CHAPTER 4

Environmental Consequences

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CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The National Environmental Policy Act mandates that environmental impact statements disclose the environmental impacts of proposed federal actions. In this case, the proposed federal action is implementation of the general management plan for Fort Raleigh National Historic Site. This chapter analyzes the impacts that could result from implementing the management alternatives, as described in chapter 2, on natural resources, cultural resources, visitor use and experience, and national historic site operations and facilities. This general management plan establishes management objectives and implementation actions needed to manage Fort Raleigh National Historic Site for the next 15 to 20 years. Therefore, the analysis period of this environmental impact statement is 15 to 20 years.

The alternatives provide broad management direction for the national historic site. Because of the general, conceptual nature of the alternatives, their potential consequences can only be analyzed in general terms. Therefore, this environmental impact statement should be considered a programmatic analysis. Prior to undertaking specific actions as a result of this general management plan, appropriate detailed environmental and cultural compliance documentation would be prepared consistent with provisions of the National Environmental Policy Act, the National Historic Preservation Act, and other legal and policy requirements. The public will have the opportunity to review and comment during the implementation phase as well.

Included in chapter 4 is a summary of the laws and policies relevant to addressing environmental consequences, definitions of impact thresholds (for example, negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative effects. A summary of the environmental consequences of each alternative is provided in Table 7 in chapter 2. The impact topics presented in this chapter and the organization of the topics correspond to the discussion contained in "Chapter 3: Affected Environment".

In this chapter...

- Summary of Laws and Policies
- Impact Analysis Methodology
- Cumulative Impact Analysis
- Impact Topics

SUMMARY OF LAWS AND POLICIES

Four overarching environmental protection laws and policies guide the actions of the NPS in the management of the parks and their resources: the NPS Organic Act of 1916, the National Environmental Policy Act and its implementing regulations, the National Historic Preservation Act and its implementing regulations, and the Omnibus Management Act. For a complete discussion of these guiding and other cross-cutting regulations, refer to chapter 1 as well as Appendix B. Guiding regulations are described in brief below.

The *NPS Organic Act of 1916* (16 USC 1) commits the NPS to making informed decisions that perpetuate the conservation and protection of national historic site resources unimpaired for the benefit and enjoyment of future generations.

The *National Environmental Policy Act of 1969* is implemented through Council on Environmental Quality regulations (40 CFR 1500-1508). NPS procedures for compliance with these regulations are detailed in Director's Order 12: *Conservation Planning*,

Environmental Impact Analysis, and Decision-making Handbook (NPS 2001).

The *National Historic Preservation Act of 1966* is implemented through the Advisory Council on Historic Preservation's regulations (36 CFR 800). These regulations require that, as a federal agency, the NPS must assume responsibility for cultural resources within the parks, and must take into account the effects of NPS undertakings on these historic properties (such as cultural resources eligible for or listed on the National Register of Historic Places). NPS procedures for compliance with these regulations are outlined in Director's Orders 28 and 28A: *Cultural Resource Management* and NPS *Management Policies 2006*.

The *Omnibus Management Act* (16 USC 5901, *et seq*.) underscores the National Environmental Policy Act in that both are fundamental to national historic site management decisions. Both acts provide direction for connecting resource management decisions to the analysis of impacts and communicating the impacts of these decisions to the public using appropriate technical and scientific information. Both acts also recognize that such data may not be readily available and they provide options for resource impact analysis should this be the case. Section 4.5 of Director's Order 12 adds to this guidance by stating "when it is not possible to modify alternatives to eliminate an activity with unknown or uncertain potential impacts, and such information is essential to making a well-reasoned decision, NPS will follow the provisions of the Council on Environmental Quality regulation (40 CFR 1502.22)." If the incomplete information relevant to reasonably foreseeable significant adverse effects is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency is directed to include the information in the environmental impact statement. If the relevant information cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency is directed to include the following within the environmental impact statement:

- A statement that such information is incomplete or unavailable;
- A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
- A summary of existing credible scientific evidence relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and
- The agency's evaluation of such impacts based on theoretical approaches or research methods generally accepted in the scientific community.

The term "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason. Collectively, these guiding regulations provide a framework and process for evaluating the impacts of the alternatives proposed in this general management plan / environmental impact statement.

IMPACT ASSESSMENT METHODS

This impact analysis and conclusions are based largely on the review of existing scientific literature and studies; information provided by experts in the NPS, other agencies, universities, and the public; and professional judgment. The method of analyzing impacts is further explained below. It is important to remember that impacts have been assessed assuming mitigating measures would be implemented to minimize or avoid impacts.

A brief description of relevant components of existing conditions is presented for each impact topic in chapter 3. This information is the basis for determining the effects of implementing each alternative. The impact analysis involved the following steps:

- Define the issues of concern, based on scoping input as described in chapter 1.

- Identify the geographic area that could be affected. This varies by impact topic, and may include a specific location within national historic site boundaries or the region. Localized effects are those effects that occur directly in the immediate vicinity of the action. The region typically is defined as the area surrounding the national historic site, and is specifically addressed under each impact topic.

- Define the resources within the area that could be affected.

- Identify the effects caused by the management alternative, compare these to the No-action Alternative, Alternative A, and determine the relative change in resource conditions. For the No-action Alternative, the analysis assumes continuation of the current management direction, that is, the NPS continues to manage the national historic site to the extent possible given current conditions and constraints.

- Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision Making*, presents an approach to identifying the duration (occurs over the short or long term), type (adverse or beneficial), and intensity or magnitude (e.g., the degree, level, or strength of an impact as negligible, minor, moderate, or major) and that approach has been used in this document. Impact topic-specific thresholds for each level of intensity are provided in each impact topic methods section. Threshold values were developed based on federal and state standards and consultation with NPS and other agency resource experts. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed. Where duration is not noted in the impact analysis, it is considered long-term.

- Define whether the effect would be beneficial or adverse.

    - Beneficial effects are those that result in a positive change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.

    - Adverse effects are a change(s) that move the resource away from a desired condition or detract from its appearance or condition.

- Determine cumulative effects by evaluating the effect in conjunction with the past, on-going, or reasonably foreseeable future actions for Fort Raleigh National Historic Site and the region. Additional detail regarding the method for determining cumulative effects is provided in sections that follow.

- Determine whether impairment would occur to resources and values considered necessary and appropriate to fulfill the purposes of Fort Raleigh National Historic Site. Details regarding the method for analyzing impairment and a discussion of impairment will be provided in the record of decision.

Impacts of the alternatives are analyzed in this order: Alternative A – No-action Alternative, Alternative B, and Alternative C, the NPS Preferred Alternative. Each impact topic includes a description of the impacts of the alternative, a discussion of cumulative effects, and a conclusion. At the end of the chapter, a brief discussion of sustainability and long-term management is included for each alternative consisting of unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and effects on short-term uses and long-term productivity. The major assumptions used in the analysis of effects are described for each impact topic assessed.

CLIMATE CHANGE

The lack of qualitative information about climate change effects adds to the difficulty of predicting how these impacts would be realized in the national historic site; for example, marsh areas may be affected by sea level rise, and storm frequency and intensity may affect cultural resources and visitor amenities. The range of variability in the potential effects of climate change is large in comparison to what is known about the future under an altered climate in the national historic site in particular, even if larger-scale climatic patterns have been accurately predicted for the Atlantic Coast (Loehman and Anderson 2009). Therefore, the potential effects of this dynamic climate on national historic site resources were included in "Chapter 3: Affected Environment." These effects are not analyzed in detail in "Chapter 4: Environmental Consequences" under each alternative because of the uncertainty and variability of outcomes and because these impacts are not expected to differ among the alternatives.

CUMULATIVE IMPACT ANALYSIS

The Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act require assessment of cumulative impacts in the decision-making process for federal actions (40 CFR 1508.7). Cumulative impacts are defined as "incremental impacts of the action when added to other past, on-going, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other action." Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The time horizon for the cumulative impacts analysis depends on the impact topic under consideration, but for most topics, was plus or minus 20 years, unless otherwise noted.

Cumulative impacts were determined by combining the impacts of each management alternative with known past, on-going, and reasonably foreseeable future actions. Other management actions that have the potential to have a cumulative effect in conjunction with measures that would be implemented in this general management plan were identified in chapter 1 under the "Relationship of Other Planning Efforts to This General Management Plan" section. Cumulative impacts are considered for all management alternatives, including the No-action Alternative – Alternative A.

In addition to specific agency actions and programs, other activities would continue within the national historic site or in the region that would cumulatively impact resources. These would include a variety of past, on-going, and future actions and events that would have effects on resources within the boundaries of the national historic site. These would include the effects of the following past, on-going, and future actions.

Past Actions

- **Adjacent real estate development.** Development activities on nearby lands outside the national historic site contribute to habitat fragmentation that affect the national historic site's fauna in terms of foraging habits, nesting, resting, or

disruption of living patterns. For species that are not mobile, such as plants, habitats may have been adversely affected, or individual populations may have been moved or eliminated. Cultural resources may have been disturbed or eliminated as development occurred on Roanoke Island.

- ***Dare County Land Use Plan.*** The 2009 *Dare County Land Use Plan* (updated and approved in 2011) identified the future land uses of properties surrounding the national historic site as community residential. The properties on the north end of Roanoke Island are comprised of platted subdivisions that are considered stable under the plan. Areas designated as community residential are predominately developed with low density residential dwellings, however other uses include small businesses, government services, education services, and passive recreation. The national historic site is zoned conservation.

- ***Dare County Community Transportation Service Plan* (Dare County 2010).** The plan provides recommendations over a five-year planning horizon to increase the mobility needs of the general public and targeted populations within Dare County. Among the recommendations are the exploration of charging a fare and consideration of ways to launch a trolley/shuttle service potentially beginning with a pilot project on Roanoke Island to serve tourist-based demand.

- **Continued overflights from Dare County Regional Airport.** The Dare County Regional Airport is located to the southeast of the national historic site and operates year round, with highest usage during the summer months (NPS 2008b). Commercial, personal, and emergency response flights that utilize the airport cause temporary impacts to soundscapes in the national historic site. Past surveys (1998) indicate moderate to major concerns from air tour overflights at Fort Raleigh National Historic Site (Vorhees and Krey 1999).

On-going Actions (past actions plus the following)

- **Increased vehicle traffic.** Town of Manteo events, activities at other regional attractions, and summer beach traffic will continue to occur.

- **Construction of the Administrative Headquarters and Visitor Center Facility, Alligator River National Wildlife Refuge.** Completion of the U.S. Fish and Wildlife Service's Administrative Headquarters and Visitor Center Facility at Alligator River National Wildlife Refuge would provide visitors to Roanoke Island opportunities to learn about the region's natural history and other interpretive themes.

- **Installation of a county waterline.** An eight-inch waterline was installed along old Highway 64 and planned to be extended along Pearce Road into the Heritage Point Community. The water line will supply drinking water to residences and businesses as well as improve emergency water response. Waterlines will be located in the public right of way where possible.

Future Actions (present actions plus the following)

- **Potential development of undeveloped land within the boundary of the national historic site.** Future development of land

that is owned and managed by the Roanoke Island Historical Association within the boundary of Fort Raleigh National Historic Site may impact natural and cultural resources. The level of disturbance and impact would be dependent on the size of the development and the amount of land cleared for construction. However, impacts associated with future development cannot be determined at this time.

- **Connection to the county waterline and installation of new waterlines throughout Fort Raleigh National Historic Site.** While not currently planned, future development on Roanoke Island may require additional water lines and other utilities to cross NPS lands. Future compliance would be required and determined during design of utility systems.

- **Potential for military training operations, overflights.** Future potential for the location of a Navy Outlying Landing Field (OLF) along coastal areas of North Carolina may increase the frequency of air traffic over or near the national historic site. Location of the outlying landing field would be subject to federal compliance and agency coordination.

- **US 64 widening project.** Project to widen the 27.3-mile segment of US 64 from Columbia (Tyrrell County) to US 264 (Dare County near Manns Harbor) and replace the Lindsay C. Warren Bridge across the Alligator River (NCDOT N.D.). This effort includes: widening of US 64 (multi-lanes) east of Columbia to east of the Alligator River (Funded 2011-2015); and widening of US 64 (multi-lanes) east of the Alligator River to US 264 (Funded 2016-2020)

- **Future revision(s) of the Land Use Plan for Dare County.** Revisions to the *Dare County Land Use Plan* may occur within the 15- to 20- year planning horizon of this general management plan. The national historic site would continue to participate in state, regional, and local planning efforts.

- **Dare County Regional Airport Expansion.** Expansion of Dare County Regional Airport runways to accommodate small jet traffic may increase overflight frequency and impacts to the national historic site's natural soundscape. Currently, the national historic site is not in line with a regular flight pattern, so overflights are sporadic and are not a current concern. There is potential for overflights to become a concern in the future, if expansion of the Dare County Regional Airport takes place. An update on the future projections for the Dare County Regional Airport (e.g., frequency of flights, etc.) is needed to provide baseline sound data and to mitigate potential future impacts of an expansion of Dare County Regional Airport.

FLOODPLAINS

Methods

Floodplain issues raised during public meetings and planning workshops were general in terms of protection of national historic site resources and habitat preservation. Potential adverse effects of the alternatives on floodplains were assessed based on a qualitative analysis of the potential for locating facilities in or near floodplains, the relative extent of the effects, and the effectiveness of mitigation measures employed. The geographic area analyzed is the entire area within the boundaries of the national historic site unless otherwise noted.

The major assumptions used in the analysis were: (1) facilities would be sited to avoid floodplains when possible and if construction within a floodplain is unavoidable, impacts would be mitigated in accordance with NPS polices; (2) facility construction would be dependent on availability of funding and environmental review; (3) for purposes of this analysis, storm surge areas are considered in each alternative's impact scenario due to overlap between floodplains and storm surge areas; (4) impacts related to shoreline erosion will be addressed under a shoreline erosion management plan and related National Environmental Policy Act assessment; and (5) under all alternatives, best management practices for construction would be implemented on any construction project proposed by the national historic site, and potentially adverse effects of construction on floodplains would be minimized by implementation of site-specific mitigation measures identified in environmental assessments tiered to this general management plan/environmental impact statement. Effects of individual projects on floodplains would be effectively assessed, and mitigation measures employed.

> It is NPS policy to preserve **floodplain** values and minimize potentially hazardous conditions associated with flooding. (NPS Director's Order 77-2)

If, during the implementation phase, a proposed action is located within an applicable regulatory floodplain and relocating the action to a non-floodplain site is considered not to be a viable alternative, then flood conditions and associated hazards would be quantified as a basis for management decision-making and a formal Statement of Findings would be prepared with environmental compliance documentation. The Statement of Findings would describe the rationale for selection of a floodplain site, disclose the amount of risk associated with the chosen site, and explain flood mitigation plans. The Statement of Findings would be available for public review and comment by including the document in applicable National Environmental Policy Act compliance documentation. For future facilities in the national historic site, site-specific environmental assessments would be prepared.

Impact Threshold Definitions

The thresholds to determine the intensity of impacts on floodplains are defined as follows:

Negligible: Impacts would result in a change to floodplain functions and values, but the change would be so slight that it would not be of any measurable or perceptible consequence.

Minor: Impacts would result in a detectable change to floodplain functions and values, but the change would be expected to be small, of little consequence, and localized. There would be no appreciable increased risk to life or property. Mitigation measures, if needed to reduce adverse effects, would be simple and successful.

