

US DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE

***RECORD OF DECISION***

**SOUTH FLORIDA AND CARIBBEAN PARKS  
EXOTIC PLANT MANAGEMENT PLAN**

**FINAL ENVIRONMENTAL IMPACT STATEMENT**

**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**

**INTRODUCTION**

The Department of the Interior, National Park Service (NPS), has prepared this Record of Decision (ROD) for the *South Florida and Caribbean Parks Exotic Plant Management Plan and Final Environmental Impact Statement (Plan/Final EIS)*<sup>1</sup> for nine Florida and Caribbean parks. These parks 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 ROD includes a statement of the decision made (the selected action), synopses of other alternatives considered, the basis for the decision, a description of the environmentally preferred alternative, a discussion of why the selected action will not cause impairment of park resources or values, a listing of measures to minimize environmental harm, and an overview of public and agency involvement in the decision-making process.

The nine units of the National Park System, listed in the paragraph above, that participated in this plan make up the **geographical study area** for the Plan/Final EIS.

The purpose of the South Florida and Caribbean Parks Exotic Plant Management Plan is to:

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

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<sup>1</sup> The Final Plan/EIS was published in abbreviated form and incorporated the Draft Plan/EIS. Therefore in this ROD, Final Plan/EIS refers to the combination of the Draft and Final *South Florida and Caribbean Parks Exotic Plant Management Plan/Environmental Impact Statement*.

This ROD documents the decision by the NPS to select the preferred alternative (*Alternative C – New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants*) of the Plan/Final EIS for implementation. Alternative C was also identified in the Plan/Final EIS as the environmentally preferred alternative.

The intended effects or objectives of this action are to:

- 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;
- 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 and protect archeological and historic resources, while reducing the spread of exotic plant species;
- Conduct the exotic plant management plan so it is continually monitored and improved, is 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;
- 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;
- Coordinate NPS efforts with partners and neighbors (nationally and internationally) to establish compatible goals and provide assistance to achieve them; and
- Restore and protect native plant communities in ways that allow natural processes, function, cycles, and biota to be re-established and maintained in perpetuity.

## **BACKGROUND**

Approximately 1,200 exotic plant species in Florida and the Caribbean have become established in natural areas, and as many as four percent of those exotic plant species have displaced native species. 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:

- 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 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; and
- 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 required “wait period” before approval of the ROD was initiated September 3, 2010 with the U.S. Environmental Protection Agency’s *Federal Register* notification of the filing of the Final Plan/EIS. As soon as practical after the publication of the Notice of Approval and Summary of the ROD in the *Federal Register*, the nine parks included in the Final Plan/EIS will begin to implement treatment and control, monitoring, adaptive management of exotic plants and restoration of native plant communities as described and analyzed in the preferred alternative (Alternative C) presented in the Final Plan/EIS.

## **OTHER ALTERNATIVES CONSIDERED**

### **Alternative A: No Action – Continue Current Management**

Under *Alternative A, Continue Current Management*, the parks would continue to manage exotic plants under the existing management framework. The parks would continue to treat infestations of exotic plants on an ad hoc basis using a variety of physical, mechanical, chemical, and biological methods and through currently available funding sources.

### **Alternative B: New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation**

Under *Alternative B, New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation*, the parks 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. Alternative B 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 of native habitats would increase as a result of uniform recording and storage of information acquired during monitoring and of sharing that information among the nine parks.

## **DECISION (SELECTED ACTION)**

The NPS will implement Alternative C, the preferred alternative, as identified, fully described, and analyzed in the Final Plan/EIS. There are no changes or modifications incorporated in this ROD. Under the selected action, the NPS will apply a systematic approach that will 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. The NPS will 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. High priority species for treatment are Australian pine, Brazilian pepper, guinea grass, lather leaf, melaleuca, Old World climbing fern, tan tan, lime berry (or sweet lime), and genip. The parks will continue to use biological, physical, chemical, and mechanical methods to control exotic plants during initial treatment and for the re-treatment of sites. The selected action includes a decision tool that will be applied to determine the best treatment method for exotic plant control, based on the type of exotic plant species, the vegetation category, and the potential threatened and endangered species habitat present, in the treatment area. All parks may identify some species of exotic plants that have historical or cultural significance that would be maintained. These plants will be considered character-defining elements of a cultural landscape or critical to interpreting the history of a particular area. The exotic plant program manager will recommend how to maintain these plants while reducing their potential to expand from the area.

The selected action also includes a decision tool that will be applied to determine areas that are appropriate for active restoration, which will 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 is desirable. Other areas in the park will recover passively, i.e. native plant species will be left to re-establish naturally from the presence of seeds in the soil or from the propagation of native plants in adjacent habitats. If, however, monitoring reveals that recovery is not meeting objectives in areas identified for passive restoration, then active restoration may be implemented. The active restoration approach for a given site will be determined based on a collaboration between exotic plant managers and other park resource specialists and other agencies, as appropriate, to define how active restoration would take place and what native species would be used, based on what is appropriate for that specific site and to meet the desired future condition goal. Active restoration of sites will entail one method, or a combination of methods, to facilitate the recovery of native plant species. Restoration could involve soil or site amendments, seeding sites with native seed sources, planting with native plant species, or system-level alternation.

Best management practices (BMP) and mitigation measures have been incorporated as integral elements of the selected alternative as described in Tables 13 and 19 of the Final Plan/EIS. These tables are included as Appendix 1 of this ROD. All mitigation measures described in Table 13 for Alternative B are also applicable to Alternative C. NPS is clarifying in this ROD that the intent of the NPS in implementing the following BMP from Table 13 is that chemical controls would not be used directly on historic fabric or historic structures not only to avoid staining, but

also to avoid the potential for structural damage. This clarification takes into consideration the findings of an additional reference recently brought to the attention of the NPS.<sup>2</sup>

“Methodology for removing exotic plant materials from historic ruins and archeological sites would be developed in consultation with NPS cultural resource specialists (park, region, and SEAC) prior to treatment. Protective measures for treatment areas within and adjacent to structures would be developed to prevent staining or other ancillary structural damage from herbicide applications. Chemical controls would not be used directly on historic fabric or historic structures in order to avoid staining.”

