

National Park Service
U.S. Department of the Interior

South Florida and Caribbean Parks

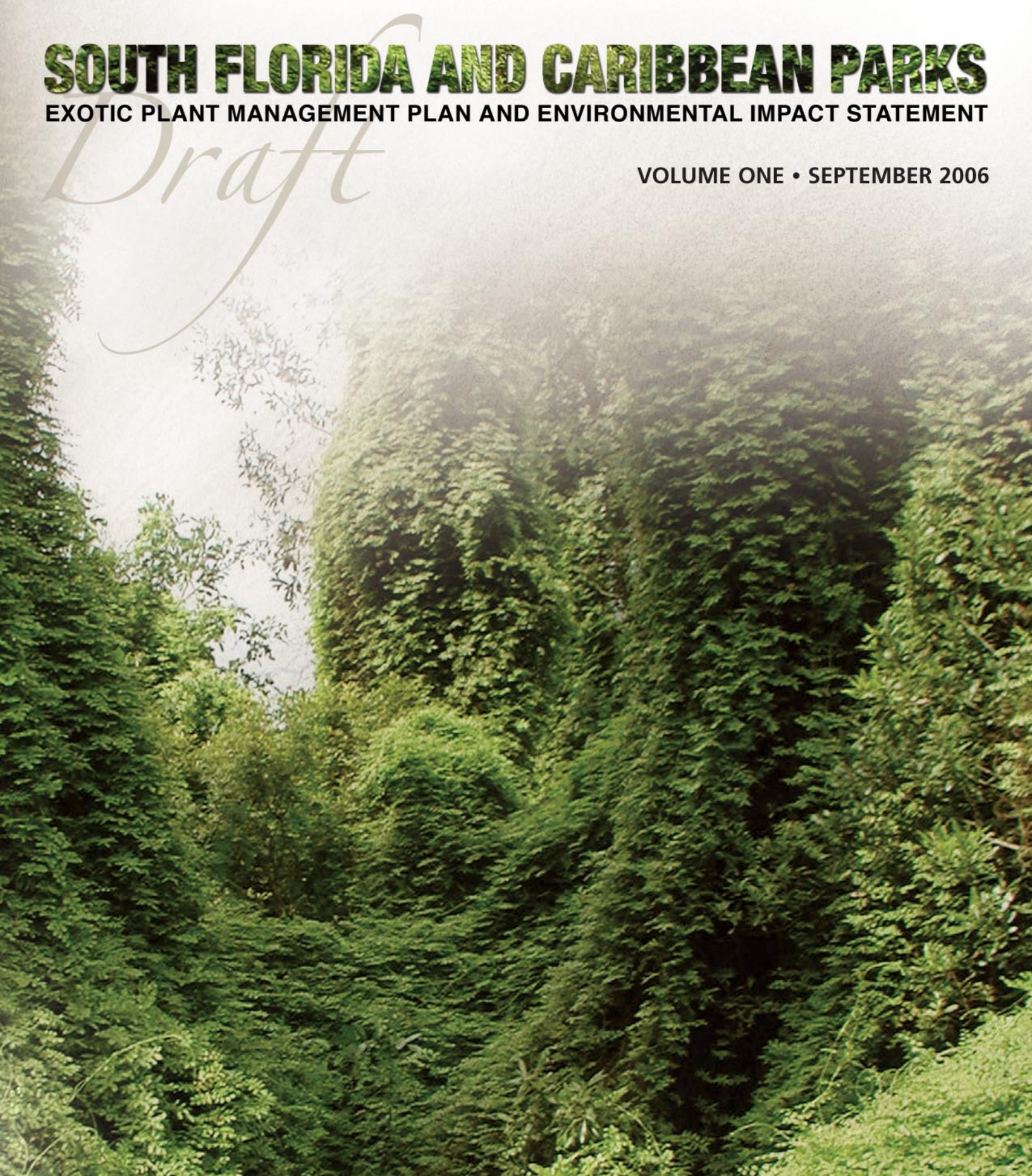


SOUTH FLORIDA AND CARIBBEAN PARKS

EXOTIC PLANT MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Draft

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**UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE**

DRAFT EXOTIC PLANT MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT

South Florida and Caribbean Parks

Lead Agency: National Park Service (NPS), U.S. Department of the Interior

This draft *Exotic Plant Management Plan / Environmental Impact Statement* (EPMP/EIS) analyzes a range of alternatives and actions for the management of exotic plants in nine south Florida and Caribbean parks. The parks included in this EPMP/EIS are Big Cypress National Preserve, Biscayne National Park, Canaveral National Seashore, Dry Tortugas National Park, Everglades National Park, Buck Island Reef National Monument, Christiansted National Historic Site, Salt River Bay National Historic Park and Ecological Preserve, and Virgin Islands National Park. This EPMP/EIS assesses the impacts that could result from continuation of the current management framework (the no-action alternative) or implementation of either of the two action alternatives.

Alternative A, No Action: Continue Current Management, would continue the existing management framework. The nine parks would continue to treat infestations of exotic plants on an *ad hoc* basis and through currently available funding sources.

Alternative B, New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, would apply a systematic approach that would prioritize exotic plants for treatment, monitor effects of those treatments on exotic plants and park resources, and mitigate any adverse effects to park resources as determined through the monitoring program. This alternative would employ an adaptive management strategy, using the results of monitoring to adjust treatment methods or mitigation methods to reach the desired future condition of treated areas in the parks. The effectiveness of efforts to control exotic plant invasion or native habitats would increase as a result of uniform recording and storage of information acquired during monitoring and sharing of that information among the nine park units.

Alternative C, New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants, the preferred and environmentally preferred alternative, would augment the systematic approach integral to alternative B, but would add an active restoration program to enhance the return of native species to treated areas in selected high-priority areas. The difference between alternatives B and C lies in the restoration plan, with some alterations to the monitoring plan and the criteria used to determine success of treatment. Under alternative C, a decision tool would be applied to determine areas that are appropriate for active restoration, which would occur in park areas that have been previously disturbed and in areas with potential threatened and endangered species habitat or sensitive vegetation communities where a more rapid recovery would be desirable. The active restoration approach for a given treatment area would be determined based on a site-specific evaluation. Other areas in the parks would recover passively as described in alternative B.

Public Comment—If you wish to comment on this Draft Exotic Plant Management Plan/Environmental Impact Statement you may submit your comments by any one of several methods. It is important to note that all comments must be postmarked, transmitted, or logged no later than 60 days from the date the U.S. Environmental Protection Agency filing notice in the Federal Register. This deadline will be posted on the National Park Service (NPS) Planning, Environment, and Public Comment (PEPC) website at <http://parkplanning.nps.gov/ever> and will be published in press release in local and regional newspapers. Written comments can be mailed to

Sandra Hamilton, National Park Service
Environmental Quality Division
PO Box 25287, Denver, CO 80225

Reviewers are encouraged to submit comments, ideas, or questions online at <http://parkplanning.nps.gov/ever>.

It is the practice of the NPS to make all comments, including names and addresses of respondents who provide that information, available for public review following the conclusion of the NEPA process. Individuals may request that the NPS withhold their name and/or address from public disclosure. If you wish to do this, you must state this prominently at the beginning of your comment. Commentators using the website can make such a request by checking the box "keep my contact information private." NPS will honor such requests to the extent allowable by law, but you should be aware that NPS may still be required to disclose your name and address pursuant to the *Freedom of Information Act*.

EXECUTIVE SUMMARY

This draft *Exotic Plant Management Plan / Environmental Impact Statement* (EPMP/EIS) analyzes a range of alternatives and actions for the management of exotic plants in nine south Florida and Caribbean parks. The parks included in this EPMP/EIS are Big Cypress National Preserve, Biscayne National Park, Canaveral National Seashore, Dry Tortugas National Park, Everglades National Park, Buck Island Reef National Monument, Christiansted National Historic Site, Salt River Bay National Historic Park and Ecological Preserve, and Virgin Islands National Park. This EPMP/EIS assesses the impacts that could result from continuation of the current management framework (the no-action alternative) or implementation of either of the two action alternatives.

This EPMP/EIS is mostly programmatic in nature, which means that it provides a framework for taking a range of management actions. Some actions would require additional, more site-specific analyses before they could be implemented if this EIS has not analyzed all of the relevant conditions present in the site-specific action or if conditions have changed from those that are analyzed in this EIS. If additional analyses are required, environmental compliance, including an opportunity for public comment, would be completed.

PURPOSE OF AND NEED FOR ACTION

This draft EPMP/EIS proposes a range of strategies to manage and control exotic plants and establish a framework for future implementation of site-specific actions in the nine parks. The parks also have similar goals to preserve and protect park resources, face similar issues related to the presence and spread of exotic plants, and use similar techniques to manage exotic plants. In addition, this programmatic approach is intended to increase efficiency by combining the resources and expertise available from the nine participating parks. Based on these factors, the NPS determined that a programmatic environmental impact statement covering all nine parks is appropriate.

The EPMP/EIS:

- Provides a programmatic plan to manage and control exotic plants in nine parks in south Florida and the Caribbean.
- Promotes restoration of native species and habitat conditions in ecosystems that have been invaded by exotic plants.
- Protects park resources and values from adverse effects resulting from exotic plant presence and control activities.

The mild, humid climate of south Florida and the Caribbean makes the national parks in these areas especially susceptible to exotic plant infestations that threaten park natural and cultural resources. There is a need to manage exotic plants because they

Exotic plants—Plants that are not native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.



often cause irreparable damage to natural resources by destroying the ecological balance between plants, animals, soil, and water achieved over many thousands of years

are aggressive and competitive and, in newly invaded areas, lack sufficient predators from their native range or even local occurring natural predators to effectively control them

displace native plants by robbing moisture, nutrients, and sunlight, resulting in declines in habitat and food sources for animal populations, including critical habitat for threatened and endangered species

can interbreed with native plant species and dilute native gene pools

alter cultural landscapes, and excessive growth can threaten the integrity of historic and cultural sites and structures

Activities to control exotic plants can also affect natural and cultural resources. The use of mechanized equipment, chemical herbicides, and physical treatments (such as flooding or fire to remove and control exotic plants) can disturb native habitats; harm nontarget species; damage archeological, ethnographic, landscape, and historic resources; and alter natural communities.

The National Park Service (NPS) spends millions of dollars each year controlling the spread of exotic plants in parks and protecting and preserving park resources. These activities can be expensive: Canaveral National Seashore spent over \$500,000 for treatment since 2000; Big Cypress National Preserve reported spending approximately \$388,000 annually; and funding at Everglades National Park has increased from approximately \$100,000 in 2001 to over 1.2 million dollars in 2004.

Currently, each of the nine national parks manages exotic plants on a project-by-project basis. In planning for this draft EPMP/EIS, the NPS recognized that it needed to adopt a collaborative approach among parks to more effectively manage and control the spread of exotic plants. This comprehensive plan improves the ability to respond to the threat of exotic plants in an effective, efficient, and timely manner that meets NPS mandates and individual park missions to protect park resources and values.

OBJECTIVES IN TAKING ACTION

Objectives are specific statements of purpose and describe what must be accomplished, to a large degree, for the plan to be considered a success. The objectives developed to guide preparation of this draft EPMP/EIS are organized under the following six categories.

PRESENCE OF EXOTIC PLANTS

- Establish priorities for exotic plants to be treated and treatment locations in parks.
- Reduce the number of individual targeted exotic plants to minimize the threat to natural resources (native habitat, plants, and wildlife).
- Reduce to the greatest extent possible the introduction of new exotic plants into parks.
- Ensure that park exotic plant management programs support, and are consistent with, south Florida ecosystem restoration goals.

CULTURAL RESOURCES

- Reconcile potential conflicts between preservation of significant cultural landscapes and removal of exotic plants.
- Preserve plants and sites valued by Native Americans and other traditional cultures while reducing the spread of exotic plant species.
- Protect archeological and historic resources while reducing the spread of exotic plant species.

OPERATIONS TO CONTROL EXOTIC PLANTS

- Conduct the exotic plant management plan so it is continually monitored and improved; environmentally safe; incorporates best management practices; and supports, and is supported by, science and research.
- Minimize unintended impacts of control measures on park resources, visitors, employees, and the public.
- Use federal resources with increased efficiency.
- Ensure that control measures are consistent with the *Wilderness Act* and *NPS Wilderness Policy*.

VISITORS AND THE PUBLIC

Increase visitor and public awareness of the impacts exotic plants have on native habitat and species and on cultural resources, building support for NPS management efforts.



GOVERNMENT PARTNERS / NEIGHBORING COMMUNITIES

Coordinate efforts with partners and neighbors (nationally and internationally) to establish compatible goals and provide assistance to achieve them.

RESTORATION

Restore and protect native plant communities in ways that allow natural processes, function, cycles, and biota to be re-established and maintained in perpetuity.

PURPOSE AND SIGNIFICANCE OF THE SOUTH FLORIDA AND CARIBBEAN PARKS

BIG CYPRESS NATIONAL PRESERVE



*Cypress stand at
Big Cypress
National Preserve*

Project Site Location

Big Cypress National Preserve encompasses approximately 720,500 acres. It is located in southwest Florida and lies in Collier, Monroe, and Miami-Dade counties (see appendix A).

