



Cape Hatteras Lighthouse

Lighthouse Repair and Landscape Improvement Project

Environmental Assessment

May 2022



Cover Photos by: NPS and VHB

**US Department of the Interior
National Park Service
Cape Hatteras National Seashore**

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May 2022

The National Park Service (NPS) proposes to rehabilitate the interior and restore the exterior of the Cape Hatteras Lighthouse (the Lighthouse) at Cape Hatteras National Seashore and implement landscape improvements. Specifically, the purpose of this project is to rehabilitate the interior and restore the exterior of the Lighthouse and its character-defining features, to repair or replace deteriorated materials and finishes, and to selectively reverse unsympathetic treatments added to the Lighthouse and the Oil House after 1920. Additionally, the project purpose includes providing a more immersive experience of the Cape Hatteras Light Station (the light station) by defining pedestrian circulation patterns and considering ways to improve the resiliency of the light station and grounds through use of design and materials suited to a coastal environment that is subject to heavy visitation.

The Lighthouse was constructed in 1870 and at 193 feet, it is the tallest brick lighthouse in the United States and the second tallest in the world. It was original lit by an oil lamp inside a First-Order Fresnel lens, which uses a series of prisms to bend light from a single source into parallel beams. The First-Order is the largest size of Fresnel lenses and was used for the largest seacoast lighthouses. The Lighthouse is historically an important navigational aid warning mariners of the hazards located off the coast of Cape Hatteras. These hazards include a collision of ocean currents as well as a 12-mile-long sandbar known as the Diamond Shoals. Hundreds, if not thousands, of shipwrecks are located within the vicinity of Diamond Shoals, giving the area the name, “The Graveyard of the Atlantic.”

The light station, which includes the Lighthouse as well as its associated support buildings and grounds, was designated as a National Historic Landmark on August 5, 1998, with a boundary revision on December 20, 2000. This designation defines the light station’s period of significance as 1870-1936, which encompasses the construction of the Lighthouse in 1870 through the deactivation of the light station by the US Coast Guard in 1936 (NPS 1998a). The light station is significant for its association with navigational aids for safe maritime transportation in the late 19th and early 20th centuries, as well as for its unique design and method of construction typical of coastal lighthouses during the late 19th century (NPS 1998a). Today, the light beacon still serves as a functional navigational aid, operated and maintained by the US Coast Guard. The NPS has defined the period 1870-1920 for restoration of the site. This period will incorporate the restoration of missing character-defining features of the Lighthouse that existed together, including the decorative metal fence, window pediments, interior wooden doors, and Fresnel lens.

The project is needed to address the deteriorated elements of the interior and exterior of the Lighthouse such as the paint, masonry, severely oxidized metalwork, and cracked marble tiles. There are also missing character-defining features that were important to the historic design and construction of the Lighthouse, such as the original First Order Fresnel lens and exterior window pediments. There are unsympathetic modern alterations such as the vinyl perimeter fence around the Lighthouse and the shade canopy on the Oil House that detract from this historic character of the site. Heavy visitation of the site in combination with limited comprehensive pedestrian walkways has resulted in visitors walking across the landscape, trampling turf vegetation to the point of wearing large bare spots in the lawn. Visitors arriving at the site

are not provided a clear circulation route along which to visit the site, which results in visitors walking off the established path.

This Environmental Assessment (EA) evaluates three alternatives: the no-action alternative and two action alternatives. The no-action alternative (alternative A) would continue the current management of the light station and not implement any major rehabilitation work. The action alternatives would include restoration and rehabilitation of the Lighthouse and the Oil House as well as different degrees of improvements to the landscape to accommodate heavy visitation of the site. Alternatives B and C include the same restoration and rehabilitation actions at the Lighthouse and Oil House (for example, repointing and repairing damaged masonry, repairing or replacing corroded metal components, and refinishing or repainting metalwork). Alternative B envisions a restoration of the original Fresnel lens being reinstalled in the Lighthouse, and the extent of the proposed circulation improvements would be relatively modest. Alternative C would install a replica of the original Fresnel lens in the Lighthouse, and circulation improvements would be more substantial.

This EA analyzes the potential impacts these alternatives would have on the natural, historic, and human environment. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [USC] 4332[2] [C]); the implementing regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500-1508); the Department of the Interior NEPA regulations (43 CFR Part 46); and NPS Director's Order #12: Conservation Planning, Environmental Impact Analysis and Decision-Making (NPS 2011) and the accompanying NEPA Handbook (NPS 2015).

Note to Reviewers and Respondents:

This EA will be on formal public and agency review for 30 days from the release date. Please provide comments on the NPS's Planning, Environment & Public Comment (PEPC) website at https://parkplanning.nps.gov/caha_lighthouse or by mailing to the name and address below. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

The National Park Service (NPS) proposes to rehabilitate¹ the interior and restore² the exterior of the Cape Hatteras Lighthouse (the Lighthouse) at Cape Hatteras National Seashore (the Seashore), to restore the oil house, and to implement landscape improvements. The Cape Hatteras Light Station (the light station), which includes the Lighthouse as well as its associated support buildings and grounds, was designated as a National Historic Landmark on August 5, 1998, with a boundary revision on December 20, 2000. The light station was designated a National Historic Landmark for its association “with the federal government’s efforts to provide an integrated system of navigational aids to provide for safe maritime transportation” in the late 19th and early 20th centuries and because it embodies a distinctive design and method of construction typical of coastal lighthouses on the East Coast of the United States during the second half of the 19th century (NPS 1998a). Today, the light beacon still serves as a functional navigational aid, operated and maintained by the US Coast Guard. The purpose of and need for the project are discussed in the “Purpose of and Need for Action” section below.

The Lighthouse was constructed in 1870, replacing a smaller 1803 lighthouse, to guide mariners around the shallow, shifting sands of the Diamond Shoals located just off the coast. The Lighthouse was originally lit by an oil lamp inside a First-Order Fresnel lens. This type of lens is made of a series of prisms that bend light from a single source into parallel beams. The First-Order is the largest size of Fresnel lenses and was used for the largest seacoast lighthouses. The original Fresnel lens remained in the Lighthouse until circa 1949, when it was removed after it was vandalized. The original pedestal remained in the Lighthouse and a modern light beacon was installed in 1950. The original lens was moved into NPS storage and was later loaned out to the Graveyard of the Atlantic Museum in 2002. Following a partial lens restoration project in 2005, the NPS removed the original pedestal and clockwork from the lighthouse and loaned it, along with the lens, for display at the museum. In 2006, the lens, remaining prisms, pedestal, and railing pieces were reunited and displayed at the museum where they remain today.



Historic photograph of the Lighthouse and Oil House dated June 1, 1899
(Source: NPS)

Several buildings associated with the Lighthouse were constructed to accommodate the light keepers and their families. The buildings that remain today include the Oil House where fuel for the beacon was stored, as well as quarters to house the principal keeper and assistant

¹ *Rehabilitation* is the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values (NPS 2017).

