effects would be localized, short-term to long-term, minor, and mainly beneficial. This alternative would not produce any major adverse impacts to floodplains and wetlands whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are identified as a management goal of the park.

Unique Ecosystems, and Rare or Unusual Vegetation

Affected Environment

Gateway NRA is home to several unique native plant communities. A locally unique 9-acre swamp white oak forest occurs at Staten Island's Miller Field, and regionally scarce grasslands occur in various locations. On Sandy Hook, there is a small "heathland" of beach heather, which is sensitive to disturbance due to its shallow root system, slow growth, and brittle wood. Sandy Hook is also the location of a locally and regionally unique mature maritime American holly forest. While these are notable examples of unique vegetation found at Gateway NRA, the high level of development in the region implies that all examples of intact native plant communities are also somewhat unusual.

Although many of the native trees, shrubs, grasses, and marsh plants have adaptations to periodic fire, some do not. The maritime holly forest on Sandy Hook does not; it is mature and is of concern should a fire burn through the stand. American holly is very susceptible to fire; its thin bark is easily injured and it is easily top-killed. Even large trees may be killed by light fires in the understory. It may persist by sprouting from the root crown. See the Fire Effects Information System (FEIS) online database (http://www.fs.fed.us/database/feis/plants/tree/ileopa/all.html) for more information.

Fire and fuels management activities at Gateway NRA should help maintain long-term ecological diversity and stability, with fire-dependent communities sustained by fire and fire intolerant communities protected from unwanted wildland fire. Fire management activities will need to adapted to meet the needs of each plant community.

Impacts of Alternative 1: No-Action

Impact Analysis

The no-action alternative would continue to provide aggressive initial attack on over 50 wildland fires annually within the park. This would minimize the overall number of acres burned. This would have a direct, long-term, minor to moderate beneficial effect in vegetation types which are poorly adapted to fire, such as the maritime holly forest. In vegetation adapted to more frequent fire, however, the overall indirect effect could be adverse, short-term to long-term, and minor to moderate. In grasslands, for example, a continued lack of fire may allow the encroachment of trees and shrubs, displacing grasses. In all vegetation types, an indirect, adverse, negligible to minor long-term effect of fire exclusion would be a continued build-up of fuels, possibly resulting in larger, more intense wildfires, and in damage to even fire-adapted communities. A long-term, indirect, minor to moderate, beneficial effect of burning in native fire-dependent plant communities is to invigorate the community, resulting in robust growth and increased seed production.

Under the no-action alternative, aggressive fire suppression would result in relatively more disturbance to plant communities. The direct adverse impacts of fire suppression on vegetation include removal and/or damage of plants during construction of firelines or use of heavy equipment. Indirect adverse impacts to vegetation communities may include the introduction of nonnative species carried to fire sites on firefighting equipment. Both the direct and indirect impacts of fire suppression are generally short-term, localized, and minor to moderate, though the spread of nonnative species may have long-term implications.

Removal of hazard trees and mowing of herbaceous vegetation around park facilities would have negligible effects on native plant communities.

The impacts of the no-action alternative on vegetation, then, are beneficial or adverse, short-term and long-term, localized, and negligible to moderate.

Cumulative Effects

Treatment of non-native invasive species could contribute to cumulative effects on vegetation at Gateway NRA, but overall, the cumulative effects of this alternative would be negligible.

Conclusion

The direct impacts of the no-action alternative on vegetation communities would be localized, adverse or beneficial, short-term to long-term, and minor to moderate. The indirect impacts would be localized, adverse to beneficial, short-term to long-term, and negligible to moderate. The no-action alternative would not produce any major adverse impacts to unique or unusual vegetation whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Under this alternative, a slightly larger acreage may be burned annually when a range of suppression strategies are utilized to control wildland fires. As explained under the no-action alternative, more fire would tend to have direct, short-term to long-term adverse effects in vegetation types that are poorly adapted to fire, such as the holly forest, and direct and indirect short-term to long-term beneficial effects in fire-adapted types, such as grasslands. A reduced degree of fire exclusion would slightly reduce the continued build-up of fuels, somewhat reducing the risk of large, intense wildfires. The difference in acreage burned between this alternative and the no-action alternative would be relatively small, so these effects would mostly be negligible to moderate.

Because suppression activities could be more easily avoided in sensitive and other plant communities when employing a range of suppression strategies, this alternative would result in less overall disturbance than would occur under the no-action alternative. Types and effects of disturbance would be the same as that described for the no-action alternative. The direct adverse impacts of fire suppression on vegetation include removal and/or damage of plants during construction of firelines or use of heavy equipment. Indirect adverse impacts to vegetation communities may include the introduction of nonnative species carried to fire sites on firefighting equipment. Both the direct and indirect impacts of fire suppression are generally short-term, localized, and minor, though the spread of nonnative species may have long-term implications.

An expanded program of mechanical fuel reduction should have negligible to minor effects on unique native plant communities. Effects would be short-term to long-term, beneficial, and indirect,

as mechanical treatments could be used to protect unique communities, such as the holly forest or swamp white oak forest, from unwanted wildfire.

The impacts of this alternative on vegetation, then, are direct and indirect, beneficial or adverse, short-term and long-term, localized, and negligible to moderate.

Cumulative Effects

Treatment of non-native invasive species could contribute to cumulative effects on vegetation at Gateway NRA, but overall, the cumulative effects of this alternative would be negligible.

Conclusion

The impacts of this alternative on vegetation, then, are direct and indirect, beneficial or adverse, short-term and long-term, localized, and negligible to moderate. The preferred alternative would not produce any major adverse impacts to unique or unusual vegetation whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

Under this alternative, a slightly larger acreage may be burned annually when a range of suppression strategies are utilized to control wildland fires. As explained under the no-action alternative, more fire would tend to have direct, short-term to long-term adverse effects in vegetation types that are poorly adapted to fire, such as the holly forest, and direct and indirect short-term to long-term beneficial effects in fire-adapted types, such as grasslands. A reduced degree of fire exclusion would slightly reduce the continued build-up of fuels, somewhat reducing the risk of large, intense wildfires. The difference in acreage burned between this alternative and the no-action alternative would be relatively small, so these effects would mostly be negligible to moderate.

Because suppression activities could be more easily avoided in sensitive and other plant communities when employing a range of suppression strategies, the preferred alternative would result in less overall disturbance than would occur under the no-action alternative. Types and effects of disturbance would be the same as that described for the no-action alternative. The direct adverse impacts of fire suppression on vegetation include removal and/or damage of plants during construction of firelines or use of heavy equipment. Indirect adverse impacts to vegetation communities may include the introduction of nonnative species carried to fire sites on firefighting equipment. Both the direct and indirect impacts of fire suppression are generally short-term, localized, and minor, though the spread of nonnative species may have long-term implications.

An expanded program of mechanical fuel reduction should have negligible to minor effects on unique native plant communities. Effects would be short-term to long-term, beneficial, and indirect, as mechanical treatments could be used to protect unique communities, such as the holly forest or swamp white oak forest, from unwanted wildfire.

The addition of a prescribed fire program would provide opportunities to use fire for hazard fuel reduction and maintenance of fire-adapted vegetation communities. The effect of prescribed burning in these vegetation types includes rejuvenation of the burned stands and regeneration of fire-dependent species. Long-term effects of fire on vegetation could include the production of early successional habitats, the prevention of encroachment of fire-intolerant species, and the reduction of fuels, rendering the communities less vulnerable to unwanted high-intensity fire. The direct and indirect effects would be localized, short-term to long-term, beneficial, and minor to moderate.

The impacts of this alternative on vegetation, then, are beneficial or adverse, short-term and long-term, localized, and negligible to moderate.

Cumulative Effects

Treatment of non-native invasive species could contribute to cumulative effects on vegetation at Gateway NRA, but overall, the cumulative effects of this alternative would be negligible.

Conclusion

The impacts of this alternative on vegetation, then, are direct and indirect, beneficial or adverse, short-term and long-term, localized, and negligible to moderate. The preferred alternative would not produce any major adverse impacts to unique or unusual vegetation whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Unique or Important Wildlife or Wildlife Habitat

Affected Environment

Gateway NRA is home to a variety of wildlife species. Large mammals are limited to the occasional white-tailed deer on the Sandy Hook peninsula. Small native mammals include red fox, raccoons, squirrels, opossums, chipmunks, white-footed mice, bats, and voles. Non-native mammal species such as Norway rats and feral cats and dogs also occur.

Numerous reptiles and amphibians occur in Gateway NRA, including the eastern box, painted, and spotted turtles, black racers and hog-nosed snakes, Fowler's toads and spring peepers. There is also a population of diamondback terrapins, a brackish water turtle that comes ashore to lay eggs during the summer.

Bird life is abundant, with over 325 species viewed, and includes peregrine falcons, ospreys, barn owls, tree swallows, savannah sparrows, great blue herons, and snowy egrets. Waterfowl, shorebirds, and pelagic species are also common, including sea ducks, gulls, terns, sandpipers, and others; these water-associated species will not be discussed since they would be unaffected by fire and fire management activities.

Over 70 species of butterflies and over 250 species of moths use Gateway NRA's extensive fields, including monarch, mourning cloak, tiger swallowtail, and tawny emperor butterflies, and polyphemus, cecropia, hummingbird clearwing and sweetheart moths.

Fish and other aquatic wildlife abound in Gateway NRA's waters and support numerous recreational activities. Over 80 species have been documented to use the waters surrounding the park, including striped bass, menhaden, winter flounder, northern puffer, blue claw and horseshoe crabs, lion's mane and mushroom cap jellyfish, ribbed mussels, quahogs, razor clams, and moon snails. Marine turtles and marine mammals, including dolphins, whales, and seals, also occupy the marine waters surrounding the park. Marine wildlife species and habitat have almost no potential to be affected by fire and fire management activities.

Impacts of Alternative 1: No-Action

Impact Analysis

The no-action alternative would continue to provide aggressive initial attack on over 50 wildland fires annually within the park; these fires would be suppressed at the smallest reasonable acreage. This approach would have the beneficial effect of limiting the direct, adverse, localized, short-term, negligible to minor impacts of fire itself, which would include limited loss of habitat for short periods following fire and possible mortality to individuals of species that are not mobile enough to escape or obtain below ground shelter. Birds and larger mammals would easily escape fire. Other indirect, localized, short-term, negligible to minor impacts of fire which would be minimized include reduction of hazardous fuels, temporary displacement of individuals, creation or renewal of habitat for certain species, possible increases in food sources. Limiting these effects by limiting total acres burned could be adverse or beneficial.

The use of aggressive fire suppression methods under the no-action alternative would result in a relatively greater degree of disturbance from suppression activities. The direct adverse impacts of fire suppression would include very limited disturbance to small mammals, some reptiles and amphibians, and ground-nesting birds due to fireline construction and/or off-road vehicle use. Indirect adverse impacts would include temporary displacement of individuals. Both direct and indirect impacts would be localized, short-term, and negligible to minor.

The direct adverse impacts of hazard tree removal and mowing herbaceous vegetation near park facilities would include very limited disturbance to small mammals, some reptiles and amphibians, and nesting birds due to human presence, vegetation removal, and vehicle use. The indirect adverse impact of loss of nest trees would have a negligible effect from a population standpoint as hazard tree removal would occur in limited areas. Direct and indirect adverse impacts would be localized, short-term, and negligible.

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, negligible to minor, and both adverse and beneficial.

Cumulative Effects

Construction and development in and around Gateway NRA could contribute to cumulative effects on wildlife, but the cumulative impacts of the no-action alternative would be localized and negligible to minor.

Conclusion

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, negligible to minor, and adverse and beneficial. The no-action alternative would not produce any major adverse impacts to wildlife or wildlife habitat whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

This alternative would result in an incremental increase of acreage burned from slightly larger wildland fires suppressed under a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines), but ground disturbance from fire suppression activities would be lessened in comparison with the no-action alternative. Direct impacts of fire and fire suppression utilizing a range of suppression strategies would be similar to those described above under the no-action alternative. The direct and indirect adverse and beneficial impacts of this aspect of this alternative would be localized, short-term, and negligible to minor.