Park Enabling Legislation and Purpose

Big Cypress National Preserve was established in 1974 by Public Law (PL) 93-440 to “assure the preservation, conservation, and protection of natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress watershed in the state of Florida and to provide for the enhancement and public enjoyment thereof.” The park’s enabling legislation also states that as a unit of the national park system it is to be managed in a manner that ensures its “natural and ecological integrity in perpetuity.” In April 1988, PL 93-440 was amended by PL 100-301—the *Big Cypress National Preserve Addition Act*. The addition totaled 146,000 acres and was designated the “Big Cypress National Preserve Addition.”

The enabling legislation (16 USC 6, Section 698j) also mandates that “members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the preserve and the Addition, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials.”

Park Significance

Big Cypress National Preserve is key to the survival of Everglades National Park and the integrity of the entire south Florida ecosystem. This meeting place of temperate and tropical species is a hotbed of biological diversity. The preserve

contains a mixture of pines, hardwoods, prairies, mangrove forests, cypress strands, and domes; vast remnants of vegetation types found only in the preserve's mix of upland and wetland environments; and the largest known stands of dwarf cypress. White-tailed deer, bear, and Florida panther can be found in the preserve, along with the more tropical tree snail (*Liguus*), royal palm, and cigar orchid. Big Cypress provides habitat for 34 animal and plant species receiving special protection or recognition by the state of Florida, the United States, or the Convention on International Trade in Endangered Species.

BISCAYNE NATIONAL PARK

Project Site Location

Biscayne National Park is located in southeast Florida, in Biscayne Bay and the offshore waters along the Atlantic coast. The park is located in Miami-Dade County, south of the city of Miami, and encompasses almost 173,000 acres, of which nearly 165,000 acres are water (see appendix B).

Park Enabling Legislation and Purpose

Biscayne National Park was established by Congress in 1968 as Biscayne National Monument (PL 90-606). The boundaries were expanded in 1974 "to add approximately 8,738 acres of land and water, including all of Swan Key and Gold Key" (PL 93-477). In 1980 the boundaries were again expanded to create its current size of 173,000 acres, and Biscayne National Monument was designated Biscayne National Park "to preserve and protect for the education, inspiration, recreation, and enjoyment of present and future generations a rare combination of terrestrial, marine, and amphibious life in a tropical setting of great natural beauty." (PL 96-287). Congress also directed the NPS to "manage this area in a positive and scientific way in order to protect the area's natural resource integrity."

Park Significance

Biscayne National Park is the largest marine park in the national park system, with 95% of its 173,000 acres covered by water. The park's waters contain unique marine habitats and nursery environments capable of sustaining diverse and abundant native fisheries. The park marks the northernmost extent of fragile and dynamic Florida coral reefs and coastal systems characterized by transitions in the physical and biological environment. In addition to the coral reefs, the park contains keys, estuarine bays, and mangrove coastal areas that are integral parts of the south Florida ecosystem, providing a place where diverse temperate and tropical species mingle, including largely undisturbed populations of tropical and subtropical plants.

The diversity and complexity of natural and cultural resources in the park provide a dynamic laboratory for education and scientific research. The park's cultural history is linked to the natural environment, and the submerged and terrestrial resources represent a rich history of diverse cultures from prehistoric times to today. Park visitors are offered opportunities to observe an abundance of

resources, experience a multitude of recreational activities, or simply enjoy the park for the tranquility and solitude it offers.

CANAVERAL NATIONAL SEASHORE

Project Site Location

Canaveral National Seashore is made up of nearly 60,000 acres located on a barrier island along Florida's central Atlantic coast. The park consists of the North and South Districts and the Seminole Rest Site. The North District and Seminole Rest Site lie in Volusia County, while the South District lies in Brevard County near Titusville (see appendix C).

Park Enabling Legislation and Purpose

Canaveral National Seashore was established by PL 93-626 on January 3, 1975, "to preserve and protect the outstanding natural, scenic, scientific, ecologic, and historic values of certain lands, shoreline, and waters of the State of Florida, and to provide for public outdoor recreation use and enjoyment of the same."

Park Significance

Canaveral National Seashore is on a barrier island that includes ocean, beach, dune, hammock, lagoon, salt marsh, scrubland, and pine flatwood habitats. The barrier island and adjacent waterways offer a blend of plant and animal life. Records show that 1,045 species of plants and 310 species of birds can be found in the park. The national seashore is home to 15 federally listed threatened or endangered wildlife species including, loggerhead, green, and leatherback sea turtles (over 4,000 sea turtles nest in the park each year); West Indian manatee; bald eagle; wood stork; eastern indigo snake; and Florida scrub jay. Canaveral National Seashore has 98 known cultural sites; some may prove to be of tremendous significance in Florida, such as sites from the period of the conflict between Spain and France for the control of colonial Florida.



Mosquito Lagoon

Mosquito Lagoon is part of the larger Indian River lagoon which contains one of the highest diversities of species of in North America and is listed as an Estuary of National Significance under the Environmental Protection Agency's National Estuary. In addition, Mosquito Lagoon provides critical habitat for the West Indian manatee, juvenile sea turtles, and Atlantic salt marsh snake. The lagoon also supports a nationally recognized commercial and recreational fishery that includes finfish and shellfish.

DRY TORTUGAS NATIONAL PARK

Project Site Location

Dry Tortugas National Park includes seven islands composed of coral reefs and sand and the surrounding shoals and water which encompasses 64,701 acres; it is located approximately 70 miles west of Key West, Florida, in Monroe County (see appendix D).

Park Enabling Legislation and Purpose

In 1935, President Franklin Roosevelt set aside Fort Jefferson and the surrounding waters as a national monument. Congress redesignated the area as Dry Tortugas National Park in 1992 “to (a) protect and interpret a pristine subtropical marine ecosystem, including an *intact* coral reef community; (b) to protect fish and wildlife, including (but not limited to) loggerhead and green sea turtles, sooty terns, frigate birds, numerous migratory bird species; (c) to protect the pristine natural environment of the Dry Tortugas group of islands; (d) to preserve and protect submerged cultural resources; and (e) in a manner consistent with the above, provide opportunities for scientific research” (PL 102-525).

Park Significance

Dry Tortugas National Park is a unique area of the national park system and the least disturbed portion of the Florida Keys coral reef ecosystem. The tropical coral reef of the Dry Tortugas is one of the best developed on the continent and possesses a full range of Caribbean coral species, some of which are rare elsewhere.

The national park provides outstanding opportunities to understand and experience a rare combination of near-pristine natural resources and historic, scientific, and exceptional marine resources, in addition to quiet remoteness and peace in a vast expanse of sea and sky.

The park is an important resting spot for migrating birds, providing unique opportunities to see tropical birds. It has the only significant sooty and noddy tern nesting colonies in the country (Bush Key) and the only frigate bird nesting colonies in the continental United States (Long Key). The park is also one of the most isolated and least-disturbed habitats for endangered and threatened sea turtles in the United States.

Fort Jefferson, on Garden Key, is the park’s central cultural feature and the largest 19th century American coastal fort of military and architectural significance. Also on this key are the ruins of the first marine biological laboratory in the Western Hemisphere—the Carnegie Institution of Washington, D.C. Marine Biological Laboratory. Historic Loggerhead Key lighthouse and historic Garden Key harbor light are also located in the park.



EVERGLADES NATIONAL PARK

Project Site Location

Everglades National Park is located in south Florida, spanning the southern tip of the Florida Peninsula and most of Florida Bay. The 1,509,000-acre park lies in portions of three counties: Miami-Dade, Monroe, and Collier (see appendix E).

Park Enabling Legislation and Purpose

Everglades National Park was established in 1947 to be “wilderness where no development . . . or plan for entertainment of visitors shall be undertaken which would interfere with the preservation of the unique flora and fauna of the essential primitive natural conditions now prevailing in the area.” An additional 109,506 acres were added to the East Everglades portion of the park under the *Everglades National Park Protection and Expansion Act of 1989* (PL 101-229). Title 16, Chapter 1, of the U.S. Code outlines rights of the Seminole Indian Tribe by stating: “...nothing in sections 410 to 410c of this title shall be construed to lessen any existing rights of the Seminole Indians which are not in conflict with the purposes for which the Everglades National Park is created.”

Park Significance

Everglades National Park is the largest designated subtropical wilderness reserve on the North American continent. The park contains both temperate and tropical plant communities and marine and estuarine environments. Its vast subtropical upland and marine ecosystems include freshwater marshes, tropical hardwood hammocks, rock pinelands, sawgrass prairies, extensive mangrove forests and cypress swamps, and seagrass ecosystems that support world-class fisheries. The park is known for its rich bird life, particularly large wading birds such as the roseate spoonbill, wood stork, great blue heron, and a variety of egrets. It is also the only place in the world where alligators and crocodiles exist side by side.

The park is the only place in the United States designated as a World Heritage Site, an International Biosphere Reserve, and a Wetland of International Importance. The park provides sanctuary for more than 20 federally listed and 70 state-listed rare, threatened, and endangered species, and foraging and breeding habitat for over 400 species of birds. It is home to world-renowned wading bird populations and a major corridor for migratory bird populations.

Everglades National Park contains important natural and cultural resources of Florida Native Americans: Miccosukee Tribe of Indians of Florida, Independent Traditional Seminole Nation of Florida, Seminole Tribe of Florida, and the Seminole Nation of Oklahoma. The park’s archeological and historical resources span 3,000 years of human culture. Its prehistoric sites reveal a fishing-hunting-gathering adaptation to a tropical environment (unique in the continental United States). The park has structures from a Nike missile installation constructed in the early 1960s as a part of south Florida’s Cold War defenses.



BUCK ISLAND REEF NATIONAL MONUMENT

Project Site Location

Buck Island Reef National Monument consists of approximately 19,015 land and water acres north of the island of St. Croix in the U.S. Virgin Islands (see appendix F).

Park Enabling Legislation and Purpose

Buck Island Reef National Monument originally consisted of approximately 180 acres of land and 700 acres of water. It was established by presidential proclamation as a national monument in 1961 for the purpose of “protecting Buck Island and its adjoining shoals, rocks, and undersea coral reef formations” and to preserve “one of the finest marine gardens in the Caribbean Sea” for the benefit and enjoyment of the people and to protect it from “despoliation and commercial exploitation.” Under the U.S. Coral Reef Initiative, the monument was expanded in 2001 to include submerged lands totaling 19,015 acres, to bring into the monument “additional objects of scientific and historic interest, and provide necessary further protection for the resources of the existing monument.”

Park Significance

The park is one of only a few fully protected marine areas in the national park system. The island and surrounding coral reef ecosystem support a large variety of native plants and animals. Buck Island provides nesting habitat for three endangered and one threatened species: hawksbill turtle, leatherback turtle, brown pelican, and green turtle and potential habitat for the endangered St. Croix ground lizard. The elkhorn coral barrier reef that surrounds two-thirds of the island has extraordinary coral formations, deep grottoes, abundant reef fishes, and sea fans, and the famous underwater trail is at the eastern-most point of the reef. The island contains terrestrial plants and animals and cultural artifacts.

CHRISTIANSTED NATIONAL HISTORIC SITE

Project Site Location

Christiansted National Historic Site is located on the island of St. Croix in the U.S. Virgin Islands and consists of 7 acres on the Christiansted waterfront/wharf area (see appendix G).

Park Enabling Legislation and Purpose

Christiansted National Historic Site was established through the initiative of concerned local citizens and through a series of agreements between the government of the Virgin Islands and the NPS “to preserve the historic integrity of the structures and ground as an excellent example of the Danish economy and way of life in the Virgin Islands for the enjoyment of present and future generations.” On March 4, 1952, the Department of the Interior and the government of the Virgin Islands entered into a memorandum of agreement that established the Virgin Islands National Historic Site to preserve the wharf area



and related buildings as fine examples of the town's economy and way of life in Danish times. The name of the park was changed in 1961 to Christiansted National Historic Site under a new memorandum of agreement.

*Christiansted National
Historic Site*

Park Significance

Christiansted National Historic Site, consisting of 7 acres centered on the Christiansted waterfront/wharf area, offers a glimpse at a unique part of America's heritage. The park's significance centers on its five historic structures that provide excellent examples of Danish economy and way of life in the Virgin Islands: Fort Christiansvaern (1738), the Danish West India & Guinea Company Warehouse (1749), the Steeple Building (1753), the Danish Custom House (1844), and the Scale House (1856). The site contains the oldest and largest former slave-trading complex under the U.S. flag.

The NPS uses these resources to interpret the drama and diversity of the human experience at Christiansted during Danish sovereignty—colonial administration, the military and naval establishment, international trade (including the slave trade), religious diversity, architecture, trades, and crime and punishment.

SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE

Project Site Location

The park totals 1,015 acres and is located on the island of St. Croix in the U.S. Virgin Islands (see appendix H).

Park Enabling Legislation and Purpose

Salt River Bay National Historic Park and Ecological Preserve was established by Congress in 1992 "to preserve, protect, and interpret for the benefit of present and future generations certain nationally significant historical, cultural, and natural sites and resources in the Virgin Islands" (PL 102-247).

Park Significance

Salt River Bay National Historic Park and Ecological Preserve has been a National Natural Landmark since February 1980. Salt River Bay contains nationally significant wildlife habitat that supports threatened and endangered species. The area's blend of sea and land holds some of the largest remaining mangrove forests in the Virgin Islands, as well as estuary, coral reefs, and a submarine canyon.

Inhabited possibly as far back as 2000 B.C., Salt River Bay encompasses all major cultural periods of human habitation in the Virgin Islands. The park contains prehistoric and colonial-era archeological sites and ruins, plus village middens and burial grounds that provide evidence of Caribbean life before

Columbus. It is the only known site where members of the Columbus expeditions set foot on what is now U.S. territory.