An education program will be developed to increase public awareness of the impacts that exotic plants have on park resources and to build public support for management of exotic plants in the parks. Materials describing the active restoration program will be produced and disseminated to the public and other agencies. The parks’ exotic plant program managers will interpret the results of the latest research on active restoration projects and the status of the active restoration program taking place in the parks. The managers will communicate the results to resource managers, interpreters, maintenance personnel, and others.

The parks will continue to foster communication and collaboration among federal and state agencies, private landowners, and other agencies, in an effort to build a regional front against the invasion of exotic plants. Monitoring information and data will be compiled in a systematic way by each park and compiled into one database. This information will be made available to other agencies and organizations to further improve exotic plant management on a broader scale. The NPS will continue to participate in and with organizations to develop common goals for the control of exotic plants and for ecosystem restoration. The NPS will continue to assist adjacent landowners by providing staff support and technical advice, and the parks will continue to collaborate with nongovernment organizations and agencies to provide expert knowledge. The NPS may also enter into collaborative efforts with the USDA to release biological control agents. Exotic plant program managers will consult with cultural resource specialists in the parks, region, or other NPS offices, as well as the State or Territory Historic Preservation Office, to determine the appropriate treatment methods before treating exotic plants that are affecting or have the potential to affect cultural resources such as historic structures and archeological resources.

#### **ENVIRONMENTALLY PREFERRED ALTERNATIVE**

The Council on Environmental Quality regulations provide that the environmentally preferred alternative is an alternative which will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act. Section 101 states that “...it is the continuing responsibility of the Federal Government to:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

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<sup>2</sup> Dewey, C.C. An Investigation into the Effects of an Herbicide on Historic Masonry Materials. M.S. Thesis, University of Pennsylvania. 1999.

2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;
5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depleteable resources."

Expressed more succinctly, the environmentally preferred alternative is the course of action that results in the least damage to the physical and biological environment, or conversely, is the alternative which best protects historic, cultural and natural resources. As discussed below, Alternative C (the selected action) was identified as the environmentally preferred alternative. Compared to the other alternatives, the selected action best meets the Section 101 criteria. It best protects the biological and physical environment by effectively and rapidly reducing the level of exotic plant infestation, reducing the level of threat to nontarget resources during plan implementation, and restoring, to the greatest extent, the native vegetation community.

*Alternative A (Continue Current Management)* partially meets the Section 101 criteria. Under Alternative A, exotic plant management would continue to occur, which provides protection for native plant species and other natural and cultural resources that are adversely affected by these plants. Under this alternative, the NPS is fulfilling, to some degree, its responsibility as trustee of the environment for future generations and is providing protection of the parks' natural and cultural resources. In addition, the treatment of exotic plants that are known allergens or create hazardous environmental conditions, which would continue to be controlled under this alternative, would also enhance public health and safety. Although the treatment of exotic plants would occur under this alternative, it would not be conducted at optimal frequency. Thus, some infestations within the parks may be controlled, whereas other infestations would continue to spread or rebound after treatment to pretreatment levels and, consequently, adversely affect park resources. This alternative also does not provide a framework for setting priorities for areas within the parks that would provide the greatest benefit to natural and cultural resources, as well as enhancing the visual quality of the parks for visitors. As such, areas with sensitive resources would continue to be adversely affected by exotic plants, to varying degrees. Alternative A also does not provide a means for monitoring and identifying effects of treatment actions on park resources, so that undesirable effects on nontarget resources may continue to occur. In addition, this alternative would not attain the widest benefits without an increased risk to the environment and to health and safety over the long-term. Under Alternative A, because exotic plant infestations are not being controlled to the greatest extent, there would continue to be a high level of treatment occurring within the parks and, as such, treatment intensities and the amount of herbicides that would be applied over the life of the plan, would remain at higher levels when compared to other alternatives. Although with mitigation and appropriate applications of herbicides according to labels and regulations, the risk to the environment is minimized from treatment actions, there would be a higher use of chemicals and a need to use more intensive treatment methods over a longer time period than the other

alternatives.

*Alternative B (New Framework for Exotic Plant Management: Increased Planning, Monitoring, and Mitigation)* provides a structured plan for the treatment of exotic plants that would meet the purposes of the Section 101 criteria to a large degree. This alternative would result in the treatment of exotic plants under an optimal schedule, thereby allowing park managers to reduce exotic plants to a maintenance level within a 5- to 10-year period. The rapid reduction of exotic plants that would occur under this alternative would allow for the passive restoration of native vegetation within the parks, which would ensure an increased diversity of native habitats and wildlife to be enjoyed by many generations.

By using a priority setting system for determination of what areas of infestation to treat and application of a decision tool that determines appropriate treatment methods, given the environmental setting and conditions, this alternative provides a high level of protection to park resources. Under Alternative B, the use of a framework designed specifically for the protection of sensitive resources within the parks, ensures that these resources are preserved and maintained to a high degree over time. In addition, areas of high visitor use would become a priority for exotic plant treatment. Treatment of exotic species and the restoration of native vegetation would enhance esthetics in these areas, improving the quality of the visitor experience. As under Alternative A, the control of exotic plants that are known allergens or that create hazardous environmental conditions would also enhance public health and safety. Alternative B would better ensure this because control of exotic plants in the parks would be achieved within the life of the plan.