The direct impacts of an expanded program of hazard tree removal and mechanical fuel reduction would the same as those described under the no-action alternative, except on a slightly larger scale. Direct and indirect adverse impacts would also be localized, short-term, and negligible.

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, minor, and both adverse and beneficial.

Cumulative Effects

Construction and development in and around Gateway NRA could contribute to cumulative effects on wildlife, but the cumulative impacts of the no-action alternative would be localized and negligible to minor.

Conclusion

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, minor, and adverse and beneficial. The no-action alternative would not produce any major adverse impacts to wildlife or wildlife habitat whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

The preferred alternative would result in an incremental increase of acreage burned from slightly larger wildland fires suppressed under a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines), but ground disturbance from fire suppression activities would be lessened in comparison with the no-action alternative. Direct impacts of fire and fire suppression under from a range of suppression strategies would be similar to those described above under the no-action alternative. The direct and indirect adverse and beneficial impacts of this aspect of the preferred alternative would be localized, short-term, and negligible to minor.

The direct impacts of an expanded program of hazard tree removal and mechanical fuel reduction would be the same as those described under the no-action alternative, except on a slightly larger scale. Direct and indirect adverse impacts would also be localized, short-term, and negligible.

The addition of a prescribed fire program would provide opportunities to use fire for hazard fuel reduction and maintenance of wildlife habitat. Direct adverse impacts of prescribed burning would include limited loss of habitat for short periods following fire, possible disruption of ground nests and dens due to fireline construction, and possible mortality to individuals of species that are not mobile enough to escape or obtain below ground shelter. Birds and larger mammals would escape prescribed fires. Fires during nesting season may consume bird nests, particularly those on the ground, or cause abandonment of nests. These direct impacts would be localized, short-term, and negligible to minor from a population perspective.

Indirect, localized, short-term, negligible to minor impacts of fire include adverse effects such as temporary displacement of individuals, and beneficial effects such as reduction of hazardous fuels, creation or renewal of habitat for certain species, and possible increases in food sources.

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, negligible to minor, and both adverse and beneficial.

Cumulative Effects

Construction and development in and around Gateway NRA could contribute to cumulative effects on wildlife, but the cumulative impacts of the no-action alternative would be localized and negligible to minor.

Conclusion

Overall, the direct and indirect effects of the no-action alternative would be localized, short-term, negligible to minor, and adverse and beneficial. The no-action alternative would not produce any major adverse impacts to wildlife or wildlife habitat whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Non-Native Species

Affected Environment

Varieties of non-native invasive species are present at Gateway NRA and pose a threat to native species and natural processes. These include Japanese Knotweed, Japanese Honeysuckle, Oriental Bittersweet, Mugwort, Spotted Knapweed, Japanese Curley Grass, and *Ailanthus* (Tree-of-Heaven). *Phragmites* is also considered an invasive problem species, although both native and non-native genotypes of this species exist (see http://www.invasiveplants.net/*Phragmites*/Default.htm). Fire management activities have the potential to adversely or beneficially affect the introduction, continued existence, or spread of these and other non-native invasive species. Promotion or establishment of non-native species may result in short-term or long-term effects to the ecosystem.

Ailanthus is one of the non-native species of greatest concern; it is a disturbance-adapted species, and is favored by fire. In the absence of appropriate mitigation measures, it may also be promoted by the disturbance associated with some fire and fuels management activities. The Fire Effects Information System (FEIS) online database (http://www.fs.fed.us/database/feis) offers extensive information and references on this and other species; see http://www.fs.fed.us/database/feis/plants/tree/ailalt/all.html for information on *Ailanthus*.

Phragmites is another species of concern at Gateway NRA, because of its invasive nature, and because it so readily supports intense, fast-moving fires. Fire can act either to promote or eliminate this species, depending on timing and the ability to perform additional treatments. Most fires favor *Phragmites*. Fire removes the standing dead canes and accumulated litter, allowing the soil to warm up rapidly in the spring, which results in earlier shoot emergence. Most fires cause little damage to common reed because the rhizomes are sufficiently protected by soil. Deep-burning fires, which can occur when the soil is dry and the humidity of the litter and stembase is low can damage rhizomes, however. "Root burns", in which prescribed fires burn deeply into organic soils and consume the rhizomes, will probably only work on marshes where the water can be completely drained or on marshes experiencing severe drought. Using summer burning to completely eliminate *Phragmites* is difficult. Herbicides have been successfully used in conjunction with burning to control *Phragmites*. See the Fire Effects Information System (FEIS) online database (http://www.fs.fed.us/database/feis/plants/graminoid/phraus/all.html) for more information on *Phragmites*.

Implementation of a fire and fuels management should be guided where possible on the prior research of the local fire regime and fire effects on non-native vegetation. However, monitoring of fire effects using NPS Fire Monitoring protocols to measure resulting changes in non-native species should also be used to direct adaptive management using fire. In some cases, additional research projects may also be valuable.

Impacts of Alternative 1: No-Action

Impact Analysis

The no-action alternative would continue to provide aggressive initial attack on over 50 wildland fires annually within the park. This would minimize the overall number of acres burned, which could reduce the likelihood of promoting non-native species through disturbance by fire. Aggressive suppression would, however, require a relatively greater amount of ground disturbance from suppression activities, such as construction of fireline and use of heavy equipment. This disturbance could provide opportunities for the establishment or spread of non-native species.

Hazard tree removal and mowing of herbaceous vegetation around park facilities would have negligible effect on non-native species in the park.

Effects of the no-action alternative would be direct, adverse, localized, short-term to long-term, and negligible to minor.

Cumulative Effects

Other factors which contribute to cumulative impacts on non-native species include visitor use and construction and development activities on adjacent lands. No other projects are proposed within the park that would contribute to cumulative impacts involving non-native species. The cumulative effect of the no-action alternative would be localized and negligible to minor.

Conclusion

Effects of the no-action alternative involving non-native species would be direct, adverse, localized, short-term to long-term, and negligible to minor. The no-action alternative would not produce any major adverse impacts to plant communities in which non-native species are a problem whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

This alternative would result in an incremental increase of acreage burned from slightly larger wildland fires under a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines). This could result in a slightly increased likelihood of promoting non-native species through disturbance by fire. A range of suppression strategies, however, could require relatively less ground disturbance from suppression activities, such as construction of fireline and use of heavy equipment. This reduced level of disturbance could decrease opportunities for the establishment or spread of non-native species. Direct impacts of wildland fire and fire suppression from a range of suppression strategies would be similar to those under the no-action alternative; they would be direct, adverse, localized, short-term to long-term, and negligible to minor.

An expanded program of mechanical fuels reduction would create some level of soil disturbance that could potentially provide opportunities for the establishment or spread of non-native species.

Some fuels reduction activities could also directly reduce non-native species which are also hazardous fuels. The direct effects of mechanical fuels reduction therefore could be adverse or beneficial, localized, short-term to long-term, and negligible to minor.

Cumulative Effects

Other factors which contribute to cumulative impacts on non-native species include visitor use and construction and development activities on adjacent lands. No other projects are proposed within the park that would contribute to cumulative impacts involving non-native species. The cumulative effect of the no-action alternative would be localized and negligible to minor.

Conclusion

Effects of this alternative involving non-native species would be direct, adverse or beneficial, localized, short-term to long-term, and negligible to minor. The no-action alternative would not produce any major adverse impacts to plant communities in which non-native species are a problem whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

The preferred alternative would result in an incremental increase of acreage burned from slightly larger wildland fires under a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines). This could result in a slightly increased likelihood of promoting non-native species through disturbance by fire. A range of suppression strategies, however, could require relatively less ground disturbance from suppression activities, such as construction of fireline and use of heavy equipment. This reduced level of disturbance could decrease opportunities for the establishment or spread of non-native species. Direct impacts of wildland fire and fire suppression from a range of suppression strategies would be similar to those under the no-action alternative; they would be direct, adverse, localized, short-term to long-term, and negligible to minor.

An expanded program of mechanical fuels reduction would create some level of soil disturbance that could potentially provide opportunities for the establishment or spread of non-native species. Some fuels reduction activities could also directly reduce non-native species which are also hazardous fuels. The direct effects of mechanical fuels reduction therefore could be adverse or beneficial, localized, short-term to long-term, and negligible to minor.

The addition of a program of prescribed fire under the preferred alternative will also result in a slight increase in acres burned. This could also result in an increase in soil disturbance from activities needed to manage the fires, such as construction of fireline or mechanical removal of fuels. Either of these situations could result in an increased likelihood of promoting non-native species through disturbance by fire. The use of prescribed fire could also result in a decrease in non-native species through the use of fire as a control treatment. The direct effects of a prescribed fire program on non-native species could be adverse or beneficial, localized, short-term to long-term, and negligible to minor.

Cumulative Effects

Other factors which contribute to cumulative impacts on non-native species include visitor use and construction and development activities on adjacent lands. No other projects are proposed within the park that would contribute to cumulative impacts involving non-native species. The cumulative effect of the no-action alternative would be localized and negligible to minor.

Conclusion

Effects of the preferred alternative involving non-native species would be direct, adverse or beneficial, localized, short-term to long-term, and negligible to minor. The no-action alternative would not produce any major adverse impacts to plant communities in which non-native species are a problem whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Visitor Experience, Recreation Resources, and Aesthetic Resources

Affected Environment

Gateway NRA receives very heavy visitation; a total of 7.7 million recreational visitors entered Gateway NRA in 2011. There is a peak season, but some use occurs year-round. Visitor activities include camping, picnicking, hiking, biking, boating, fishing, bird watching, surfing, sunbathing, and swimming. Special use permits are issued for various activities, including filming, pyrotechnics, and operation of model airplanes. Aesthetic values and visual or scenic resources have an important place in this region due to the high human population density and scarcity of relatively natural landscapes.

Fire management activities that have the potential to affect aesthetic resources and visitor experiences, including recreation, include fire suppression, prescribed burning, hazard tree removal, and mechanical hazard fuels reduction projects. Smoke production could possibly interfere with visitor activities. Suppression and prescribed fire would involve having additional personnel, engines, and other equipment in the area. Temporary closures may be imposed, restricting access to visitors. Hazard fuels projects would also involve the presence of additional fire personnel and vehicles, and might require the temporary closure of some areas.

Impacts of Alternative 1: No-Action

Impact Analysis

The no-action alternative would continue initial attack on over 50 wildland fires annually. Removal of hazard trees and some mowing of herbaceous vegetation would continue. Depending on the location of a wildland fire, visitor uses, including recreation, might be temporarily disrupted, but the disruption would be minimized through the use of aggressive suppression methods. Temporary closures of roads and trails to ensure visitor safety would displace some visitors, but this would also be minimized by attempting to limit fires to the smallest possible acreage. Noise from power equipment such as chainsaws and portable pumps may briefly diminish visitor experience, and would be relatively likely to occur during aggressive fire suppression. Smoke from fires may restrict visibility and impact scenic views or become heavy enough to become a nuisance for short periods of time. Direct adverse aesthetic effects would include the presence of firelines or resource damage from suppression activities. These effects could be mitigated to some extent through rehabilitation of these areas. Direct aesthetic effects from hazard tree removal would include a somewhat changed scene as hazard trees are reduced; these may be perceived as either adverse or beneficial. Visitor access to the park facilities and historic resources may be curtailed in some locations for very short times during felling of hazardous trees. Overall, these direct adverse impacts of the no-action alternative would be localized, short-term, and negligible to minor.

Indirect adverse impacts of the no-action alternative would include a continued build-up of fuels in some areas, which would increase the risk of larger, more intense wildland fires, which in turn could result in greater adverse effects to aesthetic resources and visitor experiences. Park neighbors may sense reduced risk to their properties and families as hazard trees are removed along park boundaries, a beneficial impact. Overall, these indirect adverse impacts on visitor experiences, recreation resources, and aesthetic resources would be adverse or beneficial, localized, negligible to minor, and short-term to long-term.

Cumulative Effects

Other activities which contribute to cumulative impacts on aesthetic resources and on visitor experiences and recreation include: commercial and residential development, highway traffic and associated noise, and other land management activities. The adverse impact of these activities is somewhat nullified since the expectation of solitude and quiet is diminished near a metropolitan area. A continued buildup of wildland fuels would increase the probability of larger fires and greater fire intensity, with subsequent impacts on visitor experiences, aesthetic resources, and park operations being somewhat magnified. No other projects are proposed within the park that would contribute to cumulative impacts on visitor experiences and aesthetic resources. The cumulative effects of the no-action alternative would be localized and minor.