Moderate: Impacts would result in a change to floodplain functions and values that would be readily detectable and relatively localized. Location of operations in floodplains could increase risk to life or property. Mitigation measures, if needed to reduce adverse effects, could be extensive, but would likely be successful.

Major: Impacts would result in a change to floodplain functions and values that would have substantial consequences on a regional scale. Location of operations would increase risk to life or property. Extensive mitigation measures would be needed to reduce any adverse effects, and their success would not be guaranteed.

Duration: Long-term: The floodplain takes longer than one year to recover or the effect is almost permanent.
Short-term: The floodplain recovers in less than one year from any action taken.

Impacts of Alternative A, the No-action Alternative

No new construction is proposed under Alternative A and continued, routine maintenance activities would occur. Maintenance of existing facilities including the trail system would occur. Natural processes such as shoreline erosion would be allowed to prevail in most areas. Shoreline erosion is dramatically apparent in coastal high hazards areas (Zone V) along the north shore of Roanoke Island that have not been hardened by rock revetment, groins, breakwaters, and/or offshore sills. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the shoreline erosion management plan. Placement of structural stabilization measures could alter the hydrologic relationship between open water and the floodplain during high water events (such as altered water flow, inundation rates, groundwater, etc). Further studies are necessary to determine the level and type of effect in a comprehensive manner. This would result in long-term, negligible, and adverse effects by altering shoreline and floodplain functions and the interconnectivity between shoreline and floodplain functions. Under Alternative A, the Waterside Theatre area and Dough Cemetery shorelines would continue to be protected. Overall, continuation of existing management practices under Alternative A would have long-term, negligible, adverse effects on floodplains.

Cumulative Impacts

Within the national historic site, the impacts of other actions would contribute to cumulative impacts on floodplains, including the following:

Floodplains in the national historic site would continue to be affected by development outside the national historic site including residential development and shoreline protective measures outside of the national historic site. These may adversely influence floodplain function and values within the national historic site and additional studies would be necessary to determine effects on a comprehensive basis. Future transportation projects involving the widening of US 64 and replacement of the Lindsay C. Warren Bridge across the Alligator River are unlikely to adversely affect floodplains within the Fort Raleigh National Historic Site. Collectively, these past, ongoing, and future actions would have long- and short-term, minor, adverse impacts on floodplains.

Shoreline erosion is dramatically apparent in coastal high hazards areas at the national historic site.

When the long- and short-term, minor, adverse effects of other past, ongoing, and future projects and activities affecting floodplains are combined with the long-term, negligible, adverse effects from management actions proposed under Alternative A, the resulting cumulative effects are expected to continue to be long- and short-term, minor, and adverse. The adverse effects of Alternative A would contribute a small increment to the overall adverse cumulative impact.

Conclusions

Overall, continuation of existing management practices under Alternative A would have long-term, negligible, adverse effects on floodplains. When the long- and short- term, minor, adverse effects of other past, ongoing, and future plans, projects and activities affecting floodplains are combined with the long-term, negligible, adverse effects from management actions proposed under Alternative A, the resulting cumulative effects are expected to continue to be long- and short-term, minor, and adverse. The adverse effects of Alternative A would contribute a small increment to the overall adverse cumulative impact.

Impacts of Alternative B

Under Alternative B, planned construction activities include a small, outdoor seating area, expansion of parking at headquarters (eight spaces), the extension of the Roanoke Island multi-use trail into the national historic site, and establishing a parallel trail or loop trail to the Freedom Trail. Site selection would avoid floodplains where possible.

NPS policy gives preference to locating, or relocating, proposed construction outside and not affecting the regulatory floodplain. Mitigation measures would be applied if other management considerations exist which clearly favor locating an action in a regulatory floodplain, such as shoreline protection structures which must be located in the floodplain. Mitigation may consist of any combination of structural flood protection measures, specific actions to minimize impacts to floodplain natural resource values, effective flood warning, and flood evacuation where appropriate. Mitigation and compliance with regulations and policies to prevent impacts to water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after facility construction and upgrades. These requirements would be applicable to action alternatives.

Overall, implementation of management actions proposed under Alternative B would have long- and short-term, negligible, adverse effects on floodplains.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, minor, adverse effects. When the long- and short-term, minor, adverse effects of other past, ongoing, and future plans, projects, and activities affecting floodplains are combined with the long- and short-term, negligible, adverse effects of actions under Alternative B, the resulting cumulative effects would be long- and short-term, minor, and adverse. The adverse effects of Alternative B would contribute a small increment to the overall adverse cumulative impact.

Conclusions

Overall, implementation of management actions proposed under Alternative B would have long- and short-term, negligible, adverse effects on floodplains. When the long- and short-term, minor, adverse effects of other past, ongoing, and future plans, projects, and activities affecting floodplains are combined with the long- and short-term, negligible, adverse effects of actions under Alternative B, the resulting cumulative effects would be long- and short-term, minor, and adverse. The adverse effects of Alternative B would contribute a small increment to the overall adverse cumulative impact.

Impacts of Alternative C (NPS Preferred Alternative)

Under Alternative C, the only planned construction activities would be a small, outdoor seating area, expansion of parking at headquarters (eight spaces), and establishing a parallel trail or loop trail to

the Freedom Trail. Floodplains would be avoided during the site selection and design process. Similar to Alternative B, Alternative C would have long- and short-term, negligible, adverse effects on floodplains.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, minor, adverse effects. When the long- and short-term, minor, adverse effects of other past, ongoing, and future plans, projects, and activities are combined with the long- and short-term, negligible, adverse effects of actions under Alternative C, the resulting cumulative effects on floodplains would be long- and short-term, minor, and adverse. The adverse effects of Alternative C would contribute a small increment to the overall adverse cumulative impact.

Conclusions

Similar to Alternative B, Alternative C would have long- and short-term, negligible, adverse effects on floodplains. When the long-and short-term, minor, adverse effects of other past, ongoing, and future plans, projects, and activities are combined with the overall effects under Alternative C, the resulting cumulative effects on floodplains would be long- and short-term, minor, and adverse. The adverse effects of Alternative C would contribute a small increment to the overall adverse cumulative impact.

WETLANDS

Methods

Wetland protection was identified as an issue since these natural resources could potentially be affected by construction and operation of new national historic site facilities including trails. Potential effects of the management alternatives on wetlands were determined by comparing potential locations of facilities with available wetland maps and a conclusion was made regarding potential effects where possible. The National Wetlands Inventory location map was used as the basis for the impact assessment (USFWS 2011). The geographic area analyzed is the entire area within the boundaries of the national historic site unless otherwise noted.

> It is NPS policy to 1) to provide leadership and to take action to minimize the destruction, loss, or degradation of **wetlands**; 2) to preserve and enhance the natural and beneficial values of wetlands; and 3) to avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands.
> (NPS Director's Order 77-1)

In all cases, the national historic site would adhere to section U.S. Environmental Protection Agency 404(b) (1) guidelines to avoid and minimize potentially adverse effects on wetlands. Restoration or enhancement of wetlands to reduce any unavoidable losses would be taken as the last step in this process, as required. In addition, NPS guidelines for mapping and avoiding wetlands would also be followed. The NPS requirements are more restrictive than the U.S. Environmental Protection Agency 404(b) (1) guidelines.

The major assumptions used in the analysis were as follows: (1) effects of direct physical disturbance (excavation or filling) to wetlands within the national historic site boundaries would be completely avoided by complying with NPS Director's Order 77-1: *Wetland Protection*, and by completion of site-specific environmental assessments tiered to this document; (2) that effects on wetlands resulting from implementation of an alternative would be a direct result of construction and operation of national historic site facilities; (3) impacts to wetlands

as a direct result of shoreline erosion will be addressed under a shoreline erosion management plan and related National Environmental Policy Act assessment; and (4) the mitigation measures and best management practices presented in chapter 2 would be implemented for projects that have the potential to impact wetlands.

Impact Threshold Definitions

The thresholds to determine the intensity of impacts on wetlands are defined as follows:

Negligible: Wetland habitats would not be affected or else the effects would be at or below the level of detection and would not be measurable or of perceptible consequence to wetland plant and animal populations.

Minor: Effects on wetland habitats would be measurable or perceptible. While mortality of individual plants and animals might occur, the viability of wetland populations and habitats would not be affected and the community, if left alone, would recover.

Moderate: A change in wetland habitats would occur. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of populations of plants and animals. Mitigation measures would be necessary to reduce adverse effects and would likely be successful.

Major: Effects on wetland habitats would be readily apparent and measurable. Extensive mitigation would be needed to reduce adverse effects, and the success of mitigation measures could not be assured.

Duration: Long-term: Effects last more than one year.
Short-term: Effects last less than one year.

Impacts of Alternative A, the No-action Alternative

Under Alternative A, no new facilities would be constructed by the NPS within the national historic site boundaries; therefore, there would not be construction-related effects to wetlands. Natural processes such as shoreline erosion would be allowed to prevail in most areas, including the pond on the north shore, adjacent to US 64. This pond is considered a wetland. The spit of shoreline dividing the pond would be expected to be breached during storm activity, thereby affecting the ponded wetland status. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the shoreline erosion management plan. This would result in long-term, beneficial impacts on wetland functions by providing direction for future wetland management.

A technical assistance request has been made through the Natural Resource Program Center to assist the Outer Banks Group of the National Parks regarding wetlands at the Fort Raleigh National Historic Site. The request is for assistance to delineate wetlands and develop appropriate management strategies for their continued protection. The national historic site would continue to monitor, manage and protect wetlands under existing management efforts. Overall, management actions taken under Alternative A would have long-term, beneficial effects on wetlands.

Cumulative Impacts

Within and in the vicinity of the national historic site, the impacts of other actions would contribute to cumulative impacts on wetlands, including the following:

Connection to the Dare County waterline and installation of new waterlines throughout the national historic site may affect wetlands if avoiding wetland areas during construction activities was not

feasible. Wetlands would be delineated prior to any construction activity, and avoided where possible. These activities would be subject to the Clean Water Act, Section 404 permitting, construction best management practices and mitigation measures proposed under site-specific assessments that would tier to this general management plan/ environmental impact statement. This would result in short- and long-term, negligible, adverse impacts to wetlands.

Past and potential future development of land adjacent to and in the vicinity of the national historic site would result in long-term, minor, adverse impacts on wetlands. However, the *Dare County Land Use Plan* and mitigation actions implemented in response to individual developments would serve to limit future adverse effects on wetlands.

Collectively, past, ongoing, and future actions would have long- and short-term, negligible to minor, adverse impacts on wetlands.

When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects, and activities affecting wetlands are combined with long-term, beneficial impacts to wetlands under Alternative A, the resulting cumulative effects would be considered long- and short-term, negligible to minor, and adverse. The beneficial effects of Alternative A would contribute a small increment to reduce the overall adverse cumulative impact.

Conclusions

Overall, continuation of management actions taken under Alternative A would have long-term, beneficial effects on wetlands. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects, and activities affecting wetlands are combined with long-term, beneficial impacts to wetlands under Alternative A, the resulting cumulative effects would be considered long- and short-term, negligible to minor, and adverse. The beneficial effects of Alternative A would contribute a small increment to reduce the overall adverse cumulative impact.

Great blue heron (*Ardea herodias*)

Impacts of Alternative B

Similar effects as those described under Alternative A are applicable to Alternative B based on the continuation of existing resource management practices and plans to delineate wetlands on-site. However, the establishment of management zones under Alternative B would protect the majority of the national historic site under the Resource Preservation Zone providing long-term beneficial effects. Potential development of limited new trails (establishing a parallel trail to Freedom Trail and extension of the multi-use trail into the national historic site) would avoid wetlands where possible. However, if wetlands could not be avoided, the potential negative impacts would be mitigated through the use of elevated walkways above the wetlands. An environmental assessment would be completed for any proposed trail, and mitigation measures would be employed to avoid or minimize impacts on wetlands. The overall beneficial effects provided by existing resource management efforts and establishment of management zones would reduce adverse impacts caused by new trail

and facility development. Therefore, the overall effect on the national historic site's wetlands as a result of implementation of Alternative B would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible to minor, and adverse effects. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects, and activities affecting wetlands are combined with the long- and short-term, beneficial impacts of Alternative B, the resulting cumulative effects would be considered long- and short-term, negligible, and adverse. The adverse effects of Alternative B would contribute a modest increment to reduce the overall adverse cumulative impact.

Conclusions

Overall, implementation of management actions proposed under Alternative B would have long- and short-term, beneficial effects. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects, and activities affecting wetlands are combined with the long- and short-term, beneficial impacts of Alternative B, the resulting cumulative effects would be considered long- and short-term, negligible, and adverse. The adverse effects of Alternative B would contribute a modest increment to reduce the overall adverse cumulative impact.

Impacts of Alternative C (NPS Preferred Alternative)

Similar effects as those described under Alternative A are applicable to Alternative C with regards to the continuation of existing resource management practices. However, the establishment of management zones under Alternative C would protect the majority of the national historic site under the Resource Preservation Zone providing long-term, beneficial effects.

Under Alternative C, visitors would be encouraged to experience outlying national historic site resources independently through formal interpretive trails. Potential development of limited new trails (establishing a parallel trail to Freedom Trail and extension of the multi-use trail into the national historic site) would avoid wetlands where possible. However, if wetland areas could not be avoided, the potential negative impacts would be mitigated by such means as elevated walkways above the wetlands. Potential increases in limited trail development would also result in an introduction of visitors in previously undisturbed areas of the national historic site. This would provide an opportunity for visitors to learn about wetlands and increase stewardship of these areas. Signage and education would encourage visitors to remain on trails. An environmental assessment would be completed for any proposed trail or facility, and mitigation measures would be employed to avoid or minimize impacts on wetlands.

The overall beneficial effects provided by existing resource management efforts and establishment of management zones would reduce adverse impacts caused by new trail development. Therefore, the overall effect on the national historic site's wetlands as a result of implementation of Alternative C would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible to minor, adverse effects. When the long- and short-term, negligible to minor, adverse effects of other past, on-

going, and future plans, projects, and activities affecting wetlands are combined with long- and short-term, beneficial impacts of Alternative C, the resulting cumulative effects would be considered long- and short-term, negligible, and adverse. The adverse effects of Alternative C would contribute a modest increment to reduce the overall adverse cumulative impact.

Conclusions

Overall, management of the national historic site under Alternative C would have long-and short-term, beneficial effects on wetlands. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects, and activities affecting wetlands are combined with the beneficial impacts of Alternative C, the resulting cumulative effects would be considered long-and short-term, negligible, and adverse. The adverse effects of Alternative C would contribute a modest increment to reduce the overall adverse cumulative impact.

SPECIES OF CONCERN

Methods

This impact topic is included to address planning team and other agency concerns regarding protection of species of concern. Impacts on species of concern were evaluated and determined qualitatively based on the existing literature, professional judgment of NPS staff, U.S. Fish and Wildlife Service, North Carolina Natural Heritage Program, and consultants. The primary sources of information used in this analysis include existing literature for each species, national historic site management documents, NPS research and documents, North Carolina Natural Heritage Program published and unpublished research, and unpublished observations and insights from knowledgeable national historic site staff and experts. Based on this analysis, anticipated impacts to federally listed and state listed species that are known or have the potential to occur and the distribution of their preferred habitat within the national historic site are discussed in this section. The geographic area analyzed is the entire area within the boundaries of the national historic site unless otherwise noted.