² *Restoration* is the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period (NPS 2017).

keepers and their families. The light station was added as part of the Cape Hatteras National Seashore when it was first established by legislation in 1937. When the Seashore was officially opened in 1953, the light station was included as part of the nation's first National Seashore (NPS 2016). The National Historic Landmark designation defined the light station's period of significance³ as 1870-1936, which encompasses the construction of the Lighthouse in 1870 through the deactivation of the light station by the US Coast Guard in 1936 (NPS 1998a). As a result of eroding shorelines, in 1999, the NPS moved the light station 2,900 feet southwest of its original location to a new site approximately 1,800 feet from the shoreline, where it stands today. When the light station was moved to its new site, the configuration of the buildings associated with the Lighthouse was maintained, as well as their orientation to the shoreline (NPS 2022a).

Over time, the condition of the Lighthouse has deteriorated, resulting in corroded metal, deteriorated paint, cracked masonry, failing masonry mortar broken glass, and cracked marble floors. Furthermore, there are currently missing character-defining features of the Lighthouse that previously existed together, including the Fresnel lens, decorative metal fence, window pediments, and interior wooden doors.

This Environmental Assessment (EA) evaluates three alternatives: the no-action alternative and two action alternatives. The no-action alternative would continue the current management of the light station. The action alternatives would include repair and rehabilitation of the Lighthouse and the Oil House as well as different degrees of improvements to the landscape to accommodate heavy visitation of the site. These alternatives are described in detail in "Chapter 2: Alternatives."

This EA analyzes the potential impacts these alternatives would have on the natural, historic, and human environment. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [USC] 4332[2] [C]); the implementing regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500-1508); the Department of the Interior NEPA regulations (43 CFR Part 46); and NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis and Decision-Making* (NPS 2011), and the accompanying NEPA Handbook (NPS 2015).

PURPOSE OF AND NEED FOR ACTION

The purpose of this project is to rehabilitate the interior and restore the exterior of the National Historic Landmark Lighthouse and its character-defining features⁴ (which are the characteristics of a historic property that qualify it for inclusion in the National Register of Historic Places [National Register]), to repair or replace deteriorated materials and finishes, and to selectively reverse unsympathetic modern treatments (those that are incompatible with the historic character) added to the Lighthouse and the Oil House. Additionally, the project purpose includes providing a more immersive experience of the light station by defining pedestrian circulation patterns and considering ways to improve the resiliency of the light station and grounds in a manner that will stand up to high visitor use and through use of design and materials suited to a coastal environment and heavy visitation area.

³ The period of time when the property was associated with important events or persons or when it attained the characteristics that qualify it for listing in the National Register.

⁴ Character-defining features are those elements that contribute to a property's integrity, which is composed of location, design, setting, materials, workmanship, feeling, and/or association.

The NPS has defined the period 1870-1920 for restoration of the site. As such, the alternatives include actions related to character-defining features (both missing and extant) that may not have existed together at any point in history but are representative of changes that occurred over time and are important to the interpretation and experience of the light station for visitors.

This project is needed to address the deteriorated elements of the interior and exterior of the Lighthouse that need repair or replacement. This includes paint, masonry, corroded metal elements, and cracked marble tiles. There are also missing character-defining features that were important to the historic design and construction of the Lighthouse, such as the original First Order Fresnel lens, as well as unsympathetic modern treatments that were added after the period of restoration (1870-1920), both of which diminish the historic integrity of the Lighthouse. Heavy visitation of the site in combination with limited comprehensive pedestrian walkways has resulted in visitors walking across the landscape surrounding the Lighthouse, trampling turf vegetation to the point of wearing large bare spots in the lawn and along the edges of the one paved walkway. Visitors arriving at the site are not provided a clear circulation route along which to visit the site, which results in visitors walking off the established path (including along the move corridor) and perhaps not visiting the museum at the far terminus of the walkway.



View towards Oil House and Lighthouse from brick walkway with areas of substantially worn grass due to heavy pedestrian use, October 2020

PROJECT AREA LOCATION

The Cape Hatteras Lighthouse is in Buxton, in Dare County, North Carolina, within the Cape Hatteras National Seashore on Hatteras Island, one of a string of barrier islands known as the Outer Banks. See figure 1 below for a map of the location.

When the Seashore was established in 1937, the light station became one of the most iconic features of the new NPS unit. Eroding shorelines at the time compelled the NPS to take action to protect the Lighthouse. Construction of artificial dunes by the Civilian Conservation Corps (CCC) in 1935-36 protected the Lighthouse by halting westward movement of the shoreline for about 30 years (NPS 2003). Other methods employed to protect the Lighthouse included the construction of steel groins, installation of sand bags, and beach renourishment projects (in 1971 and 1972). Eventually, the protection measures were overtaken by storms and erosion, which made the Lighthouse vulnerable to the Atlantic Ocean. As a result, in 1999 the light station was moved 2,900 feet southwest of its original location to a new site approximately 1,800 feet from the shoreline, where it stands today. The path created to move the light station buildings is known as the move corridor and connects the new site to the former Lighthouse location physically and thematically (NPS 2003). From the top of the Lighthouse, visitors have an aerial view of the move corridor, much of Hatteras Island, the Atlantic Ocean, and Pamlico Sound (NPS 2003).

This project area encompasses the light station and landscape, comprised of approximately 6.5 acres of land. This includes the portion of the move corridor between the Lighthouse and the parking lot and the visitor services area where the visitor center, restrooms, pavilion, and Keepers of the Light Amphitheater are located. The project area is bound by forested area to the north, south, and west and by the existing parking lot to the east. Some construction staging may take place in the parking lot (and some items may require short-term placement closer to the Lighthouse), though the specific location would be determined at a later date. See figure 2 below for a map of the project area. The area within the National Historic Landmarks boundary is referred to as the historic core for the purposes of this document and includes the Lighthouse, Oil House, and the keepers' quarters.

The National Oceanic and Atmospheric Administration (NOAA) reports sea-level rise projections at Oregon Inlet (approximately 38 miles north of the project area) to be between approximately 0.25 meters (m) and 1.1 m by 2050 (NOAA 2021). In its current location, the light station should remain above rising sea level through 2050. The repairs and improvements proposed under this project consider rising sea levels as well as other effects of climate change such as the potentially increased frequency and intensity of storms. More information on environmental trends and sustainability in light of climate change are included later in this document.