Conclusion

The no-action alternative would have localized, short-term, and negligible to minor direct adverse impacts on visitor experiences, recreation resources, and aesthetic resources. The indirect impacts would be localized, short-term, negligible to minor and adverse or beneficial. The no-action alternative would not produce any major adverse impacts to visitor experiences or aesthetic resources whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

This alternative differs from the no-action alternative by a slight increase of acreage burned and a minor increase in smoke production from slightly larger wildland fires from utilizing a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines). Disruption to visitor use, including recreation, could be somewhat greater than under the no-action alternative, due to somewhat larger fire sizes. Direct impacts to aesthetic resources could be somewhat greater due to larger burned areas, or could be reduced, due to decreased presence of firelines and resource damage from aggressive fire suppression. Overall, the direct adverse impacts would be localized, short-term, and negligible to minor, and the indirect adverse impacts would be adverse or beneficial, localized, negligible to minor, and short-term to long-term.

An expanded program of mechanical fuel reduction relative to the no-action alternative could result in greater disruption of visitor use from temporary closures of work areas, but would still be of limited scope and duration. Fuel reduction could also modify viewsheds, and have other minor direct aesthetic effects which may be perceived as either adverse or beneficial. Longer-term indirect impacts would include a reduced potential for large fires and subsequent reduced potential for substantive modifications of scenic vistas; these indirect impacts would be minor and beneficial.

Cumulative Effects

Other activities which contribute to cumulative impacts on aesthetic resources and on visitor experiences and recreation include: commercial and residential development, highway traffic and

associated noise, and other land management activities. The adverse impact of these activities is somewhat nullified since the expectation of solitude and quiet is diminished near a metropolitan area. No other projects are proposed within the park that would contribute to cumulative impacts on visitor experiences and aesthetic resources. The cumulative effects of this alternative would be localized and minor.

Conclusion

This alternative would have direct, localized, short-term, negligible to minor, and adverse or beneficial impacts on visitor experiences, recreation resources, and aesthetic resources. The indirect impacts would be localized, short-term to long-term, negligible to minor, and adverse or beneficial. This alternative would not produce any major adverse impacts to visitor experiences or aesthetic resources whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis

This alternative is similar to Alternative 2, and differs from the no-action alternative by a slight increase of acreage burned and a minor increase in smoke production from utilizing a range of suppression strategies (i.e., holding fires at existing barriers rather than constructing firelines). Disruption to visitor use, including recreation, could be somewhat greater than under the no-action alternative, due to somewhat larger fire sizes. Direct impacts to aesthetic resources could be somewhat greater due to larger burned areas, or could be reduced, due to decreased presence of firelines and resource damage from aggressive fire suppression. Overall, the direct adverse impacts would be localized, short-term, and negligible to minor, and the indirect adverse impacts would be adverse or beneficial, localized, negligible to minor, and short-term to long-term.

An expanded program of mechanical fuel reduction, as in Alternative 2, could result in greater disruption of visitor use from temporary closures of work areas, but would still be of limited scope and duration. Fuel reduction could also modify viewsheds, and have other minor direct aesthetic effects which may be perceived as either adverse or beneficial. Longer-term indirect impacts would include a reduced potential for large fires and subsequent reduced potential for substantive modifications of scenic vistas; these indirect impacts would be minor and beneficial.

A program of prescribed fire could result in greater direct effects to visitor use and aesthetic resources than seen in the other two alternatives. Direct adverse impacts may include additional minor displacement of some visitor activities during prescribed burn operations, but that effect should be limited to a few hours each year. Other direct adverse impacts of increased burning on visitor experiences and aesthetic resources would include smoke in scenic views, temporary restrictions in access to some areas, and the presence of blacked areas within natural vistas. The potential direct adverse impact to visitor experiences, aesthetic resources, and park operations is localized, short-term, and negligible to minor. The low frequency and small size of these fires further reduces the potential adverse impacts. The presence of fire, smoke, and blackened areas presents an opportunity for interpretation of natural processes which may provide a minor, long-

term, beneficial impact. The indirect effects of this portion of the preferred alternative would be localized, short-term, minor, and adverse or beneficial.

Cumulative Effects

Other activities which contribute to cumulative impacts on aesthetic resources and on visitor experiences and recreation include: commercial and residential development, highway traffic and associated noise, and other land management activities. The adverse impact of these activities is somewhat nullified since the expectation of solitude and quiet is diminished near a metropolitan area. No other projects are proposed within the park that would contribute to cumulative impacts on visitor experiences and aesthetic resources. The cumulative effects of the preferred alternative would be localized and minor.

Conclusion

This alternative would have direct, localized, short-term, negligible to minor, and adverse or beneficial impacts on visitor experiences, recreation resources, and aesthetic resources. The indirect impacts would be localized, short-term to long-term, negligible to minor, and adverse or beneficial. The preferred alternative would not produce any major adverse impacts to visitor experiences, recreation resources, or aesthetic resources whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Cultural Resources

The cultural resource management policies of the National Park Service are derived from several historic preservation and other laws, proclamations, Executive Orders, and regulations. Two primary mandates include the National Historic Preservation Act of 1966, as amended, (NHPA) and NPS DO-28. Taken collectively, they provide the NPS with the authority and responsibility for managing cultural resources within units of the NPS so that those resources will be preserved unimpaired for future generations. Cultural resource management for this project will be carried out in a manner consistent with legislative and regulatory provisions, and with implementing policies and procedures.

National Historic Preservation Act of 1966, as amended, Section 106:
Section 106 of NHPA requires federal agencies to consider the impacts of their proposals on historic properties, and to provide state and tribal historic preservation officers and, as appropriate, Advisory Council for Historic Preservation and the public reasonable opportunity to review and comment on these actions.

The park maintains active relationships with both the NJ SHPO and the NY SHPO regarding cultural resource issues and has notified the both the NJ SHPO and NY SHPO regarding the initiation of this EA/AoE and the intention of using this document for compliance with Section 106.

NPS Director's Order #28: Cultural Resource Management:
NPS DO-28 requires the NPS to protect and manage cultural resources in its custody through a comprehensive program of research, planning, and stewardship and in accordance with the policies and principles contained within the NPS Management Policies, 2006. The Order also requires the NPS to comply with the requirements described in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and with the 2008 Servicewide Programmatic Agreement with the Advisory Council for Historic Preservation and the National Conference of State Historic Preservation Officers.

The park actively manages its cultural resources by conducting research to identify, evaluate, document and register basic information about its cultural resources, and sets priorities for stewardship to ensure resources are protected, preserved, maintained and made available for public understanding and enjoyment. The park consults and coordinates with outside entities where appropriate regarding cultural resource management.

Affected Environment

The park preserves some of the last remaining open space surrounding New York Harbor. In addition to beaches and wildlife preserves, the park contains the remains of harbor fortifications and vestiges of military post life with extant structures dating as far back as the Civil War. Sites dealing with the early history of aviation, both civilian and military, can also be found within the park. Some, but not all, cultural resources are surrounded by burnable vegetation and are vulnerable to the effects of fire management activities.

Our known archeological resources range in age from paleo-Indian artifacts and sites to 21st-century artifacts and sites. While Gateway has a heavy concentration of military related objects and sites, non-military sites are also well represented at all 3 units of Gateway. Since so much of our

knowledge of our archeological resources is still evolving, any possible ground disturbances have the potential to affect archeological resources.

The best method of protecting cultural resources which are at risk from fire is through a continuing hazard fuel reduction program to remove adjacent fuels and prepare defensible space The planning of any fire management related project would include a review of the cultural resources that are present or may be present in the area of operation. The park's cultural resources staff will be responsible to provide site inventory and identify areas of cultural resources.

Cultural resources can be categorized as archeological resources, historic structures, cultural landscapes, ethnographic resources, and museum objects. Submerged archeological resources would not be affected by any of the alternatives.

Archeological Resources

Since the establishment of Gateway National Recreation Areas three archaeological overviews and assessments have been written; one for each unit of the park. Two archeological sites are currently listed on the National Register of Historic Places and many more have been identified throughout the park. Currently Gateway NRA has 243 sites listed in the NPS Archaeological Sites Management System (ASMIS). Many sites remain to be inventoried in all three units of the park.

The effects of wildland fire on archeological resources are influenced by fuel loading, soil texture and moisture, types of spread (e.g., head fire v. backing fire), rates of fire spread, and residence time. Fire effects, accordingly, may vary from negligible to moderate. With fires of light to moderate severity, residence time is usually short and the downward heat pulse is low. Surface fuel loading and duff accumulations in vegetation communities at Gateway NRA are generally light; wildland fires will tend to have light to moderate severity. These low intensity fires should have minimal effect on sites that are at or below ground level. Severe fires – those that burn in heavy fuel loads and exhibit long residence time and a substantial downward heat pulse – may damage buried organic and inorganic materials. The loss of vegetative cover by fire makes archeological sites easier to identify and inventory but also make them more vulnerable to looting and weather damage.

Significant damage could be inflicted through suppression tactics. Therefore, minimal impact actions will be practiced when working on or near archeological resource areas. Suppression strategies designed to minimize damage or disturbance to underground archeological or historic resources include restricting use of heavy equipment, and locating control lines away from potential sites when more damage could be anticipated from line construction than from fire effects.

Historic Structures

Gateway National Recreation Area contains cultural resources that are listed on or have been determined eligible for listing on the National Register of Historic Places. The park currently has five historic districts and four individually listed sites on the National Register of Historic Places. The districts are: Floyd Bennett Field Historic District, Jacob Riis Park National historic District, Fort Hancock and the Sandy Hook Proving Ground Historic District, Fort Tilden Historic District, Miller Army Air Field Historic District . Individually listed sites are Battery Weed, the Fort Tompkins Quadrangle, the Fort Hancock, U.S. Life Saving Station, the Sandy Hook Light and the Sandy Hook Archeological Site. Other sites have been determined eligible for the National Register

but are not yet listed. They include: Fort Wadsworth Historic District, Rockaway Coast Guard Station, Endicott Batteries, the Fountain- Mouquin. House Site, the Silver Gull Club and the Breezy Point Surf Club.

Gateway NRA has the largest collection of historic structures of any park in the Northeast Region, with over 590 structures currently on the List of Classified Structures(LCS) , the NPS official inventory and database of important historic structures.. Many historic structures in the park are aboveground wooden-frame or wooden-frame stone-reinforced structures. Many of these structures are at risk from wildfire, but many are not surrounded by burnable vegetation. Manicured lawns and roads surround many of the structures in Ft. Hancock, Fort Wadsworth, Fort Tilden and Floyd Bennett Field that are on the LCS.

Other major structures include defensive installations such as batteries, bunkers, and munitions storage buildings constructed of concrete or masonry and steel. Many of these structures are contributing structures to national register historic districts. Fire poses less risk to these less flammable structures, but these could still be damaged by heat.

Cultural Landscapes

A cultural landscape is a reflection of human adaptation and use of natural resources. It is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and types of structures that are built. The character of a cultural landscape is defined by physical materials such as roads, buildings, and vegetation and by use reflecting cultural values and traditions. Shaped through time by historical land use and management practices, cultural landscapes provide a visual record of an area's past. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes. They are a good source of information about specific times and places, but at the same time, their long-term preservation is a challenge.

Gateway NRA has three cultural landscapes listed in the Cultural Landscape Inventory (CLI). They are: Battery Weed Headland, Floyd Bennett Field, and Fort Hancock Post Grounds. Landscapes to be evaluated for possible listing on the CLI includes: Breezy Point, Fort Hancock Proving Grounds, Fort Tilden (FY 2012), Fort Wadsworth, Great Kills, Jacob Riis Park, Miller Field, and Sandy Hook Coastal Defense Batteries (FY 2012).

Five cultural landscapes have had Cultural Landscape Reports completed: Fort Hancock, Battery Weed Headland, Sandy Hook Proving Ground, Floyd Bennett Field, and Jacob Riis Park. Other potential cultural landscapes exist throughout the park but have not been formally documented and evaluated.