As in Alternative A, Alternative B would employ the use of mechanical, chemical, and prescribed fire treatment methods that would be intensively used, particularly in the early phase of the plan, that present short-term risks to the environment and to health and safety. Under alternative B, there would be more personnel needed in the field to treat exotic plant infestation and to monitor treatment success and effects. Having more personnel in the field increases the potential risk to worker health and safety. However, with implementation of mitigation measures and best management practices (BMPs), the risks to the environment and to workers are minimized to negligible to minor. Over time, treatments would become less intensive as the level of infestation is dramatically decreased, which would reduce dramatically the amount of herbicide needed and the number of personnel to perform treatments. Thus, the risk to workers and the environment would be further reduced and would eventually be lower than the risks present under Alternative A. The implementation of a monitoring program and an adaptive management plan would ensure the protection of non-target resources from any unintended consequences of treatment activities and would ensure that the most effective method for treating exotic plants is used to achieve native vegetation restoration to the fullest extent.

*Alternative C (New Framework for Exotic Plant management: Increased Planning, Monitoring, and Mitigation, with an Emphasis on Active Restoration of Native Plants)* provides a structured plan for the treatment of exotic plants, as well as a framework for actively restoring infested areas in the parks. Of the three alternatives, Alternative C would meet the purposes of the National Environmental Policy Act, Section 101 criteria to the greatest degree. Similar to Alternative B, this alternative would result in a reduction of exotic plant infestation in the parks to a maintenance level

within 5 to 10 years and would implement a decision framework to determine priority areas for treatment, and the appropriate treatment methods, to achieve and ensure the highest level of protection of natural, cultural, and visitor resources in the parks. Rapid reduction of exotic plant infestation to a maintenance level also reduces the potential for adverse effects on public health and safety due to the presence of these plants.

Alternative C also implements a decision framework for determining appropriate areas for active restoration that would allow for a faster recovery of native vegetation to provide the greatest degree of benefit to sensitive natural and cultural resources, as well as improving the visual landscape resulting in more esthetically pleasing surroundings. Short-term consequences may result during implementation of restoration activities. However, the potential for complete recovery of native systems, which may otherwise not occur due to a lack of adjacent seed source or the naturally slow recovery rate, would provide major level benefits.

As in Alternatives A and B, Alternative C would employ the use of chemical, mechanical, and prescribed fire treatment methods. These would be intensively used, particularly in the early phase of the plan, and present short-term risks to the environment and to health and safety. As under Alternative B, by having more personnel in the field to implement alternative elements, there is an increased risk to worker health and safety. However, with implementation of mitigation measures and BMPs, the risks are minimal. Over time treatments would become less intensive, as the level of infestation is dramatically decreased, which would also decrease dramatically the amount of herbicide needed to treat infestations.

Because areas in the parks have been identified for active restoration, which would help to prevent establishment of exotic plants, the amount of herbicide that potentially would be used under this alternative, is slightly less than that proposed for Alternative B, which further reduces the potential for undesirable and unintended consequences. The implementation of a monitoring program and an adaptive management plan would also ensure the protection of nontarget resources from unintended consequences of treatment or restoration activities, and would ensure that the most effective method for exotic plant treatment and restoration is used to the fullest extent to achieve recovery of native habitats.

For these reasons Alternative C is identified as the environmentally preferred alternative.

## **BASIS FOR DECISION**

In deciding to select Alternative C, the NPS considered the factors discussed above in the environmentally preferred alternative section of this ROD. The NPS also considered the *Organic Act of 1916*; the enabling legislation and planning documents for the nine parks; *NPS Management Policies 2006*; Executive Order 13112 on Invasive Species; the *National Environmental Policy Act* and other relevant laws and regulations summarized in Appendix K of the Final Plan/EIS; the wide body of scientific knowledge regarding the ecological effects of invasive exotic plants; and the public and agency comments received during the planning process. Additionally, the NPS considered the impacts of the alternatives and how well the alternatives meet the plan's objectives and resolve the purpose and need for taking action.



As summarized in Table 23 of the Final Plan/EIS, in contrast to Alternative A, which meets many objectives partially or to some degree, both Alternative B and Alternative C (the selected action) meet all of the objectives either fully or to a large degree. The selected action meets a larger number of the objectives fully than does Alternative B. Compared to Alternative B, the selected action better meets the objectives for ensuring that park exotic plant management programs support, and are consistent with, south Florida ecosystem restoration goals; coordinating efforts with partners and neighbors (nationally and internationally) to establish compatible goals and provide assistance to achieve them; and restoring and protecting native vegetation categories in ways that allow natural processes, function, cycles, and biota to be re-established and maintained in perpetuity. The selected action meets the rest of the objectives to the same degree as Alternative B.

As described in detail in the section immediately above on the environmentally preferred alternative, the selected action best protects the biological and physical environment by effectively and rapidly reducing the level of exotic plant infestation, reducing the level of threat to nontarget resources during plan implementation, and restoring, to the greatest extent, the native vegetation community. Over the life of the plan, the selected action also best protects the parks' historic, cultural and natural resources from the damage caused by uncontrolled exotic vegetation and the treatment to control it.

#### **FINDINGS ON IMPAIRMENT OF PARK RESOURCES AND VALUES**

The *NPS Management Policies (2006)* require analysis of potential effects to determine whether actions would impair park resources. The NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts to park resources and values. However, the laws do give the NPS the management discretion to allow impacts to park resources and values, when necessary and appropriate, to fulfill the purposes of a park as long as the impact does not constitute impairment of the affected resources and values. The impairment that is prohibited by the *Organic Act of 1916* is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question.

An impact to any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the enabling legislation or proclamation of the park,
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or

- Identified in the park's general management plan or other relevant NPS planning documents as being significant.