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Figure 1. Project Location Map



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Figure 2. Project Area Map

ISSUES AND IMPACT TOPICS

Impact Topics Analyzed in this Environmental Assessment

The planning process for this project began with initiation of preliminary design in 2019, working with the recommendations found in the 2016 *Cape Hatteras Lighthouse Historic Structure Report (HSR)* for rehabilitation and restoration of the Lighthouse. Although not specifically described in the HSR, the NPS decided to supplement the work on the Lighthouse with improvements to the landscape due to substantial degradation. Degradation has apparently been caused by high visitor use and a relative lack of pathways. The planning team reviewed treatment recommendations made in the 2003 *Cape Hatteras Light Station Cultural Landscape Report* (NPS 2003) during development of landscape improvements that address concerns caused by heavy visitation and corresponding landscape impacts, while also meeting the Seashore's current needs. These concerns led the Seashore to propose modifications to improvements outlined in the treatment plan in the 2003 *Cape Hatteras Light Station Cultural Landscape Report*. The team held a value analysis workshop and internal discussions to identify the proposed action and a reasonable range of alternatives to be evaluated in this EA, focusing on a continuum of ideas for walkway revisions, ways to encourage visitors to stay on the walkways, and ways to provide more shaded areas in which visitors can gather as they wait for Lighthouse climbs or otherwise experience the light station.

Impact topics are resources within the project area that could be affected, either beneficially or adversely, by the range of alternatives presented in this EA. Impact topics considered in this document were identified based on the issues raised during scoping, site conditions, federal laws, regulations, Executive Orders, NPS *Management Policies 2006*, Director's Orders, and staff knowledge of the Seashore's resources. During the scoping process, impact topics were either retained for further analysis in this EA or dismissed from further consideration. A topic was retained for analysis if it met one or more of the following conditions:

- the environmental impacts associated with the issue are central to the proposal or of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue.

Listed below are the impact topics that were retained for analysis in this EA. Additional information about each resource can be found in their respective "Affected Environment" sections in Chapter 3.

- Historic structures
- Cultural landscape
- Visitor use and experience

Impact Topics Dismissed from Further Analysis

The list below outlines the impact topics that were considered for full analysis but were ultimately dismissed from further analysis in this EA. An impact topic was initially considered for but dismissed from further analysis if it did not contribute to the factors outlined above that warrant analysis. For detailed rationale about why an impact topic was dismissed, see appendix A.

- Socioeconomics and adjacent communities
- Environmental justice
- Floodplains
- Archeological resources
- Endangered species
- Climate change

CHAPTER 2: ALTERNATIVES

This chapter describes actions that would take place under each alternative to rehabilitate and restore the Cape Hatteras Lighthouse at Cape Hatteras National Seashore and to provide related site and adjacent landscape improvements. CEQ regulations for implementation of the NEPA process call for the alternatives considered in a document to include a no-action alternative. The description and evaluation of this alternative provides a baseline to which the action alternatives can be compared. This EA evaluates three alternatives: the no-action alternative and two action alternatives. The elements of these alternatives are described in the following sections. Impacts associated with the alternatives are described in “Chapter 3: Affected Environment and Environmental Consequences.”

ALTERNATIVE A: NO ACTION

The existing conditions and foreseeable future for the site under the no-action alternative are described below and depicted on figure 3 below.

Lighthouse

Under the no-action alternative, no comprehensive repair or rehabilitation would occur to the Lighthouse. Periodic maintenance and critical repairs would be conducted as needed, as determined by current management practices.



Existing light beacon, March 2020

Light Beacon

Under the no-action alternative, the existing rotating light beacon and metal platform would remain in the Lighthouse lantern. At the end of its useful life, the existing beacon may be replaced with another modern beacon by the US Coast Guard; no specific type of beacon has been identified at this time. The original First-Order Fresnel lens is currently on loan to the Graveyard of the Atlantic Museum.

Oil House

Under the no-action alternative, there would be no repair or rehabilitation of the Oil House. Routine maintenance and critical repairs would be conducted as needed, as determined by current management practices.

Landscape

Under the no-action alternative, there are no plans for comprehensive improvements to visitor circulation, the number or types of interpretive signs, or the availability of shaded areas for those waiting to climb the Lighthouse. The existing pedestrian walkways and the employee parking lot would remain the same. Visitors would continue to arrive at the site via the entrance plaza and may follow the walkway adjacent to the bookstore or follow the path towards the amphitheater area (within the move corridor). Once visitors reach the Lighthouse, the only paved walkway available to tour the site would continue to be the existing 4.5-foot-wide walkway made of clay pavers that mimic brick extending to the keepers' quarters. Visitors waiting to climb the Lighthouse would be provided a very limited opportunity for shade under the modern canopy attached to the Oil House.



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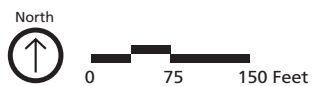


Figure 3. Alternative A: No Action

ELEMENTS COMMON TO BOTH ACTION ALTERNATIVES B AND C

Alternatives B and C both propose interior rehabilitation and exterior restoration of the Lighthouse. To simplify presentation of those alternatives, the treatments proposed for the Lighthouse and the Oil House are summarized below. The differences between actions proposed under alternative B and alternative C are described in the sections specific to those alternatives.

Lighthouse Rehabilitation

Under both action alternatives, the Lighthouse would be rehabilitated on the interior and restored on the exterior in accordance with Secretary of the Interior *Standards for the Treatment of Historic Properties*, including repair or replacement of the character-defining features and deteriorated and damaged elements. Some modern, unsympathetic treatments, materials, and finishes would be reversed. The details of these actions are laid out below, organized by Lighthouse element.

Masonry

- Remove exterior and interior coatings, repair cracks, and re-point brick with appropriate mortar.
- Repaint exterior and interior with materially compatible masonry paint to match a historically accurate color based on test analysis. Maintain the exterior daymark paint schematic.
- Repoint granite plinth and granite base features with appropriate mortar.

Metal Components

- Remove paint or coatings from, remove corrosion from, and repair all metal components including:
 - ☐ metal spiral stair
 - ☐ metal oil tank at first level
 - ☐ five metal bench caps at first level
 - ☐ metal Watch Room stair components
 - ☐ metal door ninth level Watch Room stair
 - ☐ metal lantern ladder
 - ☐ curved metal wall panels enclosing Watch Room stair that connects the ninth and tenth levels
 - ☐ metal door frame at interior entry door on first level
 - ☐ first level exterior bronze doors
- Remove and replace nuts from bolts on main stair treads.

- Remove metal weight track from Lighthouse.
- Replicate one metal bench cap.
- Remove two guardrails and handrails from entry stoop. Replace with new handrails in a non-corrosive metal of a sympathetic design to meet egress requirements.
- Replace tenth level (Watch Room/Gallery) exterior bronze door and associated frame and hardware.
- Replace non-original Watch Room deck plates as needed after additional structural inspection.
- Repaint all interior metal components with materially compatible paint to match a historically accurate color within the defined period of rehabilitation (1870-1920). Apply new finish coatings to the following components to protect and prevent corrosion:
 - ☐ all metal stair components, main spiral stair, watch room stair, lantern ladder
 - ☐ oil tank and benches
 - ☐ all metal door and wall panels on ninth level, watch room stair, lantern ladder
 - ☐ first level and tenth level exterior bronze doors
- Remove non-historic wood louver from existing cast iron frame at transom above first-level bronze doors and replace with metal louver painted to match cast iron frame.