Ethnographic Resources

NPS ethnographic resources are landscapes, sites, structures, objects, and natural resources important to peoples or park neighbors who have had a long-term, or traditional, association with them. The Ethnographic Resources Inventory (ERI) in the NPS data management system for storing information on these resources. Gateway NRA presently has 14 ethnographic resources listed in the ERI.

Museum Collections

The NPS Management Policies, 2006 and NPS DO-28 require the consideration of impacts on museum collections. Museum collections themselves are not subject to Section 106 review, therefore the impact analysis below is for purposes of NEPA and not Section 106 of NHPA.

The park's museum collection numbers 264,098 items. There are 83,702 Archeology objects; 30,790 History/Art objects; 147,607 Archives and 1,999 Natural specimens. Of the 264,098 items within the collection, 101,032 are not cataloged. The Museum Collection at Gateway NRA includes significant archival and historical collections associated with local military, aviation and recreational activities. These collections include architectural drawings, photographs, uniforms, military manuals, etc. There is also an archeological collection and a natural history collection.

Methodology and Impact Thresholds for Cultural Resources

The definitions for identifying intensity of impact in the following discussions are listed in Table 7. Beneficial impacts are described but are not assigned intensity levels.

Table 7. Cultural resource impact intensity definitions.

	Intensity Definition for each cultural resource type				
Impact Intensity	**Archeological**	**Historic Structures**	**Cultural Landscapes**	**Ethnographic Resources**	**Museum Collections**
Negligible	Impact is negative and at the lowest levels of detection, barely measurable with no perceptible consequences, either adverse or beneficial, to archaeological resources. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is at the lowest levels of detection, barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is at the lowest levels of detection, barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is at the lowest levels of detection, barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be no adverse effect.	Impact is at the lowest levels of detection, barely perceptible and not measurable.
Minor	Disturbance of a site(s) is confined to a small area with little, if any, loss of important information potential and no damage to National Register of Historic Places eligible archaeological features. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is measurable but would not be noticeable to visitors and would not affect the character-defining features of a National Register of Historic Places eligible or listed structure. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is measurable but would not be noticeable to visitors and would not affect the character-defining features of a National Register of Historic Places eligible or listed landscape. For purposes of Section 106, the determination of effect would be *no adverse effect*.	Impact is measurable but would not be noticeable to visitors and would not affect the character-defining features of a National Register of Historic Places eligible or listed ethnographic resource. For purposes of Section 106, the determination of effect would be no adverse effect.	Impact is perceptible but would affect only a few artifacts in the collection.
Moderate	Disturbance of a site(s) would not result in substantial loss of important information potential or significant damage to National Register of Historic Places eligible archaeological features.	Impact would affect a character-defining feature(s) of a structure but would not diminish the integrity of the structure to the extent that its National Register of Historic Places eligibility	Impact would affect a character-defining feature(s) of a cultural landscape but would not diminish the integrity of the landscape to the extent that its National Register of Historic Places eligibility is	Impact would affect a character-defining feature(s) of an ethnographic resource but would not diminish the integrity of the ethnographic resource to the extent that its National Register of	Impact is perceptible and would affect many artifacts in the collection.

	While there may be limited disturbance to archaeological features, the resource would remain eligible for listing on the National Register of Historic Places. For purposes of Section 106, the determination of effect would be *adverse effect,* and a Section 106 agreement document (PA/MOA) would be executed between the NPS, SHPO, and other appropriate parties.	is jeopardized. For purposes of Section 106, the determination of effect would be *no adverse effect.*	jeopardized. For purposes of Section 106, the determination of effect would be *no adverse effect.*	Historic Places eligibility is jeopardized. For purposes of Section 106, the determination of effect would be no adverse effect.	
Major	Disturbance of a site(s) is substantial and results in the loss of most or all of the site and its potential to yield information. The site would no longer be eligible for listing on the National Register of Historic Places. For purposes of Section 106, the determination of effect would be *adverse effect,* and a Section 106 agreement document (PA/MOA) would be executed between the NPS, SHPO, and other appropriate parties.	Impact would alter a character-defining feature(s) of a structure, potentially diminishing the integrity of the structure to the extent that it is no longer eligible for the National Register of Historic Places. For purposes of Section 106, the determination of effect would likely be *adverse effect,* and a Section 106 agreement document (MOA or PA) would be executed between the NPS, SHPO and other appropriate parties.	Impact would alter a character-defining feature(s) of a cultural landscape, potentially diminishing the integrity of the landscape to the extent that it is no longer eligible for the National Register of Historic Places. For purposes of Section 106, the determination of effect would likely be *adverse effect,* and a Section 106 agreement document (MOA or PA) would be executed between the NPS, SHPO and other appropriate parties.	Impact would alter a character-defining feature(s) of an ethnographic resource, potentially diminishing the integrity of the ethnographic resource to the extent that it is no longer eligible for the National Register of Historic Places. For purposes of Section 106, the determination of effect would likely be adverse effect, and a Section 106 agreement document (MOA or PA) would be executed between the NPS, SHPO and other appropriate parties.	Impact is measurable and would affect the majority of the artifacts in the collection.

Impacts of Alternative 1: No-Action

Impact Analysis

Under this alternative, wildland fires would be suppressed at the smallest reasonable acreage. An aggressive approach to fire suppression would minimize the effects from fire itself, but would result in more extensive effects from fire suppression activities. Fire suppression activities could include construction of firelines, blacklining, use of swatters, use of foam or retardant, and direct attack with water. Off-road use of equipment such as engines could occur only if the potential disturbance they would cause is less than resource damage from fire; heavy equipment such as bulldozers would be used only in the event of threats to human life or fire-susceptible historic properties.

Mechanical removal of hazard trees and mowing of herbaceous vegetation park facilities would continue.

Archeological Resources

Heat from typical surface fires would be insufficient to damage artifacts and other archeological materials in subsurface settings even if they are buried only a few centimeters below the ground surface. The direct adverse impacts of fire on archeological resources at Gateway NRA would generally be negligible, but could range to minor, depending on fire severity and the specific resources involved. Fire may also expose archeological resources as vegetation is removed. This may allow the discovery, more accurate mapping, and/or more complete assessment of archeological resources. This indirect effect would be short-term to long-term, minor, and beneficial.

The direct adverse impacts of fire suppression on archeological resources under the no-action alternative would be to displace surface materials, expose buried archeological materials during handline construction, or disturb materials immediately below the surface with vehicle use. The indirect effects include exposure of artifacts to erosion and theft. Given expected fire size and occurrence, and the planned implementation of identified mitigations and management constraints, the direct and indirect adverse effects of the no-action alternative on archeological resources would be localized and minor.

The direct adverse impact of mechanical hazard tree removal and mowing of herbaceous vegetation would be exposure of materials due to ground disturbance by vehicles associated with the activities. Indirect adverse impacts would include exposure of artifacts to erosion and theft. With avoidance of known archeological resources and implementation of mitigation actions, the direct and indirect adverse impacts of hazard tree removal would be localized, short-term, and minor.

Impacts of Alternative 1: No Action

Impact Analysis: Under Alternative 1, there would be no changes to the archaeological resources of Gateway NRA and the existing resources would be preserved as they currently exist. The Park would continue to preserve these resources in place and continue to pursue efforts to fully document the site's archaeological resources. There would be no adverse impacts to archaeological resources under this alternative.

Cumulative Impacts: There are no impacts to archaeological resources under Alternative 1; therefore, there would be no cumulative impacts to archaeological resources.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 1 would result in a determination of no adverse effect on archaeological resources.

Conclusion: Alternative 1 would have no direct or cumulative adverse impacts on archaeological resources and would result in a determination of no adverse effect for purposes of Section 106.

Historic Structures

Historic structures, and other historic sites with flammable wooden elements are especially vulnerable to wildfires and suppression activities. In developed areas, routine maintenance activities would help to maintain structural clearance from the surrounding vegetation. During wildland fires, fire suppression activities would include some or all of the strategies discussed above. The direct adverse impact of wildland fire on historic structures could be destruction or damage to the structures if fire contacts the structures directly. The indirect impacts would include smoke impacts.

The direct adverse impact of fire suppression on historic structures would be limited to the potential to damage such structures by contact with firefighting equipment. Indirect adverse impacts include the possibility of damaging the historic integrity of sites. The direct and indirect adverse effects of fire suppression on historic structures under the no-action alternative would be localized and negligible to minor.

The direct adverse impact of mechanical hazard tree removal and mowing of herbaceous vegetation would be damage to structures if hazard trees contact the structures during falling operations or damage to structures by vehicles associated with the activities. Indirect adverse impacts would include potential loss of historic fabric by removal of trees associated with the historic scene. With implementation of mitigation actions, the direct and indirect adverse impacts of hazard tree removal would be localized, short-term, and minor.

Impacts of Alternative 1: No Action

Impact Analysis: Under Alternative 1 there would be no changes to the historic structures and they would continue to be preserved as they currently exist and to keep them eligible for the National Register of Historic Places. There would be no adverse impacts to structures under this alternative.

Cumulative Impacts: There are no impacts to historic structures under Alternative 1; therefore, there would be no cumulative impacts to historic structures.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 1 would result in a determination of no adverse effect on historic structures.

Conclusion: Alternative 1 would have no direct or cumulative impacts on historic structures and would result in a determination of no effect for purposes of Section 106.

Cultural Landscapes

Fires or damage from suppression activities or hazard tree removal can result in direct impacts by removing important landscape elements, structures, or historic sites and leaving behind unsightly burned and scorched vegetation, stumps, and unvegetated firelines.

As potential cultural landscapes are associated with historic structures, the potential adverse impacts would be the same as those described for historic structures. The direct and indirect adverse effects of fire and fire suppression activities on cultural landscapes under the no-action alternative would be localized and negligible to minor.

Impacts of Alternative 1: No Action

Impact Analysis: Under Alternative 1 there would be no changes to the cultural landscapes and they would be preserved as they currently exist. The park would continue to preserve the landscapes to keep them eligible for the National Register of Historic Places. There would be no impacts to the cultural landscape under this alternative.

Cumulative Impacts: There are no impacts to the cultural landscape under Alternative 1; therefore, there would be no cumulative impacts to the cultural landscape.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 1 would not alter the cultural landscape and would result in a determination of no adverse effect on cultural landscapes.

Conclusion: Alternative 1 would have no direct or cumulative impacts on cultural landscapes and would result in a determination of no adverse effect for purposes of Section 106.

Ethnographic Resources

Groups associated with ethnographic resources may be reticent about identifying locations of sensitive sites, so some ethnographic sites may remain undocumented. All aspects of the no-action alternative have some potential to adversely affect ethnographic resources. If ethnographic resources are lost or damaged by wildland fires, fire suppression activities, and hazard tree removal, long-term minor to moderate adverse impacts would occur.

Overall, the direct adverse impacts of the no-action alternative on ethnographic resources would be localized, short-term, and negligible to minor. The indirect impacts of the no-action alternative on ethnographic resources would be localized, short-term, minor, and adverse to beneficial.

Impacts of Alternative 1: No Action

Impact Analysis: Under Alternative 1 there would be no changes to the ethnographic resources of Gateway NRA. The park would continue to preserve the known ethnographic resources. There would be no adverse impacts to the ethnographic resources under this alternative.

Cumulative Impacts: There are no adverse impacts to the ethnographic resources under Alternative 2; therefore, there would be no cumulative adverse impacts to the cultural landscape.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 2 would not alter the ethnographic resources negatively and would result in a determination of no adverse effect on ethnographic resources.

Conclusion: Alternative 2 would have no direct or cumulative adverse impacts on ethnographic resources and would result in a determination of no adverse effect for purposes of Section 106.

Museum Collections

The NPS Management Policies, 2006 and NPS DO-28 require the consideration of impacts on museum collections. Museum collections themselves are not subject to Section 106 review, therefore the impact analysis below is for purposes of NEPA and not Section 106 of NHPA.

The park's museum collection numbers 264,098 items. There are 83,702 Archeology objects; 30,790 History/Art objects; 147,607 Archives and 1,999 Natural specimens. Of the 264,098 items within the collection, 101,032 are not cataloged.