> The NPS is required under the **Endangered Species Act** to ensure that federally listed species and their habitats are protected on all lands within the agency's jurisdiction. In addition, the NPS manages state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. (NPS Management Policies 2006)

Federally listed threatened, endangered, or special concern species assessed include the West Indian manatee, black rail, loggerhead sea turtle, northern diamondback terrapin, and the shortnose sturgeon. Actions proposed under the alternatives discussed in this general management plan would not affect (a "no effect" Endangered Species Act Section 7 determination) aquatic habitat of the West Indian Manatee, loggerhead sea turtle, and the short-nose sturgeon. While these marine species of concern may have been historically known, presently known, or potentially occur in or near the national historic site, actions proposed under this general management plan would not directly or indirectly affect listed species or adversely modify designated critical habitat of these species. These marine species would be further addressed in the shoreline erosion management plan and related National Environmental Policy Act assessment prior to any protection or modification of the national historic site's shoreline. No new development would occur under any of the alternatives on NPS marsh lands within the national historic site boundary south of U.S. 64/264. Therefore, the West Indian manatee, loggerhead sea turtle, and shortnose sturgeon were dismissed from further

analysis. (See also "Species of Concern" section in chapter 3, and Appendix C).

Impacts associated with visitor use and facility development (particularly trails) and associated use are also described under the vegetation and wetlands impact topics and would also apply to the species of concern. Therefore, the reader is encouraged to read these descriptions of activities that have potential to disturb and/or alter habitats within the national historic site.

The NPS considers how to protect and perpetuate federally and state listed species during national historic site management planning, and consults with lead federal and state agencies as appropriate. NPS will, to the greatest extent possible, inventory, monitor, and manage state-listed species in a manner similar to the treatment of federally listed species.

Impact Threshold Definitions

The thresholds to determine the intensity of impacts on species of concern are defined in the paragraphs that follow.

Negligible: No species of concern would be affected, or the action would affect an individual of a listed species or its critical habitat, but the change would not be measurable or perceptible and would be within the range of natural variability.

Minor: The action would result in detectable impacts to an individual (or individuals) of a species of concern or its habitat, but they would be within the range of natural variability both spatially and temporally. No interference with feeding, reproduction, or other activities affecting population viability would result from impacts. Sufficient functional habitat would remain to support viable populations.

Moderate: An action would result in detectable impacts on individuals or population of a species of concern, habitat, or the natural processes sustaining them. Key ecosystem processes may experience disruptions that may result in population or habitat condition fluctuations that would be outside the range of natural variation (but would return to natural conditions).

Major: Individuals or population of a species of concern, habitat, or the natural processes sustaining them would be measurably affected. Key ecosystem processes might be permanently altered resulting at the population level and permanently modifying habitat.

Duration: Long-term: Effects on listed species would occur for greater than one year. Short-term: Effects on listed species would occur for less than one year.

Impacts of Alternative A, the No-action Alternative

Federally Listed Species. Under Alternative A, species of concern in the national historic site would continue to be managed under existing practices. Development and implementation of management plans, including the resource stewardship strategy, fire management plan, and shoreline erosion management plan, would provide long-term, beneficial effects through improved management efforts with regard to species of concern and their habitats. This would include, respectively, providing recommendations to manage species of concern in concert with other national historic site resources with input from stakeholders and subject matter experts on species of concern and habitats; using prescribed burns and managing the effects of fire to improve vegetation conditions and habitats where appropriate, and increase safe conditions within the national historic site as well as adjacent lands; and provide recommendations and management alternatives to managing the national historic site's changing shoreline and associated terrestrial habitats. A summary of these other past, present and future plans is included in chapters 1 and 2.

Completion of an inventory and mapping of rare plant species in the Outer Banks Group of parks, as well as training for national historic site staff would provide long- and short-term, beneficial effects from monitoring and protection of listed species. The brackish marsh located south of U.S. 64/264 has been identified as preferred habitat for the black rail and northern diamondback terrapin. No new construction would occur under Alternative A, causing no effect to species of concern or their habitat. Invasive species control, especially of common reed in the brackish marsh area, would continue to provide beneficial effects to the habitat of federally listed species of concern. Continuation of existing national historic site management practices would preserve habitat with beneficial effects to federally listed species. Under Alternative A, the overall effects to federally listed species of concern would be long- and short-term, and beneficial.

State-listed Species. North Carolina lists the following species as threatened, endangered, special concern or significantly rare: bald eagle, black-throated green warbler, peregrine falcon, Carolina watersnake, giant swallowtail butterfly, northern oak hairstreak butterfly, little metalmark, blue witch grass, ringed witch grass, moundlily yucca, twig-rush, saltmarsh spikerush, and winged seedbox. These species occur in a variety of habitats within the national historic site. Because no new construction would be proposed under Alternative A, no physical disturbance or alteration of state-listed species habitat would occur. Continued control of non-native invasive species (especially common reed) within the national historic site would result in conditions that are beneficial to preserving habitat and minimizing impacts to state-listed species. Completion of an inventory and mapping of rare plant species in the national historic site, as well as training for national historic site staff would provide long- and short-term, beneficial effects to listed plant species. Under Alternative A, the overall effects to state-listed species of concern would be long- and short-term, beneficial.

Cumulative Impacts

Within and in the vicinity of the national historic site, the impacts of other actions would contribute to cumulative impacts on species of concern, including the following:

Construction of the Administrative Headquarters and Visitor Center Facility at Alligator River National Wildlife Refuge may provide additional natural resource interpretation and education to national historic site visitors. Increased awareness of species of concern in the Outer Banks region of North Carolina would provide long-term, beneficial effects.

Potential impacts to species of concern associated with possible development of land within the boundary of the national historic site that is owned and managed by the Roanoke Island Historical Association could affect the Fort Raleigh Maritime Forest and associated species. The level of impact would be dependent on the size of the development and the amount of land cleared for construction, and cannot be determined at this time. Development activities on nearby lands outside the national historic site contribute to habitat fragmentation that effect species of concern in terms of foraging habits, nesting, resting, or disruption of living patterns. For species that are not mobile, such as plants, habitats or individual populations may be moved or eliminated.

Actions related to regional development projects including future potential expansion of Dare County Regional Airport runways to accommodate small jet traffic, potential military training operations (overflights), and highway road widening may contribute adverse effects to species of concern. The NPS would continue to coordinate with other agencies regarding regional impacts that would affect species

of concern or habitat within the national historic site. Species-specific effects would be analyzed in future compliance and coordination with federal, state, and local agencies prior to actions that may affect listed species.

Collectively, past, ongoing, and future actions would have long- and short-term, minor to moderate, adverse impacts on both federally and state listed species of concern.

When the long- and short-term, minor to moderate, adverse effects of other past, on-going, and future plans, projects, and activities affecting federal and state listed species are combined with the long- and short- term beneficial impacts under Alternative A, the resulting cumulative effects would be long-term, minor, and adverse. This is primarily the result of effects of actions outside the national historic site that contribute to habitat fragmentation. The long-and short-term beneficial effects of Alternative A would contribute a small increment to reduce the overall adverse cumulative impact.

Conclusions

Continuation of existing national historic site management practices would result in conditions that are beneficial to preserving habitat and minimizing impacts on federally listed species habitat. Under Alternative A, the overall effects to federally and state listed species of concern would be long- and short-term, and beneficial. When the long- and short-term, minor to moderate, adverse effects of other past, on-going, and future plans, projects, and activities affecting federally and state listed species of concern are combined with long- and short-term, beneficial impacts under Alternative A, the resulting cumulative effects would continue to be long-term, minor, and adverse. The beneficial effects of alternative A would contribute a small increment to reduce the overall adverse cumulative impact.

Impacts of Alternative B

Federally Listed Species. Similar effects as those described under Alternative A are applicable to Alternative B based on the continuation of existing resource management practices and plans. Under Alternative B, limited new construction (expansion of parking at headquarters [eight spaces]), establishing a parallel trail to the Freedom Trail, extension of the multi-use trail into the national historic site, and construction of a small outdoor seating area) would occur in the national historic site north of U.S. 64/264. No new facilities would be planned in the marsh area south of U.S. 64/264 under Alternative B, causing no effect to the black rail or northern diamondback terrapin or associated habitat. Creation of the Resource Preservation Zone under Alternative B would provide for protection of the majority of the national historic site (including the brackish marsh area) resulting in conditions that are beneficial to preserving habitat and minimizing habitat impacts to federally listed species of concern. Similar to Alternative A, continuation of invasive species control, especially of common reed in the marsh area south of U.S. 64/264, would continue to provide indirect long-term, beneficial effects to habitat of federally listed species of concern: black rail and northern diamondback terrapin. Under Alternative B, the overall effects to federally listed species of concern would be long-and short-term, and beneficial.

State-listed Species. General effects to state-listed species of concern addressed under Alternative A would also apply to Alternative B. Continued control of non-native invasive species (especially common reed) within the national historic site would result in conditions that are beneficial to preserving habitat and minimizing impacts to state-listed species. Completion of an inventory and mapping of state-listed plant species in the national historic site, as well as training for national historic site staff would

provide long-term beneficial effects to listed plant species.

Under Alternative B, limited new construction in the national historic site could potentially affect state-listed species of special concern. Appropriate site-specific environmental compliance would be completed to determine the potential for species or associated habitat to be present, and impacts would be avoided. State-listed plants would be relocated to more remote areas away from trails as necessary to avoid unintentional disturbance, trampling or erosion effects. The majority of the national historic site would be zoned as the Resource Preservation Zone, thereby protecting habitats of state-listed species. Resource management and protection efforts would continue to occur under Alternative B. Under Alternative B, the overall effects to state-listed species of concern would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, minor to moderate, adverse effects. When the long- and short-term beneficial effects of management actions implemented under Alternative B are taken in combination with the long- and short-term, minor to moderate, adverse effects of other past, on-going, and future projects, plans, or actions on federal and state listed species of concern, the cumulative effects would be long- and short-term, minor, and adverse. The beneficial effects of Alternative B would contribute a small increment to reduce the overall adverse cumulative impact.

Conclusions

Similar to Alternative A, continuation of invasive species control, especially common reed in the marsh area south of U.S. 64/264, would continue to provide indirect beneficial effects to habitat of federally listed species of concern: black rail and northern diamondback terrapin. Under Alternative B, the overall effects to state-listed species of concern would be long- and short-term, beneficial. When the long- and short-term beneficial effects of management actions implemented under Alternative B are taken in combination with the long- and short-term, minor to moderate, adverse effects of other past, on-going, and future projects, plans, or actions on federally and state listed species of concern, the cumulative effects would be long- and short-term, minor, and adverse. The beneficial effects of Alternative B would contribute a small increment to reduce the overall adverse cumulative impact.

Impacts of Alternative C (NPS Preferred Alternative)

Federally Listed Species. Similar effects as those described under Alternative A are applicable to Alternative C based on the continuation of existing resource management practices and plans. Effects to the federally listed black rail and northern diamondback terrapin would be the same as those described under Alternative B: long- and short-term, and beneficial.

State-listed Species. Effects to the state-listed species of special concern would be the same as those described under Alternative B. Under Alternative C, the overall effects to state-listed species of concern would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, minor to moderate, adverse effects. When the long- and short-term, beneficial effects of management actions implemented under Alternative C are taken in combination with the long- and short-term, minor to moderate, adverse effects of other past,

on-going, and future projects, plans, or actions on federally and state listed species, the cumulative effects would continue to be long- and short-term, minor, and adverse. The beneficial effects of Alternative C would contribute a small increment to reduce the overall adverse cumulative impact.

Conclusions

Effects to the federally and state listed species of concern would be the same as those described under Alternative B: long- and short-term, beneficial. When the long- and short-term, beneficial effects of management actions implemented under Alternative C are taken in combination with the long- and short-term, minor to moderate, adverse effects of other past, on-going, and future projects, plans, or actions on federally and state listed species of concern, the cumulative effects would continue to be long- and short-term, minor, and adverse. The beneficial effects of Alternative C would contribute a small increment to reduce the overall adverse cumulative impact.

VEGETATION

Methods

Vegetation issues identified during public meetings and planning workshops were primarily related to maintenance of the cultural landscape at the national historic site as well as control of invasive plants. To address these issues, an assessment of the effects of projected national historic site management actions on vegetation was made using qualitative estimates of the expected levels of visitor use and expected levels of land-disturbing activities within the national historic site (removal of the Prince and Beehive houses and trail work, for instance), and the effects were compared to Alternative A. The primary sources of information used in this analysis include NPS plant species inventories, North Carolina Natural Heritage Program data, NPS policy documents, NPS research, and unpublished observations and insights from knowledgeable national historic site staff. The area analyzed for possible effects on vegetation encompasses the national historic site.

The major assumptions used in the analysis of effects on vegetation were that: (1) increased visitor use could potentially translate to greater impacts to vegetation communities through increased trail usage and incidental off-trail or unauthorized trail activity; (2) the national historic site would continue to identify and manage non-native plant populations as staffing and funding allows; (3) removal of the Prince and Beehive houses proposed under all alternatives may affect vegetation during demolition, however these impacts would be reduced as the area is returned to its natural (undeveloped) state; (4) impacts to vegetation as a direct result of shoreline erosion will be addressed under a shoreline erosion management plan and related National Environmental Policy Act assessment; and (5) under all alternatives, best management practices for construction would be implemented on any construction project proposed by the national historic site, and potentially adverse effects of construction on vegetation would be minimized by implementation of site-specific mitigation measures identified in environmental compliance documentation tiered to this general management plan/ environmental impact statement. Effects of individual projects on vegetation would be effectively assessed, and mitigation measures employed.

Vegetation at the national historic site was inventoried in 2010 by the North Carolina Natural Heritage Program. The site contains four distinct vegetation communities: Maritime Evergreen Forest, Successional Wet Pine Flatwoods and Coastal Fringe Sandhill, Tidal Cypress – Gum Swamp, and Tidal Freshwater Marsh.

Visitor use can impact vegetation through different means, including trampling of vegetation when hiking off designated trails. Introduction or spread of invasive species can also result from visitors unwittingly bringing seeds into areas of the national historic site via clothing/shoes, dog fur, as well as from horse hair and horse excrement. New trail construction would cause limited loss of vegetation and possibly introduce non-native species. The impacts of potential visitation increases have been included in the analysis.

Impact Threshold Definitions

The thresholds to determine the intensity of impacts on vegetation are defined as follows:

Negligible: Individual native plants may occasionally be affected, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur.

Minor: Effects on native plants would be measurable or perceptible. The natural function and character of the plant community would not be affected and, if left alone, would recover.

Moderate: A change would occur in the natural function and character of the plant community in terms of basic properties (e.g., growth, abundance, reproduction, distribution, structure, or diversity) but not to the extent that the basic properties of the plant community change.

Major: Effects on native plant communities would be readily apparent and would substantially and permanently change the natural function and character of the plant types.

Duration: Long-term: Takes more than one year to recover.
Short-term: Recovers within one year.

Impacts of Alternative A

Under Alternative A, vegetation in the national historic site would continue to be managed under NPS management plans and practices. Development and implementation of management plans, including the resource stewardship strategy, fire management plan, and shoreline erosion management plan would provide long-term, beneficial effects through improved management efforts with regard to the national historic site's vegetation and natural communities. This would include, respectively, providing recommendations to manage vegetation in concert with other national historic site resources with input from stakeholders and subject matter experts on vegetation and natural communities; using prescribed burns and managing the effects of fire to improve vegetation conditions where appropriate, and increase safe conditions within the national historic site as well as adjacent lands; and provide recommendations and management alternatives to managing the national historic site's changing shoreline and associated terrestrial habitats. A summary of these other past, present and future NPS plans is included in chapters 1 and 2.