Windows and Vents

- Remove and repair or replace the following elements:
 - ❑ window frames, sashes, and hardware for all seven tower windows
 - ❑ all sills; tower lintels to be retained and encapsulated
 - ❑ damaged Service Room window sashes, frames, lintels, sills, hardware, and glazing for all ninth level windows
 - ❑ Grills inside vents above the three fixed Service Room windows at ninth-level landing and provide new louvers.
- Remove existing non-historic diamond-patterned metal fence barrier covering interior tower windows, if installed.
- Fabricate and install the following elements:
 - ❑ six exterior ornamental pedimented hoods and brackets at window heads with non-corrosive metal
 - ❑ sympathetic interior safety barrier for public at operable tower casement windows
- Repaint all exterior metal components with a materially compatible paint to match a historically appropriate color within the defined period of restoration (1870-1920).
- Prepare and apply new finish coatings to metal frames, sashes, lintels, sills, and hardware to protect and prevent corrosion for all ten windows.

Watch Room Balcony

- Clean and repair metal brackets, floor plates, handrail, and balustrade.
- Replace lintel grids.

Oil House Rehabilitation

Similar to the Lighthouse, both action alternatives would include rehabilitation and repair of the Oil House. Actions would be taken to repair the structure, some missing historic features would be replicated using historic drawings, and some unsympathetic modern intrusions would be removed. The following actions would be undertaken:

- Apply new finish coatings.
- Repaint all exterior metal components to match most historic color.

Lantern

- Clean and repair metal frame and hardware.
- Clean and repair ferric-based metal of lantern cone.
- Apply new finish coatings.
- Replace broken glass.
- Repaint all interior and exterior components of the lantern to match most historic color.

Lantern Balcony

- Repair metal floor plates.
- Install new railing and balustrade with non-corrosive metal.
- Apply new finish coatings of materially compatible paint.
- Repaint all exterior metal components to match most historic color.

Interior Wooden Doors

- Restore first-level interior wooden doors and transom.
- Restore tenth-level interior wooden door.

Marble Floor

- Repair cracks and other damages while maintaining as much original marble tile as possible and only replacing tiles when their condition is beyond repair.
- Clean, polish, and seal all tiles.

- Repoint and repair exterior and interior masonry.
- Connect top sill plate to the wall and clip down rafters.
- Remove interior coatings, repair cracks, and re-point brick with mortar similar in composition to the historic mortar. Repaint painted interior brick walls with historically sensitive masonry paint to match historic color.
- Infill with brick the existing window openings that were added to the building circa 1934.
- Remove the modern six-panel door and replace with a bronze (non-corrosive) door hung on the still-extant historic lintel with metal strap hinges.
- Remove the modern unsympathetic external shade canopy.

ALTERNATIVE B: CIRCULATION MODIFIED AND LENS RESTORED

In addition to the elements common to both alternatives, alternative B provides a new circular walkway between the Lighthouse and the keepers' quarters (including some "pull-off" areas for interpretation and photographic opportunities), adds a walkway around the Lighthouse). It would also include the restoration and reinstallation of the original Fresnel lens in the Lighthouse. This alternative is described in more detail below and is illustrated on figure 4 below.

Lighthouse and Oil House Rehabilitation

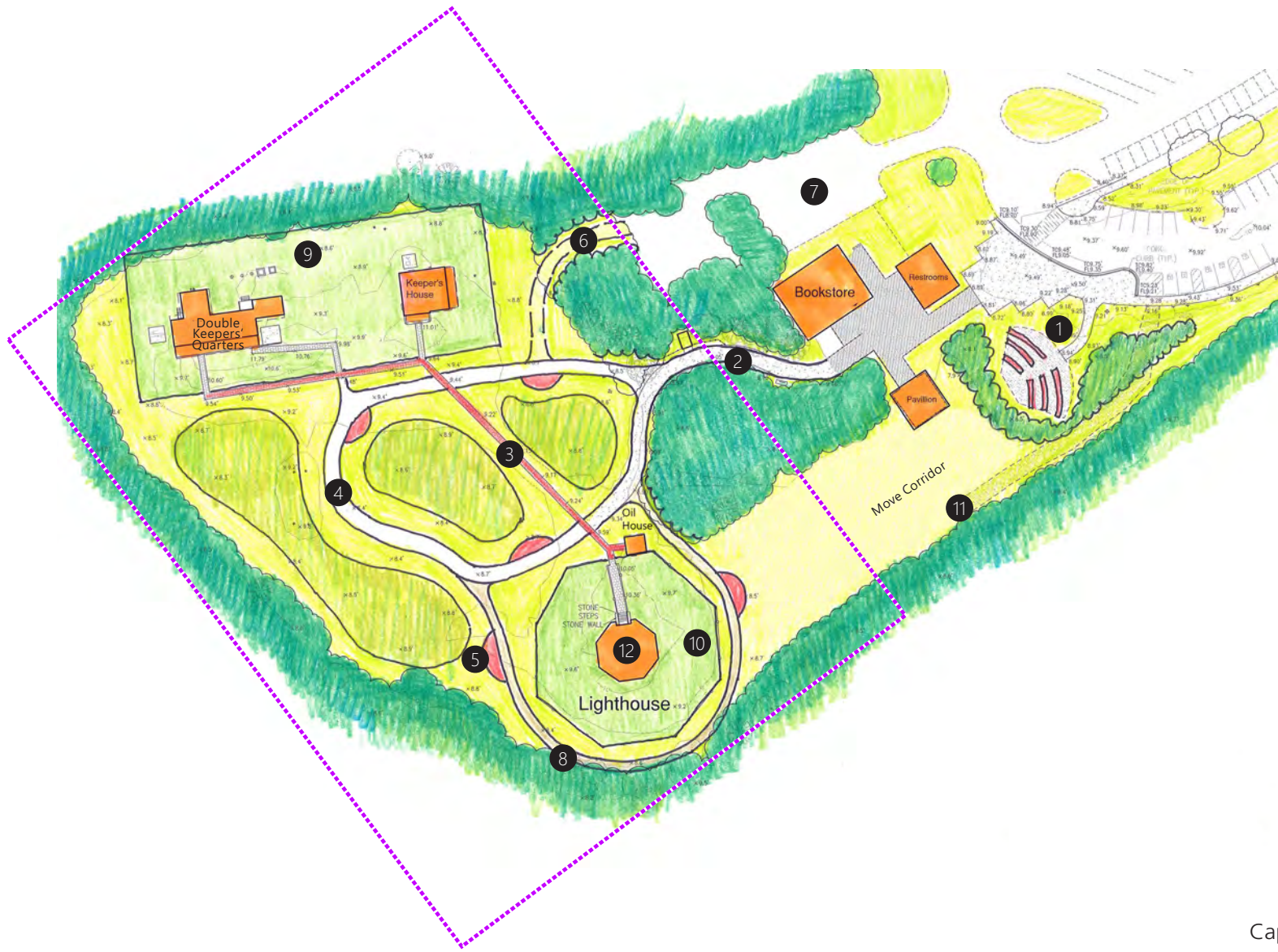
Actions related to the rehabilitation and repair of the Lighthouse and the Oil House would be the same as described under "Common to Both Action Alternatives" above.