Impacts of Alternative 1: No Action

Impact Analysis: Under Alternative 1, there would be no changes to the museum collection of Gateway NRA. The existing collection and exhibits would be maintained and preserved as they currently exist. There would be no impacts to museum collections under this alternative.

Cumulative Impacts: There are no impacts to museum collections under Alternative 1; therefore, there would be no cumulative impacts to museum collections.

Conclusion: Alternative 1 would have no direct or cumulative impacts on museum collections.

Cumulative Effects

Both within and outside the park, natural erosion and aging, and vandalism or theft contribute to cumulative effects on museum collections. The number and variety of museum collections in the region continues to be diminished through the construction and development, erosion, and collection of artifacts for profit or personal interest. The cumulative effects of the no-action alternative are regarded as adverse, localized, and minor.

Section 106 Summary
For the purpose of Section 106, the implementation of Alternative 1 would likely result in *no adverse effect* on archeological resources, historic structures, cultural landscapes, or ethnographic resources.

Conclusion

The no-action alternative would have localized and negligible to minor adverse direct impacts on museum collections. The indirect impacts would be localized, short-term, negligible to minor, and adverse to beneficial. The no-action alternative would not produce any major adverse impacts to

museum collections whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis

Under this alternative, utilizing a range of suppression strategies to control wildland fires would result in slightly more acreage burned, as natural and man-made barriers are used in lieu of constructed firelines. Effects from wildland fire and suppression activities would be similar to those described for the no-action alternative, with effects from fire increased slightly, and effects from fire suppression decreased slightly.

An expanded program of mechanical reduction of hazardous fuels would result in increased potential adverse effects from ground disturbance, and decreased potential for adverse effects from wildland fire.

Archeological Resources

Heat from typical surface fires would be insufficient to damage artifacts and other archeological materials in subsurface settings even if they are buried only a few centimeters below the ground surface. The direct adverse impacts of fire on archeological resources at Gateway NRA would generally be negligible, but could range to minor, depending on fire severity and the specific resources involved. Fire may also expose archeological resources as vegetation is removed. This may allow the discovery, more accurate mapping, and/or more complete assessment of archeological resources. This indirect effect would be short-term to long-term, minor, and beneficial.

With this alternative, wildland fires may burn a slightly larger acreage as a range of suppression strategies are implemented. This, however, would result in fewer firelines and avoidance of known archeological sites. The direct adverse impacts of fire suppression on archeological resources under this alternative would be to displace surface materials, expose buried archeological materials during handline construction, or disturb materials immediately below the surface with vehicle use. Initial attack, however, would focus on using natural barriers and other tactics with minimal ground disturbance. The indirect adverse effects include exposure of artifacts to erosion and theft. Given expected fire size and occurrence, and the planned implementation of identified mitigations and management constraints, the direct and indirect adverse effects of this alternative on archeological resources would be localized and minor.

The direct adverse impact of an expanded program of mechanical hazard fuel reductions would be exposure of materials or damage to artifacts due to ground disturbance by vehicles associated with the activities. Indirect adverse impacts would include exposure of artifacts to erosion and theft. With avoidance of known archeological resources and implementation of mitigation actions, the direct and indirect adverse impacts of hazard fuel reductions would be localized, short-term, and minor.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis: Under Alternative 2, there would be no changes to the archaeological resources of Gateway NRA and the existing resources would be preserved as they currently exist. The Park would continue to preserve these resources in place and continue to pursue efforts to fully document the site's archaeological resources. There would be no adverse impacts to archaeological resources under this alternative.

Cumulative Impacts: There are no impacts to archaeological resources under Alternative 2; therefore, there would be no cumulative impacts to archaeological resources.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 1 would result in a determination of no adverse effect on archaeological resources.

Conclusion: Alternative 2 would have no direct or cumulative adverse impacts on archaeological resources and would result in a determination of no adverse effect for purposes of Section 106.

Historic Structures

Again, slightly more acres may be burned when wildland fires are managed utilizing a range of suppression strategies. The direct adverse impact of wildland fire on historic structures could be destruction or damage to the structures if fire contacts the structures directly. The indirect impacts would include smoke impacts.

The direct adverse impact of fire suppression on historic structures would be limited to the potential to damage such structures by contact with firefighting equipment. Indirect adverse impacts include the possibility of damaging the historic integrity of sites. The direct and indirect adverse effects of fire suppression on historic structures under this alternative would be localized and negligible to minor.

Most mechanical hazardous fuels reduction would occur near historic resources. There would be no direct adverse impacts of hazardous fuels reduction actions to such resources. Indirect beneficial impacts would include reducing the threat of wildland fire near the historic resources, reducing the potential damage of vegetation encroachment on the resources, and preserving more historic scenes at the sites. The indirect impacts would be localized, short-term to long-term, negligible to minor, and beneficial.

The direct and indirect adverse impacts of the preferred alternative on historic structures would be localized, short-term, and negligible to minor. Long-term indirect impacts would be beneficial.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis: Under Alternative 2 there would be no changes to the historic structures and they would continue to be preserved as they currently exist and to keep them eligible for the National Register of Historic Places. There would be no adverse impacts to structures under this alternative.

Cumulative Impacts: There are no impacts to historic structures under Alternative 2; therefore, there would be no cumulative impacts to historic structures.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 2 would result in a determination of no adverse effect on historic structures.

Conclusion: Alternative 2 would have no direct or cumulative impacts on historic structures and would result in a determination of no effect for purposes of Section 106.

Cultural Landscapes

Wildland fires, suppression activities, hazard tree removal, and hazard fuels reductions have the potential to result in direct adverse impacts by removing important landscape elements, structures, or historic sites and leaving behind unsightly burned and scorched vegetation, stumps, and unvegetated firelines. On the other hand, a long-term indirect effect of hazard fuels reduction projects, by reducing accumulated fuels, may be restoring the integrity of cultural landscapes. These projects would be performed in accordance with the Secretary of the Interior's Standards for Rehabilitation. This would be considered a long-term benefit. The direct and indirect effects on cultural landscapes under the preferred alternative would be localized, short-term to long-term, adverse or beneficial, and negligible to minor.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis: Under Alternative 2 changes to the cultural landscapes would constitute steps toward the landscape's rehabilitation and would be completed in accordance with The Secretary of Interior's Standards for Rehabilitation. The park would continue to preserve the landscapes to keep them eligible for the National Register of Historic Places. There would be no adverse impacts to the cultural landscape under this alternative.

Cumulative Impacts: There are no adverse impacts to the cultural landscape under Alternative 2; therefore, there would be no cumulative adverse impacts to the cultural landscape.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 2 would not alter the cultural landscape negatively and would result in a determination of no adverse effect on cultural landscapes.

Conclusion: Alternative 2 would have no direct or cumulative adverse impacts on cultural landscapes and would result in a determination of no adverse effect for purposes of Section 106.

Ethnographic Resources

Groups associated with ethnographic resources are often reticent about identifying locations of sensitive sites, so some ethnographic sites may remain undocumented. All aspects of this alternative, as with the no-action alternative, have some potential to adversely affect ethnographic resources. If ethnographic resources are lost or damaged by wildland fires, fire suppression activities, and hazard tree removal, long-term minor to moderate adverse impacts would occur.

Overall, the direct adverse impacts of this alternative on ethnographic resources would be localized, short-term, and negligible to minor. The indirect impacts would be localized, short-term to long-term, negligible to minor, and adverse or beneficial.

Museum Collections

The NPS Management Policies, 2006 and NPS DO-28 require the consideration of impacts on museum collections. Museum collections themselves are not subject to Section 106 review, therefore the impact analysis below is for purposes of NEPA and not Section 106 of NHPA.

The park's museum collection numbers 264,098 items. There are 83,702 Archeology objects; 30,790 History/Art objects; 147,607 Archives and 1,999 Natural specimens. Of the 264,098 items within the collection, 101,032 are not cataloged.

Impacts of Alternative 2: Suppression and Mechanical Fuels Treatment

Impact Analysis: The impacts are the same as Alternative 1.

Cumulative Impacts: The cumulative impacts are the same as Alternative 1.

Conclusion: Alternative 2 would have no direct or cumulative impacts on museum collections.

Cumulative Effects

Both within and outside the park, natural erosion and aging, and vandalism or theft contribute to cumulative effects on museum collections. The number and variety of museum collections in the region continues to be diminished through the construction and development, erosion, and collection of artifacts for profit or personal interest. The cumulative effects of this alternative are regarded as adverse, localized, and minor.

Section 106 Summary
For the purpose of Section 106, the implementation of Alternative 2 would likely result in *no adverse effect* on archeological resources, historic structures, cultural landscapes, or ethnographic resources.

Conclusion

This alternative would have localized and negligible to minor adverse direct impacts on museum collections. The indirect impacts would be localized, adverse or beneficial, short-term to long-term, and negligible to minor. This alternative would not produce any major adverse impacts to museum collections whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire (NPS Preferred Alternative)

Impact Analysis

Under the preferred alternative, utilizing a range of suppression strategies to control wildland fires would result in slightly more acreage burned, as natural and man-made barriers are used in lieu of constructed firelines. Effects from wildland fire and suppression activities would be similar to those

described for the no-action alternative, with effects from fire increased slightly, and effects from fire suppression decreased slightly.

An expanded program of mechanical reduction of hazardous fuels would result in increased potential adverse effects from ground disturbance, and decreased potential for adverse effects from wildland fire.

The addition of a prescribed fire program would result in additional acres burned, with effects similar to those described for wildland fire. Some additional ground disturbance could occur due to construction of control lines and vehicle use. Beneficial effects could include additional reduction of hazardous fuels, and exposure of archeological resources through removal of vegetation.

Archeological Resources

Heat from typical surface fires would be insufficient to damage artifacts and other archeological materials in subsurface settings even if they are buried only a few centimeters below the ground surface. The direct adverse impacts of fire on archeological resources at Gateway NRA would generally be negligible, but could range to minor, depending on fire severity and the specific resources involved. Fire may also expose archeological resources as vegetation is removed. This may allow the discovery, more accurate mapping, and/or more complete assessment of archeological resources. This indirect effect would be short-term to long-term, minor, and beneficial.

With the preferred alternative, wildland fires may burn slightly larger as a range of suppression strategies are implemented. This, however, would result in fewer firelines and avoidance of known archeological sites. The direct adverse impacts of fire suppression on archeological resources under this alternative would be to displace surface materials, expose buried archeological materials during handline construction, or disturb materials immediately below the surface with vehicle use. Initial attack, however, would focus on using natural barriers and other tactics with minimal ground disturbance. The indirect adverse effects include exposure of artifacts to erosion and theft. Given expected fire size and occurrence, and the planned implementation of identified mitigations and management constraints, the direct and indirect adverse effects of this alternative on archeological resources would be localized and minor.

The direct adverse impact of an expanded program of mechanical hazard fuel reductions would be exposure of materials or damage to artifacts due to ground disturbance by vehicles associated with the activities. Indirect adverse impacts would include exposure of artifacts to erosion and theft. With avoidance of known archeological resources and implementation of mitigation actions, the direct and indirect adverse impacts of hazard fuel reductions would be localized, short-term, and minor.

The adverse effects of a prescribed fire program on archeological resources would be similar to those described for wildland fire. Due to the occasional need for control lines and for the use of personnel and vehicles to conduct prescribed burns, effects similar to those described for wildland fire suppression would occur as well. Finally, prescribed fire would also result in beneficial effects similar to those described for mechanical hazardous fuel reduction; prescribed fire could reduce risks to archeological resources by removing fuels and reducing the likelihood of intense wildfires. With avoidance of known archeological resources and implementation of mitigation actions, the

direct and indirect adverse impacts of a prescribed fire program would be localized, short-term, and minor.

Impacts of Alternative 3:Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis: Under Alternative 3, there would be no changes to the archaeological resources of Gateway NRA and the existing resources would be preserved as they currently exist. The Park would continue to preserve these resources in place and continue to pursue efforts to fully document the site's archaeological resources. There would be no adverse impacts to archaeological resources under this alternative.

Cumulative Impacts: There are no impacts to archaeological resources under Alternative 3; therefore, there would be no cumulative impacts to archaeological resources.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative31 would result in a determination of no adverse effect on archaeological resources.