The park not only provides outstanding opportunities to interpret Caribbean history and culture, but it reveals the impact of European exploration and settlement. It was the focal point of various European attempts to colonize the area during the post-Columbian period. The park contains sites of Spanish, French, Dutch, English, and Danish settlements, including Fort Sale, one of the few remaining mudwork fortifications in the Western Hemisphere. The park also has the only ceremonial ball court ever discovered in the Lesser Antilles.

VIRGIN ISLANDS NATIONAL PARK

Project Site Location

Virgin Islands National Park covers approximately 14,690 acres in the U.S. Virgin Islands—approximately 60% of the island of St. John, nearly all of 135-acre Hassel Island in the Charlotte Amalie harbor off the island of St. Thomas, 6 acres in the Red Hook area, and 4 acres at the Wintberg estate on St. Thomas (see appendix I).

Park Enabling Legislation and Purpose

Virgin Islands National Park was established in 1956 so its outstanding scenic values and features of national significance would be “be administered and preserved . . . in their natural condition for public benefit and inspiration.” (70 U.S. Statutes [Stat.] 746). The park was expanded in 1962 (76 Stat. 746) to include an additional 5,650 acres of adjoining submerged lands to preserve “significant coral gardens, marine life and seascapes.”

Park Significance

Virgin Islands National Park is renowned throughout the world for its breathtaking beauty and outstanding scenery. The park is an undeveloped sample of a tropical environment where the processes of nature can be observed, studied, and used as a base for comparing the development of natural ecosystems in similar areas. The park is composed of protected bays of crystal blue-green waters teeming with coral reef life, white sandy beaches shaded by seagrass trees, and tropical forests providing habitat for over 800 species of plants.

The park has a rich cultural history—it contains relics from the Pre-Colombian Amerindian civilization and cultural sites that are significant in the settlement and colonial development of the New World and in maritime history and commerce. The park contains the remains of Danish colonial sugar plantations and reminders of African slavery and the subsistence culture that followed during the 100 years after Emancipation.

ALTERNATIVES

Alternative A — Continue Current Management, would continue the existing management framework. The nine parks would continue to treat infestations of exotic plants on an *ad hoc* basis and through currently available funding sources. Initial treatment and re-treatment of areas in the parks would be done on an opportunistic basis when resources and funding permit. The effectiveness of treatment would continue to be documented for individual treatment events; however, a standardized monitoring protocol to determine treatment effectiveness and site resource conditions following treatment would not be employed.

Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, would apply a systematic approach that would prioritize exotic plants for treatment, monitor effects of those treatments on exotic plants and park resources, and mitigate any adverse effects to park resources as determined through the monitoring program. Initial and follow-up treatment of sites would be conducted using treatment methods that have been defined based on resource conditions. Re-treatments would occur at an optimal frequency, depending on the exotic plant species. This alternative would employ an adaptive management strategy, using the results of monitoring to adjust treatment methods or mitigation methods to reach the desired future condition of treated areas in the parks. The effectiveness of efforts to control exotic plant invasion or native habitats would increase as a result of uniform recording and storage of information acquired during monitoring and sharing of that information among the nine park units.

Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants, would augment the systematic approach integral to alternative B, but would add an active restoration program to enhance the return of native species to treated areas in selected high-priority areas. The difference between alternatives B and C lies in the restoration plan, with some alterations to the monitoring plan and the criteria used to determine success of treatment. Under alternative C, a decision tool would be applied to determine areas that are appropriate for active restoration, which would occur in park areas that have been previously disturbed and in areas with potential threatened and endangered species habitat or sensitive vegetation communities where a more rapid recovery would be desirable. Restoration could be accomplished using native seeds, planting plants at various growth stages (such as seedlings or trees), and by more extreme measures such as soil removal to change the water level of an area and to remove the exotic seed bank. The active restoration approach for a given treatment area would be determined based on a site-specific evaluation. Other areas in the parks would recover passively as described in alternative B. If, however, monitoring reveals that recovery is not meeting objectives in areas identified for passive restoration, then active restoration may be implemented.

PREFERRED AND ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will promote the *National Environmental Policy Act*, as expressed in Section 101 of the act. The preferred alternative and the environmentally preferred alternative is alternative C. This best protects the biological and physical environment by effectively and rapidly reducing the level of exotic plant infestation, reducing the level of threat to non-target resources during plan implementation, and restoring to the greatest extent the native vegetation category.

The preferred alternative is Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants.

ISSUES AND IMPACT TOPICS

Issues are problems, opportunities, and concerns regarding the current and potential future management of exotic plants in the nine national parks. Issues were identified by NPS, other federal agencies, state and territorial agencies, and the public throughout the scoping process. The impact topics were derived from the issues and were used to examine the extent to which the exotic plant problem would be made better or worse by the actions of a particular alternative (the environmental consequences of an alternative).

The issues include those that are general to the plan and are related to multiple topics and those that are impact topic specific.

GENERAL ISSUES

Native plants and animals and their habitats may be directly affected by methods used to treat exotic plants.

Exotic plants may be further spread by the activity associated with the treatment effort.

Some exotic plants increase fuel loads and produce chemicals that alter the fire regime of a system.

Mechanical treatments and treatment site access involving large machinery may result in soil compaction and rutting (which may alter the flow of water across the landscape) and in trampling or loss of native plants.

Removal of exotic plants by any treatment method may alter the viewshed (scenery), with resultant impacts on wilderness value, visitor use and experience, or cultural landscapes.

Controlling exotic plants in parks presents a positive environmental education opportunity.

Removal of exotic plants by any treatment method exposes areas to invasion by other exotic plants.



ISSUES SPECIFIC TO EACH IMPACT TOPIC

Native Plants / Vegetation Categories

Many species of exotic plants often have faster growth rates than native plants, enabling them to out-compete native species for essential resources. Exotic plants also displace native plants by shading, altering soil properties, and allelopathy.

Water Quality and Hydrology

The presence of exotic plants in aquatic systems may reduce or deplete water levels or alter runoff patterns and increase soil erosion, thus diminishing water quality.

Mechanical Treatment and Access. The removal of exotic plants by mechanical methods may lead to soil erosion, degrading water quality.

Chemical Treatment. The introduction of herbicide compounds into the water from terrestrial treatment of exotic plants may affect water quality.

Special Status Species

Exotic plants can alter habitat, food availability, and behavior of threatened and endangered species.

Exotic plants compete with native threatened and endangered plants by altering habitat.

Treatment methods to remove exotic plants, and the presence of humans and machinery to implement treatments, may interfere with threatened and endangered species' nesting and foraging behavior or may remove or alter critical habitat.

Wildlife and Wildlife Habitat

The presence of exotic plants could change foraging patterns, change predator and prey interactions, displace native wildlife species, and alter wildlife habitat, including breeding areas.

The removal of some exotic plants may directly reduce the nonnative food source for many birds.

Prescribed Fire and Mechanical Treatments. Prescribed fire and mechanical treatments of exotic plants may remove wildlife habitat used for nesting or cover for roosting.

Chemical Treatment. There is potential for wildlife to be directly exposed to chemicals during preparation and application of herbicides. Treatment of exotic plants with chemicals potentially may affect fish and aquatic invertebrates.

Access. The presence of humans and use of machinery for treating exotic plants may alter wildlife behavior, disrupt mating activities, and damage nests or eggs.

Essential Fish Habitat

The presence of exotic plants adjacent to areas of essential fish habitat can indirectly alter the habitat.

Mechanical Treatment. Mechanical treatments may result in increased turbidity, sedimentation, or nutrient levels, such as phosphorous or nitrogen, altering essential fish habitat.

Chemical Treatment. Chemicals entering the water as a result of herbicide treatment of exotic plants may alter habitat suitability for fish.

Access. Access to treatment areas may result in increased turbidity or result in direct physical damage, as from propellers, to essential fish habitat.

Wilderness

Exotic plant treatments can create unnatural features (such as chain-sawed trunks or stands of dead plants) that alter the visual landscape in wilderness areas. Monotypic stands (stands of the same species) of exotic plants do not impart the same sense of wilderness as diverse natural habitat.

Mechanical Treatment. Noise and visual intrusion during treatments may reduce wilderness character.

Soils

Exotic plants can affect soil integrity or quality through erosion and changes to soil chemistry.

Prescribed Fire. Excessive use of fire can rapidly oxidize soils, and rapid oxidation reduces the nutrients and organic materials in the soils, thereby lowering soil productivity.

Mechanical Treatment. Mechanical treatment of exotic plants may cause erosion, compaction, or other soil disturbance that could promote the establishment of additional exotic plants.

Chemical Treatment. Some herbicides used to treat exotic plants can remain in soil, which degrades soil quality.

Air Quality

Some exotic plant treatments can degrade air quality; for example, the exhaust from mechanized equipment used to access treatment sites and to treat the sites can cause local degradation of air quality, as can the prescribed fires used for exotic plant removal.

Soundscapes

During exotic plant treatments, the natural soundscapes can be adversely affected by noise from workers, equipment, or heavy machinery used to implement treatment methods.

Cultural Resources

The displacement of native plants by exotic plants may alter the cultural landscape by crowding out plants linked to prehistoric or historic use of an area. Conversely, some exotic plants may be a contributing element of a historic landscape, and their removal would diminish the significance of that landscape.

The physical destruction of historic structures can be accelerated if the roots of exotic plants penetrate foundations and walls. Sometimes, though, exotic plants may aid in the stabilization of historic structures by reducing soil erosion in the area or by supporting unstable ruins.

Treatment methods to control exotic plants could result in the removal of plant species of traditional or cultural value.

Management techniques to remove exotic plants may negatively alter the cultural landscape by associated physical damage to other plantings and landscape structures. Management actions to remove exotic plants may uncover historic or archeological resources, which may result in damage or loss of artifacts and features due to erosion, exposure to the environment, and unauthorized collection.

Visitor Use and Experience

The presence of exotic plants in the national parks may lead some park visitors to believe that the NPS is not fulfilling its mandate to protect and preserve park resources.

Exotic plants alter the natural landscape and may impact the viewshed and visitor experience of the park.

Some visitors may be opposed to the use of chemical treatments on exotic plants.

Public Health and Safety

The presence of exotic plants may pose a health risk to park visitors, staff, or area residents.

The treatment of exotic plants may also present health and safety risks to workers, park visitors, and area residents.

Prescribed Fire. The use of fire to treat exotic plants may damage property and pose a safety risk to people.

Chemical Treatment. Chemicals used to control exotic plants may enter the groundwater and have adverse effects on public health and safety.

People in or near exotic plant-treatment areas may be accidentally exposed to herbicides.

Management and Operations

The burden on NPS staff and resources to control exotic plants has grown with the increasing presence of the plants and the need to treat these species.

Treatment activities, especially fire may prohibit access to areas of the park, which may disrupt or hinder other park activities. In addition, heavy machinery used for mechanical control of exotic plants can damage park roads and infrastructure.

ENVIRONMENTAL CONSEQUENCES

Impacts of the exotic plant management alternatives were assessed in accordance with *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis and Decision Making*. This handbook requires that impacts on park resources be analyzed in terms of their context, duration, and intensity. The analysis provides the public and decision-makers with an understanding of the implications of exotic plant management actions in the short and long term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists.

For each impact topic, methods were identified to measure the change in the parks' resources that would occur with the implementation of each exotic plant management alternative. Thresholds were established for each impact topic to help understand the severity and magnitude of changes in resource conditions, both adverse and beneficial.

Each exotic plant management alternative was compared to a baseline to determine the context, duration, and intensity of resource impacts. The baseline is the condition that resulted from management of exotic plant management under the current management framework and assumes that all exotic plants would be treated within the planning period using similar methods and decision processes to those presently used. The baseline is represented by alternative A.

Table ES-1 provides a summary of the elements that make up each of the alternatives. Table ES-2 shows how the alternatives meet the objectives. Table ES-3 summarizes the results of the impact analysis for the impact topics that were assessed. The analysis considered a 10-year period from the end of 2006 through 2016.

TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Wilderness and Minimum Requirements Analysis (Minimum Tool)	Exotic plant control involving mechanized equipment would take place within designated wilderness in Everglades National Park. A minimum tool analysis would be conducted prior to implementation of each project or year's program per the NPS Wilderness Policy.	Exotic plant control involving mechanized equipment would take place within designated wilderness in Everglades National Park. A minimum tool analysis would be conducted prior to implementation of each project or year's program per the NPS Wilderness Policy.	Exotic plant control and restoration activities involving mechanized equipment would take place within designated wilderness in Everglades National Park. A minimum tool analysis would be conducted prior to implementation of each project or year's program per the NPS Wilderness Policy.
Adaptive Management	No standard adaptive management program is in place for exotic plant control. Park staff have altered treatment methods when it was determined that treatment success was low or non-target species damage was occurring.	Establish a standard adaptive management program for controlling exotic plants. Adaptive management would be used to guide exotic plant control activities, while drawing on the best available science, emergent technologies, and an increasing database on the effectiveness of treatment methods and the effects of exotic plant treatment on park resources.	Establish a standard adaptive management program for controlling exotic plants and restoring native vegetation. Adaptive management would be used to guide exotic plant control and restoration activities, while drawing on the best available science, emergent technologies, and an increasing database on the effectiveness of treatment and restoration methods and the effects of exotic plant treatment and restoration efforts on park resources.
Determination of Subsequent Compliance	Currently, each park unit determines the appropriate level of compliance based on interdisciplinary team evaluation and through use of an environmental screening form.	Develop a standard compliance determination pathway and environmental screening form specific to control of exotic plants.	Same as alternative B.
General Concept			
Exotic Plant Management Program	Under this alternative, the parks would continue to manage exotic plants using a variety of physical, mechanical, chemical, and biological methods. Currently, much of what drives decisions for treatment is available funds, focusing on periodic treatment to remove exotic plants and then returning to re-treat (maintain) a site so that exotic plants are controlled.	Under alternative B, staff would continue to treat areas of the park infested with exotic plant species that have not been previously treated. Those areas that have been treated for exotic plants in the past would be monitored for the effectiveness of the control method on reducing exotic plant density and distribution and for the rate of return of native species into the area. Re-treatment of sites would occur as needed.	Under alternative C, the parks would continue to treat areas of the park infested with exotic plant species. Those areas that have been treated for exotic plants in the past would be re-treated and maintained to control the reoccurrence of exotic plant species. The monument would also continue to survey the island for new infestations. Staff would monitor the

TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY (CONTINUED)

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
General Concept (continued)			
Exotic Plant Management Program (continued)	There currently is no formal program to treat exotic plants in Christiansted National Historic Site, Salt River Bay National Historic Park and Ecological Preserve, or Virgin Islands National Park. However, those parks would follow the direction of the EPMT.	The program would also enhance cooperation with other agencies to control exotic plants in areas adjacent to the park and to enhance education programs to improve the public's understanding of the impacts exotic plants have on native communities.	effectiveness of the control methods for reducing exotic plant density and distribution, the rate of return of native species into the area, and the success of replanting activities. In addition, the new program would enhance cooperation with other agencies to control exotic plants in areas adjacent to park and to increase education programs to improve the public's understanding of the impacts that exotic plants have on native communities.
Management Framework	<p>Currently parks do not have a standard management framework for prioritizing exotic plant treatment projects. Projects tend to be prioritized by the likelihood of the parks to procure additional outside funding. Under alternative A, the parks that receive funding through the EPMT would apply the EPMT priority setting protocol with the following criteria:</p> <p>The targeted exotic species for control are recognized as having a high invasive potential.</p> <p>Exotic plant species that have current technologies already established for their control are also ranked as high priority for treatment.</p> <p>The control project would benefit specific threatened or endangered species that inhabit the area or site.</p> <p>The site has a relatively high restoration potential.</p> <p>Opportunities for public involvement, and</p> <p>Park commitment to follow-up monitoring and treatment exist.</p> <p>Cooperative cost-sharing matching funds are available. This applies only to projects in Florida parks.</p>	<p>Under alternative B, treatment areas would be prioritized using a new framework to enhance protection of park resources. The following criteria were used to determine treatment priorities for existing and new areas of infestation:</p> <p>The control of exotic plants would benefit specific threatened or endangered species that inhabit the area or site and would also benefit other sensitive resources, such as cultural resources.</p> <p>The control of exotic plants would benefit park visitors or improve the quality of the visitor experience and appreciation of park resources.</p> <p>The site is easily accessible.</p> <p>This treatment prioritization, together with knowledge of which treatment method is most effective in achieving treatment objectives with the least impact to other resources, would guide the site-specific implementation of exotic plant control projects.</p>	Same as alternative B.



TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY (CONTINUED)

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
General Concept (continued)			
Determination of treatment methods	Treatment methods are determined based on the following criteria: Location and accessibility of the site, Whether or not the site is a cultural landscape, and Whether or not the site is within a research natural area or area containing sensitive natural resources. The following criteria are also used Site conditions, Density of the infestation, or Type of species.	Treatment methods are determined based on the same criteria as identified in alternative A. A decision tool would be used to determine the appropriate initial and follow-up treatment methods given the environmental conditions within the treatment area. The appropriate method for each site is determined by the type of potential habitat of threatened and endangered species that is present, the exotic plant species present, and in what vegetation category an infestation occurs. Use of the decision tool would further enhance protection of park resources including sensitive species within the parks by using the least invasive or damaging treatment method.	Same as alternative B.
Exotic Plant Treatments	Parks would continue to use chemical, physical, mechanical or biological treatment methods or combinations of methods to control exotic plants.	Same as alternative A.	Same as alternative A.
Implementation	Exotic plant infestation within the parks would undergo initial treatments over the next 10 years. Re-treatment of sites would occur on an opportunistic basis determined by funding and resources available. It is estimated that re-treatments would occur on average every 3 to 5 years.	Exotic plant infestation within the parks would undergo initial treatments within 3 years of implementation of the exotic plant management plan. To gain control over exotic plant infestations, re-treatments would occur using an appropriate method under an optimal schedule considering the species of exotic plants. Re-treatments would occur every 4 to 12 months dependent upon the exotic plant species and the recovery of native plants.	Same as alternative B.
Mitigation	Standard mitigations would be implemented in each park through work conducted through the EPMT to protect worker safety and for the proper storage and handling of chemicals. Parks would not implement standard mitigations for the protection of natural and cultural resources. Park specific mitigations would be implemented for protection of sensitive and cultural resources (see table 5).	In addition to the mitigations implemented under alternative A, a standard list of mitigation measures for the protection of natural and cultural resources and to further protect public health and safety would be developed and implemented for exotic plant management actions in each park (see table 13).	The mitigation measures identified under alternative B would also be implemented under alternative C. In addition, mitigation measures and best management practices have been identified for activities involving active restoration (see table 19).

TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY (CONTINUED)

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
General Concept (continued)			
Monitoring Program	<p>At individual parks, monitoring for exotic plants occurs opportunistically when re-treating sites. Formal and informal monitoring of roadsides is also conducted. At Buck Island National Monument monitors the return of exotic plants, return of native plants, and soil loss in treated areas.</p> <p>Data collection and reporting are not done systematically and vary by park.</p> <p>Regionally, through the EPMT, monitoring of exotic plants in south Florida is conducted through systematic reconnaissance flights.</p>	<p>Under alternative B, a systematic monitoring and data collection program would be developed for all parks. This program would include monitoring and collecting data regarding the following:</p> <ul style="list-style-type: none"> Extent of infestation within the parks; Effectiveness of control method on reducing the density and distribution of exotic plants; Effects of treatment on other resources; Effectiveness of mitigation measures to prevent or reduce impacts on other resources; Rate of return of native species into the treated sites; Occurrence of new areas of infestation or the presence of new exotic species; and Natural recovery rate of native species. 	<p>The monitoring and data collection program would include the same elements described under alternative B. In addition, the program would include:</p> <ul style="list-style-type: none"> Effectiveness of restoration method in achieving prescribed levels of area restoration; and Response of native fauna to restored areas.
Restoration Program	<p>Restoration of treated sites is dependent upon the natural return and growth of native species from native seed sources that naturally establish within the treated area (passive restoration).</p>	<p>Same as alternative A.</p>	<p>Restoration of some treated sites would occur passively as described under alternative A.</p> <p>Under alternative C, a decision-making tool would be applied to assist the parks in determining whether a treated site would be actively restored. The framework for determining what sites to restore and how to restore the sites would be based on the following:</p> <ul style="list-style-type: none"> The degree of infestation prior to treatment. The ability and time frame of the native system to recover on its own. Whether the treatment area is in a location with high visitor use and visibility. Whether the treatment area is in an area containing sensitive resources and if there is a desire for a faster recovery of habitat for these resources over what would



TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY (CONTINUED)

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
General Concept (continued)			
Restoration Program (continued)			<p>occur if the system were left to recover on its own.</p> <p>The level of prior disturbance to the area.</p> <p>The accessibility of the site.</p> <p>The cost to actively restore a treated site.</p> <p>Sites would be actively restored through the use of amendments, seeding, replanting, and/or physical site alteration.</p>
Education Program	<p>No educational enhancements would be included in this alternative.</p> <p>Currently park staff use the following to varying degrees:</p> <p>Signage indicating exotic plant control activities are being undertaken.</p> <p>Interpretive programs on exotic plants and treatments.</p> <p>Exhibits presented in visitor centers.</p> <p>End-of-year report provides information on the exotic plant control program.</p> <p>Informal brochures prepared on exotic plants.</p> <p>Presentations to focus groups.</p>	<p>Improvements and enhancements would occur to educate the public on the problems with exotic plants as well as what the parks are doing to control the infestation. Information would be provided as to what the public can do to prevent the establishment and spread of exotic plants.</p>	<p>Same as alternative B but would include materials and programs dedicated to explaining the importance of restoration activities and how they are being conducted within the parks.</p>
Cooperation with Other Agencies	<p>Parks would collaborate with local, state, and federal agencies in efforts to control exotic plants on a regional level. The NPS would participate in organizations such as NEWTT and the SFWMD in order to establish common goals for the control of exotic plants and for ecosystem restoration. The NPS would assist adjacent landowners by providing staff support and technical advice, and the parks would collaborate with non-government organizations and agencies to provide expert knowledge in focused sessions and field demonstrations. Through the EPMT, the NPS would also collaborate with international agencies in the control of exotic plants and exchange information.</p>	<p>The parks would continue to foster communication and collaboration between federal and state agencies, private landowners, and other agencies in an effort to build a regional front against the invasion of exotic plants as is done under alternative A.</p> <p>The parks would increase their sharing of knowledge of latest technologies and research, and providing feedback on successful management technique based on data collected from the monitoring program.</p> <p>Collaboration between NPS divisions including the inventory and monitoring program, interpretation, and cultural and natural resources specialists would be increased.</p>	<p>Same as alternative B.</p>

TABLE ES-1: ALTERNATIVES ELEMENTS SUMMARY (CONTINUED)

Element	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
General Concept (continued)			
		Exotic plant managers would also coordinate with any NPS division that plans for, contracts, oversees, or drives heavy equipment in the parks.	
Cost of Implementation	See table 8.	See table 16.	See table 21.



TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Presence of Exotic Plants				
1	Establish priorities for exotic plants to be treated and treatment locations in parks.	Partially meets the objective. The parks currently employ ranking criteria that provide guidance as parks choose the exotic plant species and infested areas to treat. However, application of the criteria is inconsistent, with some parks emphasizing the risk to threatened and endangered species, others accenting the threat to natural areas, and still others giving highest consideration to the availability of funds. Determination and prioritization of areas for re-treatment is not standardized, resulting in re-treatments occurring on an opportunistic basis.	Meets objective to a large degree. Priority setting for exotic plant treatment areas and for re-treatment projects would be standardized for the nine parks using a defined set of criteria to enhance protection of natural and cultural resources, and visitor use. Using an adaptive management approach, information gained through monitoring would enable managers to make the most effective decisions about which control methods to employ and areas to treat to best control exotic plants within each park.	Meets objective to a large degree. In addition to the outcomes under alternative B, this alternative establishes criteria to prioritize areas for active restoration. Establishing priorities for active restoration further promotes protection of natural and cultural resources, and visitor use. Using an adaptive management approach, information gained through monitoring would enable managers to make the most effective decisions about which restoration methods to employ to best facilitate the return of native plant species.
2	Reduce the number of targeted exotic plants to minimize the threat to natural resources (native habitat, plants, and wildlife).	Partially meets the objective. Parks currently treat exotic plants using chemical, mechanical, biological, and physical methods. Peer-reviewed literature, on-the-ground experience, and/or collaboration with other agencies identify effective, environmentally safe treatment strategies. Reducing the density and number of exotic plants improves native habitat for plants and animals. However, due to funding and resource constraints, treatments do not occur on an optimal schedule to successfully control all exotic plant species. No standard monitoring program is in place to determine the effect of treatment methods on natural resources or the success of mitigation measures to minimize non-target resource impacts.	Meets objective to a large degree. Parks would continue to treat exotic plants using chemical, mechanical, biological, and physical methods. Data obtained through monitoring would show the success of various treatments on each target species, allowing modification of treatment methods, as necessary, to reduce target populations more effectively, thus increasing the benefits to natural resources. Monitoring the passive recovery of treated areas would provide information about recovery of native habitat, plants, and wildlife. Monitoring would allow managers to adjust mitigation measures accordingly to enhance protection of natural resources during treatment activity.	Meets objective to a large degree. Same as alternative B; however, monitoring of passive vs. active recovery efforts would provide information about which approach is most effective for a given set of conditions. In many areas, active restoration measures would speed the return of native plant species to treated areas, simultaneously reducing the area available to exotic plants and promoting the return of natural resources. Using an adaptive management approach, methods of treatment and restoration could be adjusted to promote recovery of native habitat.

TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Presence of Exotic Plants (continued)				
3	Reduce to the greatest extent possible the introduction and establishment of new exotic plants into parks.	Partially meets the objective. An executive order prohibits planting exotic species within national parks, and project-specific measures reduce the possibility of accidentally introducing such species. In addition, superintendent compendiums identify appropriate plantings for park landscapes. Parks also participate with other agencies in programs that focus on preventing the spread of exotic plants across park boundaries. However without a standard monitoring program to allow for identification of newly established exotic plants, there is an inability to respond rapidly with treatment thereby increasing the risk of spreading within a park.	Meets objective to a large degree. In addition to the measures under alternative A, standardized monitoring would increase the probability of discovering newly introduced exotic plants before they establish extensive colonies. Monitoring protocols would be established for areas with high potential for infestation. Enhanced collaboration between parks and other land-owners to share data and information could alert all parks to the presence of a new species within the region, allowing for early implementation of appropriate preventive measures. Monitoring could also determine the relative effectiveness of various approaches for preventing introduction, allowing for more effective planning.	Meets objective to a large degree. In addition to the monitoring under alternative B, actively restored sites would be monitored for reinfestation by exotic plants, including species not yet known in the parks. Under this alternative, however, there is an increased risk of introduction of new species through seed or plants used to actively restore sites. Monitoring would allow for detection of newly established exotic plants in these areas and rapid treatment response.
4	Ensure that park exotic plant management programs support, and are consistent with, south Florida ecosystem restoration goals.	Meets the objective. As a member of the Noxious Exotic Weed Task Team (NEWTT), which was established by the South Florida Ecosystem Restoration Working Group, the National Park Service has restoration goals consistent with those of the state. Big Cypress National Preserve, Dry Tortugas National Park, and Everglades National Park participate in restoration planning with the South Florida Water Management District; Dry Tortugas National Park and Everglades National Park also work on restoration issues with the Florida Exotic Pest Plant Council.	Meets objective to a large degree. Activities described under alternative A would continue; information gained through increased monitoring would allow parks to provide better-informed support for south Florida ecosystem restoration goals.	Fully meets objectives. These activities would continue as under alternative A; information gained through increased monitoring would allow parks to provide better-informed support for south Florida ecosystem restoration goals. The active restoration of lands within the parks which could include large-scale restoration projects that return areas to pre-disturbed conditions further enhances the consistency with the south Florida ecosystem restoration goals.
Cultural Resources				
5	Reconcile potential conflicts between preservation of significant cultural landscapes and removal of exotic plants	Meets objective to a large degree. All parks would continue to consult with cultural resource specialists and the State Historic Preservation Office regarding management of exotic plants within cultural landscapes to resolve any potential conflict.	Meets objective to a large degree same as alternative A.	Meets objective to a large degree same as alternative A.



TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Cultural Resources (continued)				
6	Preserve plants and sites valued by Native Americans and other traditional cultures while reducing the spread of exotic plant species.	Meets objective to some degree. Parks would continue to identify plants and sites valued by Native American and traditional cultures and would make determinations on treatment and preservation of plants on a site-by-site basis.	Meets objective to a large degree same as described in alternative A. Monitoring would improve identification of plants or sites valued by traditional cultures, enhancing the ability of parks to implement appropriate preservation measures.	Meets objective to a large degree. In addition to monitoring that would occur as described under alternative B, the potential for active restoration of sites that contain cultural resources that are important to Native American and traditional cultures would further enhance the preservation of these resources as they would be protected from the environment as well as from human activities.
7	Protect archeological and historic resources while reducing the spread of exotic plant species.	Partially meets the objective. Parks currently consult with cultural resource experts and the State Historic Preservation Office on a project-by-project basis to determine appropriate treatment methods to reduce the adverse effects to archeological and historic resources. Reducing the density and number of exotic plants also reduces the damage that exotic plants have on these resources. However, due to funding and resource constraints, treatments do not occur on an optimal schedule to successfully control all exotic plant species and damage may continue to occur in untreated areas of infestation. In addition, no standard monitoring program is in place to determine the effect of treatment methods on archeological or historic resources or the success of mitigation measures to minimize resource impacts.	Meets objective to a large degree. Parks would consult the State Historic Preservation Office under a programmatic agreement and continue to gain input from cultural resource experts to determine appropriate treatment methods to reduce the potential adverse effects to archeological and historic resources. Data obtained through monitoring would show the success of various treatments on each target species, the effect of treatment of archeological and historic resources and allowing modification of treatment methods, as necessary to reduce any adverse effects. Monitoring would also allow managers to adjust mitigation measures accordingly to enhance protection of archeological and historic resources during treatment activity. The control of exotic plants that would be achieved under this alternative would more effectively reduce or eliminate the effects of exotic plants on archeological and historic resources.	Meets objective to a large degree. Parks would consult the State Historic Preservation Office under a programmatic agreement and continue to gain input from cultural resource experts to determine appropriate treatment and restoration methods to reduce the potential for adverse effects to archeological and historic resources. In addition to monitoring that would occur as described under alternative B, the potential for active restoration of sites that contain archeological or historic resources would further enhance the preservation of these resources as they would be protected from the environment as well as from human activities. Monitoring of restoration methods would provide information about which approach is most effective to provide protection to archeological and historic resources.

TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Cultural Resources (continued)				
8	Conduct the exotic plant management plan so it is continually monitored and improved; environmentally safe; incorporates best management practices; and supports, and is supported by, science and research	Partially meets the objective. Individual parks are responsible for their own data collection, with no consistency across parks regarding what is observed or how information is used. Some parks rely on opportunistic observation by staff and visitors; others use a more systematic approach. The parks would continue to follow guidelines for storage, transportation, application, and disposal of herbicides; employ certified contractors; and use only EPA approved herbicides according to label requirements (USDA) approved biological controls to minimize environmental risks. The NPS would continue to employ best management practices when choosing treatment strategies and methods. NPS staff refer to available scientific studies and publications, and some have published articles based on their research and experiences.	Fully meets objective. This alternative would implement a standard mitigation plan for the treatment of exotic plants to be used by the nine parks. This alternative would employ a standard monitoring and data collection program that would provide information on the effectiveness of treatments, the effects on other park resources, and the return of native species. Monitoring would provide data for scientific analysis, helping parks more effectively adapt to changing conditions. Use of a decision framework to define appropriate treatment methods given various environmental parameters further reduces risk to non-target resources. Park personnel would also provide access to other agencies and entities of the findings that result from management actions and could also submit their findings to peer-review publications, expanding the pool of knowledge available to researchers and managers in the field.	Fully meets objective. In addition to the activities under alternative B, monitoring of active restoration efforts would provide additional information that would allow parks to continually improve exotic plant management and share their findings with others in the discipline.
9	Minimize unintended impacts of control measures on park resources, visitors, employees, and the public.	Meets the objective to a large degree. Park staff employ mitigation measures to protect health and safety and park resources. Park personnel and contractors working on exotic plant control must have proper training and licensing to handle herbicides. Training involves identifying and establishing methods for protecting non-target plant species through proper herbicide application methods. The EPMT handbook provides additional safeguards for personnel performing treatments. Parks use signage or brochures to inform the public about treated areas. EVER employs mitigation measures to reduce impacts on wilderness and species of special concern.	Fully meets the objective. In addition to mitigations employed under alternative A, a standard set of mitigation measures would be implemented that includes guidance about types of measures required for various treatments to protect resources, visitors, employees, and the public. Use of a decision framework that identified appropriate treatment methods given consideration of various environmental parameters further minimizes the potential for unintended impacts. Monitoring would include the effectiveness of mitigation measures. Through adaptive management, management actions and mitigation measures would be adjusted if monitoring results show unintended impacts were occurring.	Fully meets the objective. In addition to the measures under alternative B, parks would ensure that seed stock or plants for replanting are consistent with native plant varieties and monitoring would reduce the potential for establishment of new exotic plants.





TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Operations to Control Exotic Plants (continued)				
10	Use federal resources with increased efficiency.	Meets the objective to some degree. At present, parks rely primarily on NPS funds and Florida matching funds, giving attention to projects that seem likely to gain funds from other sources as well. Contract laborers trained in identification and treatment of exotic plants perform most field operations also increases efficiency.	Meets the objective to a large degree. Monitoring would enable managers to determine the most cost-effective approaches using available funds. Re-treatment on an optimal schedule would reduce future costs increasing efficiency.	Meets the objective to a large degree. Comparison of active vs. passive restoration would show the most cost-effective techniques for the return of native vegetation under given conditions. With active restoration of sites there would also be a slight decline in amount of labor and materials needed over time compared to alternative B.
11	Ensure that control measures are consistent with the <i>Wilderness Act</i> and <i>NPS Wilderness Policy</i> .	Meets the objective to some degree. Treatment in wilderness or proposed wilderness areas is conducted after completion of a minimum tool requirement analysis to determine the least intrusive method. In addition, the park botanist monitors treated areas and receives feedback from park staff to confirm compliance with wilderness policy. New projects proposed in wilderness areas consider information gained through such monitoring. However, without implementation of an optimal re-treatment program, exotic plants would continue to infest wilderness areas, degrading wilderness values and resources, and would require over the long-term, the use of intensive and intrusive methods within wilderness.	Fully meets the objective. Management actions would be conducted after completion of a minimum tool requirement analysis. Data would be collected to monitor the effects of treatment methods on wilderness resources and values, and methods would be adjusted to minimize any unintended impacts. The reduction of exotic plant infestation to a maintenance level of control and the reduction in need of mechanized equipment over the long-term would be consistent with the <i>Wilderness Act</i> and the <i>NPS Wilderness Policy</i> .	Fully meets the objective as described under alternative B, however, the benefits to wilderness as a result of active restoration of sites would occur more rapidly under this alternative.

TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Visitors and the Public				
12	Increase visitor and public awareness of the impacts exotic plants have on native habitat and species and on cultural resources, building support for NPS management efforts.	Meets objective to some degree. Most parks use one or more measures to inform the public and to encourage public involvement. Interpretive programs and displays in visitor centers include information about the threat posed by exotic plant species. Outreach also involves distributing brochures, submitting news releases and articles, presenting lectures to organizations, including information about exotic plants in annual reports and park newsletters, and hosting focus-group meetings. Cooperation with other government agencies, environmental organizations, and native plant societies provides information to a broader audience.	Fully meets objective. Educational materials and programs would be enhanced under this alternative. Information gained through monitoring could be added to the information distributed to the public using the methods described under alternative A, which would help increase public awareness of the issues and build additional support for NPS responses to those issues. Monitoring could also include surveys to gauge visitor reaction to exotic plant management efforts, and could help determine which outreach techniques are most effective.	Fully meets objective. In addition to the efforts under alternative B, public education would also include information about active restoration efforts and their effects.
Government Partners / Neighboring Communities				
13	Coordinate efforts with partners and neighbors (nationally and internationally) to establish compatible goals and provide assistance to achieve them.	Meets objective to some degree. The National Park Service collaborates with federal, state, and local agencies to establish common goals for treating exotic plants and to set priorities for funding exotic plant control efforts. EPMT and park staff member provides expertise and treatment assistance to neighboring agencies and landowners. EPMT staff share information about exotic plant control with representatives from other nations and territories.	Meets this objective to a large. Expanded monitoring of treatment and mitigation would provide information that would allow park staff to give more effective advice and assistance to neighboring agencies and landowners. Park personnel could share their findings with partners and neighbors directly and through peer-reviewed publications.	Fully meets this objective. Increased knowledge about the effectiveness of active vs. passive restoration efforts would permit improved cooperative goal setting and better enable the parks to achieve those goals with partners and neighbors.



TABLE ES-2: ANALYSIS OF HOW ALTERNATIVES MEET OBJECTIVES (CONTINUED)

	Objectives	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Restoration				
14	Restore and protect native vegetation categories in ways that allow natural processes, function, cycles, and biota to be re-established and maintained in perpetuity.	Meets objective to some degree. The parks' focus in the field is on treatment, relying on passive return of native plants to treated areas through natural reseeding or re-establishment from adjacent areas. Treatment however does not occur on a frequent enough basis to allow for success in treating all exotic plant species within the parks and therefore restoration of native vegetation in treated sites is not ensured.	Meets objective to a large degree. The integrated inventory and monitoring program would acquire information about the rate of return of native plant species as a function of the type of treatment and the mitigation measures used, allowing parks to determine actions that would best promote the return of native plant species. This, in turn, would help the parks modify exotic plant management methods to continuously improve responses and allow for the greatest recovery of native vegetation. Treatment under an optimal schedule of all treated sites would ensure recovery of native vegetation.	Fully meets this objective. This alternative would ensure recovery of native vegetation to treated sites more rapidly than other alternatives. In addition, park resource managers would have the ability to direct the type of native vegetation to be restored to enhance the restoration of native systems that could not occur through passive restoration. Monitoring would provide information to allow comparisons of the effectiveness of active vs. passive restoration, further improving re-establishment and maintenance of natural conditions.