The existing vinyl perimeter fence around the Lighthouse would be removed. A replica of the original (pre-1920) decorative metal octagonal fence with granite bases would be constructed based on documentary research and material samples in NPS storage. The new fence would be constructed of a painted, non-corrosive metal.

A replica stockade fence would be added around both the Principal Keeper's Quarters and Double Keepers' Quarters to match the look and feel of the original landscape of the early historic period (1870-1890s). This fence would be installed in a rectangular shape around both buildings with a wide buffer of lawn grasses surrounding the dwellings.

Light Beacon

The original First-Order Fresnel lens, which is a character-defining feature of the Lighthouse, was removed from the Lighthouse circa 1949, followed by the pedestal and clockwork, which were removed in 2006. The lens, pedestal, and clockwork are currently on loan to and display at the Graveyard of the Atlantic Museum as a historic artifact. The feasibility of the restoration and components (summarized below) are based on an initial assessment of the existing conditions of the artifact. A detailed assessment of the existing condition of the lens, pedestal, and clockwork was not able to be completed in advance of the preparation of this EA; therefore, it would be required to determine the exact treatment required for the reinstallation and restoration of the original First-Order Fresnel lens.

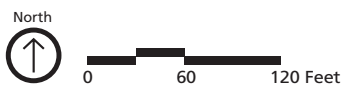


LEGEND

- Legend**
- L Boundary (approximate)
 - ① Retain Keeper's Memorial
 - ② Retain Concrete Walkway
 - ③ Retain 4.5' Wide Paver Walkway
 - ④ 12' Concrete Walkway
 - ⑤ Visitor Interpretive Station (Typical)
 - ⑥ Emergency/ Maintenance Access
 - ⑦ Maintain Staff Parking
 - ⑧ 6' Min. Pervious Paving
 - ⑨ Reconstructed Wood Fence
 - ⑩ Reconstructed Metal Fence
 - ⑪ Emergency/ Maintenance Access to Remain
 - ⑫ Lens Restoration

Note

Location and scale of all improvements are approximate and subject to refinement during future design phases.



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**Figure 4. Alternative B:
Circulation Modified and Lens Restored**

Under alternative B, the existing rotating light beacon and metal platform would be removed from the Lighthouse lantern, the NPS would restore the original historic Fresnel lens, pedestal, and clockwork to the greatest extent practicable and reinstall it in the Lighthouse with a new light source to replace the existing modern beacon. The details of the restoration would be determined during a future phase, but would likely include the following general elements:

- Remove non-historic, modern metal platform on the 11th level of the Lighthouse that supports the existing beacon.
- Remove the non-historic, modern existing beacon.
- Dismantle First-Order Fresnel lens, remove from the museum, and salvage and tag all components.
- Recast missing portions of the metal framework.
- Recut and replace missing bullseye prisms.
- Realign the metal framework and pedestal; remove from the museum.
- Remove paint coatings, clean, and repair all damaged metal components of the metal framework.
- Recoat with high performance epoxy coating system.
- Reinstall the lens, pedestal, and clockwork in Lighthouse.

Landscape Improvements

Under alternative B, NPS would implement landscape improvements to accommodate heavy visitation of the site. Specific elements of the landscape improvements are described in further detail below and are mapped on figure 4 on page 14.

Circulation

Visitors would continue to arrive at the site via the existing walkway between the bookstore and pavilion and would exit via the same walkway. A new concrete pedestrian walkway would be constructed from the bookstore path that offers a circular route that connects the Lighthouse and the keepers' quarters (see figure 4 on page 14). The walkway would be approximately 10-12 feet wide. The material would be a colored concrete, though the specific material and color would be determined during a future design phase. The width of the new walkway would accommodate heavy visitation during peak season and would accommodate emergency and maintenance vehicles, if needed. Under this alternative, emergency access could be gained via the northern portion of the site in addition to the existing maintenance access along the move corridor in the southern portion of the site.

A new pedestrian path approximately 6 feet wide and made of pervious material would also be constructed around the Lighthouse. Finally, the existing concrete paver walkways would be replaced with clay brick pavers, and the original width of the paths (4.5 feet) would be retained.

Topography and Vegetation

Topography and vegetation would be modified slightly to help address issues caused by heavy visitation. Lawn grasses such as Bermuda grass would also be re-established on the interior of the stockade and Lighthouse fences. The lawn areas outside of the fenced areas would be landscaped with native grasses in select locations (see figure 4 on page 14) to partially mitigate the visual intrusion of the walkways on the landscape and to encourage visitors to keep foot traffic on the paved walkways. The proposed new walkways would be subtly graded to shed water away from surfaces, helping to minimize standing water on and around walkways during heavy rain events. No grading or elevation changes would be

implemented between the walkways. Lastly, landscape plantings may be added around the Keepers of the Light amphitheater.

Interpretation

Interpretive wayside panels would be added in key locations throughout the landscape. These panels would describe important cultural resources within the project area and tell the story of the light station. Interpretive panels would be used to convey the history of changes to the buildings and landscape that occurred during and after the period of restoration (1870-1920). The specific location and design of these panels would be determined during a future design phase of the project and would be carefully considered to minimize intrusion on the landscape.

Gathering Area and Shade

There would be no shaded queuing area immediately adjacent to the Lighthouse for visitors waiting to climb the Lighthouse. The Keepers of the Light Amphitheater would remain in its existing location within the move corridor near the parking lot and pavilion, in an area unshaded from the sun.

ALTERNATIVE C: CIRCULATION ENHANCED AND LENS REPLICATED (PROPOSED ACTION / NPS PREFERRED ALTERNATIVE)