Conclusion: Alternative 3 would have no direct or cumulative adverse impacts on archaeological resources and would result in a determination of no adverse effect for purposes of Section 106.

Historic Structures

Again, slightly more acres may be burned when wildland fires are managed utilizing a range of suppression strategies. The direct adverse impact of wildland fire on historic structures could be destruction or damage to the structures if fire contacts the structures directly. The indirect impacts would include smoke impacts.

The direct adverse impact of fire suppression on historic structures would be limited to the potential to damage such structures by contact with firefighting equipment. Indirect adverse impacts include the possibility of damaging the historic integrity of sites. The direct and indirect adverse effects of fire suppression on historic structures under the preferred alternative would be localized and negligible to minor.

Most mechanical hazardous fuels reduction would occur near historic resources. There would be no direct adverse impacts of hazardous fuels reduction actions to such resources. Indirect beneficial impacts would include reducing the threat of wildland fire near the historic resources, reducing the potential damage of vegetation encroachment on the resources, and preserving more historic scenes at the sites. The indirect impacts would be localized, short-term to long-term, negligible to minor, and beneficial.

The adverse effects of a prescribed fire program on historical structures would be similar to those described for wildland fire. Due to the occasional need for control lines and for the use of personnel and vehicles to conduct prescribed burns, effects similar to those described for wildland fire suppression would occur as well. Finally, prescribed fire would also result in beneficial effects similar to those described for mechanical hazardous fuel reduction; prescribed fire could reduce risks to historical structures by removing fuels and reducing the likelihood of intense wildfires. By avoiding historical structures and employing appropriate mitigation measures, the direct and indirect adverse impacts of a prescribed fire program would be localized, short-term, and minor.

The direct and indirect adverse impacts of the preferred alternative on historic structures would be localized, short-term, and negligible to minor. Long-term indirect impacts would be beneficial.
Impacts of Alternative 3:Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis: Under Alternative 3 there would be no changes to the historic structures and they would continue to be preserved as they currently exist and to keep them eligible for the National Register of Historic Places. There would be no adverse impacts to structures under this alternative.

Cumulative Impacts: There are no impacts to historic structures under Alternative 3; therefore, there would be no cumulative impacts to historic structures.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 3 would result in a determination of no adverse effect on historic structures.

Conclusion: Alternative 3 would have no direct or cumulative impacts on historic structures and would result in a determination of no effect for purposes of Section 106.

Cultural Landscapes

Wildland fires, suppression activities, hazard tree removal, hazard fuels reduction, and prescribed fire have the potential to result in direct adverse impacts by removing important landscape elements, structures, or historic sites, and leaving behind unsightly burned and scorched vegetation, stumps, and unvegetated firelines. On the other hand, a long-term indirect effect of hazard fuels reduction projects, including prescribed fire, by reducing accumulated fuels, may be restoring the integrity of cultural landscapes. This would be considered a long-term benefit. The direct and indirect effects on cultural landscapes under the preferred alternative would be localized, short-term to long-term, adverse or beneficial, and negligible to minor.

Impacts of Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis: Under Alternative 3 changes to the cultural landscapes would constitute steps toward the landscape's rehabilitation and would be completed in accordance with The Secretary of Interior's Standards for Rehabilitation. The park would continue to preserve the landscapes to keep them eligible for the National Register of Historic Places. There would be no adverse impacts to the cultural landscape under this alternative.

Cumulative Impacts: There are no adverse impacts to the cultural landscape under Alternative 3; therefore, there would be no cumulative adverse impacts to the cultural landscape.

Section 106 Summary: For the purposes of Section 106, the implementation of Alternative 3 would not alter the cultural landscape negatively and would result in a determination of no adverse effect on cultural landscapes.

Conclusion: Alternative 3 would have no direct or cumulative adverse impacts on cultural landscapes and would result in a determination of no adverse effect for purposes of Section 106.

Ethnographic Resources

Groups associated with ethnographic resources are often reticent about identifying locations of sensitive sites, so some ethnographic sites may remain undocumented. All aspects of the preferred alternative, as with the no-action alternative, have some potential to adversely affect ethnographic resources. If ethnographic resources are lost or damaged by wildland fires, fire suppression activities, and hazard tree removal, long-term minor to moderate adverse impacts would occur.

Overall, the direct adverse impacts of the preferred alternative on ethnographic resources would be localized, short-term, and negligible to minor. The indirect impacts would be localized, short-term to long-term, negligible to minor, and adverse or beneficial.

Museum Collections

The NPS Management Policies, 2006 and NPS DO-28 require the consideration of impacts on museum collections. Museum collections themselves are not subject to Section 106 review, therefore the impact analysis below is for purposes of NEPA and not Section 106 of NHPA.

The park's museum collection numbers 264,098 items. There are 83,702 Archeology objects; 30,790 History/Art objects; 147,607 Archives and 1,999 Natural specimens. Of the 264,098 items within the collection, 101,032 are not cataloged.

Impacts of Alternative 3:Suppression, Mechanical Fuels Treatment, and Prescribed Fire

Impact Analysis: The impacts are the same as Alternative 1.

Cumulative Impacts: The cumulative impacts are the same as Alternative 1.

Conclusion: Alternative 3 would have no direct or cumulative impacts on museum collections.

Cumulative Effects

Both within and outside the park, natural erosion and aging, and vandalism or theft contribute to cumulative effects on museum collections. The number and variety of museum collections in the region continues to be diminished through the construction and development, erosion, and collection of artifacts for profit or personal interest. The cumulative effects of the preferred alternative are regarded as adverse, localized, and minor.

Section 106 Summary

For the purpose of Section 106, the implementation of Alternative 3 would likely result in *no adverse effect* on archeological resources, historic structures, cultural landscapes, or ethnographic resources.

Conclusion

The preferred alternative would have localized, short-term, and negligible to minor adverse direct impacts on museum collections. The indirect impacts would be localized, adverse or beneficial,

short-term to long-term, and negligible to minor. The preferred alternative would not produce any major adverse impacts to museum collections whose conservation is necessary to the purpose of the establishment of the park, that are key to the natural or cultural integrity of the park, or that are actions identified as a management goal of the park.

Section 106 Summary By Alternative

A preliminary draft of this EA/AoE underwent internal NPS review by the Park's cultural resource advisors (Section 106 advisor team) in December 2011. Subsequent to internal review, the EA/AoE was submitted to both the NJ SHPO and NY SHPO for review in May 2012. As the project undergoes further planning and design beyond this EA/AoE, additional submittals would be provided to the SHPO for review.

The environmental consequences, including and assessment of effect for Section 106 of the NHPA, were documented within individual impact topics in Chapter 3 of this EA/AoE. In the analysis, an Assessment of Effect for purposes of Section 106 was included for the listed or potentially eligible National Register cultural resources including: cultural landscapes, historic structures, and archeological resources. Effects were assessed for each topic by each of the three alternatives. Below is a summary discussing an overall assessment of effect for each alternative.

Alternative 1: No Action
Alternative 1, which maintains current management practices, would result in a *no adverse effect* determination for archeological resources, cultural landscapes, historic structures, and ethnographic resources. These resources would continue to be managed to retain their eligibility for listing on the National Register. Therefore, the overall assessment of effect for Alternative 1 would be *no adverse effect*.

Alternative 2: Suppression and mechanical fuels treatment
Alternative 2 allows managers to consider other factors while suppressing wildland fires rather than just limiting wildland fires to smallest acreage burned. This alternative also allows for a mechanical fuels treatment program. This alternative would result in a *no adverse effect* determination for archeological resources, cultural landscapes, historic structures, and ethnographic resources. These resources would continue to be managed to retain their eligibility for listing on the National Register. Therefore, the overall assessment of effect for Alternative 2 would be *no adverse effect*.

Alternative 3: Suppression, Mechanical Fuels Treatment, and Prescribed Fire (NPS Preferred Alternative)

In addition to all options allowed under Alternative 2, Alternative 3 allows for the use of prescribed fires. This alternative would result in a *no adverse effect* determination for archeological resources, cultural landscapes, historic structures, and ethnographic resources. These resources would continue to be managed to retain their eligibility for listing on the National Register. Therefore, the overall assessment of effect for Alternative 3 would be *no adverse effect*.

In accordance with Section 106 or the National Historic Preservation Act (36 CFR Part 800), the National Park Service has determined that the Fire Management Plan and preferred alternative for Gateway National Recreation Area will have No Adverse Effect on the characteristics that make

Gateway National Recreation Area's cultural resources eligible for listing on the National Register of Historic Places. While both wildland fire and fire suppression activities pose potential adverse effects on cultural resources within the park, the mitigation measures included in the Fire Management Plan, and those listed below, recognize and prioritize the protection of park's cultural resources.

To ensure adequate protection and to continue the preservation of the park's cultural resources, the fire management activities will be implemented using the mitigation measures identified on pages 37-39 of this document.

CHAPTER 4: CONSULTATION & COORDINATION

History of Planning and Public Involvement

Development of the Fire Management Plan originally began in 2004, with internal scoping to identify important issues associated with plan was conducted with the park's Interdisciplinary Team and Regional Office specialists during meetings held at Gateway NRA on December 7-9, 2004. Due to a series of personnel changes, however, the Environmental Assessment and Fire Management Plan itself did not progress beyond several drafts.

Starting April 2011, the draft Environmental Assessment and Fire Management Plan from 2005 were updated to reflect current National Park Service wildland fire policy and organizational changes. On August 3, 2011, staff from the park's Division of Resource and Visitor Protection, Division of Resource Management, and the Unit Coordinators met to discuss any issues regarding the updated plan.

Additional public scoping was conducted following the release of the Environmental Assessment.

This EA/AoE will be on formal public and agency review for 30 days and has been distributed to a variety of interested individuals associated with the park's mailing list and outreach, agencies, and organization. This document is also available on the Internet at http://parkplanning.nps.gov and hard copies are available at additional locations.

The following staff, agencies and organizations were contacted for information, assisted in identifying issues, developing alternatives, analyzing impacts, or identified compliance requirements:

U.S. Fish & Wildife Service Coordination

The natural resource management staff at Gateway NRA has determined that actions associated with plan implementation would not adversely affect any of the federally listed species that are known to occur in the park. Copies of this Environmental Assessment were sent to the U.S. Fish & Wildlife Service Long Island and New Jersey Field Offices seeking their concurrence with the park's determination.

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- Timothy Regan, Fire Chief, Gateway National Recreation Area, Sandy Hook, New Jersey
- Mark Christiano, GIS Specialist, Gateway National Recreation Area, Staten Island, New York

Agencies, Organizations, and Persons Contacted During Plan Development

Federal Agencies

- U.S. Fish and Wildlife Service
- Federal Aviation Administration
- U.S. Environmental Protection Agency

State and Local Governments and Agencies

- New York State Department of Environmental Conservation (DEC)
- New York State Historic Preservation Office (NY SHPO)
- New York City Fire Department (FDNY)
- New York City Department of Environmental Protection (DEP)
- New Jersey Historic Preservation Office (NJ SHPO)

List of EA Recipients

Federal Agencies

- U.S. Fish and Wildlife Service
- Environmental Protection Agency

Tribes

No tribes were contacted.

Other Organizations and Individuals

- The Nature Conservancy
- Audubon Society

GLOSSARY OF WILDLAND FIRE TERMS

A

Agency: Any federal, state, or county government organization participating with jurisdictional responsibilities.

Aspect: Direction toward which a slope faces.

B

Brush: A collective term that refers to stands of vegetation dominated by shrubby, woody plants, or low growing trees, usually of a type undesirable for livestock or timber management.

Burning Conditions: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

C

Canopy: The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees.

Chain: A unit of linear measurement equal to 66 feet.

Closure: Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Contain a fire: A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.

Control a fire: The complete extinguishment of a fire, including spot fires. Fireline has been strengthened so that flare-ups from within the perimeter of the fire will not break through this line.

Control Line: All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency: An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort; e.g., Red Cross, law enforcement agency, telephone company, etc.

Crown: The part of a tree, or other woody plant, bearing live branches and foliage.