Under Alternative A, there would be no new development within the national historic site. Existing trails would continue to be maintained and operated by the national historic site. Visitors and island residents would continue to use the national historic site's trails for interpretation and exercise, and potential for visitor-created trails would continue to occur. Visitor-created trails and trampling of vegetation are likely to occur near points of interest such as near the earthen fort or off the Thomas Hariot Nature Trail to access Albemarle Sound. Impacts associated with off-trail visitor use would be minimal and localized as the national historic site contains two short walking trails within its boundaries. Visitor use related effects to the national historic sites vegetation would result in long- and

short-term, negligible to minor, adverse effects.

Demolition of the Prince and Beehive houses may cause temporary impacts to surrounding vegetation as the structures are removed, however these impacts would be largely reduced as areas where the structures once stood are returned to a more natural state, resulting in long-term beneficial effects.

Unintentional transport or improper disposal of non-native invasive species from surrounding development and visitor use would continue to threaten natural vegetation communities. Spread of invasive species (non-native) plant would also continue, although the magnitude of this effect is unknown. The national historic site, through the efforts of the Southeast Coast Exotic Plant Management Team and staff resource managers and maintenance, would continue to identify and manage non-native plant populations, reducing their effects on native plant communities or possibly eliminating some stands from the landscape. Invasive plant populations were treated and removed from the national historic site most recently in 2010. However, there is a high probability of additional species and populations due to development along national historic site borders as well as the volume of traffic in the site. Continued invasive plant controls would provide long-term beneficial effects to native vegetation by reducing competition for available habitat. The national historic site was treated for gypsy moths in cooperation with the U.S. Forest Service's "Slow the Spread Project" in 1999, providing long-term beneficial effects to the national historic site's hardwood tree species. These efforts would continue to improve species composition and habitat quality in the national historic site with long-term, beneficial effects.

The national historic site would also continue mechanically thinning understory brush for fire management as staff and funding allow. These actions would also preserve the evergreen maritime forest as succession would be suppressed by thinning of understory hardwood species.

Continuation of current national historic site resource management and invasive species controls would provide long-term beneficial effects to the national historic site's Fort Raleigh Maritime Forest Significant Natural Heritage Area (see "Vegetation" section of chapter 3 for more information). Continued shoreline protection measures instituted on the north shore of Roanoke Island and continued maintenance of the shoreline to protect national historic site resources have localized, long-term, beneficial and long-term, minor to moderate, adverse effects on shorelines and associated native plant communities as areas of high importance are protected while other areas would continue to erode. The impacts of shoreline erosion at the national historic site will be addressed in a comprehensive manner through the shoreline erosion management plan and related National Environmental Policy Act assessment.

Overall, continuation of current management under Alternative A would have long-term, beneficial impacts and long- and short-term, negligible to minor, adverse effects on vegetation communities.

Cumulative Impacts

Within and in the vicinity of the national historic site, the impacts of other actions would contribute to cumulative impacts on vegetation, including the following:

Connection to the Dare County waterline and installation of new waterlines throughout the national historic site may affect vegetation and natural communities. These activities would be subject to construction best management practices and mitigation measures proposed under site-specific environmental compliance documentation that are tiered to this general management plan/environmental impact statement. Expansion of water lines within

the national historic site would cause long- and short-term, negligible, adverse effects on vegetation.

Fort Raleigh National Historic Site resource management staff would continue to manage and protect the Fort Raleigh Maritime Forest providing long-term, beneficial effects. Formal designation has not occurred with the North Carolina Natural Heritage Program; however, the NPS manages the Fort Raleigh Maritime Forest to maintain this designation. Potential future development of undeveloped land within the boundary of Fort Raleigh National Historic Site that is owned and managed by the Roanoke Island Historical Association would affect the Fort Raleigh Maritime Forest Significant Natural Heritage Area. The level of impact would be dependent on the size of the potential development and the amount of land cleared for construction with a resulting fragmentation of habitat.

Collectively, past, ongoing, and future actions would have long- and short-term, negligible, adverse effects on vegetation communities in the national historic site.

When the long- and short-term, negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined with the long-and short-term, negligible to minor, adverse and beneficial impacts under Alternative A, collectively the resulting cumulative effects would be considered long-term, and beneficial. The beneficial effects of Alternative A would contribute a modest increment to the overall beneficial cumulative impact.

Conclusions

Overall, continuation of current management under Alternative A would have long-term and short-term, negligible to minor, adverse and beneficial effects on vegetation and natural communities. When the long- and short-term, negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined with the long-and short-term, negligible to minor, adverse and beneficial impacts under Alternative A, collectively the resulting cumulative effects would be considered long-term, and beneficial. The beneficial effects of Alternative A would contribute a modest increment to the overall beneficial cumulative impact.

Yaupon Holly (*Ilex vomitoria*), one of the dominant species observed in the national historic site.

Impacts of Alternative B

Similar effects as those described under Alternative A are applicable to Alternative B, with continuation of existing resource management practices and plans, as well as control of invasive species. However, the establishment of management zones under Alternative B would protect the majority of the national historic site under the Resource Preservation Zone thereby providing long-term, beneficial effects. Construction of a small outdoor seating area near the earthen fort in the Visitor Services Zone may adversely affect vegetation and natural communities (including the Fort Raleigh Maritime Forest Significant Natural Heritage Area) as there could be a localized loss of native plants and habitat. The seating area would be sited in previously disturbed areas and would also be subject to environmental review and mitigation, thereby reducing adverse effects to vegetation and natural

communities. Native vegetation would be planted to screen the maintenance and headquarters area providing long-term, beneficial effects. Increased interpretive activities and directional signage would increase visitor knowledge and reduce the potential for vegetation to be trampled. This would result in long-term and short-term, beneficial effects to vegetation.

Potential development of limited new trails (establishing a parallel trail to Freedom Trail and extension of the multi-use trail into the national historic site) would result in a loss of habitat and loss of native plants in the localized area where the trail would be constructed. Potential increases in limited trail development would also result in an introduction of new visitors in previously undisturbed areas of the national historic site, as well as increase the potential for spread of invasive species via national historic site visitors. Environmental compliance documentation would be completed for any proposed trail, and mitigation measures would be employed to reduce the spread of invasive species, manage visitor impacts, and limit impacts on native vegetation and natural communities providing long-term beneficial effects. These actions would have long-term, negligible to minor, adverse and beneficial effects on the national historic site's vegetation.

Proposed increases in national historic site staff under Alternative B would provide long-term, beneficial effects to native vegetation and communities through increased interpretation, maintenance, and enforcement. Management actions would be taken as needed to reduce visitor impacts on vegetation and natural communities.

The overall beneficial effects provided by existing resource management efforts and plans, establishment of management zones, and increased national historic site staff would slightly reduce adverse impacts caused by new trail and facility construction, increased potential for off-trail impacts, and spread of invasive species into previously undisturbed areas of the national historic site. Therefore, the overall effect on the national historic site's vegetation and natural communities as a result of implementation of management actions under Alternative B would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible, adverse effects. When the long- and short-term, negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined with the long- and short-term beneficial impacts of Alternative B, the resulting cumulative effects would be considered long- and short-term, and beneficial. The overall effects of Alternative B would contribute a modest increment to the overall beneficial cumulative impact.

Conclusions

Overall, management of the national historic site under Alternative B would have long-and short-term, beneficial effects on vegetation and natural communities. When the long- and short-term, negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined with the overall long- and short-term, beneficial impacts of Alternative B, the resulting cumulative effects would be considered long- and short-term and beneficial. The overall effects of Alternative B would contribute a modest increment to the overall beneficial cumulative impact.

Impacts of Alternative C (NPS Preferred Alternative)

Similar effects as those described under Alternative A are applicable to Alternative C. Continuation of existing resource

management practices and plans as well as control of invasive species would occur under Alternative C. The establishment of management zones under Alternative C would protect the majority of the national historic site under the Resource Preservation Zone thereby providing long-term beneficial effects. The Resource Preservation Zone under Alternative C provides for the largest area zoned under the action alternatives. Alternative C would also reduce heavily landscaped and maintained areas, and allow these areas to return back to natural conditions or convert them to low maintenance plantings. Native vegetation would be planted to screen the maintenance and headquarters area providing localized long-term beneficial effects.

Live Oak (*Quercus virginianus*), a native species.

Potential development of limited new trails (establishing a parallel trail to Freedom Trail and extension of the multi-use trail into the national historic site) would result in a loss of habitat and native plants in the localized areas where the trails would be constructed. This would have long- and short-term, minor, adverse effects. Potential increases in limited trail development would also result in an introduction of new visitors in previously undisturbed areas of the national historic site, as well as increase the potential for spread of invasive species via national historic site visitors. Under Alternative C, visitors would be encouraged to experience outlying national historic site resources independently though formal interpretive trails, causing an increased potential for off-trail impacts to vegetation and natural communities. Construction of a small outdoor seating area near the earthen fort in the Visitor Services Zone may adversely affect vegetation and natural communities (including the Fort Raleigh Maritime Forest Significant Natural Heritage Area). Environmental compliance documentation would be completed for any proposed trail or facility, and mitigation measures would be employed to reduce the spread of invasive species, manage visitor impacts, and limit impacts on vegetation and natural communities. Increased interpretive activities that increase visitor knowledge and control of visitor use impacts in the vicinity of the earthen fort would also provide beneficial effects.

Proposed increases in national historic site staff under Alternative C would provide long-term, beneficial effects to native vegetation and communities through increased interpretation, maintenance, and enforcement. The addition of an historian under Alternative C may provide visitors opportunities to learn about the national historic site's native vegetation and its importance in telling the many stories of the history of the national historic site. Additional interpretation and education about resource protection may reduce some impacts associated with visitor use. Management actions would be taken as needed to reduce visitor impacts on vegetation and natural communities (see also user capacity analysis provided in chapter 2).

The overall beneficial effects provided by existing resource management efforts and plans, establishment of management zones, and increased national historic site staff would slightly reduce adverse impacts caused by new trail construction and use, increased potential for off-trail impacts, and spread of invasive species into previously undisturbed areas of the national historic site. Therefore, the overall effect on the national historic site's native vegetation and natural communities as a result of implementation of management actions

under Alternative C would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible, adverse effects. When the long- and short-term, negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined the overall long- and short-term, beneficial impacts of Alternative C, the resulting cumulative effects would be considered long- and short-term, and beneficial. The overall effects of Alternative C would contribute a modest increment to the overall beneficial cumulative impact.

Conclusions

Overall, management of the national historic site under Alternative C would have long-and short-term, beneficial effects on vegetation and natural communities. When the long- and short-term negligible, adverse effects of other past, on-going, and future plans, projects, and activities affecting vegetation and natural communities are combined the overall long- and short-term, beneficial impacts of Alternative C, the resulting cumulative effects would be considered long- and short-term and beneficial. The overall effects of Alternative C would contribute a modest increment to the overall beneficial cumulative impact.

CULTURAL RESOURCES

Methods

Impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. Cultural resources are nonrenewable; therefore, adverse impacts to cultural resources may extend well beyond implementation of the general management plan. Because of the comprehensive coverage and expected longevity of this general management plan, the area of potential effects considered for the impact analyses consists of the entire national historic site and its immediate environs.

> The NPS is the steward of many of America's most important **cultural resources**. These resources are categorized as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections. (NPS Management Policies 2006)

These impact analyses are intended to comply with the requirements of both National Environmental Policy Act and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800, Protection of Historic Properties), impacts to cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected National Register of Historic Places eligible or listed cultural resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either adverse effect or no adverse effect must also be made for affected National Register of Historic Places listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register of Historic Places, e.g. diminishing the integrity (or

the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places.

Cultural resources are non-renewable. Archeological surveys at the national historic site are key to cataloging and telling the story of the site's history and its peoples for future generations. Credit: First Colony Foundation

Council on Environmental Quality regulations and the NPS's Conservation Planning, Environmental Impact Analysis and Decision Making (Director's Order 12) also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included under each impact analysis section for the two action alternatives for archeological resources, ethnographic resources, cultural landscapes, and historic structures. The Section 106 summary is an assessment of the effect of the undertaking (implementation of the alternative) based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

The following issues related to cultural resources were identified by the NPS, other agencies, and the public during internal and public scoping. (See chapter 2 for a complete list of identified issues.)

- Cultural resource management in the form of archeological research.
- Management of the landscape at Fort Raleigh National Historic Site including its boundaries and shorelines.
- Interpretation of the historical Freedmen's Colony and Underground Railroad stops at Fort Raleigh National Historic Site.
- African American history.

ARCHEOLOGICAL RESOURCES

Impact Criteria and Thresholds for Archeological Resources

Negligible: Impact is at the lowest level of detection. Impacts would be measurable but with no perceptible consequences. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor: Disturbance of a site(s) results in little loss of integrity. The determination of effect for Section 106 would be no adverse effect.

Moderate: Site(s) is disturbed but not obliterated. The determination of effect for Section 106 would be adverse effect.

Major: Site(s) is obliterated. The determination of effect for Section 106 would be adverse effect.

Duration: Short-term: Impacts would last less than five years. Long-term: Impacts would persist for five or more years. Permanent: Impacts would last indefinitely.

The NPS will incorporate information about **archeological resources** into interpretive, educational, and preservation programs. Artifacts and specimens recovered from archeological sites, along with associated records and reports, will be maintained together in the park museum collection. (NPS Management Policies 2006)

Impacts of Alternative A, the No-action Alternative

With continuance of existing management practices into the future, two primary factors—human actions and natural processes—would contribute to permanent, negligible to minor adverse effects on the national historic site's archeological resources from loss of data and sites or diminished site integrity. Adverse effects would be permanent because cultural resources are nonrenewable, and once damaged or lost, cannot be restored. Meanwhile, visitor education and national historic site management actions would result in long-term beneficial impacts.

Under Alternative A, removal of the Prince and Beehive houses and routine maintenance would have a limited potential to affect sensitive archeological resources. The Prince house is located on stilts in an area subject to a high degree of erosion so it is unlikely that any *in situ* archeological materials would be found beneath the house. However, demolition activities involving heavy equipment and removal of construction debris would likely affect the area around the house by compressing and disturbing soils, contributing to erosion, disturbing archeological strata and possibly exposing buried materials. The Beehive house is situated on a raised concrete block foundation, and archeological materials could be present beneath and around the structure. These resources could be disturbed during razing of the house. Once disturbed, archeological materials cannot be replaced or replicated, and lose much of their potential significance. Given the previously disturbed nature of the area, however, the potential for damage to archeological resources from razing the two structures would be relatively low. Disturbance associated with demolition activities could result in permanent, negligible to minor, adverse impacts to archeological resources.

Prior to razing the Prince and Beehive houses, a survey for archeological resources in the general vicinity of the affected structures would be conducted. The excavation, recordation, and mapping of any significant cultural remains, if present, would be completed prior to demolition of the houses to ensure that important archeological data that otherwise would be lost is recovered and documented. These actions would result in long-term beneficial effects to archeological resources in the general vicinity of the Prince and Beehive houses.

Most on-going, routine maintenance activities would likely be conducted in previously disturbed areas, and national historic site staff would work with an awareness of the potential for subsurface cultural resources to prevent resource disturbance. Few, if any, permanent,

negligible to minor, adverse impacts would be anticipated. The national historic site would continue to address vegetation growth as it impacts foundations and grave sites in Dough Cemetery, resulting in long-term beneficial effects.