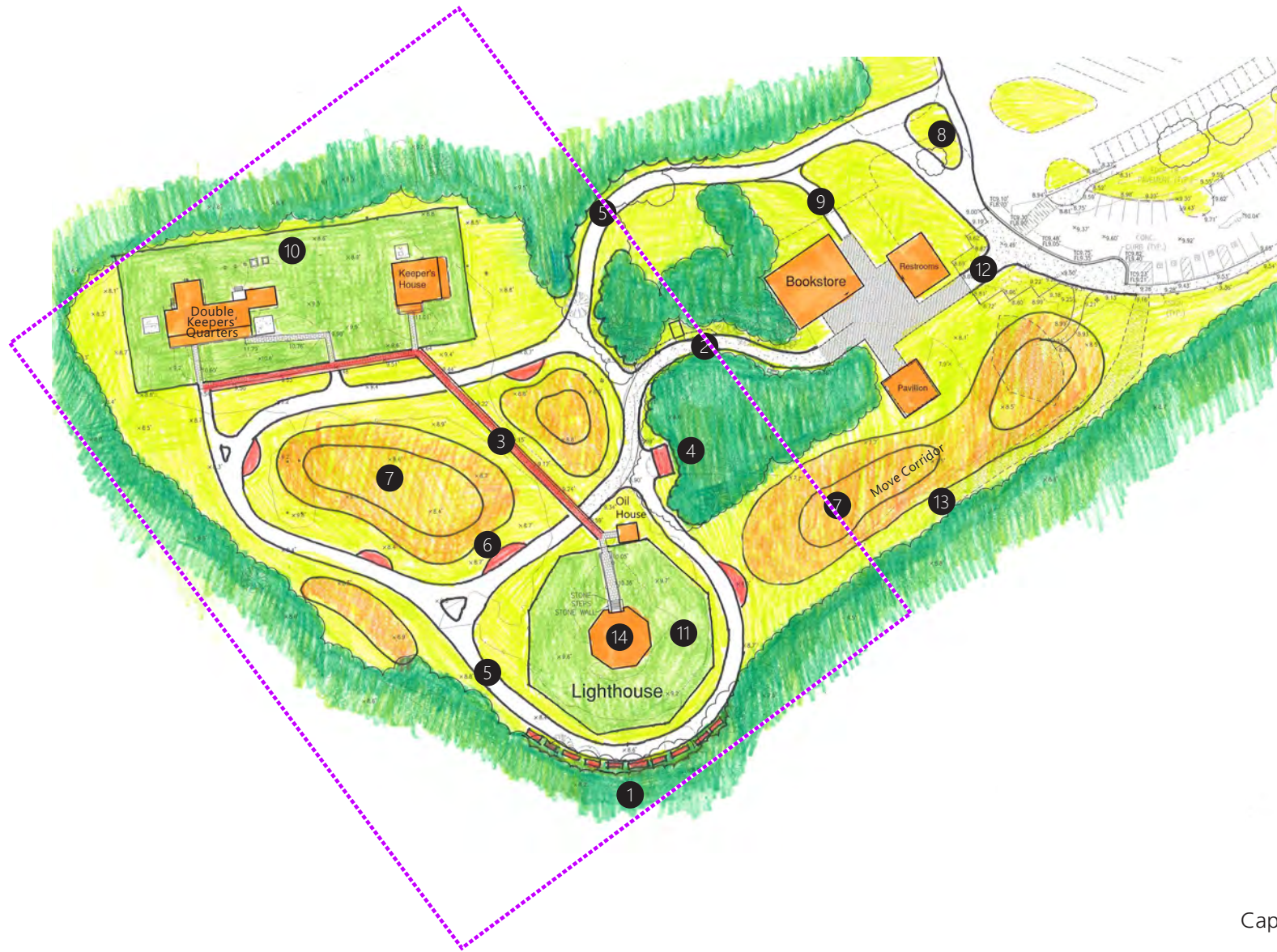
In addition to the elements common to both alternatives, alternative C provides a new, flow-through circulation pattern to the site wherein visitors enter the site via a new visitor entrance to the north of the bookstore. Once within the site, the new walkways would be similar to those proposed under alternative B but would be wider to better accommodate heavy use and emergency/maintenance vehicles. This alternative proposes to implement a contoured landscape with low (1- to 3-foot high) berms that mimic the natural topography of the original site that may have been seen during the late 1800s. The contoured landscape would also encourage visitors to stay on walkways. It would also include the installation of a replica of the original Fresnel lens in the Lighthouse. This alternative is described in more detail below and is illustrated on figure 5 below.

Lighthouse and Oil House Rehabilitation

Actions related to the rehabilitation and repair of the Lighthouse and the Oil House would be the same as described under “Common to Both Action Alternatives” above. Actions related to the fencing around the Lighthouse and the keepers’ quarters would be the same as under alternative B above.

Light Beacon

Under the proposed action, a complete replica of the original lens would be produced and installed in the Lighthouse. Similar to alternative B, the existing rotating light beacon and metal platform would be removed from the Lighthouse lantern. Details of the replica are discussed below.

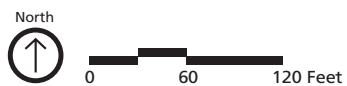


LEGEND

- Legend**
- L Boundary (approximate)
 - ① Re-purpose Keeper's Stones
 - ② Replace Concrete Walkway (Colored)
 - ③ Widen Paver Walkway to 7'
 - ④ Lighthouse Tour Shade Structure
 - ⑤ 12' Colored Concrete Walkway
 - ⑥ Visitor Interpretive Station (Typical)
 - ⑦ Contoured Landforms (Typical)
 - ⑧ New Visitor Entrance
 - ⑨ Pedestrian Connection
 - ⑩ Reconstructed Wood Fence
 - ⑪ Reconstructed Metal Fence
 - ⑫ Visitor Exit
 - ⑬ Emergency/ Maintenance Access to Remain
 - ⑭ Lens Replica

Note

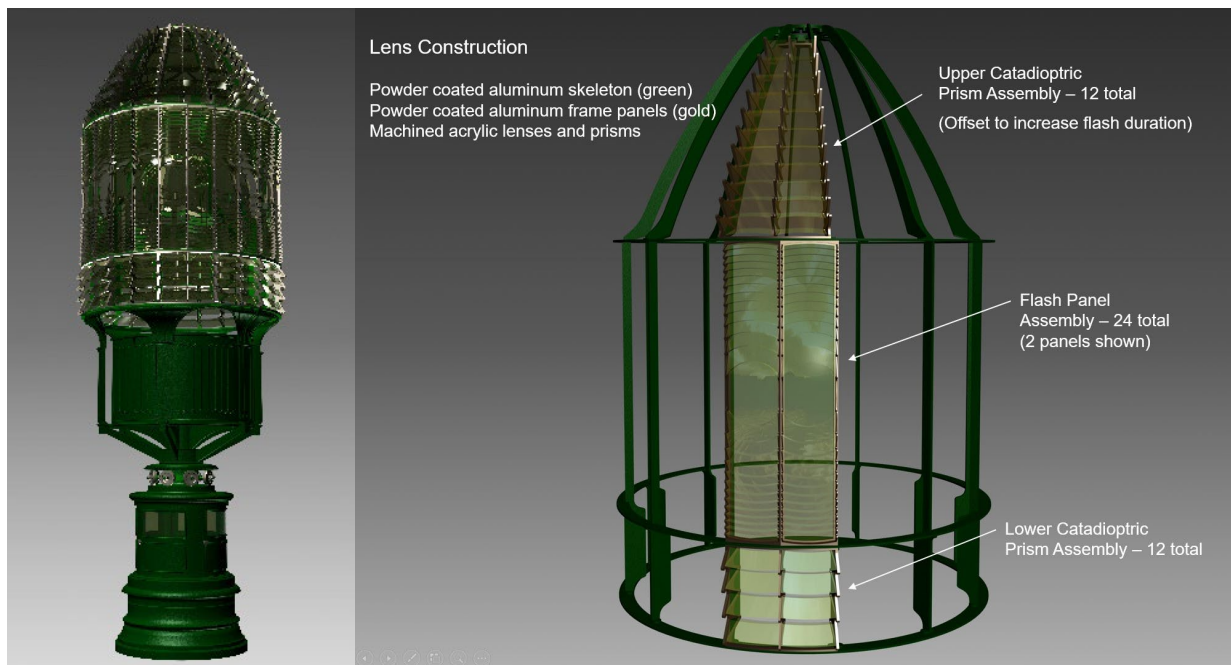
Location and scale of all improvements are approximate and subject to refinement during future design phases.