Crown Fire: A fire that advances through the crowns of trees or shrubs normally in direct conjunction with a surface fire, but sometimes independently of the surface fire. Three categories of crown fires are recognized (passive, active, and independent); they are determined by three crown fuel properties (live crown base height, foliar moisture content and bulk density) and two characteristics of fire behavior (spread rate and surface intensity).

Curing: Drying and browning of herbaceous vegetation or slash.

D

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Detection: The act or system of discovering and locating fires.

Direct Attack: Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel. Line is constructed adjacent to the fire perimeter: usually the preferred method, because of immediate access to escape routes and safety zones. Used when fire behavior, weather and fuel permit.

Dozer: Any tracked vehicle with a front-mounted blade used for exposing mineral soil.

E

Ecosystem: A functional unit consisting of all the living organisms in a given area, and all of the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size, but it always functions as a whole unit.

Environmental Assessment (EA): EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with public participation that determine if an environmental impact statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.

Environmental Impact Statement (EIS): EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis, and an array of action alternatives allowing managers to see the probable effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area, such as an already burned area, previously constructed safety area, a meadow that won't burn, or natural rocky area that is large enough to take refuge without being burned. When escape routes deviate from a defined physical path, they should be clearly marked (flagged).

Extended Attack Incident: A wildland fire that has not been contained or controlled by initial attack forces, and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.

F

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Front: The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fireline: A linear fire barrier that is scraped or dug to mineral soil.

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires, and documents the fire management program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Fire Management Unit: An administrative management area in which the same fire management methods are likely to be employed throughout.

Fire Perimeter: The entire outer edge or boundary of a fire.

Fire Risk: The probability or chance of fire starting determined by the presence and activities of causative agents.

Fire Season: 1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities. 2) A legally enacted time during which burning activities is regulated by state or local authority.

Fire Severity: A relative measure of the post-fire appearance of vegetation as it relates to the intensity of the fire and the consumptive effects on vegetation.

Fire Suppression (Fire Control): All of the work and activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Firefighter Safety: A work environment where foreseeable risks have been minimized through the mitigation of known hazards associated with wildfire suppression.

Firefighting Resources: All people and major items of equipment that can or potentially could be assigned to fires.

Flame Length: The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity.

Flaming Front: The zone of a moving fire where the combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front. Also called fire front.

Flare-up: Any sudden acceleration of fire spread or intensification of a fire. Unlike a blow-up, a flare-up lasts a relatively short time and does not radically change control plans.

Fuel: Combustible material. Includes vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire. (See Surface Fuels.) Includes both living plants; dead, woody vegetative materials; and other vegetative materials which are capable of burning.

Fuel Bed: An array of fuels usually constructed with specific loading, depth and particle size to meet experimental requirements; also, commonly used to describe the fuel composition in natural settings.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area, usually in tons per acre.

Fuel Management: Manipulation or reduction of flammable matter for the purpose of reducing the intensity or rate of spread of a fire, while preserving and enhancing environmental quality.

Fuel Model: Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel Moisture (Fuel Moisture Content): The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Reduction: Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

H

Head of a Fire: The side of the fire having the fastest rate of spread.

Heavy Fuels: Fuels of large diameter such as snags, logs, and large limb wood that ignite and are consumed more slowly than flashy fuels.

Helibase: The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot: A temporary landing spot for helicopters.

Holding Actions: Planned actions required to achieve wildland prescribed fire management objectives. These actions can have less sensitive implementation demands for suppression actions.

Holding Resources: Firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction but generally not including extensive mop-up.

I

Incident: A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Initial Attack: An aggressive suppression action taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire, consistent with firefighter and public safety and values to be protected.

L

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.

Large Fire: 1) For statistical purposes, a fire burning more than a specified area of land e.g., 300 acres. 2) A fire burning with a size and intensity such that its behavior is determined by interaction between its own convection column and weather conditions above the surface.

LCES: Lookouts, **C**ommunications, **E**scape Routes, and **S**afety Zones. A standard guideline for firefighting safety in which firefighters are directed to select lookouts, set up communications, choose escape routes, and select safety zones.

Light (Fine) Fuels: Fast-drying fuels, generally with comparatively high surface area-to-volume ratios, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lightning Activity Level (LAL): A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning. The scale is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2).

Litter: Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

M

Mineral Soil: Soil layers below the predominantly organic horizons; soil with little combustible material.

Monitoring: The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

N

National Environmental Policy Act (NEPA): NEPA is the basic national law for protection of the environment, passed by Congress in 1969. It sets policy and procedures for environmental protection, and authorizes environmental impact statements and environmental assessments to be used as analytical tools to help federal managers make decisions.

Native Species: Species that are indigenous to a region: not introduced or exotic.

O

Overstory: The portion of the trees that form the uppermost canopy layer in a forest of more than one story.

P

Preparedness: Condition or degree of being ready to cope with a potential fire situation.

Prescribed Fire: The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., hazardous fuel reduction, silviculture, wildlife management, etc.). Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescription: Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection from a range of strategies, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations.

Prevention: Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

Project: An organized effort to achieve an objective, identified by location, activities, outputs, effects, and time-period and responsibilities for execution.

R

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Rehabilitation: The activities necessary to repair damage or disturbance caused by wildland fires or the fire suppression activity.

Resources: 1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to incidents. 2) The natural resources of an area, such as timber, crass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP): A document prepared by field office staff with public participation, and approved by field office managers that provides general guidance and direction for land management activities at a field office. The RMP identifies the need for fire in a particular area and for a specific benefit.

Retardant: A substance or chemical agent that reduces the flammability of combustibles.

S

Safety Zone: An area cleared of flammable materials used for escape in the event the line is outflanked, or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas, which can be used with relative safety by firefighters and their equipment in the event of a blowup in the vicinity.

Slash: Debris left after logging, pruning, thinning or brush cutting; includes logs, chips, bark, branches, stumps, and broken understory trees or brush.

Smoke Management: Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.

Snag: A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spot Fire: A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Standard Firefighting Orders: Ten principles of firefighting safety which include: Keep informed on fire weather conditions and forecasts; Know what your fire is doing at all times; Base all actions on current and expected behavior of the fire; Identify escape routes and safety zones and make them known; Post lookouts when there is possible danger; Be alert. Keep calm. Think clearly. Act decisively; Maintain prompt communications with your forces, your supervisor, and adjoining forces; Give clear instructions and insure they are understood; Maintain control of your forces at all times; and Fight fire aggressively, having provided for safety first.

Strategy: The science and art of command as applied to the overall planning and conduct of an incident.

Structure Fire: Fire originating in and burning any part or all of any building, shelter, or other structure.

Suppression: All the work of extinguishing or containing a fire, beginning with its discovery.

T

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Timelag: Time needed under specified conditions for a fuel particle to lose about 63 percent of the difference between its initial moisture content and its equilibrium moisture content. If conditions remain unchanged, a fuel will reach 95 percent of its equilibrium moisture content after four timelag periods.

Torching: The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

U

Understory: The portion of vegetation that is underneath the dominant tree canopy.

V

Volunteer Fire Department (VFD): A fire department of which some or all members are unpaid.

W

Watch Out Situations: Eighteen principles of firefighting safety describing potentially hazardous situation including: Fire not scouted and sized up; In country not seen in daylight; Safety zones and escape routes not identified; Unfamiliar with weather and local factors influencing fire behavior; Uninformed on strategy, tactics, and hazards; Instructions and assignments not clear; No communication link with crewmembers/supervisors; Constructing line without safe anchor point; Building fireline downhill with fire below; Attempting frontal assault on fire; Unburned fuel between you and the fire; Cannot see main fire, not in contact with anyone who can; On a hillside where rolling material can ignite fuel below; Weather is getting hotter and drier; Wind increases and/or changes direction; Getting frequent spot fires across line; Terrain and fuels make escape to safety zones difficult; and Taking a nap near the fireline.

Watershed: The drainage basin contributing water, organic matter, dissolved nutrients and sediments to a stream, lake or river.

Weather Information and Management System (WIMS): An interactive computer system designed to accommodate the weather information needs of all federal and state natural resource management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).

Wildland Fire: Any non-structure fire, other than prescribed fire, that occurs in the wildland. Any fire originating from an unplanned ignition.

Wildland Urban Interface (WUI): The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Includes those areas of resident human population at imminent risk from wildfire, and human developments having special significance. These areas may include critical communications sites, municipal watershed, high voltage transmission lines, observatories, church camps, scout camps, research facilities, and other structures that if destroyed by fire, would result in hardships to communities. These areas encompass not only the sites themselves, but also the continuous slopes and fuels that lead directly to the sites, regardless of the distance involved.

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APPENDICES

Appendix A: Park Maps

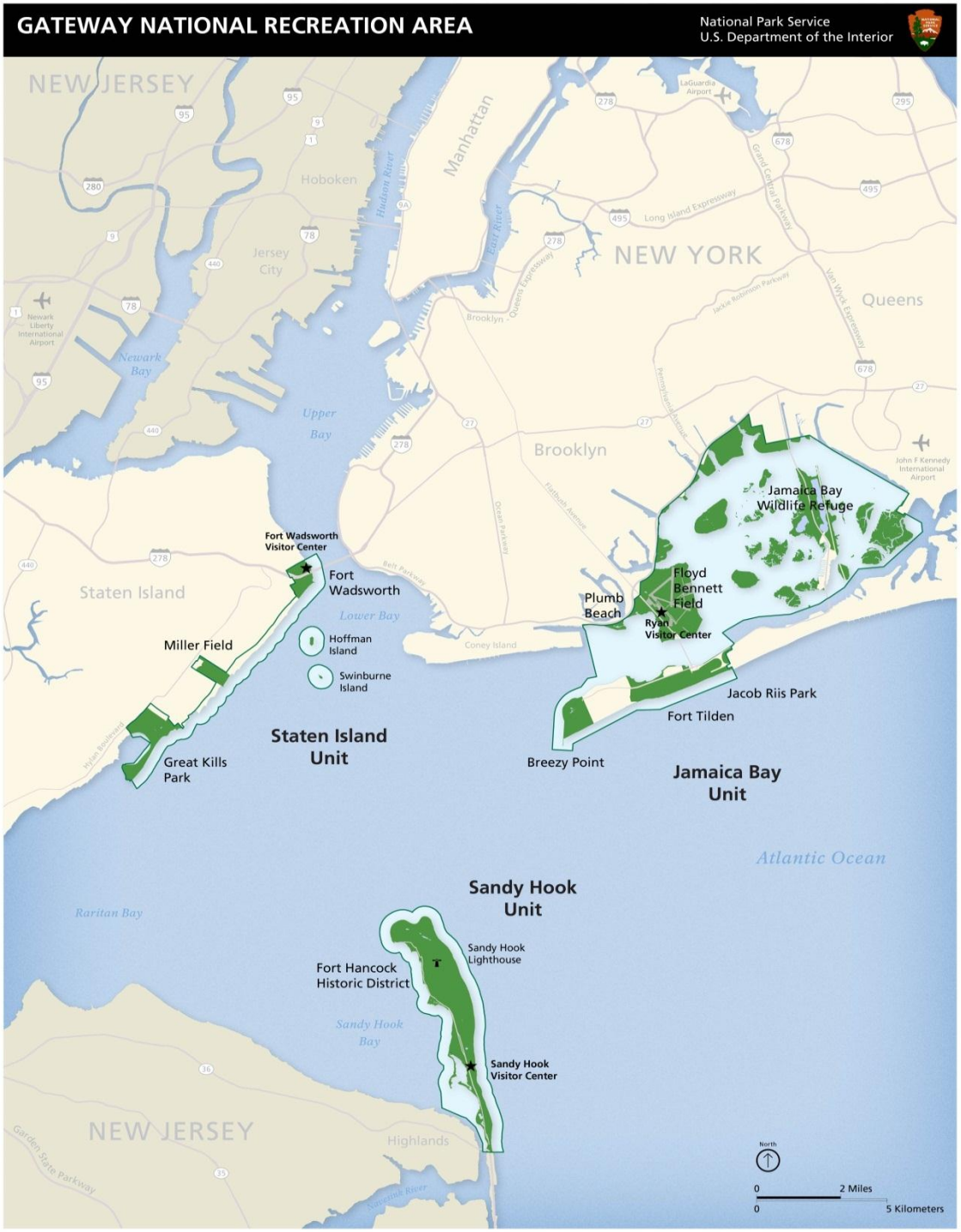
1. **Gateway National Recreation Area**
2. **Jamaica Bay Unit**
3. **Staten Island Unit**
4. **Sandy Hook Unit**