An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values. However, the impact threshold at which impairment occurs is not always readily apparent. After considering the environmental impacts described in the Final Plan/EIS and public comments received, the NPS has determined that implementation of the selected action will not constitute impairment to any resources and values of the nine parks participating in this Final Plan/EIS.

**Native Plants:** Implementation of the selected action would not impair native plants for the following reasons. The impact analysis indicates that the implementation of treatment methods under the selected action would have negligible to minor adverse impacts on native plants. Minor impacts on native plants would be measurable or perceptible, but would be localized within a small area. The natural function and character of the vegetation category would not be affected. The active restoration of native vegetation, which reduces or prevents the potential for re-infestation of exotic plants, would result in long-term minor to major beneficial impacts to native plants.

**Soils:** The selected action would not impair soil resources because although the effects of treatment under the selected action would result in both short-term adverse and beneficial effects, it would result in long-term benefits to park soil resources. 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. Minor short-term adverse effects would be detectable, but effects on soil productivity or fertility would be small. There would be localized, detectable effects on the rate of soil erosion and/or the ability of the soil to support native vegetation. If mitigation measures were needed to offset adverse effects, they would be relatively simple to implement and would likely be successful.

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. By actively restoring native vegetation on selected, 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 re-establishing native microbial communities. The short-term adverse impacts of restoration efforts on soils would be negligible to moderate, and localized.

**Water Quality/Hydrology:** Water quality and hydrology would not be impaired by implementation of the selected action because the effects of treatment and scheduled, routine re-treatment and monitoring would range from no effect to short-term, localized, minor adverse effects. In those situations with minor effects, the chemical, physical or biological changes to water quality and hydrology would be detectable in and/or immediately adjacent to treatment areas but would be well below water quality standards or criteria, and would be within historical or desired water quality and hydrologic conditions. These impacts would result from sedimentation from disturbance, erosion, and nutrient loading from use of prescribed fire and herbicide applications. None of these impacts would likely persist beyond 1 year. 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. By actively 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 from restoration would result from a return to more natural hydrologic conditions and hydroperiods. Where exotic plants are dispersed throughout the native vegetation category, little active restoration activity is anticipated, and no impacts on water resources would be anticipated.

**Special Status Species:** The selected action would not impair special status species. Negligible to minor effects 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. Minor effects would result in detectable impacts to an individual (or individuals) of a listed species or its critical habitat, but they would not be expected to result in substantial population fluctuations and would not be expected to have any measurable long-term effects on species, habitats, or natural processes sustaining them.

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, which would result in an Endangered Species Act determination of may affect/not likely to adversely affect. The active restoration of the native vegetation categories would reduce or prevent the potential for re-infestation of exotic plants and speed restoration. This would result in long-term beneficial impacts to special status species that would range in intensity depending on the level of infestation, the amount of area restored, and the species. The selected action would have long-term moderate to major beneficial impacts on Southeastern beach mouse and Everglade snail kite because much larger 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, re-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. Best management practices would be used to ensure that the Acropora corals and their habitat would not be affected by the implementation of the selected action.

**Wildlife and wildlife habitats:** Implementing the selected action would not impair wildlife and wildlife habitats because it would not result in substantial population fluctuations or any measurable, long-term, adverse effects on native species, their habitats, or the natural processes sustaining them. Implementation of the selected action would have short-term, negligible to minor adverse impacts from exotic plant treatment methods and access to sites for treatment and monitoring. Overall there would be long-term benefits to wildlife from passive and active restoration activities implemented under the selected action.

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. 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. Passive and active restoration activities under the selected action would provide an overall, long-term benefit to wildlife.

**Air Quality:** Implementation of the selected action would not impair air quality because impacts from a particular exotic plant management action would either result in no change, an undetectable change, or measurable, but small and localized, changes in air quality. Although changes in air quality from a large prescribed fire could be measurable, the effect would be relatively local and changes in air quality would not have substantial consequences or be noticed regionally. Overall, the effects of implementing the selected action would result in short-term, measurable, but small and localized, impacts on air quality in Everglades National Park, Big Cypress National Preserve, Canaveral National Seashore, Salt River Bay National Historic Park and Ecological Reserve, 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 Reserve and Virgin Islands National Park by immediately treating the guinea grass and eliminating the potential for intense wildfire and its associated air quality impacts.

**Archeological Resources:** Implementation of the selected action would not impair archeological resources because treatment effects would be negligible to minor, adverse and beneficial. Additionally, the systematic approach, coordination, monitoring, and adaptive management strategies under the selected action would reduce potential impacts on sites and have long-term, moderate to major benefits, both directly and indirectly. With mitigation to protect sites during initial restoration, and with appropriate choices of restoration location, plant materials, and techniques, implementation of the selected action would impact one or more archaeological sites with modest data potential and no significant ties to a living community's cultural identity. The site disturbance would be confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect for these minor adverse effects would be "no adverse effect."

**Historic Structures, Buildings, and Districts:** The selected action would not impair historic structures, buildings, and districts. With mitigation, exotic plant management could alter a feature(s) of a structure, building or district that is eligible for or listed in the national Register, but it would not alter its character-defining features, nor would the action diminish the overall integrity of the property. For purposes of Section 106, the determination of effect would be no adverse effect. Additionally, there would be long-term major benefits from removing exotic plants from historic structures.

**Ethnographic Resources:** The selected action would not impair ethnographic resources. Ethnographic resources would not be affected at Biscayne and Dry Tortugas National Parks. At Canaveral National Seashore effects would be barely perceptible and would neither alter resource conditions, such as traditional access or the presence of ethnographically valued plants, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination would be no historic properties affected. At the other parks, except for Everglades National Park, if ethnographic resources can be identified and protected during removal of exotic plants and restoration of native plants, then adverse effects on ethnographic resources from exotic plant management under the selected action would include impacts that would be slight but noticeable, but would neither appreciably alter resource conditions, such as traditional access or presence of ethnographically valued plants, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination of effect would be no adverse effect.