Cape Hatteras Lighthouse Repair and
Landscape Improvement Project
Environmental Assessment

Figure 5. Alternative C:
Circulation Enhanced and Lens Replicated

Replica lens design and construction may be guided by 3-D modeling of the original and constructed of a metal frame and panel, such as a powder coated aluminum skeleton and frame panels with machined acrylic prisms and bullseye lenses. It would be the same size and overall appearance as the original. A modern light source, such as an LED source, would be used inside the lens. The beacon would either be a fixed flashing light or would rotate and flash through the bullseye prism as it did historically. If it rotates, a modern precision rotating system, likely aided by ball bearings would be used to rotate the lens but give the appearance that it is rotating on chariot wheels.



Rendering of Cape Hatteras Lens Replica and Construction (Source: Artworks Florida)

Landscape Improvements

The project would include changes to the landscape of the site to improve pedestrian circulation, wayfinding, interpretation, and visitor experience. The actions are described below, broken out by topic.

Circulation

Under this alternative, a new visitor entrance to the light station would be created to the north of the bookstore to foster a one-way pedestrian circulation. The specific alignment of this entrance is subject to additional design but is likely to also provide a route to access the existing restrooms, given visitor needs upon arriving at the site. The walkway would run along the edge of the tree line, entering the historic core east of the Principal Keeper's Quarters. The walkway would then continue west in front of the Principal Keeper's Quarters and connect to the paver walkway that provides access into the museum in the Double Keepers' Quarters. After passing or visiting the museum, visitors would then follow the path to the southeast, leading to the Lighthouse. There, visitors could either continue southeast and follow the path around the Lighthouse to view all sides of the Lighthouse and the move corridor, or head east directly to the Lighthouse entrance. Both options would converge at the proposed shade pavilion to the north of the Lighthouse (discussed below). After visiting the Lighthouse, visitors would follow the walkway to the

northeast along the existing entrance/exit route through the plaza where the bookstore and restrooms are located, and finally back to the parking lot.

The historic circulation route along the paver walkway between the Lighthouse and the keepers' quarters would be retained. The existing concrete pavers would be replaced with clay brick pavers, and the walkway would be widened from 4.5 feet to 7 feet to accommodate existing visitors at the site. This paver walkway would continue to provide a direct route for visitors between the keepers' quarters and the Lighthouse, while the new looped walkways would provide a route for visitors to experience the full site, disperse along a comprehensive walkway for additional interpretive and photograph opportunities, and to rest in the shade of the wooded areas near the Lighthouse.

The new pedestrian walkway loop circulating between the keepers' quarters and the Lighthouse would follow the same alignment as under alternative B but would be approximately 10-12 feet wide to accommodate heavy visitor traffic and to facilitate emergency vehicle access. The specific material and color would be determined during a future design phase.

Topography and Vegetation

The project would include the creation of a contoured landscape with native landscape planting 1-3 feet high in strategic locations around the site to move stormwater to the edges of the landscaped area and limit standing water on the walkways. The contours would not visually impede views in the area. The landscape would be revegetated throughout the site with native grasses, which could include species such as American beachgrass, coastal panic grass, sea oats, saltmeadow hay, dune hairgrass, and narrowleaf silkgrass. Lawn grasses, such as Bermuda grass, would be re-established within the proposed fences (see below) around the Lighthouse and the keepers' quarters and would be maintained as mown lawn. The project would also include grading the proposed walkways to shed water away from the surfaces to minimize standing water on and around walkways during heavy storm/rain events.

Interpretation

Actions related to interpretation would be the same as described under alternative B above.

Gathering Area and Shade

A new shade pavilion would be constructed to accommodate waiting tour groups near the Lighthouse. The pavilion would be located to the north of the Lighthouse and Oil House, adjacent to the proposed pedestrian walkway (see figure 5 on page 17). The pavilion would be set back into the wooded area and vegetation screening would be used to limit the visual dominance it would have on the landscape. It would be a wooden, open-air shelter with a pyramidal hipped roof with open ceiling. It would be approximately 17 by 17 feet. Benches would be integrated into the design to provide areas for visitors to sit under the pavilion.

To provide another opportunity for visitors to rest in the shade, and provide more opportunities for visitors to experience the foundation blocks, the Keepers of the Light Amphitheater would be disassembled and the blocks relocated along the perimeter of the proposed walkway south of the Lighthouse. The blocks would be placed along the path in areas shaded by the maritime forest canopy along to provide respite to visitors from the hot sun.

MITIGATION MEASURES OF THE ACTION ALTERNATIVES

To minimize negative environmental impacts from the action alternatives, the Seashore would implement mitigation measures whenever feasible. Exact mitigation measures to be implemented would depend upon the final design and approval of plans by relevant agencies and would be determined during future design and construction phases. A comprehensive (but not exhaustive) list of mitigation measures to avoid impacts on sensitive resources is provided below. This list includes actions that the Seashore may implement directly or may require of contractors.

- Instruct all personnel engaged in undertaking any of the proposed actions on the sensitivity of the general environment and monitor their activities in order to mitigate and minimize potential impacts on natural and cultural resources during construction. Corridors for construction vehicle movement would be established and defined on the ground. Staging of construction equipment would be restricted to the road corridor, parking lots, and other identified previously disturbed areas to avoid impacts on natural and cultural resources.
- Clearly state all protection measures in the construction specifications and instruct workers to avoid conducting activities beyond the fenced construction zone.
- Fence all areas in order to keep related disturbances within an NPS-defined and minimal impact area required for construction.
- Use the minimum size equipment needed to complete the proposed project. Hand digging and other minimally intrusive methods may be specified to minimize damage to historic properties.
- During final design and construction, the NPS would follow the recommendations contained in the *Historic Structure Report* and the *Cultural Landscape Report*, and the *Secretary of Interior's Standards for the Treatment of Historic Properties* to ensure rehabilitation and restoration measures, as well as all proposed new features on the landscape, do not adversely affect historic buildings and structures and cultural landscapes.
- The visual intrusion of new sidewalks would be minimized due to the use of a colored concrete that is compatible with the setting.
- To mitigate the impact of introducing elements that did not exist together in history and avoid creating a false sense of history at the site, install interpretive wayside panels to convey the changes that have occurred at the light station over time, including changes made as a result of this undertaking.
- Implement standard noise abatement measures during construction. Standard noise abatement measures could include the following elements: a schedule that minimizes impacts on adjacent noise-sensitive uses (construction and demolition work would be limited to daylight hours in the project area to avoid night-time noise disruption), the use of the best available noise control techniques wherever feasible, the use of hydraulically or electrically powered impact tools when feasible, and location of temporary noise sources as far from sensitive uses as possible. Construction equipment would be properly maintained to minimize noise.
- When possible, construction should be performed over the late fall and winter months when visitation is lowest in order to minimize the impact on the visitor experience.
- To minimize possible fluid leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.
- Demolition and construction contractor(s) would implement best management practices, such as appropriately handling and disposing of packing materials and other debris to ensure it does not mobilize beyond the construction limits.