Permanent, minor, adverse impacts on archeological resources from visitor activities such as parking along roadways and in grassy areas, off-trail visitor use (including walking on the earthworks), and unauthorized collecting would be expected to continue to occur. Continued ranger patrol and emphasis on visitor education, regarding the significance and fragility of such resources and how visitors can reduce their impacts to them, would discourage vandalism and inadvertent visitor impacts. On-going NPS management efforts, interpretation, and visitor education would continue to have long- and short-term beneficial effects to archeological resources, but because of staff constraints, some desired interpretive needs would not be met.

NPS management policies and programs provide an umbrella of protection for cultural sites by establishing proactive procedures for their identification, evaluation, management, and interpretation. Protection of resources at the national historic site is a high priority. These resource protection and management activities would be expected to continue at existing levels but would be insufficient to protect all sites from these threats, resulting in permanent and minor, adverse effects and long-term beneficial effects.

Under Alternative A, NPS cultural resource management plans, the *Fort Raleigh National Historic Site Long-Range Interpretive Plan*, and other management plans for the Outer Banks Group and for Fort Raleigh National Historic Site would continue to have long-term beneficial effects on archeological resources because they would be inventoried, monitored, excavated, nominated to the National Register, protected, and interpreted to the public.

Continued shoreline protection measures instituted on the north shore of Roanoke Island and continued maintenance of the shoreline to protect site resources has had both adverse and beneficial effects on shorelines and archeological sites located in the vicinity of these areas. The extent of these effects to archeological resources is not thoroughly understood at this time. Long-term beneficial effects may occur because some archeological sites would be covered by water and sand thereby protecting them. Other archeological resources may be lost due to erosion and wave action, causing permanent, major, adverse effects. The assessment of shoreline erosion effects requires a comprehensive look at the resources, measures, and consideration of other related actions. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the shoreline erosion management plan and related National Environmental Policy Act assessment. This plan and other plans such as a resource stewardship strategy and a fire management plan would provide direction for the future management of archeological resources which would have long-term, beneficial effects on archeological resources.

While benefits would accrue from national historic site management actions to protect and stabilize sites threatened by natural processes or inappropriate visitor use, management of the national historic site's archeological resources is complicated by the fact that no parkwide systematic cultural resources survey has been conducted. Unknown, undocumented sites cannot be protected, and such sites could suffer unintentional permanent, negligible to minor, adverse consequences.

NPS archeologists would continue to monitor the condition of known archeological sites and would undertake appropriate protection measures when possible to reduce or avoid site impacts, resulting in long-term benefits. However,

existing national historic site staff would not be able to meet all the needs for managing the complex cultural resources at the national historic site.

Adverse effects of human actions and natural processes would be permanent and negligible to minor while long- and short-term beneficial impacts would result from visitor education and national historic site management actions. Therefore, the overall effect on the national historic site's archeological resources under Alternative A would be permanent, negligible to minor, and adverse as well as long- and short-term and beneficial.

Cumulative Impacts

Within and in the vicinity of the national historic site, the impacts of other actions would contribute to cumulative impacts on archeological resources, including the following:

Ground-disturbing construction activities have affected prehistoric and historic sites. Past and on-going construction activities such as the local and regional transportation corridors, installation of a county waterline along old Highway 64, recreational facilities, housing, harbors, etc. modify, add to, or destroy archeological sites, both within and adjacent to the national historic site. Similar losses of archeological resources across the surrounding area have reduced the integrity and the numbers and types of sites available for research and interpretation, leaving a somewhat skewed vision of past cultures for future generations. Construction activities in and around the national historic site have resulted in permanent, moderate, adverse effects to archeological resources.

Future connection to the county waterline and installation of new waterlines within the national historic site would have the potential for permanent, moderate, adverse impacts on archeological resources as there is the potential for disturbance to archeological sites that are as yet unknown. The NPS ensures that surveys are conducted and resource mitigation measures address any archeological sites during the periods of construction. NPS surveys and mitigation measures would provide long-term beneficial effects.

Collectively, past, ongoing, and future actions would have permanent, moderate, adverse and long-term beneficial impacts on archeological resources. When the permanent, moderate adverse and long-term beneficial effects of other past, present, and future plans, projects and activities affecting archeological resources in the national historic site and immediately surrounding areas are combined with the permanent, negligible to minor, adverse and long- and short-term, beneficial impacts of Alternative A, the resulting cumulative effects would be permanent, minor, adverse and long- and short-term beneficial. Alternative A would contribute a small increment to the overall cumulative impacts.

Conclusions

Under Alternative A, effects of human actions on archeological resources would be permanent, negligible to minor, and adverse. Long- and short-term beneficial effects to archeological resources would result from visitor education and national historic site management actions. When the permanent, moderate adverse and long-term beneficial effects of other past, present, and future plans, projects and activities affecting archeological resources in the national historic site and immediately surrounding areas are combined with the permanent negligible to minor adverse and long- and short-term beneficial impacts in Alternative A, the resulting cumulative effects would be permanent, minor and adverse and long- and short-term beneficial. Alternative A would contribute a small increment to the overall cumulative impacts.

Impacts of Alternative B

Many of the same management actions and maintenance activities addressed under Alternative A are also applicable to Alternative B. However, under Alternative B, much of the national historic site would be included in a Resource Preservation Zone, which would provide for increased emphasis on resource preservation. Avoiding future ground disturbance within the management zone provides additional protection for archeological resources.

Alternative B includes limited ground-disturbing activities discussed in the analysis of Alternative A (removal of the Prince and Beehive houses) as well as extension of existing trails, creation of new trails, expansion of parking at headquarters (eight spaces), vegetative screening along the road to the Waterside Theatre, and construction of a small outdoor seating area near the reconstructed earthworks. The impacts of ground disturbing activities would be the same as described for Alternative A. That is, impacts would be permanent, negligible to minor, and adverse.

Development of formalized programs and directional signs would encourage visitors to stay on designated trails, helping to reduce the potential for unauthorized use of informal trails that cause resource damage (e.g. reducing incidents of unauthorized collecting and erosion that could expose sites). While new trail construction could inadvertently uncover archeological resources, such trails could decrease the potential for creation of informal trails and subsequent loss of archeological materials. This element of Alternative B would result in long-term beneficial impacts.

NPS managers, archeologists, historians and partners would collaborate to ensure that cultural resource investigations of proposed project area(s) would be completed prior to final project design, and that sites located during these investigations would be evaluated for their National Register of Historic Places eligibility. Results of the investigations would help guide precise locations and design of these new facilities to ensure resource protection. This would result in long-term beneficial effects on archeological resources.

As with Alternative A, NPS archeologists would continue to monitor the condition of known archeological sites and undertake appropriate protection measures to reduce or avoid site impacts, providing long- and short-term, beneficial effects.

Under Alternative B, one additional archeological investigation would be conducted between Pear Pad Road and the Heritage Point subdivision. This area has not been investigated to the extent that other areas of the national historic site have and it has the potential to yield information about island historical themes apart from the Roanoke voyages and the Lost Colony. These themes include the Native American culture, the Antebellum period, the Civil War, the Freedmen's Colony, and the Works Progress Administration camp. These investigations would lead to long-term, beneficial impacts because additional archeological sites could be identified in accordance with Section 110 of the National Historic Preservation Act (which stipulates that federal agencies identify and protect cultural resources), and because subsequent research and analyses could substantially add to both the regional and national knowledge of the people, places, and events associated with the history of the area.

When compared with Alternative A, Alternative B would increase reliance on partnerships, cooperative agreements, and on-site visitor center facilities to interpret important stories about this historic area. Increased involvement of these entities and enhanced interpretive opportunities would tend to increase a sense of stewardship for the national historic site's archeological resources, a long-term beneficial effect.

The overall effect to archeological resources associated with implementation of management actions proposed under Alternative B would be permanent, negligible to minor, adverse and long- and short-term beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be permanent, moderate, adverse and long-term beneficial effects. When the permanent, moderate, adverse and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting archeological resources are combined with the permanent, negligible to minor, adverse and long- and short-term, beneficial effects of Alternative B, the resulting cumulative effects would be permanent, minor, adverse and long-term, beneficial. Alternative B would contribute a small increment to the overall cumulative impacts.

Conclusions

Limited new construction activities proposed under Alternative B have the potential to encounter previously undisturbed archeological resources. However, archeological investigations, careful design, and site avoidance would help ensure that any permanent adverse impacts resulting from new construction under this alternative would be negligible to minor. Increased reliance on partnerships and others would increase stewardship, benefitting archeological resources. New archeological investigations would provide data for future resource protection and prioritization of cultural resource treatments. The overall effect to archeological resources associated with implementation of management actions proposed under Alternative B would be permanent, negligible to minor, adverse and long- and short-term, beneficial.

When the permanent, moderate, adverse and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting archeological resources are combined with the permanent, negligible to minor, adverse and long- and short-term, beneficial effects of Alternative B, the resulting cumulative effects would be permanent, minor, adverse and long- and short-term, beneficial. Alternative B would contribute a small increment to the overall cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative B would not result in an adverse effect to archeological resources. For purposes of Section 106, the determination of effect would be no adverse effect.

Impacts of Alternative C (NPS Preferred Alternative)

Designation of the majority of the national historic site as a Resource Preservation Zone would provide for a greater emphasis on resource preservation compared to Alternative A. Formalized programs and directional signs would help reduce the potential for creation of informal trails, resulting in fewer incidents of unauthorized collecting and erosion of off-trail areas. These elements of Alternative C would result in long-term, beneficial impacts.

Alternative C also proposes removal of the Prince and Beehive houses, construction of a small outside seating area near the reconstructed earthworks, extension of existing trails, creation of new trails (as discussed in Alternative B), addition of vegetative screening and expansion of parking at headquarters (eight spaces). Heavily landscaped and maintained areas would be restored to natural conditions or converted to low maintenance plantings.

This work would be done in a sensitive manner so as to not adversely affect archeological resources.

Results of archeological investigations, resource documentation, and site evaluation would help identify areas to be avoided during construction and revegetation. It is anticipated that permanent, adverse impacts to archeological resources resulting from new construction activities under Alternative C would be negligible to minor.

NPS archeologists would continue to monitor the condition of known archeological sites, and would undertake appropriate protection measures to reduce or avoid site impacts. Establishment of on-going archeological excavations with partner organizations would be beneficial by broadening the national historic site's knowledge base and by involving others in research, helping to build stewardship. These actions would result in long-term beneficial impacts to archeological resources.

Additional annual archeological investigations and data recovery would be conducted in the following locations: between the Elizabethan Gardens and the Dough Cemetery; between the Thomas Hariot trail and the Elizabethan Gardens; and at the Works Progress Administration camp. These areas have been investigated the least over the years and have the potential to yield information about island historical themes apart from the Roanoke voyages and the Lost Colony. These themes include the Native American culture, the Antebellum period, the Civil War, the Freedmen's Colony, and the Works Progress Administration camp. These investigations would have long-term beneficial effects because additional archeological sites could be identified in accordance with Section 110 of the National Historic Preservation Act. Identification, documentation and evaluation of sites in these areas would not only increase knowledge about past human use of the area, it also would provide a sound basis for setting future priorities for site protection, preservation and interpretation.

Alternative C would emphasize research on the history and archeology of the national historic site and the associated peoples and events. This research and analysis would substantially add to both the regional and national knowledge of the people, places, and events associated with the history of the area. The combined actions of Alternative C would result in permanent, negligible to minor, adverse and long-term, beneficial impacts to archeological resources.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be permanent, moderate, adverse and long-term beneficial effects. When the permanent, moderate adverse and long-term beneficial effects of other past, ongoing, and future plans, projects and activities affecting archeological resources are combined the long-term, beneficial impacts and the permanent, negligible to minor, adverse impacts of Alternative C, the resulting cumulative effects are expected to be permanent, minor, and adverse and long-term beneficial. Alternative C would contribute a modest increment to the overall cumulative impacts.

Conclusions

The combined actions of Alternative C would result in permanent, negligible to minor, adverse and long-term, beneficial impacts to archeological resources

Alternative C includes new construction activities that have the potential of encountering previously undisturbed archeological resources. However, archeological investigations, site documentation, and evaluation would help ensure that any permanent adverse impacts resulting from new construction under this alternative would be negligible to minor.

Alternative C would include a greater degree of new archeological investigations and research compared to Alternative A, resulting in increased beneficial impacts by providing data that could be used in establishing priorities for future protection, preservation, and interpretation. The overall range of actions proposed under this alternative would have permanent, negligible to minor adverse, and long-term, beneficial impacts on archeological resources. When the permanent, moderate adverse and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting archeological resources are combined the long-term, beneficial impacts and the permanent, negligible to minor, adverse impacts of Alternative C, the resulting cumulative effects are expected to be permanent, minor, adverse and long-term beneficial. Alternative C would contribute a modest increment to the overall cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative C would not result in an adverse effect to archeological resources. For purposes of Section 106, the determination of effect would be no adverse effect.

The variety and arrangement of cultural and natural features in a landscape often have sacred or other continuing importance in the **ethnic histories and cultural vigor** of associated peoples. These features and their past and present-day uses will be identified, and the beliefs, attitudes, practices, traditions, and values of traditionally associated peoples will be considered in any treatment decisions. (NPS Management Policies 2006)

ETHNOGRAPHIC RESOURCES

Impact Criteria and Thresholds for Ethnographic Resources

Negligible: Impacts would be at the lowest levels of detection and barely perceptible. Impacts would neither alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the associated group's body of practices and beliefs. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor: Impacts would be slight but noticeable and would neither appreciably alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the associated group's body of beliefs and practices. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate: Impacts would be apparent and would alter resource conditions or interfere with traditional access, site preservation, or the relationship between the resource and the associated group's beliefs and practices, even though the group's practices and beliefs would survive. For purposes of Section 106, the determination of effect would be adverse effect.

Major: Impacts would alter resource conditions. Proposed actions would block or greatly affect traditional access, site preservation, or the relationship between the resource and the associated group's body of beliefs and practices to the extent that the survival of a group's beliefs and/or practices would be jeopardized. For purposes of Section 106, the determination of effect would be adverse effect.

Duration: Short-term: Impacts would last less than five years.
Long-term: Impacts would persist for five or more years.
Permanent : Impacts would last indefinitely.

Impacts of Alternative A, the No-action Alternative

A long-range interpretive plan was completed for the national historic site in 2010. This plan guides the interpretation of the national historic site's human and natural history with a modestly expanded content and range of interpretive programming. Because ethnographic resources at the national historic site consist mainly of associations of people to ancestors connected to events and historical eras at the national historic site rather than tangible resources, new exhibits and enhanced interpretation would serve to strengthen these associations. These changes would be especially important to those African Americans who trace their heritage back to the Freedmen's Colony or the Underground Railroad. The anticipated enhancement to ethnographic associations, whether based on new scholarship or simply an expanded awareness, knowledge, or pride, would result in long-term, beneficial impacts to ethnographic resources.

Cumulative Impacts

Fort Raleigh National Historic Site and surrounding area has had human inhabitants from many different cultures, ranging from the earliest prehistoric peoples to the Freedmen's Colony to Civil War soldiers to 20th century settlers. Past effects on ethnographic resources have been both positive and negative. That is, despite the fact that all of these cultural histories and stories cumulatively contribute to the importance of this site, and its archeological remains and archival documents provide physical evidence of their presence, it is only in the past quarter century that the strong ethnographic ties of some of these groups have been recognized. This lack of recognition and interpretation constitutes a long-term, minor to moderate, adverse effect. An ethnographic overview and assessment would be completed to formally identify and document the ethnographic resources associated with the national historic site. This would result in long-term, beneficial effects associated with increased knowledge concerning these resources. When the long-term, minor to moderate, adverse effects and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with long-term, beneficial impacts of Alternative A, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative A would contribute a modest increment to the overall cumulative impacts.