Appendix B: Organizational Charts

1. **Gateway National Recreation Area**
2. **Northeast Region Fire and Aviation**
3. **National Park Service Fire and Aviation**

Appendix A: Park Maps

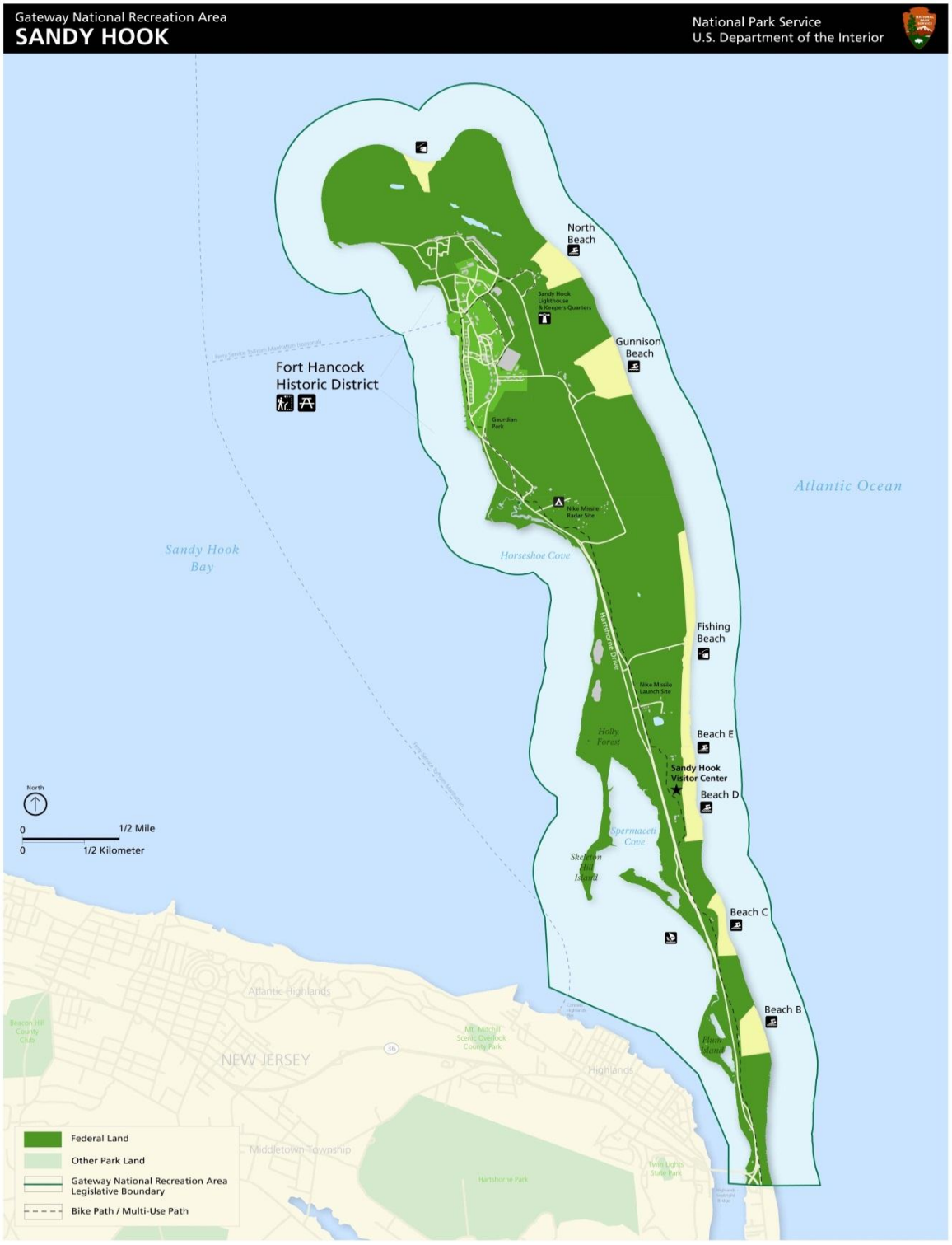
1. Gateway National Recreation Area



2. Jamaica Bay Unit

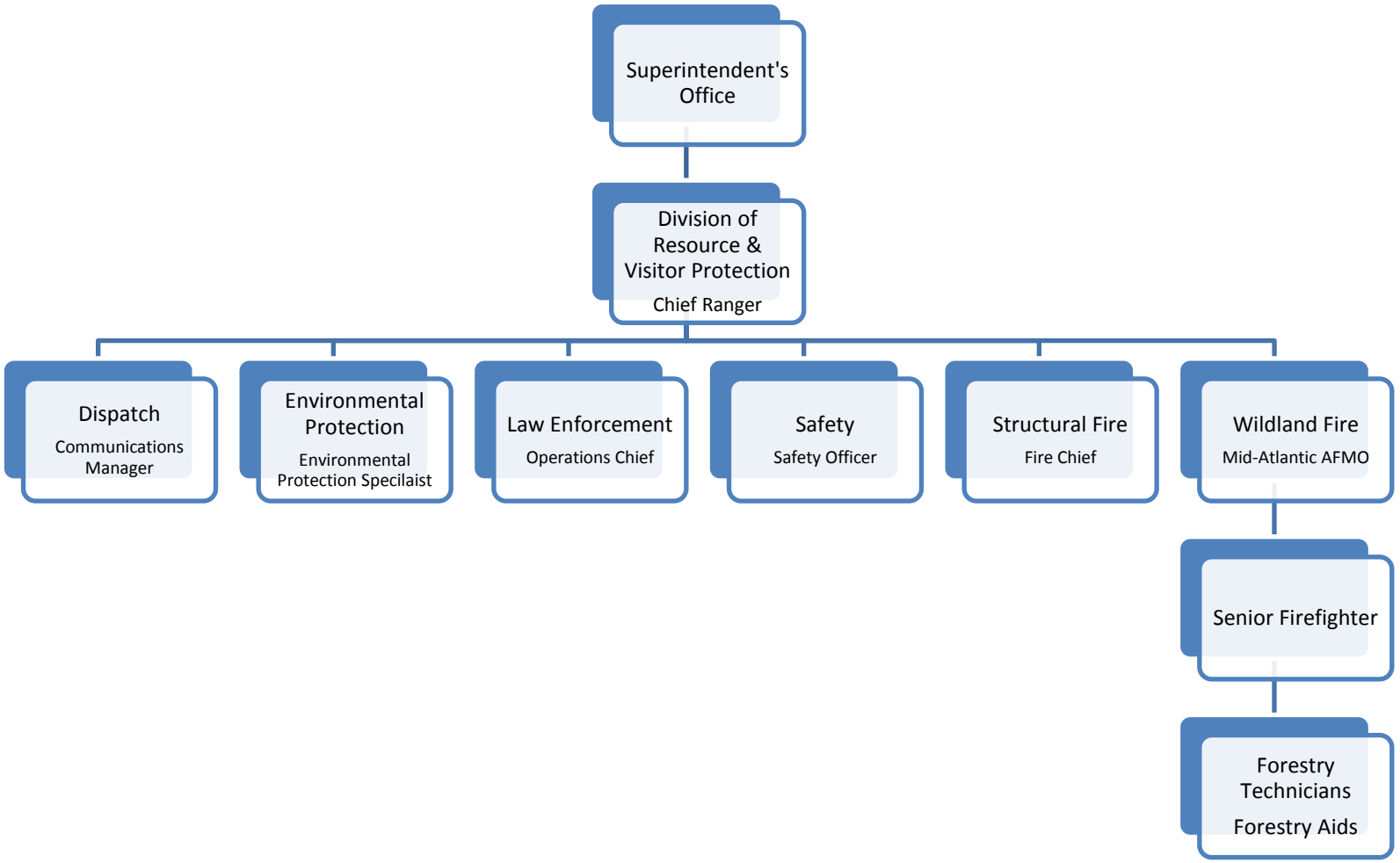
3. Staten Island Unit

4. Sandy Hook Unit

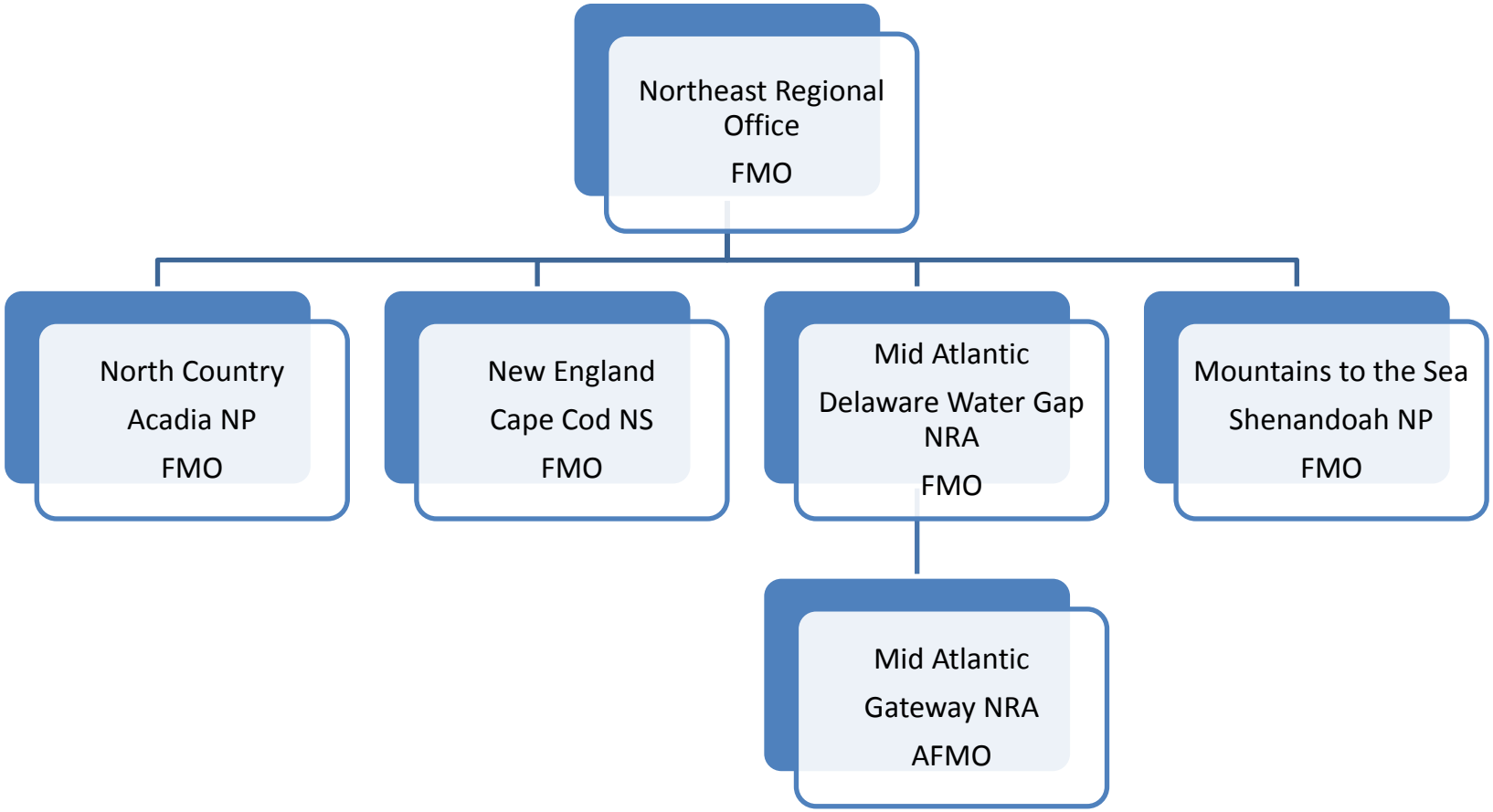


Appendix B: Organizational Charts

1. Gateway National Recreation Area



2. Northeast Region Fire and Aviation Organization



3. National Park Service Fire and Aviation Organization