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Native Plants / Vegetation Categories	<p>Under alternative A, all areas of exotic plant infestation would be treated by current methods. The continued application of currently used chemicals in all native vegetation categories would result in long-term negligible adverse impacts because of the accuracy of application and the low impact on nontarget vegetation. Mechanical methods would result in long-term negligible to minor adverse impacts, and there would be temporary adverse impacts from foot traffic and vehicular access resulting from trampling of undergrowth and breaking of branches. This impact would be local and negligible to minor. When prescribed fire is used as a prescribed fire, it is used in formerly infested vegetation categories. Adverse impacts to native vegetation categories would be negligible because they are fire-adapted.</p> <p>Removing exotic vegetation restores the biological integrity and biodiversity of native vegetation categories. Under alternative A, exotic plants would be controlled, but native vegetation categories would not be fully restored. Long-term minor to major beneficial impacts would result in those parks with large areas of shrubland, upland dry / mesic forest, and sawgrass marsh / wet prairie / freshwater marsh where infestation is high. In grasslands, mangrove, coastal marsh, beach / dune, and wetland forests, where infestation and reductions in biodiversity are less predominant, there would be long-term, negligible to moderate beneficial impacts.</p> <p>The exotic plant management actions would contribute to reducing regional long-term cumulative adverse impacts to a moderate level. Alternative A would not produce major adverse impacts that would result in impairment of native plants and vegetation categories in the parks.</p>	<p>The treatment methods under alternative B are the same as those described in alternative A but with an increased frequency, occurring at a minimum of every 6 months for 5 or 6 years or until the exotic plants are under control. However, with mitigation measures implemented, and the monitoring and adaptive management program in place, the potential adverse impacts on native plants and natural vegetation categories would be avoided or minimized, and adverse impacts would be direct, local, short term, and negligible to minor. The benefits of the plan proposed as alternative B would be direct, long term, regional, and minor to major.</p> <p>Cumulative impacts would be the same as alternative A. Alternative B would not produce major adverse impacts that would result in impairment of native plants and vegetation categories in the parks.</p>	<p>The implementation of treatment methods under alternative C would have the same negligible to minor adverse impacts as alternative B. The active restoration of native vegetation categories reduces or prevents the potential for re-infestation of exotic plants. This would result in long-term minor to major beneficial impacts.</p> <p>Cumulative impacts would be the same as alternative A. Alternative C would not produce major adverse impacts on native plants and would not result in impairment of native plants and vegetation categories.</p>

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Soils	<p>In Big Cypress National Preserve and Everglades National Park, using prescribed fire would produce localized, beneficial, and negligible to minor impacts on soils as deep litter layers are removed, nutrients are recycled, and soil function is enhanced by this natural process.</p> <p>Mechanical pulling of saplings occurs in all parks, and removal of small plants would produce site-specific, short-term, negligible adverse, impacts on soil resources from very limited surface disturbance. During cut and mulch activities, the use of large chipping equipment and trucks would produce site-specific, short-term, minor, adverse impacts on soils from compaction and surface disturbance.</p> <p>The continued use of herbicides to treat exotic plant infestations would produce limited adverse impacts. Due to the brief half-life of these chemicals (especially in warm, humid tropical climates), their limited ability to move through the soil and absence of adverse effects in previously treated areas, the impacts of their continued use on park soils would be localized, short term, negligible to minor, and adverse.</p> <p>Throughout the parks, there would be localized, negligible, adverse, short-term impacts on soils from crews accessing treatment sites and using equipment and vehicles during treatment. These temporary effects would result from compaction and limited surface disturbance from foot and equipment access.</p> <p>The presence of a relatively constant rate of overall exotic plant infestation in the parks would produce adverse impacts on soils that would result from altered soil chemistry, function, and loss of productivity. These impacts would be long term, localized, and negligible to minor.</p> <p>Cumulative long-term impacts would be beneficial and negligible to minor. Alternative A would not result in impairment of soil resources within the parks.</p>	<p>Accelerated treatment of exotic plant species and reduction of the total acreage of infestation in the parks would result in short-term adverse and beneficial effects and long-term benefits to park soil resources.</p> <p>Prescribed fire would produce negligible to minor, localized short-term benefits; chemical treatment using herbicides would produce localized, short-term, negligible to minor adverse impacts; and mechanical treatment would produce site-specific, negligible to minor, short-term adverse impacts on soils. These adverse effects would lessen over time as less intensive methods would be used to maintain treated sites and fewer crews are needed to perform treatments.</p> <p>Over the long term, reduction in the total acreage of exotic plant infestation and maintenance of functioning native vegetation categories would produce localized, negligible to minor, beneficial effects on soils as nutrient cycling, soil chemistry, and the natural fire regimen (or lack thereof) are returned to the system.</p> <p>Cumulative impacts would be the same as alternative A. Alternative B would not result in impairment of soil resources within the parks.</p>	<p>The effects of accelerated exotic plant treatment and scheduled, routine re-treatment and monitoring would be similar to those outlined for alternative B.</p> <p>By actively restoring native vegetation categories on previously infested sites, soils would experience localized, long-term, minor beneficial effects. The beneficial effects would be due to a return to more natural hydrologic conditions, enhanced nutrient cycling and soil chemistry, and reestablishing native microbial communities. The short-term adverse impacts of restoration efforts would be negligible to moderate, and localized.</p> <p>Cumulative long-term impacts would be beneficial and minor to moderate. Alternative C would not result in impairment of soil resources within the parks.</p>

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Water Quality and Hydrology	The impacts of exotic plant treatments on water quality and hydrology range from no effect to short term, localized, adverse, and minor . These would result from sedimentation from disturbance, erosion, and nutrient loading from use of prescribed fire and herbicide application. None of these effects would likely persist past one year.	The impacts of alternative B on water quality and hydrology range from no effect to short term, localized, adverse, and minor . The impacts would result from sedimentation from disturbance, erosion, and nutrient loading from use of prescribed fire and herbicide application. None of these impacts would likely persist beyond 1 year.	The effects of accelerated exotic plant treatment and scheduled, routine re-treatment, and monitoring would be similar to those outlined for alternative B.
Water Quality and Hydrology (continued)	The long-term effects of a relatively consistent rate of overall exotic plant infestation would range from no impact on water quality and hydrology to long-term, localized, adverse impacts of minor intensity . These impacts would result from persistence of altered nutrient loading and altered natural hydrologic regimens caused by the presence of large monotypic stands of exotic plants. Cumulative effects for South Florida parks would be minor to moderate beneficial . Cumulative effects for Dry Tortugas National Park would be short-term minor adverse . Cumulative effects for Caribbean parks would be long-term negative to minor beneficial . There would be no impairment of water quality or hydrology as a result of implementation of alternative A.	The long-term effects of reducing the overall infestation rates in the parks would vary from no effect to beneficial, long term, localized, and minor effects. These benefits would result from return to a more natural hydrologic regimen, including increased sheet flow and hydroperiod, as dense stands of exotic plants are removed and native vegetation takes their place. Cumulative effects would be the same as alternative A. There would be no impairment of water quality or hydrology as a result of the implementation of alternative B.	By restoring native vegetation categories to sites densely infested with exotic plant species, water quality and hydrology would experience long-term, localized benefits of minor intensity . These benefits would result from return to more natural hydrologic conditions and hydroperiods. Where exotic plants are dispersed throughout the native vegetation category, little restoration activity is anticipated, and no impacts on water resources would be anticipated. Cumulative effects would be the same as alternative A. There would be no impairment of water quality or hydrology as a result of the implementation of alternative C.
Special Status Species	Under alternative A, all areas of exotic plant infestation would be treated by mechanical, chemical, physical, and/or biological methods or a combination of methods. The continued application of currently used chemicals in special status species habitats would result in long-term negligible to minor adverse impacts because of the accuracy of application and the low impact and low level of toxicity on species and nontarget vegetation in their habitat. Mechanical methods would result in short-term adverse impacts from foot traffic and vehicular access that would result from trampling of undergrowth and breaking of branches. Access to sites for treatment would disturb and displace individuals of species; however, mitigation would be implemented to avoid activities during the nesting or breeding season of special status species. The adverse impacts would be local, short term, and negligible to	The treatment method proposed under alternative B are the same as those described for alternative A, but with an increased frequency occurring at a minimum of every 6 months for 5 or 6 years or until the exotic plants are under control. The adverse impacts of exotic plant treatments under alternative B on the special status species and their habitats would be the same as under alternative A. These would result from ground crew accessing special status species habitat, displacement and disturbance of individuals from noise and activity, and the use of chemical treatments, where applicable. The increased frequency of treatment would result in a greater frequency of these impacts but the intensity of effects would still be the same because mitigation measures would be combined with the monitoring and adaptive management program. This would minimize the negative impacts of more frequent	Alternative C would have short-term, adverse effects that would range from negligible to minor in intensity . These would result from ground crews accessing special status species habitat, displacement and disturbance of individuals from noise and activity, and the use of chemical treatments, where applicable. Active restoration activities would be appropriately chosen based on site-specific conditions and the presence or absence of special status species to ensure that no adverse effects occur at an intensity level greater than minor (i.e., may affect / not likely to adversely affect).



TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
	<p><i>minor</i>. Biological controls would have no adverse effect on special status species and their habitat and beneficial effects would be negligible. Prescribed fire would be used in vegetation categories and habitats that are fire-adapted. Adverse effects from prescribed fire on special status species would range depending on how adapted each species is to low-energy ground fires, and effects would range up to minor in intensity if a species needed to temporarily flee from fire activities.</p>	<p>treatments and would result in short-term, adverse impacts that range from negligible to minor in intensity.</p>	
<p>Special Status Species (continued)</p>	<p>Removing exotic plants restores the biological integrity and biodiversity of special status species habitat. Under the no-action alternative, all infested areas would be initially treated and then re-treated approximately every 3 years. Exotic plant infestations would be controlled, but habitats would not be fully restored. Benefits to special status species would range depending on the level of infestation in potential habitat and the effects exotic plants have on a particular species. Long-term moderate beneficial impacts would result in habitat where the pine rocklands special status plants exist, as well as habitat where the Southeastern beach mouse and brown pelican exist. Minor to moderate beneficial long-term impacts would result in habitat for the Atlantic salt marsh snake; minor, beneficial long-term impacts would result in habitat for the Florida semaphore cactus, St. Thomas lidflower and prickly ash, American crocodile, Eastern indigo snake, sea turtles, bald eagle, Cape Sable seaside sparrow, Everglade snail kite, Florida scrub-jay, red-cockaded woodpecker, wood stork, Miami blue butterfly, Schaus swallowtail butterfly, and Stock Island tree snail. Beneficial impacts to the Audubon’s crested caracara, piping plover, and roseate tern would range from negligible to minor. The exotic plant management actions would contribute to reducing regional long-term cumulative adverse impacts to a moderate level. There would be no impairment of special status species in the parks from implementation of alternative A.</p>	<p>Removing exotic plants would restore the biological integrity and biodiversity of special status species habitat. Under alternative B, all infested areas would be initially treated and then re-treated every 6 months. Exotic plants would be controlled, and the habitats of special status species would be more fully restored than under alternative A. Beneficial effects special status species and their habitats would vary in intensity depending on the level of infestation and how affected each species is by the presence of exotic plants. Long-term moderate to major beneficial impacts would occur to the Southeastern beach mouse because of the potential high level of exotic plant infestation. Long-term, moderate beneficial impacts would occur to habitat for the pine rockland special status plant species, brown pelican, red-cockaded woodpecker, Schaus swallowtail butterfly, and Stock Island tree snail. Long-term minor to moderate beneficial impacts would result for Florida semaphore cactus, Florida panther, American crocodile, Atlantic salt marsh snake, Eastern indigo snake, bald eagle, Cape Sable seaside sparrow, Everglade snail kite, and Florida scrub jay habitat. Lastly, long-term minor beneficial impacts would occur to the habitat of the St. Thomas lidflower and prickly pear, sea turtles, Audubon’s crested caracara, piping plover, roseate tern, wood stork, and Miami blue butterfly. Cumulative impacts would be the same as alternative A. Alternative B would not result in impairment of special status species or their habitat.</p>	<p>The active restoration of the native vegetation categories would reduce or prevent the potential for re-infestation of exotic plants and speeds restoration. This would result in long-term beneficial impacts that would range in intensity depending on the level of infestation and the amount of area restored. Alternative C would have long-term moderate to major beneficial impacts on Southeastern beach mouse and Everglade snail kite because much large portions of the infested potential habitat could undergo active restoration. Long-term moderate beneficial impacts would result for the habitat of pine rockland special status plant species, Florida panther, Atlantic salt marsh snake, Eastern indigo snake, brown pelican, Cape Sable seaside sparrow, Florida scrub-jay, red-cockaded woodpecker, Schaus swallowtail butterfly, and Stock Island tree snail. Long-term minor to moderate beneficial impacts would occur to the habitat of Florida semaphore cactus, American crocodile, sea turtles, bald eagle, and wood stork. Lastly, long-term minor beneficial impacts would occur to St. Thomas lidflower and prickly pear, Audubon’s crested caracara, piping plover, roseate tern, and Miami blue butterfly habitat. Cumulative impacts would be the same as alternative A. Alternative C would not result in impairment of special status species.</p>