A ranger-led interpretive program held at the First Light of Freedom Memorial.

Conclusions

Alternative A would result in long-term, beneficial effects to ethnographic resources by means of strengthened connections made through new exhibits and enhanced interpretation based on the long-range interpretive plan. When the long-term, minor to moderate adverse effects and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with the long-term, beneficial impacts of Alternative A, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative A would contribute a modest increment to the overall cumulative impacts.

Impacts of Alternative B

Under Alternative B, emphasis would be placed on an expanded interpretive mission. Part of the expanded interpretative program would include increased coverage of stories at the national historic site other than the Roanoke Voyages (which would be the emphasis of the Roanoke Island Historical Association). In this scenario, greater opportunity would exist for national historic site visitors to learn about African American history relevant to the area. Given this change, the existing ethnographic resource conditions, i.e. linkage of the national historic site to African Americans tracing their heritage back to the Freedmen's Colony or Underground Railroad, would likely be strengthened. Alternative B would result in a long-term beneficial impact to ethnographic resources due to the expanded interpretive mission and the likelihood of strengthening existing linkages and relationships.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long-term, minor to moderate, adverse effects and long-term, beneficial effects. When the long-term, minor to moderate adverse effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with the long-term, beneficial impacts of Alternative B, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative B would contribute a modest increment to reduce the overall adverse cumulative impacts.

Conclusions

Alternative B would have long-term, beneficial impacts on ethnographic resources, resulting from an expansion of interpretation that would strengthen the linkage between the national historic site and its resources and African Americans tracing their heritage to the Freedmen's Colony or Underground Railroad. When the long-term, minor to moderate, adverse effects and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with the long-term, beneficial impacts of Alternative B, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative B would contribute a modest increment to reduce the overall adverse cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative B would not result in an adverse effect to ethnographic resources. For purposes of Section 106, the determination of effect would be no adverse effect.

Impacts of Alternative C (NPS Preferred Alternative)

Under Alternative C, research on the history and archeology of the national historic site and the associated peoples and events would be emphasized. Archeology would be a central focus of ongoing research and the addition of a historian to the staff would provide opportunities to create closer links with African Americans and Native Americans who have cultural ties to the area.

In this alternative, a greater reliance is placed on partnerships with groups such as the First Colony Foundation, Roanoke Island Historical Association, Roanoke Island Festival Park, the North Carolina Maritime Museum, The Elizabethan Gardens, and the University of North Carolina. In this scenario, given the strong focus on archeology and research, opportunities for

national historic site visitors to learn about the Freedmen's Colony and Underground Railroad also expand. (See "Visitor Use and Experience" for a more detailed analysis.) Ethnographic resource conditions (that is, the linkage of the national historic site to African Americans tracing their heritage back to the Freedmen's Colony or Underground Railroad) would likely expand and improve compared to existing practices under Alternative C. As such, Alternative C would result in long-term, beneficial impacts to ethnographic resources.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long-term, minor to moderate, adverse effects and long-term, beneficial effects. When the long-term, minor to moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with the long-term, beneficial impacts of Alternative C, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative C would contribute a modest increment to reduce the overall adverse cumulative impacts.

Conclusions

Alternative C would have long-term, beneficial effects on ethnographic resources. Addition of a historian to the staff would provide opportunities for closer links to ethnographic groups with ties to this area, and expanded interpretation opportunities would include the Freedmen's Colony and Underground Railroad. When the long-term, minor to moderate, adverse effects and long-term, beneficial effects of other past, ongoing, and future plans, projects and activities affecting ethnographic resources are combined with the long-term, beneficial impacts of Alternative C, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative C would contribute a modest increment to reduce the overall adverse cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative C would not result in an adverse effect to ethnographic resources. For purposes of Section 106, the determination of effect would be no adverse effect.

> The treatment of a **cultural landscape** will preserve significant physical attributes, biotic systems, and uses when those uses contribute to historical significance. (NPS Management Policies 2006)

CULTURAL LANDSCAPE

Impact Criteria and Thresholds for the Cultural Landscape

Negligible: Impacts would be at the lowest levels of detection-barely perceptible and measurable. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor: Impacts would affect character-defining features or patterns but would not diminish the overall integrity of the landscape. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate: Impacts would alter character-defining features or patterns, diminishing the overall integrity of the landscape to the extent that its National Register eligibility would be jeopardized. For purposes of Section 106, the determination of effect would be adverse effect.

Major: Impacts would alter character-defining features or patterns, diminishing

the overall integrity of the landscape to the extent that it would no longer be eligible to be listed on the National Register. For purposes of Section 106, the determination of effect would be adverse effect.

Duration: Short-term: Impacts would last less than five years. Long-term: Impacts would persist for five or more years. Permanent : Impacts would last indefinitely.

Impacts of Alternative A, the No-action Alternative

Under Alternative A, limited management actions have been identified that would affect the cultural landscape within the national historic site. These actions include possible targeted shoreline erosion control measures to protect Dough Cemetery and, possibly, removal of introduced/invasive species from the national historic site that may have, at one time, been part of an earlier landscape. Although Dough Cemetery cannot be considered individually for National Register of Historic Places inclusion, it is a contributing element to the cultural landscape within the national historic site. Continuation of shoreline erosion control efforts to protect the cemetery would result in long-term, beneficial impacts to this element of the cultural landscape. Archeological elements of the landscape remain as well. (See also discussion of archeological resources in this chapter for more information on these resources.)

Assessment of shoreline erosion effects requires a comprehensive look at the resources, measures, and consideration of other related actions. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the shoreline erosion management plan and related National Environmental Policy Act assessment. This plan and other plans such as a resource stewardship strategy and a fire management plan, in addition to the Cultural Landscape Inventory, would provide direction for the future management of the cultural landscape which would have long-term, beneficial effects.

Alternative A would result in long-term, beneficial impacts to the cultural landscape within the national historic site because of continued protection of its contributing elements.

Cumulative Impacts

The vegetation of the national historic site has undergone extensive changes due to human intervention and natural processes. Roadways, trails, and buildings have been added, modified or removed. Non-native plants were introduced, often resulting in changes in native plant populations. Archeological elements of the cultural landscape may not be visible, yet many may remain hidden below the ground surface. Erosion and vegetation growth also have changed the appearance of area shorelines. Each period of human habitation and use in this area brought a corresponding change in the buildings, infrastructure, transportation corridors, vegetation, and other component elements of the area, resulting in the present-day cultural landscape.

Cultural landscapes evolve over time, and it is clear that the past, ongoing, and future plans, projects, and activities affecting the cultural landscape of the national historic site have resulted in both long-term, beneficial and long-term, moderate, adverse impacts. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with long-term, beneficial impacts of Alternative A, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative A would contribute a small increment to reduce the overall adverse cumulative impacts.

Conclusions

Alternative A would result in long-term, beneficial impacts to the cultural landscape within the national historic site because of continued protection of its contributing elements including Dough Cemetery. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with the long-term, beneficial impacts of Alternative A, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative A would contribute a small increment to reduce the overall adverse cumulative impacts.

Impacts of Alternative B

Similar to Alternative A, possible targeted shoreline erosion measures to protect Dough Cemetery would be included in Alternative B and would result in a long-term, beneficial impact to this contributing element of the cultural landscape by offering protection from erosion. Other actions in Alternative B that would affect the cultural landscape include the construction of a small outdoor seating area near the reconstructed earthworks; trail improvements; expansion of parking at headquarters (eight spaces); and the establishment of vegetative screening along the road to the Waterside Theatre. The proposed new construction projects would neither affect topography nor appreciably alter the landscape's spatial organization, land use patterns, historic structures, circulation systems, or views and vistas. Any adverse impacts would be negligible to minor and long-term. The proposed outdoor seating area would be small in size and designed to be context-sensitive. Establishment of vegetation along the road leading to the Waterside Theatre would be a long-term benefit because it would minimize or screen distracting vehicle movements from visitors who are experiencing the nearby reconstructed earthworks. Increased interpretive activity would improve stewardship of the cultural landscape, thereby reducing visitor impacts. The overall impact of these projects and proposed management action on the cultural landscape would be long-term and beneficial.

The Dough Cemetery is evidence of the farming- and fishing-based community that persisted on Roanoke Island throughout the 1800s.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long-term, moderate, adverse and long-term, beneficial effects. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with the long-term, beneficial impacts of Alternative B, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative B would contribute a small increment to reduce the overall adverse cumulative impacts.

Conclusions

Alternative B includes several actions that would affect the cultural landscape, ranging

from the protection of Dough Cemetery to potential construction of an outdoor seating area, trail modifications, expansion of parking at headquarters (eight spaces), and the addition of vegetative screening. These actions would have an overall long-term, beneficial effect on the landscape. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with long-term, beneficial impacts of Alternative B, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative B would contribute a small increment to reduce the overall adverse cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative B would not result in an adverse effect to the cultural landscape. For purposes of Section 106, the determination of effect would be no adverse effect.

Impacts of Alternative C (NPS Preferred Alternative)

As with Alternatives A and B, this alternative includes possible targeted shoreline erosion control measures to protect Dough Cemetery, which would result in a long-term, beneficial impact to this contributing element of the cultural landscape.

Alternative C also includes new walking trails and a small outdoor seating area near the reconstructed earthworks. These proposed construction projects would not appreciably alter overall vistas, historic structures, or circulation patterns that are included in the cultural landscape. Improved signage and interpretive programs would provide additional information to visitors that would provide a long-term benefit to the cultural landscape and instill greater stewardship of cultural resources.

Under Alternative C, heavily landscaped and maintained areas would be reduced in size and affected areas would be restored to natural conditions or converted to low maintenance plantings. The Cultural Landscape Inventory report considers Mission 66-era vegetative plantings to be a contributing element to the national historic site's overall eligibility as a cultural landscape. As such, any reduction in Mission 66 vegetation would result in a long-term, minor, adverse impact. Invasive species would continue to be monitored and controlled as funding allowed.

When viewed in totality, the respective impacts associated with Alternative C would result in greater long-term, beneficial effects to the cultural landscape compared to Alternative A.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long-term, moderate, adverse and long-term, beneficial effects. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with the long-term, beneficial impacts of Alternative C, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative C would contribute a small increment to reduce the overall adverse cumulative impacts.

Conclusions

The overall effect of implementation of management actions proposed under Alternative C would have greater long-term, beneficial effects than Alternative A. The cumulative impacts to the cultural landscape would be the same as described

in Alternative A. When the long-term, beneficial and long-term, moderate, adverse effects of other past, ongoing, and future plans, projects and activities affecting the cultural landscape are combined with long-term, beneficial impacts of Alternative C, the resulting cumulative effects are expected to be long-term, minor, and adverse. Alternative C would contribute a small increment to reduce the overall adverse cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative C would not result in an adverse effect to the cultural landscape. For purposes of Section 106, the determination of effect would be no adverse effect.

MUSEUM COLLECTIONS

Impact Criteria and Thresholds for Museum Collections

Negligible: Impact is at the lowest levels of detection — barely measurable with no perceptible consequences.

Minor: Impact(s) would affect the integrity of few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation.

Moderate: Impact(s) would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

Major: Impact(s) would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

Duration: Short-term: Impacts would last less than five years.
Long-term: Impacts would persist for five or more years.
Permanent : Impacts would last indefinitely.

> The Service will collect, protect, preserve, provide access to, and use objects, specimens, and archival and manuscript **collections** in the disciplines of archeology, ethnography, history, biology, geology, and paleontology to aid understanding among park visitors, and to advance knowledge in the humanities and sciences.
> (NPS Management Policies 2006)

Impacts of Alternative A, the No-action Alternative

Under an approved and funded project included in all alternatives, Fort Raleigh National Historic Site would design and install new exhibits for the recently repaired and renovated Lindsay Warren Visitor Center. Modern, interactive exhibits would meet current NPS guidelines outlined in the *Museum Handbook: Museum Collection Use* and the Americans with Disabilities Act standards for quality, scope, content, and design. These exhibits would be in accord with the recommendations of the national historic site's long-range interpretive plan. These improvements to the display and interpretation of museum collections would help ensure the "well-being" and long-term preservation of data and archival materials while improving the usefulness of the collection. Alternative A would result in long-term, beneficial effects to the museum collections interpreted at the national historic site.

Over time, collections used as part of an interpretive display have been damaged by such factors as light, moisture, incorrect handling, heat, insects, and mice and other vermin, a long-term, minor adverse effect. By installing modern exhibit facilities, displayed artifacts and archival materials would be better protected from these threats in the future, a long-term benefit. There would

be no focused effort to conduct research, survey sites, or expand partnerships that would benefit from museum collections. This would not affect the capacity or status of the existing museum collections, resulting in no effect to museum collections.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

Conclusions

Alternative A would have long-term, beneficial effects on museum collections resulting from installation of new, improved exhibits at the national historic site's renovated visitor center. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

Impacts of Alternative B

As discussed in the analysis for Alternative A, new exhibits for the recently repaired and renovated Lindsay Warren Visitor Center would improve the display and interpretation of museum collections, and would result in greatly improved conditions for data and archival materials under Alternative B. These actions would result in long-term, beneficial effects on museum collections.

One additional archeological investigation between Pear Pad Road and the Heritage Point subdivision included in Alternative B could increase holdings within the collection; these items would be accessioned and cataloged, preserved, protected, and made available for access and use according to NPS standards and guidelines. Expanded interpretive activities would increase visitor awareness and support for the management and preservation of museum collections, resulting in long-term, beneficial effects.

The overall effects of implementing Alternative B on museum collections would be long-term and beneficial.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

Conclusions

Alternative B would have long-term, beneficial impacts to displayed museum collections resulting from improvements in Lindsay Warren Visitor Center facilities. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

Impacts of Alternative C (NPS Preferred Alternative)

Additional annual archeological investigations and data recovery conducted between the Elizabethan Gardens and the Dough Cemetery; between the Thomas Hariot trail and the Elizabethan Gardens; and at the Works Progress Administration camp; could, potentially, increase holdings within the collection even more so than in Alternative A, resulting in a long-term, beneficial impact. In addition, any items recovered would be accessioned and cataloged, preserved, protected, and made available for access and use according to NPS standards and guidelines.

As discussed in the analysis for Alternative A, new exhibits for the recently repaired and renovated Lindsay Warren Visitor Center would improve the display and interpretation of museum collections, and would result in greatly improved conditions for data and archival materials under Alternative C. These actions would result in long-term, beneficial effects on exhibited collections.

Expanded education, research and interpretive activity and increased partnering would improve the use of the collections and sharing of resources, knowledge and appreciation of museum collections. This would increase visitor awareness and support for the management and preservation of museum collections, resulting in additional long-term, beneficial effects. Improvements in the visitor center and its exhibits under Alternative C would also have a long-term beneficial effect on displayed items.

The overall effects of implementing Alternative C on museum collections would be long-term and beneficial.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

Conclusions

The overall effects of implementing Alternative C on museum collections would be long-term and beneficial. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on museum collections.

HISTORIC STRUCTURES

Impact Criteria and Thresholds for Historic Structures

Negligible: Impacts would be at the lowest levels of detection – barely perceptible and measurable. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor: Impacts would affect character-defining features but would not diminish the overall integrity of the building or structure. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate: Impacts would alter a character-defining feature(s), diminishing the overall integrity of the building or structure to the extent that its National Register eligibility could be jeopardized. For purposes of Section 106, the determination of effect would be adverse effect.