At Everglades National Park there is a lack of ethnographic information. If ethnographic resources are not identified and protected during removal of exotic plants and restoration of native plants, then impacts of these actions would be apparent and would alter resource conditions, and would interfere with traditional access, site and resource preservation, or the relationship between the resource and the affiliated group's practices and beliefs, even though the group's practices and beliefs would survive. In this case the determination of effect for Section 106 would be adverse effect. However, to mitigate these potential minor adverse impacts the Final Plan/EIS provides that until a programmatic agreement is developed with the Florida State Historic Preservation Office, potential direct and indirect impacts on ethnographic resources will be evaluated on an individual basis, resulting in a minimal adverse effect.

Additionally, exotic plants also displace native plants valued by tribes and West Indian residents. Implementation of the selected action would provide a slight benefit to ethnographic resources because restoration activities could encourage the presence and health of native plants valued by tribes and West Indian residents.

**Cultural Landscapes:** Cultural landscapes would not be impaired by implementation of the selected action because impacts would not alter patterns or features of the cultural landscape to the point of seriously diminishing the overall integrity of the resource and calling into question its national Register eligibility. A cultural landscape study at Dry Tortugas National Park is available to help determine which exotic plants should be eradicated and which should be retained. The rest of the parks lack data on character defining cultural landscape features. Therefore, to mitigate the potential for adverse impacts, the selected action provides that any ground disturbing activities that will occur on areas not previously subjected to a cultural resources assessment survey, would be assessed.

**Soundscapes:** Implementation of the selected action would not impair park soundscapes for the following reasons. Impacts from use of motorized vehicles and vessels, mechanized equipment, and field crews to treat exotic plants would be short term and would not dominate the soundscape and replace natural sounds. Natural sounds in the project area would not be commonly impacted by noise from management activities for most of the day without periods of time that are noise free. The impacts of small-scale mechanized equipment used to prepare sites for active seeding or replanting with native plants would be short term and, if detectable above ambient sounds, would occur for less than an hour during the day. In Big Cypress National Preserve, Everglades National Park, and on spoil islands in Canaveral National Seashore, larger active restoration projects that involve large construction equipment would have adverse impacts on soundscapes. Noise from these activities could dominate the soundscape and replacing natural sounds for most of the day in the area of the activity. However, such large restoration projects are infrequent; their noise impacts do not last beyond the completion of the restoration activity; mitigation measures such as turning off equipment when not in use and using the quietest equipment available may reduce some of these impacts; and the remaining impacts are an unavoidable result, which cannot be further mitigated, of an action necessary to preserve or restore the integrity of other park resources or values. Therefore large scale restoration projects that may be implemented under the selected alternative would not constitute impairment to soundscapes. Over the 10-year life of the plan, the use of mechanized and motorized equipment would be considerably less than under the no-action alternative and there would be an overall benefit to soundscapes in the parks compared to current management.

**Wilderness:** Of the nine parks included in the Final Plan/EIS, Everglades National Park is the only park with designated wilderness or with lands identified as suitable for wilderness designation. Implementation of the selected action would not impair wilderness resources in Everglades National Park because the wilderness resources would not be substantially altered, eliminating the characteristics

that meet the criteria for consideration and classification as wilderness. Adverse impacts to wilderness related to human-induced noise and visual intrusion from the implementation of exotic plant management actions would not substantially alter the wilderness resource throughout the designated wilderness area or alter extensive areas of wilderness to the point that they do not offer outstanding opportunities for solitude or a primitive and unconfined type of recreation. Adverse impacts would occur in the localized treatment or restoration area and only for the length of the treatment or restoration activity. These adverse effects would be an unavoidable result, which cannot be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values. 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 under the selected action because the vegetation category would recover faster than what would occur under passive (natural) restoration. Therefore, the selected action would not impair wilderness resources.

## **PUBLIC ENGAGEMENT AND AGENCY COORDINATION**

In December 2003, the NPS met with various federal, territorial, state and local government agencies in meetings on St. John, St. Croix and in Florida to scope the issues and alternatives. The public scoping phase formally began on January 22, 2004 with the publication in the *Federal Register* of a notice of intent to prepare the *South Florida and Caribbean Parks Exotic Plant Management Plan and Draft EIS* (*Federal Register*, vol 69, no. 14). In February 2004, the NPS distributed a newsletter summarizing the nature and extent of the exotic plant problem in the parks, the purpose of and need for an exotic plant management plan, the objectives for the plan, a description of how exotic plants are controlled in the parks, and the preliminary alternatives. The newsletter also provided dates, times and locations for the public scoping open houses. These open houses were held in March 2004, in Cruz Bay, St. John; Christiansted (2 meetings) and Frederiksted, St. Croix; and Naples and Homestead, Florida. News releases and paid ads announcing the scoping open houses were published in the Everglades Echo, Golden Gate Gazette, Florida Keys Keynoter, Upper Keys Reporter, Homestead News, South Dade Newsleader, St. Croix Avis, Virgin Islands Daily News, St. Croix Source (on-line) and St. John Source (online). The format for each meeting included an opening presentation, followed by an open house where participants were encouraged to provide comments at the meeting or to email or mail their comments to the NPS before the close of the scoping comment period on April 1, 2004. Issues and concerns were recorded at the public meetings and from subsequent written comments and emails. The public comment period ended on April 1, 2004. A total of 40 pieces of correspondence were received, containing 144 individual comments which were considered by the planning team in developing the Draft Plan/EIS.