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Wildlife and Wildlife Habitats	<p>Under alternative A, all areas of exotic plant infestation would be treated by current methods. The continued application of currently used chemicals in all wildlife habitats would result in short-term negligible to minor adverse impacts because of the accuracy of application and the low impact and low level of toxicity on species and nontarget vegetation in their habitat. Mechanical methods would cause trampling of undergrowth and breaking of branches and disturbance and displacement of individuals from foot traffic and motorized access and result in short-term negligible to minor adverse impacts. This impact would be local and negligible to minor. Biological controls would have no adverse effect on wildlife and wildlife habitat and may provide negligible benefits to individuals of species that feed on invertebrates. When fire is used as a prescribed fire, it would be used in native vegetation categories and wildlife habitats that are fire-adapted, and as a result, adverse impacts would be negligible to minor.</p> <p>The removal of exotic plants would restore the biological integrity and biodiversity of wildlife habitats and the native vegetation categories in which they occur. Under alternative A, exotic plants would be controlled, but habitats and native vegetation categories would not be fully restored. Long-term minor to moderate beneficial impacts would result in bird habitats due to the extensive presence of and the dependence of species such as wading birds and migratory birds on that habitat. In other wildlife habitat of mammals, reptiles, amphibians, and aquatic organisms, there would be long-term and negligible to minor beneficial impacts because of the lesser effect that exotic plants have on these species.</p> <p>The exotic plant management actions would contribute to reducing regional long-term cumulative adverse impacts to a minor level. Implementation of alternative A would not result in impairment of wildlife or wildlife habitats.</p>	<p>The treatment methodologies for alternative B are the same as those described in alternative A but with an increased frequency occurring at a minimum of every 6 months for 5 or 6 years or until the exotic plants are under control. The adverse impacts on wildlife and their habitat from treatment under alternative B would be the same as under alternative A. The increased frequency of treatment may result in some increase in the occurrences of nontarget species impacts and ground crew access impacts on wildlife species habitat. However, mitigation measures would be combined with the monitoring and adaptive management program, which would collect information to determine if the treatment methodology and frequency are appropriate to achieve desired future conditions in wildlife species habitat. This would minimize the negative effects of more frequent treatments and result in short-term negligible to minor adverse impacts.</p> <p>Under alternative B, all infested wildlife habitat would be initially treated and then re-treated every 6 months. Exotic plants would be controlled, and the habitat would be more fully restored in a shorter period of time than in alternative A. There would be long-term moderate beneficial impacts on bird habitats due to the extensive presence of habitat and the dependence of species, such as wading birds and migratory birds, on vegetation categories that are heavily affected by exotic plants. In mammal, reptile, and amphibian and aquatic habitats there would be long-term and minor to moderate beneficial impacts because of the lesser effect that exotic plants have on these species.</p> <p>Cumulative impacts would be the same as alternative A. Implementation of alternative B would not result in impairment of wildlife or wildlife habitats.</p>	<p>The implementation of alternative C would have the same negligible to minor adverse impacts as alternative B from exotic plant treatment methods and access to sites for treatment and monitoring. The active restoration of the native vegetation categories would reduce or prevent the potential for re-infestation of exotic plants and speed restoration. Active restoration areas would provide improved habitat for wildlife particularly in areas where large-scale restoration actions would take place. The overall long-term benefit to wildlife from passive and active restoration activities under alternative C would be minor to moderate.</p> <p>Cumulative impacts would be the same as alternative A. Implementation of alternative C would not result in impairment of wildlife or wildlife habitats.</p>



TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Air Quality	<p>Impacts on air quality from implementation of alternative A would be due to exhaust emissions from motorized vehicles and equipment, the generation of dust during project activities, ground and aerial spraying of herbicides, the use of prescribed fire, and the potential for intense fire from not immediately treating areas infested with guinea grass. The impacts from all exotic plant management actions in the applicable parks would range from negligible to minor, and impacts could increase to moderate if a large prescribed fire was implemented. Overall, management actions would result in short-term, minor, adverse impacts on air quality in Everglades National Park, Big Cypress National Preserve, Canaveral National Seashore, Salt River Bay National Historic Park and Ecological Preserve, and Virgin Islands National Park.</p> <p>Alternative A would result in short-term and long-term negative adverse cumulative impacts. Alternative A would not result in impairment of air quality resources or values in the parks.</p>	<p>Air quality effects from the implementation of alternative B would result from exhaust emissions from motorized vehicles and equipment, the generation of dust during project activities, ground and aerial spraying of herbicides, and the use of prescribed fire. The impact from all exotic plant management actions in the applicable parks would range from negligible to minor, and impacts could increase to moderate if a large prescribed fire was implemented. Overall, management actions under alternative B would result in short-term, minor, adverse impacts on air quality in Everglades National Park, Big Cypress National Preserve, Canaveral National Seashore, Salt River Bay National Historic Park and Ecological Preserve, and Virgin Islands National Park. In addition, there would be long-term, minor, beneficial effects on air quality in Salt River Bay National Historic Park and Ecological Preserve and Virgin Islands National Park by immediately treating the guinea grass and eliminating the potential for intense fire and its associated air quality impacts.</p> <p>Cumulative impacts would be the same as alternative A. Alternative B would not result in impairment of air quality resources or values in the parks.</p>	<p>Impacts on air quality from the implementation of alternative C would result from exhaust emissions from motorized vehicles and equipment, the generation of dust during treatment, monitoring, and restoration activities, ground and aerial spraying of herbicides, and the use of prescribed fire. The impacts from all exotic plant management actions in the applicable parks would range from negligible to minor, and impacts could increase to moderate if a large prescribed fire was implemented. Overall, these effects would result in short-term, minor, adverse impacts on air quality in Everglades National Park, Big Cypress National Preserve, Canaveral National Seashore, Salt River Bay National Historic Park and Ecological Preserve, and Virgin Islands National Park. In addition, there would be long-term, minor, beneficial effects on air quality in Salt River Bay National Historic Park and Ecological Preserve and Virgin Islands National Park by immediately treating the guinea grass and eliminating the potential for intense fire and its associated air quality impacts.</p> <p>Cumulative impacts would be the same as alternative A. Alternative C would not result in impairment of air quality resources or values in the parks.</p>
Cultural Resources			
Archeological Resources	<p>The indirect long-term beneficial effects of biological treatments on archeological resources would be negligible to minor because of their limitations in control of exotic plants. Depending upon the type and vulnerability of archeological resources and other physical factors, long-term direct and indirect adverse impacts from overspray and soil applications could range from negligible to minor, but treatment would have minor short-term indirect benefits by killing plants whose roots have invaded archeological sites. (Benefits would be short-term because, under alternative A, roots likely would have an opportunity to regrow.)</p>	<p>Exotic plant treatments would have long-term, negligible to minor, adverse and beneficial effects on archeological resources, and the systematic approach, coordination, monitoring, and adaptive management strategies under alternative B would reduce potential impacts on sites and have a long-term, moderate to major benefits, both directly and indirectly.</p>	<p>Under alternative C, most impacts of exotic plant treatment on archeological resources would be the same as described for alternative B. With mitigation to protect sites during initial restoration, and with appropriate choices of restoration location, plant materials, and techniques, implementation of alternative C would have minor long-term adverse impacts on archeological resources.</p>

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Archeological Resources (continued)	<p>With use of best management practices such as erosion control, leaving dead plants in place, and treatment of large areas in a mosaic pattern, individual sites vulnerable to collection or recreational uses would suffer indirect long-term, negligible to minor adverse impacts from treatment, depending on the location and site visibility. With resource identification and site avoidance, impacts from use of all-terrain vehicles or other modes of land transportation to reach treatment areas would be negligible. Loss of site markers would generally be a minor adverse impact.</p> <p>Protective measures would be developed and appropriate archeological investigations conducted prior to use of fire to control exotic plants, resulting in minor long-term direct adverse effects on individual archeological sites. With prior identification and testing of buried resources, the use of prescribed fires would have minor direct and indirect adverse impacts on archeological resources. Depending on the type of mechanical treatment used, direct adverse impacts on an individual site or district would vary from negligible to minor and would be long term.</p> <p>Natural restoration of native plants would have minor benefits by helping to stabilize soils and making artifacts and features less visible on the ground surface. However, regrowth of vegetation with extensive root systems also could adversely affect archeological resources in the same manner as exotic plant growth (minor adverse effect).</p> <p>Lack of coordination among exotic plant crews and park cultural staff could result in long-term, localized, minor to moderate indirect and direct adverse impacts on individual sites and districts.</p>	<p>Cumulative impacts would be the same as alternative A. There would be no impairment of archeological resources within any of the nine parks as a result of exotic plant management activities under alternative B.</p>	<p>Cumulative impacts would be the same as alternative A. There would be no impairment of archeological resources in any of the nine parks as a result of exotic plant management activities under alternative C.</p>





TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Archeological Resources (continued)	<p>Archeological investigations and resource evaluation would be completed for areas proposed for future active restoration, so impacts of restoration would be limited in scope and would generally produce only minor adverse impacts. The cumulative effects of exotic plant control measures under alternative A are both beneficial and adverse but would contribute only in a minor way to the moderate cumulative effects of other past, present, and future actions and projects within the park</p> <p>There would not be an impairment of archeological resources at any of the nine parks as a result of exotic plant management activities.</p>		
Historic Structures, Buildings, and Districts	<p>Biological treatments would have a negligible to minor beneficial impact on historic structures (benefits would be low because of the limitations of the treatments). Some chemical treatments may stain masonry, resulting in minor direct adverse effects. Chemical treatments could cause later, indirect, minor adverse impacts should the killed trees or limbs fall on and damage the structure, but also would help extend the life span of structures by minimizing root penetration and secondary damage, resulting in long-term major benefits. Potential impacts to structures would be reduced by careful evaluation of the relationship between the plant and the structural walls prior to treatment. Some of the Virgin Islands historic structures have been cleared of vegetation and stabilized against deterioration, a long-term major beneficial effect. However, treatment programs for the rest of the structures have been unable to keep pace with plant growth, resulting in direct and indirect moderate adverse impacts. Treatment would confer long-term, moderate benefits on structures in the Florida parks.</p>	<p>With implementation of alternative B, preservation of structures and historic district resources would be enhanced. Short-term adverse direct impacts from treatments would be negligible to minor in intensity and would be outweighed by long-term major benefits of removing exotic plants from historic structures.</p> <p>In Florida parks, cumulative impacts would be moderate adverse; in Caribbean parks, cumulative impacts would be moderate adverse. There would be no impairment of historic structures, buildings, or districts in any of the nine parks as a result of exotic plant management activities.</p>	<p>With mitigation, long-term adverse impacts of exotic plant management on historic structures, buildings, and districts would be minor.</p> <p>Cumulative impacts would be the same as alternative B. There would be no impairment of historic structures, buildings, or districts in any of the nine parks as a result of exotic plant management activities under alternative C.</p>

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
<p>Historic Structures, Buildings, and Districts (continued)</p>	<p>Depending on the method of mechanical treatment used, and development of appropriate protective measures, long-term impacts on historic structures could vary from beneficial (moderate to major) to adverse (minor). Prescribed fires generally are inappropriate in historic districts or areas containing ruins, so at present are not being used.</p> <p>Treatment methods and amount of coordination between exotic plant crews and park resource staff varies among parks, and where treatment choices are based primarily on criteria for management of exotic plant species, protection of structures would be less than optimal, resulting in a long-term minor adverse effect. With the continuation of treatments to remove exotic plants from historic structures, passive restoration, where it might occur under a 3-year interval of re-treatment, would generally have a minor beneficial effect.</p> <p>In Florida parks, cumulative impacts would be minor adverse; in Caribbean parks, cumulative impacts would be moderate adverse. There would not be an impairment of historic structures, buildings, or districts at any of the nine parks as a result of exotic plant management activities.</p>		
<p>Ethnographic Resources</p>	<p>Under the no-action alternative, adverse impacts on ethnographically valued plants in the Caribbean parks would be minor, direct and indirect, and both adverse and beneficial from removal of traditionally used exotic plants while encouraging regrowth of ethnographically valued native plants.</p>	<p>Implementation of alternative B would result in a range (from negligible to moderate) of adverse effects on ethnographic resources, depending on whether ethnographic resources could be accurately identified and protected during removal of exotic plants. Programs outlined under Alternative B, along with continuing consultation until completion of ethnographic studies would help reduce potential impacts.</p> <p>Cumulative impacts would be the same as alternative A. There would be no impairment of ethnographic resources in any of the nine parks as a result of exotic plant management activities under alternative B.</p>	<p>Long-range adverse effects on ethnographic resources from exotic plant management would range from minor to moderate, depending on whether ethnographic resources can be identified and protected during removal of exotic plants and restoration of native plants.</p> <p>Cumulative impacts would be the same as alternative A. There would be no impairment of ethnographic resources in any of the nine parks as a result of exotic plant management activities under alternative C.</p>



TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Ethnographic Resources (continued)	<p>Biological treatments in the Florida parks would have negligible effects because the specific exotic plants treated are plentiful and generally are not among plants most valued by tribes. Chemical treatments such as aerial spraying or soil applications could inadvertently kill ethnographically valued plants, resulting in minor adverse impacts. Negligible to minor adverse effects would occur from other types of more selectively applied chemical treatments in the Florida and Caribbean parks (basal bark, cut surface, cut stump). Use of heavy equipment would generally be confined to previously disturbed areas with concentrations of exotic plants, so mechanical treatments would have a negligible impact on traditionally valued ethnographic resources. Prescribed fires and subsequent changes in the system's ecology would have a long-term minor adverse effect on the number and types of traditionally valued plants available in a particular area.</p> <p>Treatments would give native plants an opportunity to regenerate and to spread back into former habitats, a long-term minor benefit. However, lack of viable information regarding the identity and location of ethnographically valued plants and inconsistent consultation and communication would have a range of long-term, direct and indirect, adverse and beneficial effects on ethnographic resources (from negligible to moderate) under alternative A.</p> <p>Cumulative impacts from treatment programs under alternative A would be both moderately beneficial and adverse (negligible to minor), but would not substantively reduce or increase the overall moderate cumulative impact of past, present, and future actions.</p> <p>There would be no impairment of traditional cultural properties / ethnographic resources within the nine parks as a result of exotic plant management activities.</p>		