Major: Impacts would alter character-defining features, diminishing the integrity of the building or structure to the extent that it would no longer be eligible to be listed on the National Register. For purposes of Section 106, the determination of effect would be adverse effect.

Duration: Short-term: Impacts would last less than five years. Long-term: Impacts would persist for five or more years. Permanent : Impacts would last indefinitely.

The treatment of **historic and prehistoric structures** will be based on sound preservation practice to enable the long-term preservation of a structure's historic features, materials, and qualities. (NPS Management Policies 2006)

Impacts of Alternative A, the No-action Alternative

In accordance with the Secretary of Interior's Standards and as funding permits, the national historic site would continue to carry out preservation of its historic structures through routine maintenance and upkeep to arrest deterioration and to retain as much of the historic integrity of these structures as possible. These measures would have long-term, beneficial effects.

Past, on-going, and future NPS cultural resource management plans, the long-range interpretive plan, and other management plans for the Outer Banks Group and for Fort Raleigh National Historic Site would continue to have long-term beneficial effects on historic structures because they

provide park staff with the framework and guidance necessary to ensure continued, proper identification, evaluation, treatment, and interpretation of the historic structures within the national historic site. These and other past and future management plans, along with the ongoing maintenance conducted by NPS staff, would continue to provide long-term benefits to historic structures.

Assessment of shoreline erosion effects requires a comprehensive look at the resources, measures, and consideration of other related actions. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the shoreline erosion management plan and related National Environmental Policy Act assessment. This plan would provide direction for the future management of resources which would have long-term, beneficial effects on historic structures.

Historic structures would generally remain as they exist now, undergoing routine maintenance with no substantial impact to their historic fabric, integrity, or character-defining features other than the typical effects of aging and natural processes. These measures would have long-term, beneficial effects and the effects of aging and natural processes would result in permanent, negligible, adverse impacts. Alternative A would result in permanent, negligible, adverse effects and long-term, beneficial effects to historic structures.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Conclusions

Continuation of existing management actions under Alternative A would result in permanent, negligible, adverse impacts from the effects of aging and natural processes, and long-term, beneficial effects to historic structures from implementation of existing management plans. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Impacts of Alternative B

The structures would generally remain as they exist now, undergoing routine maintenance with no substantial impact to their historic fabric, integrity, or character-defining features other than the typical effects of aging and natural processes. These measures would have long-term, beneficial effects and the effects of aging and natural processes would result in permanent, negligible, adverse impacts. However, historic structures within the Resource Preservation Zone would be somewhat better protected from possible effects of any future activity than under Alternative A. Therefore, implementation of Alternative B would result in both long-term, beneficial and permanent, negligible, adverse impacts to historic structures.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Conclusions

Alternative B includes no specific actions that would lead to substantial changes to the national historic site's historic structures other than the typical effects of aging and natural processes, a permanent, negligible, adverse impact. With continued protection of these resources, especially within the Resource Protection Zone, implementation of Alternative B would also result in long-term, beneficial impacts to historic structures. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative B would not result in an adverse effect to historic structures. For purposes of Section 106, the determination of effect would be no adverse effect.

Impacts of Alternative C (NPS Preferred Alternative)

As with Alternative A, historic structures would generally remain as they exist now, undergoing routine maintenance with no substantial impact to their historic fabric, integrity, or character-defining features other than the typical effects of aging and natural processes, resulting in permanent, negligible adverse impacts. The increased emphasis on partnerships and research in the national historic site would contribute to the knowledge base of the national historic site. Partnerships may provide additional resources that would benefit historic structures through enhanced stewardship and increased educational awareness of historic structures within the national historic site. Both these elements of Alternative C would be expected to lead to long-term, beneficial effects. Alternative C would therefore result in long-term, beneficial and permanent, negligible adverse impacts to historic structures within the national historic site.

Cumulative Impacts

There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Conclusions

Alternative C would result in long-term, beneficial and permanent, negligible, adverse impacts to historic structures within the national historic site. There are no other past, ongoing, or future plans, projects, or activities that would result in cumulative impacts on historic structures.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the NPS concludes that implementation of Alternative C would not result in an adverse effect to historic structures. For purposes of Section 106, the determination of effect would be no adverse effect.

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. (NPS Management Policies 2006)

VISITOR USE AND EXPERIENCE

Methods

Visitor use and experience issues identified during public meetings and planning workshops generally included: (1) improving interpretive and directional signage; (2) assessing the adequacy of visitor facilities; (3) improving access to the sound; and (4) improving efforts to partner with organizations to provide resource protection and interpretive programming. To address these issues, an assessment of the effects of proposed national historic site management actions on visitor use and experience was made using qualitative estimates, and the effects were compared to Alternative A. In addition, information on visitor use and experience was evaluated based on available research and the professional judgment of NPS staff. The area analyzed for possible effects on visitor use and experience includes the entire national historic site.

The major assumptions used in the analysis of effects on visitor use and experience are: (1) under Alternative A, the existing

management direction for visitor experience would be extended into the future, including existing interpretive programming; (2) increased visitor use could potentially translate to greater impacts to national historic site resources; (3) impacts to visitor use as a direct result of shoreline erosion would be addressed under a shoreline erosion management plan and environmental impact assessment; and (4) differences between beneficial and adverse effects to visitor use and experience would depend on individual expectations and personal preferences; therefore, a range of intensity of effect is reported to reflect the spectrum of differences.

Impact Threshold Definitions

Impact threshold definitions for visitor use and experience are as follows:

Negligible: Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicator of visitor satisfaction or behavior.

Minor: Changes in visitor use and/or experience would be slight but detectable, but would not appreciably diminish or enhance the desired visitor experience. Visitor satisfaction would remain stable.

Moderate: Few characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. Visitors would be aware of the effects associated with implementation of the alternative and would likely express an opinion about the changes. Visitor satisfaction would begin to change as a direct result of the effect.

Major: Multiple characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly change.

Duration: Long-term: Changes would be recognized for more than one year.
Short-term: Changes would be recognized for less than one year.

Impacts of Alternative A, the No-action Alternative

Under Alternative A, past, on-going, and planned implementation of NPS resource management, interpretive plans, and other plans, such as the long-range interpretive plan, resource stewardship strategy, and shoreline erosion management plan, would continue to have long-term, beneficial effects on visitor use and experiences at the national historic site. These plans would provide guidance for interpretive planning and resource protection that, when implemented, would help address visitor use and experience issues identified during scoping. Coordinated efforts for regional planning allow for increased partnering and outreach to the community at large to also address visitor use and experience issues identified. This would have long-term, beneficial impacts. (A summary of these other past, present and future plans is included in chapters 1 and 2.)

The Lost Colony outdoor symphonic drama and programs and events held by The Elizabethan Gardens would continue to occur into the future. The events and programs result in long-term, beneficial impacts on visitor use and experience. The popularity of these events, however, increases traffic into the national historic site and parking constraints do occur during peak times. Parking constraints would be expected to continue into the future under similar peak conditions, resulting in long- and short-term, minor, adverse impacts on visitor experience.

The national historic site would design and install new exhibits for the recently repaired and renovated Lindsay Warren Visitor Center. Modern, interactive exhibits that meet current NPS and Americans with Disabilities Act standards for quality, scope, content and design would be provided in accordance with recommendations of the national historic site's long-range interpretive plan which was approved in May 2010. These improvements would improve visitor services with long-term, beneficial effects.

The national historic site's boundary and research and interpretive purpose were expanded under PL 101-603 in 1990. Under Alternative A, the national historic site would continue to interpret the Roanoke Voyages with limited opportunities to address expanded interpretive themes through films, exhibits, and other methods at the Lindsay Warren Visitor Center and throughout the national historic site. Interpretive activities would continue to be limited as there would be no increases in interpretive staff at the national historic site. This would continue to challenge the ability of the existing staff to address this growing need, with resulting long-term, moderate, adverse effects.

Under Alterative A, no new facilities would be constructed by Fort Raleigh National Historic Site. The NPS would continue to centralize visitor orientation services at the Lindsay Warren Visitor Center. Interpretation of the national historic site's modestly expanded interpretive themes would continue to occur through media, exhibits, and other methods at the Lindsay Warren Visitor Center and from selected areas within the national historic site as existing staffing resources allow. The national historic site would maintain their current staffing levels. Current partnering efforts would continue into the future, and there would likely be future constraints to meeting future demands. The level of current staffing is inadequate to conduct sufficient outreach to potential partners and subsequently to develop partnering agreements that would increase and enhance resource protection and interpretive programs, materials, and signage. The overall effect of management actions proposed under Alternative A on visitor use and experience would be considered long-term, minor to moderate, and adverse.

The Waterside Theatre filled to its 1,498 seat capacity during a summer production.

Cumulative Impacts

Other past, ongoing, and foreseeable projects, plans, and activities that would contribute to cumulative impacts on visitor use and experience, including the following:

Completion of the U.S. Fish and Wildlife Service's Administrative Headquarters and Visitor Center Facility at Alligator River National Wildlife Refuge would provide visitors to Roanoke Island opportunities to learn about the region's natural history and other interpretive themes not interpreted by the national historic site, resulting in long-term, beneficial effects.

Potential for military training operations (overflights) and expansion of Dare County Regional Airport runways to accommodate small jet traffic may detract from some visitors' experiences at the national historic site. These activities may cause unwanted sound and disturb some visitors in the national historic site, with long- and short-term, minor, adverse effects. In addition, increased vehicle traffic associated with

Town of Manteo events and activities at other regional attractions may also impact national historic site visitors by increasing the time it takes to access the national historic site, yet this would occur primarily during special events causing long-and short-term, minor, adverse effects.

Collectively, past, ongoing, and future actions would have long- and short-term, negligible to minor, adverse impacts on visitor use and experience.

When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and access are combined with the long-term, minor to moderate, adverse impacts of Alternative A, the resulting cumulative effects would be long- and short-term, minor, and adverse. Alternative A would contribute a modest increment to the overall cumulative impacts.

Conclusions

The overall effect of management actions proposed under Alternative A to visitor use and experience would be considered long-term, minor to moderate, and adverse. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and access are combined with the long-term, minor to moderate adverse impacts of Alternative A, the resulting cumulative effects would continue to be long- and short-term, minor, and adverse. Alternative A would contribute a modest increment to the overall cumulative impacts.

Impacts of Alternative B

All the studies and planning efforts to provide improved access, safety, and visitor orientation on Roanoke Island would be the same as described in Alterative A, providing long-term, beneficial effects. In addition, other long- term, beneficial effects under Alternative B would be provided. The national historic site would attempt to retain more visitors on-site through expanded interpretive efforts, facilities, partnering, and availability of food services at the national historic site. Interpretive signage would be installed that would aid in clarifying circulation patterns on national historic site trails. A small outdoor seating area would be established to provide interpretive programming near the reconstructed earthworks. Additional staff members would be proposed to help maintain, interpret, and protect national historic site resources. Expanded partnerships would provide visitors with an opportunity to learn theatrical skills, address opportunities for event collaboration, and expand visitor experiences. Potential use of the Arts-in-Parks program would provide visitors the opportunity to explore national historic site resources in combination with the performing arts. Alternative B provides increased opportunities to improve and maintain visitor satisfaction by addressing the issues identified during scoping. The overall effect of management actions proposed under Alternative B on visitor use and experience would be long- term and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible to minor, and adverse effects. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and access are combined with the long-term beneficial impacts of Alternative B, the resulting cumulative effects would be long-term and beneficial. Alternative B would contribute a large increment to the overall cumulative impacts.

Conclusions

The overall effect of management actions proposed under Alternative B on visitor use and experience would be long-term and beneficial. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and access are combined with the long-term, beneficial impacts of Alternative B, the resulting cumulative effects would be long-term and beneficial. Alternative B would contribute a large increment to the overall cumulative impacts.

Impacts of Alternative C (NPS Preferred Alternative)

All the studies and planning efforts to provide better access, safety, and visitor orientation on Roanoke Island would be the same as described in Alternative A, providing long-term, beneficial effects. In addition, other long- term, beneficial effects under Alternative C would be provided. The national historic site would continue to centralize orientation in the Lindsay Warren Visitor Center and provide opportunities for visitors to interact with archeologists, historians, and researchers at the national historic site, providing long- and short-term benefits to visitors. Implementation of the NPS researcher-in-the-park program would have long- and short-term beneficial effects by providing visitors the opportunity to further explore national historic site resources through research conducted on site. Under Alternative C, additional staff are proposed to help maintain, protect, and interpret national historic site resources. Included in the proposed additional staff is an historian that would initiate, schedule, and manage on-site research and provide input for interpretation efforts, thereby providing opportunities to benefit more visitors in the long- and short-term. A small outdoor seating area would be established to provide interpretive programming near the reconstructed earthworks. Creation of interpretive trails with themed areas would provide visitors with opportunities to experience outlying resources independently. Interpretive trails would be improved with signage that clarifies circulation patterns.

The NPS would also expand partnering opportunities with other historical, tourism-oriented organizations on Roanoke Island, and other organizations thereby providing an opportunity to reach more people and share the stories about Fort Raleigh National Historic Site and its rich cultural and natural resources, resulting in long-and short-term beneficial effects. Alternative C provides increased opportunities to improve and maintain visitor satisfaction by addressing the issues identified during scoping through the measures identified above. Alternative C provides additional advantages in the national historic site's abilities to address visitor concerns compared to Alternative A, with resulting long- and short term beneficial effects.

The overall effect of management actions proposed under Alternative C on visitor use and experience would be long- and short-term, and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long- and short-term, negligible to minor, and adverse effects. When the long- and short-term, negligible to minor, adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and experience are combined with the long- and short-term, beneficial impacts of Alternative C, the resulting cumulative effects would be long-term and beneficial. Alternative C would contribute a large increment to the overall cumulative impacts.

Conclusions

The overall effect of management actions proposed under Alternative C on visitor use and experience would be long- and short-term, and beneficial. When the long- and short-term, negligible to minor, and adverse effects of other past, on-going, and future plans, projects and activities affecting visitor use and access are combined with the long-term beneficial impacts of Alternative C, the resulting cumulative effects would be long-term and beneficial. Alternative C would contribute a large increment to the overall cumulative impacts.

Fort Raleigh National Historic Site shares staff across the Outer Banks Group that provide a full scope of functions and activities to accomplish management objectives and perform duties that include resource protection and management, visitor services, interpretation and education, law enforcement, public health and safety, and maintenance.

PARK OPERATIONS AND FACILITIES

Methods

This impact topic refers to the ability of NPS staff to protect and preserve natural and cultural resources at Fort Raleigh National Historic Site and provide opportunities for enjoyable visitor experiences while leaving national historic site resources unimpaired for future generations, and the efficiency and effectiveness with which NPS staff are able to perform tasks. Issues related to operations identified during public comment periods and planning workshops generally included: (1) the need for additional staff to maintain facilities; (2) the desire to pursue new partnerships with organizations to enhance research, resource protection, and interpretation; and (3) concerns associated with the adequacy of existing facilities.

To address these issues, an assessment of the effects of projected national historic site management actions on operations was made using qualitative measurements, and the impacts were compared to Alternative A. In addition, information on national historic site operations was evaluated based on the professional judgment of NPS staff. The area analyzed for possible effects as well as cumulative effects includes the entire national historic site.