Based on the attendance at the public scoping meetings, a mailer was later sent to the parks' mailing lists for the project to ascertain interest in public meetings on the draft Plan/EIS. Based on a low level of interest, it was decided not to hold public meetings on the Plan/DEIS. No requests for public meetings were received during the public comment period on the Plan/DEIS.

The U.S. Environmental Protection Agency Notice of Availability (NOA) was published on September 27, 2006. The publication of the NOA initiated a 60-day public comment period. Correspondence received during the public comment period included two public comments on the NPS PEPC website,

correspondence from two federal government agencies, and correspondence from three state government agencies.

#### U.S. ENVIRONMENTAL PROTECTION AGENCY

The NPS received a letter from the U.S. Environmental Protection Agency providing its comments on the draft Plan/EIS, supporting implementation of preferred Alternative C, and rating the action LO, Lack of Objection.

#### U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service (FWS) was first notified of the proposed Plan/EIS in December 2003 at the beginning of the scoping process when several regional offices were invited to attend government partnership meetings in Florida and the Virgin Islands. Issues and concerns raised during the meetings by representatives of the FWS were incorporated into the development of the Plan/EIS. In accordance with Section 7 of the *Endangered Species Act*, the NPS conducted informal consultation with the FWS South Florida field office and the FWS Boqueron field office in Puerto Rico. Letters of concurrence with the NPS determinations that the preferred alternative would not adversely affect listed species were received from both offices of the FWS.

#### NATIVE AMERICAN TRIBES

A scoping letter inviting attendance at a government partners meeting was sent to the following tribes in November 2003: Miccosukee Tribe of Florida, Seminole National of Oklahoma, and Seminole Tribe of Florida. No members were in attendance at the December 2003 government partners meetings and no comments or feedback were received on the project.

#### FLORIDA STATE HISTORIC PRESERVATION OFFICE

A scoping letter inviting attendance at a government partners meeting was sent to the Florida State Historic Preservation Office (Florida SHPO) in November 2003. No representatives of the office were in attendance at the December 2003 government partners meetings and no comments or feedback were received during public scoping. The NPS received a letter providing the advice of the Florida SHPO under section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800 on the draft Plan/EIS in November 2006.

#### FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (Florida DEP)

Comments were received through the Florida State Clearinghouse from the Florida DEP, Bureau of Invasive Plant Management supporting the proposed plan and from the Florida Department of Transportation (Florida DOT) noting the requirement that any exotic plant management activities on Florida DOT right-of-ways be coordinated with the Florida DOT. NPS received a letter from the Florida DEP, Office of Intergovernmental Programs, with their determination that the proposed plan is consistent with the Florida Coastal Management Program.

**CONCLUSION**

Among the three management alternatives considered, the selected action best meets the NPS legal and regulatory requirements and policy guidance for managing park resources and exotic plants. The selected action will most effectively control exotic plants and restore native species, while protecting the parks' natural and cultural resources. It will not result in the impairment of park resources and values. The official responsible for implementing the selected action is the Superintendent of each of the participating parks.

**Approved by:**

  
\_\_\_\_\_  
David Vela  
Regional Director, Southeast Region

11/15/10  
\_\_\_\_\_  
Date



## **Appendix 1. Best Management Practices and Mitigation Measures**

**TABLE 13: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES UNDER ALTERNATIVE B**

<b>Native Plants / Vegetation Categories</b>
<ul style="list-style-type: none"><li>• All equipment would be cleaned before leaving the treatment site when operating in areas infested with exotic plants.</li><li>• Equipment entering natural areas would be inspected and cleaned prior to entry to prevent new introduction of exotic plants.</li><li>• All exotic plants that are mechanically or hand-excavated after bud stage would be bagged and properly disposed.</li><li>• New biological agents would not be released until approved by the U.S. Department of Agriculture Animal and Plant Health Inspection Service and reviewed by an integrated pest management specialist.</li><li>• When transporting biological control insects with host plant material, containers would be used that prevent premature release of the insects and release of seeds from the exotic plant.</li><li>• All exotic plant treatment areas would be assessed or field surveyed for sensitive native plants prior to treatment. No chemical would be directly applied on sensitive plants during spot applications, and a buffer zone (100-foot radius) would be applied to sensitive plant populations during aerial applications.</li><li>• Damage to nontarget plant species would be minimized by using ground crews with compression (backpack or hand-held) sprayers, when feasible. All herbicides would be applied by highly trained and certified personnel in accordance with EPA registration label requirements.</li><li>• Specific treatment guidelines would be reviewed with all contractors and personnel prior to treatment in order to ensure only target exotic plants are removed.</li><li>• All herbicides used would be approved through the NPS Pesticide Use Proposal System and designated Integrated Pest Management Coordinator, as required by NPS policy. Annual Pesticide Use Logs tracking the type, amount, location, and targeted species would be maintained and submitted to the IPM coordinator.</li></ul>
<b>Soils</b>
<ul style="list-style-type: none"><li>• A spill containment kit would always be on hand during chemical treatments and, in case of an accidental herbicide spill, specific spill procedures, as outlined in the EPMT Operations Handbook, would be followed.</li><li>• Project vehicles would be inspected regularly to make sure the vehicles have no oil or fuel leaks, which could result in contamination of the park environment. An adequate hydrocarbon spill, containment system would be available on site in case of unexpected fuel or oil spills in the project area.</li></ul>
<b>Water Quality and Hydrology</b>
<ul style="list-style-type: none"><li>• All herbicides would be applied in accordance with EPA registration label requirements and restrictions. Herbicides would not be applied over open water, unless the label specifically allows such applications.</li><li>• Herbicide applicators would obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind event could occur during or immediately after spraying, which could allow runoff or drift into water bodies.</li></ul>
<b>Wildlife and Special Status Species</b>
<ul style="list-style-type: none"><li>• Exotic plant treatments would be timed to avoid sensitive seasons for wildlife and would be coordinated to avoid sensitive wildlife areas or nesting sites.</li><li>• If herbicides are to be sprayed within potential habitat for any threatened, endangered, or sensitive plant species, a survey of that habitat would be conducted, if possible. If no survey is conducted, the potential habitat would be treated as if occupied by the threatened, endangered, or sensitive plant species, and the mitigation that follows (for occupied habitats) would apply.</li><li>• Within 25 feet of any occupied threatened, endangered, or sensitive plant species habitat, there would be no spraying of herbicides from vehicles, and herbicides must be applied by hand to individual weeds (e.g., wand from backpack sprayer or on gloves, wicks, rags).</li></ul>
<b>Air Quality</b>
<ul style="list-style-type: none"><li>• The application of herbicides and use of prescribed fire would only be implemented when weather conditions are optimal. Aerial herbicide applications would not be conducted during temperature inversions.</li><li>• Specific label directions, recommendations, and guidelines (e.g., nozzle size and pressure, additives, wind speed, aircraft height, boom length, etc.) would be followed to reduce drift potential from herbicide applications. Typically, aerial spraying is only conducted when wind speeds are less than 10 miles per hour.</li><li>• The aerial application system shall include a positive shut-off valve to prevent overspray while in flight and must be adjustable for fast and accurate calibration.</li><li>• Buffer zones around any sensitive receptors would be delineated (flagged and mapped) and reviewed with the pilot prior to aerial herbicide application.</li></ul>