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Cultural Landscapes	<p>Under alternative A, elimination of exotic plants in un-inventoried, unevaluated landscapes and inconsistent approaches to preservation would negatively impact the landscape by removing vital character-defining elements. Uncoordinated preservation efforts would continue to have negligible to moderate beneficial effects. The lack of cultural landscape studies and systematic coordination among exotic plant crews and park resource staff would result in future minor to moderate adverse impacts under alternative A.</p> <p>Cumulative impacts would be moderate adverse. There would be no impairment of cultural landscapes within any of the nine parks as a result of exotic plant management activities.</p>	<p>Most of the parks lack data on character defining cultural landscape features, so under alternative B there would be a range of long-range beneficial (minor to moderate) and adverse (negligible to moderate) impacts on cultural landscapes.</p> <p>Cumulative impacts would be minor adverse. There would be no impairment of cultural landscapes in any of the nine parks as a result of exotic plant management activities under alternative B.</p>	<p>A cultural landscape study currently underway at Dry Tortugas National Park would aid the park in determining which exotic plants should be eradicated and which should be retained. For the rest of the south Florida and Caribbean parks, implementation of alternative C would result in long-term, direct and indirect, negligible to moderate adverse impacts on cultural landscapes.</p> <p>Cumulative impacts would be the same as alternative B. There would be no impairment of cultural landscapes in any of the nine parks as a result of exotic plant management activities under alternative C.</p>
Visitor Use and Experience	<p>The visitor experience in the parks would continue to be affected by the presence of exotic plants and by the methods to control exotic plants. This would result in adverse effects for some visitors and beneficial effects for others. These effects could range in intensity from negligible to major, depending on the visitor. Cumulative impacts would be minor to moderate beneficial.</p>	<p>Because alternative B would decrease infested areas in the parks, impacts on visitor use and experience would be similar to the impacts of alternative A, with adverse impacts slightly lower in intensity and beneficial effects slightly higher. Cumulative impacts would be the same as alternative A.</p>	<p>Because active restoration would decrease infested areas in the parks somewhat more quickly than under alternative B, impacts of alternative C on visitor use and experience would be similar to the impacts of alternative B, with adverse impacts slightly lower in intensity and beneficial effects slightly higher. Active restoration activities would result in short-term, minor to moderate adverse impacts. Cumulative impacts would be the same as alternative A.</p>
Soundscapes	<p>The noise generated from helicopters and fixed-wing aircraft used to treat or monitor exotic plants in the parks would result in short-term, minor to moderate adverse impacts on soundscapes. Trucks, airboats, motorboats, and off-road vehicles used to transport equipment and crews to treatment locations and chainsaw use would have minor to moderate impacts in developed areas of the parks because the noise generated from use of this equipment would be detectable above ambient noise levels but audible only for short durations. In remote or undeveloped areas of the parks, the impact on soundscapes from use of mechanized equipment would range up to moderate because the ambient soundscape would be drowned out for periods of time when activities were occurring.</p>	<p>During initial treatment of exotic plants, impacts on soundscapes would be similar to those described under alternative A although they would occur in more areas of the parks during the initial phase of the plan. Although the frequency of management actions would increase under alternative B, there would be a decrease in intensity of impact over time as less intrusive methods are employed to maintain sites. Compared to alternative A, there would be an overall benefit to soundscapes in the park. Impacts on soundscapes from use of motorized vehicles and vessels, mechanized equipment, and field crews would be short term, negligible to minor in developed areas and range up to moderate in remote or undeveloped areas of the parks. Cumulative impacts would be the same as alternative A.</p>	<p>During initial treatment of exotic plants, impacts on soundscapes would be similar to those described under alternative B. Impacts on soundscapes from use of motorized vehicles and vessels, mechanized equipment, and field crews to treat exotic plants would be short term and negligible to minor in developed areas and would range up to moderate in remote or undeveloped areas of the parks. The impacts of small-scale mechanized equipment used to prepare sites for active seeding or replanting with native plants would be short term and minor. Larger active restoration projects that involve large construction equipment would have adverse impacts on soundscapes that could range up to major. Over the 10-year life of the plan, the use of mechanized and motorized equipment would be considerably less than alternative A, and there would be an overall</p>



TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Soundscapes (continued)	The cumulative impacts would be moderate to major and intermittent . Alternative A would not result in impairment of the soundscapes in any of the parks analyzed.	Alternative B would not result in impairment of the soundscapes in any of the parks analyzed.	benefit to soundscapes in the parks. Cumulative impacts would be the same as alternative A. Alternative C would not result in impairment of the soundscapes in any of the parks analyzed.
Wilderness	Adverse impacts on wilderness resources and values from exotic plant management actions would be short term and minor to moderate as a result of the temporary introduction of human-induced noise, visual intrusion, and local air quality decline. Effects from leaving dead exotic trees standing, as well as potential effects from vehicles traveling along previously undisturbed lands, especially those that could occur in very wet conditions, would be considered short and long term, negligible, and adverse . These impacts would be highly localized because of the mitigation measures that would be employed. Minor, beneficial effects would result over the long term from controlling exotic plant populations and sustaining the diverse, natural conditions and functions within designated wilderness. Cumulative impacts would be moderate adverse . Alternative A would not result in impairment of wilderness resources and values.	Adverse impacts related to human-induced noise and visual intrusion from the implementation of exotic plant management actions would be short term and of minor to moderate intensity . The higher-intensity impacts would result from the potential for localized noise disturbance from motorized equipment and visual effects when large areas are treated. Visual impacts could become long term depending on the native vegetation category type and its recovery. The emissions from mechanized equipment and smoke from prescribed fire would result in short-term impacts on air quality and the viewshed but only in the immediate vicinity of the treatment areas. Emissions from tools and vehicles would be negligible , but impacts on air quality within wilderness could range up to moderate if the park were to implement larger prescribed fires. Vehicles traveling along previously undisturbed lands within wilderness, especially if they were used under very wet conditions, would produce short- and long-term, minor, adverse impacts from rutting. Major beneficial effects would result over the long term from controlling exotic plant populations and sustaining the diverse, natural conditions and functions within designated wilderness. Cumulative impacts would be the same as alternative A. Alternative B would not result in impairment of wilderness resources and values.	Adverse impacts related to human-induced noise and visual intrusion from the implementation of exotic plant management actions would be short term and minor to moderate . The higher-intensity impacts would result from the potential for localized noise disturbance from motorized equipment and visual effects when large areas are treated. Visual impacts could become long term depending on the native vegetation category type and its recovery. Short-term air quality impacts would occur in the immediate vicinity of the management actions from emissions from mechanized equipment, dust generated from project activities and transport vehicles, and smoke from prescribed fires. Emissions from tools and vehicles and the generation of dust would be negligible ; however, impacts on air quality within wilderness could range up to moderate if the park implements larger prescribed fires. Vehicles traveling along previously undisturbed lands within wilderness, especially those that could occur in very wet conditions would produce short- and long-term, minor, adverse impacts from rutting. Major beneficial effects would result over the long term from controlling exotic plant populations and sustaining the diverse, natural conditions and functions within designated wilderness. These beneficial effects would occur more rapidly with the employment of active restoration methods because the vegetation category would recover faster than what would occur under passive (natural) restoration. Cumulative impacts would be the same as alternative A. Alternative C would not result in impairment of wilderness resources and values.

TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Public Health and Safety	<p>In parks that have reduced exotic plant infestations to a maintenance level, exotic plant management actions have had long-term, negligible to minor, beneficial effects on public health and safety. In other parks, exotic plants continue to expand their territory and would continue to present a long-term, negligible to minor, adverse impact on public health and safety. The adverse impacts on public health and safety resulting from exotic plant treatments would be short term and minor. Any cumulative adverse impacts would be negligible and short term.</p>	<p>The more effective re-treatment schedule proposed under alternative B would help all parks reduce exotic plant infestations to maintenance levels, thereby reducing the risks posed by exotic plants to negligible. The adverse impacts on public health and safety resulting from treatment in the parks would be short term and minor, with long-term impacts declining to negligible to minor as parks reduce infestations. Any adverse cumulative impacts would be negligible.</p>	<p>As under alternative B, parks would reduce exotic plant infestations to maintenance levels, and risks posed by exotic plants would decline to negligible. These reductions would occur at a slightly faster rate because active restoration, where appropriate, would somewhat reduce the potential for further infestation. The adverse impacts on public health and safety resulting from exotic plant treatments would be short term and minor, with long-term impacts declining to negligible to minor as parks reduce infestations. Any cumulative adverse impacts would be negligible.</p>
Essential Fish Habitat	<p>Removing exotic vegetation would restore the biological integrity of infested mangrove habitats within the parks, and improving essential fish habitat. Because infestation in these habitats is low and restoration would not be fully achieved under this alternative, the overall long-term benefit to essential fish habitat would be negligible to minor. Increased sedimentation and reduced water clarity as a result of mechanical treatment and use of prescribed fire would have short-term negligible to minor adverse impacts on essential fish habitats. The low slopes in south Florida and the rapid revegetation that occurs within the region would reduce the amount of sediments and nutrient being transported to the aquatic environment. In the Caribbean parks, mechanical treatments would result in localized soil disturbance and with rapid revegetation of the area, there would be no potential for transport to essential fish habitats resulting in no effect. In the event of wildfire occurring in areas infested with guinea grass in the Salt River Bay and Virgin Islands National Park, the delivery of sediment and nutrients to localized areas would have short-term negligible to minor adverse effects. Due to the low probability of herbicides being transported to the aquatic environment, application of herbicides according to the label, and implementation of BMPs and SOPs, the effect from chemical treatment on the essential</p>	<p>Removing exotic vegetation would restore infested mangrove habitats within the parks and improve essential fish habitat as described under alternative A, however restoration would be more complete and occur faster. The overall long-term benefit from this restoration would be minor to major. During the initial phase of the plan, the adverse effects on essential fish habitats would be similar to those described in alternative A. Mechanical treatment methods in Canaveral and Everglades National Parks and the use of prescribed fire in Everglades would have short-term negligible to minor adverse effects from sediment delivery to the aquatic environment. The use of small-scale mechanical treatment methods in the Caribbean parks would have no effect on essential fish habitats. Due to the low probability of herbicides being transported to the aquatic environment, application of herbicides according to the label, and implementation of BMPs and SOPs, the effect from chemical treatment on the essential fish habitats in the parks would also be negligible to minor. Effects from use of motor or air-boats to access sites would be expected to occur more frequently under this alternative during the initial phase of the plan resulting in short-and long-term minor adverse effects. The adverse effects from exotic plant treatments would decline over time as less intrusive methods are employed to maintain</p>	<p>Removing exotic vegetation and passive and active restoration of infested mangrove habitats within the parks would improve essential fish habitat resulting in an overall long-term minor to major benefit. The short- and long-term adverse and beneficial impacts of exotic plant management actions would be the same as described in alternative B and would be negligible to minor. Seeding, planting, and/or use of soil amendments to actively restore treated areas within the parks would have negligible to minor adverse effects on essential fish habitats from the transport of sediments or nutrients that affect water quality. Large-scale restoration actions in Canaveral National Seashore and Everglades National Park that occur adjacent to areas of essential fish habitat could result in the transport of sediments that would degrade the water quality and the habitat. With implementation of mitigation measures, the short-term effects would be negligible to minor. Cumulative impacts would be the same as alternative B. Overall, the diversity and abundance of fisheries that rely on the essential fish habitats within the parks would not be adversely affected. Exotic plant management activities under alternative C would not result in the impairment of essential fish habitat resources or values.</p>



TABLE ES-3: SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topics	Alternative A — Continue Current Management	Alternative B — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation	Alternative C — New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants (Preferred Alternative)
Essential Fish Habitat (continued)	<p>fish habitats in the parks would also be negligible to minor. Short- and long-term localized adverse effects from motor or airboat access to sites would negligible to minor.</p> <p>Cumulative impacts would be moderate to major adverse. Overall, the diversity and abundance of fisheries that rely on the essential fish habitats within the parks would not be affected. Exotic plant management activities under no action would not result in the impairment of essential fish habitat resources or values.</p>	<p>treated sites and the amount of herbicide that would be applied decreases rapidly over time compared to alternative A. Under this alternative guinea grass in the Caribbean parks would be treated under an optimal schedule reducing the threat of wildfire and indirect effects on essential fish habitats resulting in negligible to minor long-term benefits. Cumulative impacts would be minor to major adverse. Overall, the diversity and abundance of fisheries that rely on the essential fish habitats within the parks would not be adversely affected. Exotic plant management activities under alternative B would not result in the impairment of essential fish habitat resources or values.</p>	
Management and Operations	<p>The requirements of exotic plant management exceed available resources, particularly time, resulting in long-term, minor, adverse impacts on resource managers' ability to control exotic plants in the nine parks. Because education and interpretation activities associated with exotic plant control are minimal, current exotic plant management would have long-term, minor, adverse impacts on visitor education and interpretation in the nine parks. Continuing to divert resources from management of other park resources would cause long-term, minor, adverse impacts on park operations. The exotic plant management actions would contribute to reducing regional long-term cumulative adverse impacts to a moderate level.</p>	<p>While increased planning before treatment may have a minor, adverse impact on time demands of park staff in the short term as they acquire and analyze data, long-term impacts on exotic plant management operations would be beneficial and minor to moderate as decreased re-infestation rates decrease the time required for re-treatment. Increased, systematic monitoring would have a long-term, negligible to minor adverse impact on management resources. However, the information gathered would enhance exotic plant management operations while providing reference and guidance for future projects, resulting in long-term, minor to moderate beneficial impacts. Increased initial efforts associated with implementation of alternative B would produce short-term, minor, adverse impacts on other resource management activities in the nine parks, but resulting in more effective exotic plant management activities that would produce minor to moderate beneficial effects on resource management over the long term. Impacts on education and interpretation activities would be negligible. Exotic plant management and supporting operations under alternative B would have long-term, negligible to minor adverse impacts on park operations, decreasing in intensity as the areas requiring re-treatment decrease. Cumulative impacts would be the same as alternative A.</p>	<p>Alternative C impacts would be similar to those described for alternative B, and active restoration activities would result in minor to moderate, long- and short-term adverse impacts on park operations. Cumulative impacts would be the same as alternative A.</p>