Major assumptions used in the analysis of effects on national historic site operations were that: (1) increased visitor use and access to the national historic site could potentially translate to a greater strain on national historic site staff; (2) increased education and interpretive programs and increased partnering and/or research initiatives would strain operations without an increase in staff; (3) expansion of the trail system would require increased staff requirements including maintenance and enforcement; (4) removal of the Prince and Beehive houses would reduce maintenance demands on staff as these areas are returned to a natural state across all alternatives; and (5) protection of sensitive resources from shoreline erosion would require increased maintenance demands on national historic site staff.

Although increased staffing and funding are proposed under the action alternatives, it should be noted that implementation of the approved plan would depend on future funding and servicewide priorities. Approval of a general management plan does not guarantee that funding and staffing needed to implement the plan would be forthcoming. Full implementation of the general management plan could be many years into the future.

Impact Threshold Definitions

Impact threshold definitions for park operations are as follows:

Negligible: Management actions would be at or below levels of detection and would not have an appreciable effect on national historic site operations.

Minor: Management actions would affect operations in a way that would be difficult to measure. Impacts on staff workload would be short-term, with little material effect on other on-going national historic site programs. The change would be noticeable to staff but not to the public.

Moderate: Changes in national historic site operations would be readily apparent and would have appreciable effects on national historic site operations that are noticeable to the staff and the public.

Major: Changes in national historic site operations would be readily apparent and would result in substantial changes in national historic site operations that are noticeable to the staff and public and are markedly different from existing operations.

Duration: Long-term: Changes would be recognized for more than one year.
Short-term: Changes would be recognized for less than one year.

Impacts of Alternative A, the No-action Alternative

Under Alternative A, past, on-going, and future NPS resource management and interpretive plans (resource stewardship strategy, fire management plan, and shoreline erosion management plan) completed for the Outer Banks Group including Fort Raleigh National Historic Site would continue to affect operations as each plan is implemented. (A summary of these other past, present and future plans is included in chapters 1 and 2.) Completion and implementation of a resource stewardship strategy would identify resources of management concern and establish methods to evaluate and maintain those resources, providing long-term beneficial effects to national historic site operations. Official designation of the Fort Raleigh Maritime Forest Significant Natural Heritage Area may require increased management activities in primary and secondary areas of concern to maintain desired conditions, resulting in long-term, minor, adverse effects to national historic site operations as staff workloads are adjusted to maintain the designated area.

Continued maintenance and protection of shorelines may cause additional staffing demands causing long-term, minor, adverse impacts to national historic site operations. By allowing natural processes to prevail in most areas, excavation of cultural resources in high erosion areas may be required, including the potential relocation of Dough Cemetery. Continued shoreline protection measures instituted on the north shore of Roanoke Island and continued maintenance of the shoreline to protect national historic site resources would have both long- and short-term, minor, adverse and beneficial effects on national historic site staff. The impacts of shoreline erosion at the national historic site would be addressed in a comprehensive manner through the Outer Banks Group shoreline erosion management plan and related National Environmental Policy Act assessment. Future resource management decisions associated with shoreline erosion would be deferred to the shoreline erosion management plan and environmental assessment.

In addition, completion of a fire management plan would provide management strategies to manage fuel loading and protect national historic site resources and surrounding lands. Implementation of a fire management plan would result in long-term beneficial effects to national historic site operations as management actions would reduce the potential for resource damage and resulting maintenance efforts. The current staffing level is not adequate to meet the national historic site's operational and maintenance demands and also fully support future natural and cultural resource planning

efforts discussed above, resulting in long- and short-term, minor, adverse affects to national historic site operations.

Existing vehicle-use trends associated with the continued production of *The Lost Colony* and events and activities at The Elizabethan Gardens would be expected to continue, creating additional enforcement challenges during peak summer seasons. Parking and traffic enforcement at the national historic site would cause short-term, moderate, adverse effects to limited enforcement staff thereby adversely affecting operations.

Under Alternative A, no new facilities would be constructed within the national historic site boundary. Current levels of operation and maintenance would continue into the future. National historic site staff would continue to strive to meet visitor needs and desires, yet would continue to be constrained by funding and staff availability. Removal of the Prince and Beehive houses proposed under all alternatives would require intensive staff resources during the removal activity, and reduce maintenance demands on staff over the long-term as these areas are returned to a more natural state, providing beneficial effects to staff availability and maintenance operations at the national historic site.

The national historic site's boundary and research and interpretive mission were expanded under PL 101-603 in 1990. Under Alternative A, the national historic site would continue to interpret the Roanoke Voyages with limited opportunities to address expanded interpretive themes through films, exhibits, and other methods at the Lindsay Warren Visitor Center and throughout the national historic site. The current level of interpretive staff would be inadequate to produce the kinds of interpretive materials and programs that would meet the long-term expanded interpretive program demands created by PL 101-603, causing long-term, moderate, adverse effects.

The national historic site would maintain existing partnerships with the Roanoke Island Historical Association and the First Colony Foundation. Expansion of existing partnerships or development of new partnerships would not likely occur under Alternative A. The current level of staff would be inadequate to perform outreach to potential partners and to develop partnerships that would provide opportunities for new visitor services or expand interpretive activities that would benefit the national historic site, its staff and visitors. Overall, continued management actions under Alternative A would have a long- and short-term, moderate, adverse effect on national historic site operations.

Cumulative Impacts

Completion of the construction of the Administrative Headquarters and Visitor Center Facility, Alligator River National Wildlife Refuge may attract additional visitors to the national historic site, thus increasing the need for interpretation and other visitor services. The opposite may be true however, as more visitors may opt to spend their time at Alligator River visitor facilities and choose not to visit the national historic site. However, the magnitude of impact on Fort Raleigh National Historic Site's visitor services provided by NPS staff is unknown at this time.

Potential future development of parcels adjacent to the national historic site would cause additional opportunities for the spread of invasive species that would require management efforts to control. This would have short-term, minor, adverse impacts to national historic site operations.

Increased vehicular traffic, local events, and activities at other regional attractions could have spill-over effects on the national historic site, with potential increases in visitation. This would have short-term, minor, adverse impacts to operations because existing staff would not be able to address increased demands for visitor

services, maintenance, interpretative and enforcement activities.

Collectively, past, ongoing, and future actions would have short-term, minor, adverse impacts on national historic site operations.

When the short-term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, moderate, adverse effects on national historic site operations in Alternative A, the resulting cumulative effects would be long- and short-term, moderate, and adverse. Alternative A would contribute a large increment to the overall cumulative impacts.

Conclusions

Overall, continued management actions under Alternative A would have a long- and short-term, moderate, adverse effect on national historic site operations. When the short-term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, moderate, adverse effects on national historic site operations in Alternative A, the resulting cumulative effects would be long- and short-term, moderate, and adverse. Alternative A would contribute a large increment to the overall cumulative impacts.

Impacts of Alternative B

The establishment of management zones under Alternatives B provides effective means to improve operations. Management zones aid national historic site staff in decision-making, resource management, and enforcement. The establishment of management zones would provide long-term beneficial effects to national historic site operations. Plans discussed under Alternative A would also be applicable to Alternative B. However, additional staffing proposed under Alternative B would provide necessary maintenance availability to implement resource plan recommendations resulting in long- and short-term, beneficial effects.

Under Alternative B, limited new facilities (extension of the Roanoke Island multi-use trail, parallel trail to Freedom Trail, expansion of parking at headquarters (eight spaces), and small outdoor seating area) would provide visitors with increased interpretive and recreational opportunities, thus potentially increasing visitation or the length of stay of individual visitors to the national historic site. Visitor use of new trails and the seating area would increase maintenance and enforcement efforts over the long-term. Construction of limited new facilities would cause short-term, minor, adverse impacts to staff that would be required to oversee such activities, thereby taking them away from other assigned duties. Increased staffing demand associated with peak summer visitation and limited new facilities under Alternative B would be reduced by an additional law enforcement and maintenance staff, providing long-term beneficial effects. Additionally, a partner-funded feasibility study and assessment of a range of alternatives for the design and construction of a partner-funded and operated visitor center annex would occur under Alternative B. This action would cause a short-term, negligible, adverse impact on national historic site staff during review and coordination of the feasibility study.

Under Alternative B, the national historic site would maintain and enhance existing partnerships and establish new partnerships for interpretive and theatrical education purposes. Increased partnering would likely provide additional resources to the national historic site that would benefit overall operations over the long- and short-term. The national historic site would rely more upon the Roanoke Island Historical Association to tell the story of the Roanoke Voyages, whereas the NPS would interpret other themes and provide self-guided

interpretive opportunities on existing trails and potential NPS Arts-in-Parks program offerings. Additional interpretive staff would be proposed to support the expanded interpretive service program efforts and inspire visitors to remain at the national historic site for longer periods of time.

One additional archeological investigation between Pear Pad Road and the Heritage Point subdivision would also have the potential to increase the responsibilities of cultural resources staff and increase museum collections management efforts. This would have projected short-term, minor, adverse effects.

Removal of the Prince and Beehive houses proposed under all alternatives would require intensive staff resources during the removal activity, and reduce maintenance demands on staff over the long-term as these areas are returned to a more natural state. This action would have short-term, minor adverse effects to national historic site operations and long-term beneficial effects. Native vegetation plantings near headquarters and the maintenance area would reduce maintenance demands on national historic site staff. Shoreline protection would continue to occur and be maintained at the Waterside Theatre and Dough Cemetery which would require continued monitoring by the existing staff at the national historic site. Future resource management decisions associated with shoreline erosion would be deferred to the shoreline erosion management plan and environmental assessment.

Overall, management actions proposed under Alternative B would have long- and short-term beneficial effects on national historic site operations.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be long-and short-term, minor, adverse effects. When the long- and short- term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, beneficial effects on national historic site operations in Alternative B, the resulting cumulative effects would be long- and short-term, and beneficial. Alternative B would contribute a large increment to the overall cumulative impacts.

The Lindsey Warren Visitor Center is a 6,000-square-foot facility that provides access to park staff and volunteers that orient visitors to Roanoke Island through exhibits, artifacts, and a 17-minute national historic site video. Credit: Doug Stover

Conclusions

Overall, continued management actions under Alternative B would have a long- and short-term beneficial effect on national historic site operations. When the long- and short-term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, beneficial effects on national historic site operations in Alternative B, the resulting cumulative effects would be long- and short-term, and beneficial. Alternative B would contribute a large increment to the overall cumulative impacts.

Impacts of Alternative C (NPS Preferred Alternative)

The establishment of management zones under Alternatives C provides effective means to improve operations. Management zones aid national historic site staff in decision-making, resource management, and enforcement. The establishment of management zones would provide long-term beneficial effects to national historic site operations. Plans discussed under Alternative A would also be applicable to Alternative C. However, additional limited staffing proposed under Alternative C would provide maintenance availability to implement resource plan recommendations, resulting in long-and short-term, negligible, adverse effects.

Alternative C provides for limited new facilities that include the extension of the Roanoke Island multi-use trail, a parallel trail to Freedom Trail, expansion of parking at headquarters (eight spaces), and a small outdoor seating area near the reconstructed earthworks. Additional trails and seating area would provide visitors with increased interpretive and recreational opportunities, thus increasing visitation within the national historic site. Visitor use of new trails would increase maintenance and enforcement efforts over the long-term. Construction of limited new facilities would cause short-term, minor, adverse impacts to national historic site staff. Additional law enforcement and maintenance staff would reduce increased staffing demand associated with peak summer visitation and new facilities under Alternative C.

Under Alternative C, the national historic site would implement recommendations of the national historic site's long-range interpretive plan that includes improving communication with partners, working closely with partners to integrate interpretive programming, continuing to host archeological research, and coordinating interpretive programming with other local parks and organizations. Alternative C would also seek to expand partnerships with other tourism-oriented organizations on Roanoke Island. New partnerships would be developed with research organizations that could provide research efforts on other national historic site topics (beyond the Roanoke Voyages), both cultural and natural. Enhanced research opportunities would continue through the partnership with the First Colony Foundation and others, for interpretive, archival, and research purposes. These partnerships would have long-term, beneficial effects to national historic site operations as resources would be made available to cooperatively address operational needs.

Under Alternative C, research efforts would be managed by a full-time historian that would initiate, schedule, and manage research activities. Additional annual archeological investigations and data recovery would be conducted in the following locations: between the Elizabethan Gardens and the Dough Cemetery; between the Thomas Hariot trail and the Elizabethan Gardens; and at the Works Progress Administration camp. Addition of the historian would benefit operations in the long-term.

Removal of the Prince and Beehive houses proposed under all alternatives would reduce maintenance demands on national historic site staff as these areas are returned to a more natural state. There would be an increase in short-term demands on staff during the removal; however, long-term maintenance demands would be reduced, with long-term, beneficial effects. Native vegetation plantings near headquarters and the maintenance area would reduce maintenance demands on national historic site staff. Shoreline protection would continue to occur and be maintained at the Waterside Theatre and Dough Cemetery increasing demand on national historic site staff; however natural processes would continue to prevail in most areas. Future resource management decisions associated

with shoreline erosion would be deferred to the shoreline erosion management plan and environmental assessment. Overall, management actions proposed under Alternative C would be long- and short-term and beneficial.

Cumulative Impacts

Impacts associated with other past, present, and reasonably foreseeable actions are the same as described under Alternative A. There would be short-term, minor, adverse effects. Potential impacts to national historic site operations Alternative C would be long- and short-term and beneficial. When the short-term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, beneficial effects on national historic site operations in Alternative C, the resulting cumulative effects would be long- and short-term, and beneficial. Alternative C would contribute a large increment to the overall cumulative impacts.

Conclusions

Overall, continued management actions under Alternative C would be long- and short-term beneficial. When the short-term, minor, adverse effects of other past, on-going, and future plans, projects and activities affecting national historic site operations are combined with long- and short-term, beneficial effects on national historic site operations in Alternative C, the resulting cumulative effects would be long- and short-term, and beneficial. Alternative C would contribute a large increment to the overall cumulative impacts.

SUSTAINABILITY AND LONG-TERM MANAGEMENT

The National Environmental Policy Act (sec. 101(b)) and the NPS Organic Act require an assessment of the potential for each alternative to produce long-term effects and the potential of foreclosing future options available to the NPS with regard to managing each park. An alternative is required to allow for sustainable development, which is defined as an action that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development in NPS 2001). This section addresses the following three components of the sustainability assessment for the alternatives proposed in this general management plan: adverse impacts that cannot be avoided, relationship of short-term uses and long-term productivity, and irreversible and irretrievable commitments of resources.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Unavoidable adverse impacts are those environmental consequences of an action that cannot be avoided, either through mitigation or by changing the nature of the action.

The NPS defines adverse impacts as those that cannot be fully mitigated or avoided. Some negligible to moderate, adverse effects on natural and cultural resources would be essentially unavoidable (e.g., soil erosion, vegetation trampling or vegetation growth on historic structures); however, the majority of adverse effects may be mitigated or avoided. There are no major, adverse effects to cultural and natural resources identified that are associated with implementation of the management actions proposed under any of the alternatives (A, B, or C).

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The NPS must determine if the effects of project alternatives involve trade-offs of the long-term productivity and sustainability of national historic site resources for the immediate short-term use of those resources. It must also consider if the effects of the alternatives are sustainable

over the long-term without causing future adverse environmental effects (National Environmental Policy Act Section 102(c) [IV]). None of the alternatives suggest substantial loss or impairment of natural or cultural resources as a consequence of their implementation.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The National Environmental Policy Act requires that environmental analysis include identification of ". . .any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources would have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site). Excluding the expenditure of resources for limited construction purposes, there are no other irreversible or irretrievable commitments of resources associated with implementation of the management actions proposed under any of the alternatives (A, B, or C).