**TABLE 13: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES UNDER ALTERNATIVE B (CONTINUED)**

<b>Cultural Resources</b>
<ul style="list-style-type: none"><li>• Before any ground-disturbing activity occurs, the immediate area would be visually surveyed for shell middens or any historic structural remains, and if cultural deposits are identified, the park's cultural resource specialist would be notified. Findings would help guide treatment methodology.</li><li>• Close coordination among EPMT and park, regional, and Southeast Archeological Center (SEAC) staff would help identify and evaluate cultural resources in proposed treatment areas, choice of best possible treatment methodology, and identification and implementation of protective measures.</li><li>• Methodology for removing exotic plant materials from historic ruins and archeological sites would be developed in consultation with NPS cultural resource specialists (park, region, SEAC) prior to treatment. Protective measures for treatment areas within and adjacent to structures would be developed to prevent staining or other ancillary structural damage from herbicide applications. Chemical controls would not be used directly on historic fabric or historic structures in order to avoid staining.</li><li>• The exotic plant removal field crew would consult with the park archeologist before commencing work within the boundaries of historic districts or cultural landscapes. "Marker" species (either exotic or native species) for prehistoric and historic archeological sites in the park would be identified, and a listing provided to EPMT. When "marker" or ethnographically valued species are identified at a potential treatment site by EPMT: (1) the site location would be recorded; (2) park resource staff/archeologist would be notified by the EPMT of species presence and location; (3) the park would arrange for the area to be inventoried and sites to be documented and evaluated; (4) the park would consult with concerned traditional groups/tribes as appropriate; and (5) based on the above, protocols for future treatment and protection methods appropriate to the site would be developed, and alternative methods of exotic plant management would be sought.</li><li>• Archeological resources would be considered when accessing treatment sites to avoid damage from vehicles or other equipment. If previously unknown archeological resources were discovered during treatment, monitoring, or restoration activities, SEAC would be notified immediately.</li><li>• The effects of herbicides on archeological resources, such as shell, charcoal, and bone, are poorly known; however, some petroleum products can affect C 14 analyses. Sites containing these types of resources would not be treated until SEAC has an opportunity to visit the site, conduct appropriate investigations and documentation, and site importance has been determined.</li><li>• No treatment would occur within defined or potential cultural landscape areas until resources have been properly documented and evaluated. Should any species linked to historic agricultural practices (e.g., key limes, pineapples, tomatoes) be located, an individual from the park's cultural resource program would be notified prior to their removal.</li><li>• Altering hydrologic conditions could potentially result in deterioration or loss of archeological resources. This method would not be used in areas with unevaluated cultural resources or in areas containing sites that are eligible for inclusion in the National Register of Historic Places.</li><li>• Altering fire regimes through prescribed fire can damage cultural landscapes and vegetation categories valued by tribes and traditional groups and destroy archeological sites and undocumented ruins. The use of prescribed fire would be closely coordinated with the park's fire management plan, cultural resource staff, and SEAC, to prevent damage to cultural resources.</li><li>• Mechanical removal of plants and/or soils can cause damage to buried, or partially buried, archeological sites. Mechanical treatment activities would only occur on archeological sites if closely supervised by, and coordinated with, SEAC.</li></ul>
<b>Visitor Use and Experience</b>
<ul style="list-style-type: none"><li>• All treatment areas would be properly identified with signage and flagging, and, if necessary, access would be restricted to appropriate personnel.</li><li>• The use of helicopters and heavy equipment would be limited during heavy visitation periods and in high visitor-use areas.</li><li>• Park interpretive staff would make visitors aware of treatment activities and integrate the exotic plant management program into educational and interpretive activities. Signs would be placed around treatment areas to notify/educate the public about projects.</li><li>• To minimize visual impact in high visitor-use areas, exotic plant stumps would be cut to ground level when possible, or alternatively, the remaining stumps would be left with an irregular/ragged edge to imitate a natural break.</li></ul>
<b>Wilderness</b>
<ul style="list-style-type: none"><li>• A minimum tool analysis would be conducted for all projects located in designated or proposed wilderness areas. This analysis would help determine the minimum tool that is needed in order to achieve treatment objectives, while minimizing impacts to wilderness values.</li><li>• The frequency of trips and operation of equipment and vehicles would be limited in wilderness areas. Transportation to and from the treatment site would be coordinated between all personnel working on a project to limit the number of vehicles.</li></ul>

**TABLE 13: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES UNDER ALTERNATIVE B (CONTINUED)**

**Public Health and Safety**

- In treatment areas where motorboats or airboats operate, trees would be left standing or "marker trees" would be used to provide visual evidence of treated vegetation.
- Herbicides would only be applied by trained and licensed personnel, and the manufacturer's instruction for mixing, loading, and disposal of chemicals would be followed. A Material Safety Data Sheet (MSDS) for all chemicals would be readily available at storage facilities and in vehicles. Personnel would strictly adhere to the storage and labeling requirements outlined in the EPMT Operations Handbook.
- The precautions set forth in the EPMT Operations Handbook for the safe transport and mixing/loading of herbicides would be followed.
- Appropriate personal protective equipment (e.g., safety glasses, gloves, special footwear), which varies according to chemical, would be worn during the mixing and application of herbicides, as suggested on the chemical's label. In many areas, long pants and long-sleeved shirts would be required to protect against harmful native plants (such as poison ivy, cactus, and manchineel).
- A spill containment kit would always be on hand during chemical treatments; the kit would include a shovel, absorbent pads, absorbent material, and plastic bags. Herbicide applicators would be familiar with and carry spill procedures to reduce the risk and potential severity of an accidental spill. The spill procedures (as outlined in the EPMT Operations Handbook) identify methods to report and clean up spills in the event they occur.
- All treatment areas would be identified with signage and flagging, and, if necessary, access would be restricted to appropriate personnel.
- Adjacent landowners would be notified in advance of herbicide applications.

**TABLE 19: MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES UNDER ALTERNATIVE C**

<b>Native Plants / Vegetation Categories</b>
<ul style="list-style-type: none"> <li>• Areas of ground disturbance resulting from exotic plant treatment activities would be revegetated with an appropriate native plant seed mix, as necessary. No seeding of exotic plant materials would be permitted.</li> </ul>
<b>Soils</b>
<ul style="list-style-type: none"> <li>• To reduce erosion from surface disturbance, the park or contractor would be required to implement storm water pollution - prevention plan (SWPPP) measures prior to, during, and following ground-disturbing activities.</li> <li>• Soils contaminated with exotic plant seeds or reproductive vegetative material would be fully contained at the project site until removed for proper disposal at a previously determined landfill or other suitable waste management location.</li> <li>• If imported soil is required to provide substrate for new vegetation, it would be obtained from an NPS-approved source and certified weed-free.</li> </ul>
<b>Water Quality and Hydrology</b>
<ul style="list-style-type: none"> <li>• The project contractor would be responsible for installation and maintenance of all erosion and sediment control measures and the quality and quantity of offsite discharges during excavation. Excavation, topsoil storage, and revegetation operations would be carried out in such a manner that erosion and water pollution would be minimized. All applicable federal, state, territorial, and local laws would be complied with at all times.</li> <li>• The contractor would be responsible for ensuring that turbidity levels downstream are not increased, and the project site is protected from erosion.</li> <li>• Prior to beginning ground-disturbing activities for a large-scale restoration effort, the contractor would provide a SWPPP in accordance with the proposed sequence of operations and consistent with National Pollution Discharge Elimination System criteria. Prior to submittal to the NPS and appropriate state or territorial governing agency, the contractor would obtain written approval from an engineer. A notice to proceed would not be granted until a SWPPP is approved.</li> <li>• For each phase of project implementation, the contractor would install erosion-control measures after performing clearing and grubbing necessary for installation of erosion-control measures but before beginning other work for the restoration phase.</li> <li>• The contractor would not remove erosion-control measures until all upstream areas are permanently stabilized in accordance with the plans and specifications.</li> <li>• Structural measures for erosion control would be in place before disturbing soil upstream of the control measures. Structural measures must include at least the following, unless otherwise approved by the engineer: silt fencing, inlet protection, sediment basins, and storm water ponds.</li> <li>• Stockpiles of excavated topsoil and materials would be enclosed at the perimeter of the stockpile area, with silt fencing in accordance with appropriate state and territorial standards.</li> </ul>
<b>Wildlife and Special Status Species</b>
<ul style="list-style-type: none"> <li>• Active restoration activities would be timed to avoid sensitive seasons for wildlife and would be coordinated to avoid sensitive wildlife areas or nesting sites.</li> </ul>
<b>Air Quality</b>
<ul style="list-style-type: none"> <li>• The park or contractors would implement vehicle emissions controls, such as keeping equipment properly tuned and maintained in accordance with manufacturers' specifications, and implementing best management construction practices to avoid unnecessary emissions (e.g., engines would not idle).</li> <li>• In order to reduce the generation of dust, loose, stockpiled soil would be covered, and, if necessary, watering activities would be implemented.</li> <li>• Workers would be encouraged to use carpooling and other techniques to minimize the trip generation of the construction activity. Shipment of materials in full loads would also be encouraged, and heavy equipment and vehicles would be maintained to minimize pollution generation.</li> </ul>
<b>Visitor Use and Experience</b>
<ul style="list-style-type: none"> <li>• All construction equipment would be fitted with mufflers that are kept in proper operating condition, and, when possible, equipment would be shut off rather than allowed to idle. Standard noise-abatement measures would include a schedule that minimizes impacts to adjacent noise-sensitive areas, use of the best available noise control techniques wherever feasible, and use of hydraulically or electrically powered impact tools, when feasible.</li> </ul>