- All construction debris would be properly disposed of in an approved landfill.
- To minimize the amount of ground disturbance, staging and stockpiling areas shall be located in previously disturbed sites, away from visitor use areas to the greatest extent possible. All staging and stockpiling areas shall be returned to pre-construction conditions following construction.
- Erosion control measures, such as limiting the time soil is left exposed, erosion matting, and silt fencing or coir logs, shall be installed around the limits of construction as appropriate to reduce erosion, surface scouring, and discharge to water bodies. Erosion control features must be maintained throughout the project and removed after revegetation is established. The erosion control measures shall meet the federal, state, or local regulations governing the project site.
- A sediment control erosion plan would be prepared and submitted to the state. Sediment Control in North Carolina is governed by the Sedimentation Pollution Control Act of 1973. The Act requires anyone involved in a land disturbing activity of one acre or more to submit an erosion and sediment control plan to the Land Quality Section of the North Carolina Department of Environmental Quality for approval.
- Implement measures to prevent invasive plants from entering construction areas, such as ensuring that construction-related equipment arrives at the site free of mud or seed-bearing materials and certifying that all seeds and straw material are weed-free.
- Remove invasive plants that may have entered construction areas using approaches prescribed in the Seashore's Integrated Pest Management Program.
- Rehabilitate areas that are disturbed, either during construction or areas that were previously disturbed, with NPS-approved vegetation, as per NPS standards and consistent with the cultural landscape report.
- Immediately implement National Historic Preservation Act (NHPA) Section 106 procedures if any unknown significant archeological resources are uncovered during ground-disturbing activities. If previously unknown archeological resources are discovered during construction, all work in the immediate vicinity of the discovery shall be halted until the resources are identified and documented and an appropriate mitigation strategy developed, if necessary, in accordance with pertinent laws and regulations, including the stipulations of the 2008 Programmatic Agreement Among the Seashore (US Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.
- Time tree removal to avoid the bat roosting season from May 1–July 31. If it is determined that a tree needs to be removed during this time, the Seashore's Resource Management and Science Division will be consulted prior to taking action.
- Project would abide by best management practices regarding avoidance of tree damage. Trees not being removed would have fencing established to prevent vehicle damage to main stem, root pruning would be used to trim roots within below grade work zones, and care will be given to avoid compaction of soils over root systems.
- Follow the Seashore's Severe Weather Plan in the event of severe weather during construction to minimize the risk to human health and safety as well as to minimize potential property damage.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the current environmental conditions in and surrounding the project as they relate to each impact topic retained for analysis (40 CEQ 1502.15), as outlined in chapter 1. These conditions serve as a baseline for understanding the resources that could be impacted by implementing the project. This chapter then analyzes the potential beneficial and adverse impacts that would result from implementing any of the alternatives considered in this EA.

GENERAL METHODOLOGY FOR ANALYZING IMPACTS

In accordance with the CEQ regulations for implementation of NEPA, impacts of the alternatives are described under each impact topic (40 CFR 1502.16). Where appropriate, mitigating measures for adverse impacts are also described and incorporated into the evaluation of impacts. The specific methods used to assess impacts for each resource may vary; therefore, these methodologies are described under each impact topic.

HISTORIC STRUCTURES

Affected Environment

NEPA, NHPA, the NPS Organic Act, NPS *Management Policies 2006*, Director's Order #12, and Director's Order #28: *Cultural Resource Management Guideline* require the consideration of impacts on any cultural resource that might be affected by a proposed federal action. This includes historic structures located within the project area. Efforts to identify historic properties at the site included a review of information provided by the National Park Service, supplemented by other published and unpublished sources, primarily:

- National Register nomination forms,
- the National Historic Landmark nomination form,
- the North Carolina State Historic Preservation Office online database,
- the 2003 *Cape Hatteras Light Station, Cape Hatteras National Seashore, Cultural Landscape Report*,
- the 2016 *Cape Hatteras Lighthouse Historic Structure Report*,
- the 2017 *Cape Hatteras Light Station Oil House Historic Structure Report*,
- the 2017 *Hatteras Light Station Double Keepers' Quarters Historic Structure Report*, and
- the 2017 *Hatteras Light Station Principal Keeper's Quarters Historic Structure Report*.

Some of the structures in the project area are contributing resources to the National Register listing and National Historic Landmarks designation, including the Cape Hatteras Lighthouse, the Oil House, a First-Order Fresnel lens (otherwise referred to as the Fresnel lens or the lens), the Principal Keeper's Quarters, and the Double Keepers' Quarters. Each of these structures is described in further detail under their respective headings below. Additionally, the original First-Order Fresnel lens, which is currently on loan from the NPS to the Graveyard of the Atlantic Museum, is considered for restoration under this project and is also discussed below as a historic artifact. The *Secretary of Interior's Standards for the Treatment of*

Historic Properties embodies two important goals: 1) to preserve historic materials and 2) to preserve a building's distinguishing character (NPS 2016). The proposed action has the potential to result in changes to these historic structures, including rehabilitation and repair of the Lighthouse and Oil House. Additionally, changes proposed on the landscape, including a shade structure and new walkways, have the potential to affect the recreated historic setting of the structures and the National Historic Landmark setting as a whole.

The Lighthouse was listed in the National Register in 1978 in its original location as the Cape Hatteras Light Station Historic District, significant under Criteria A and C (NPS 1998a). The historic district included the Lighthouse, Oil House, 1803 lighthouse ruins, Double Keepers' Quarters, and the Principal Keeper's Quarters. The boundary of the historic district encompassed a 10-acre L-shaped property. In 1998, the Lighthouse was designated a National Historic Landmark with a period of significance of 1870-1936, and the Lighthouse, Oil House, and two keepers' quarters as contributing properties; the 1803 Lighthouse ruins had washed into the ocean by this time and were thus not included in the nomination as a contributing resource (NPS 1998a). As part of the 1999 relocation, the configuration of the structures to one another as well as their orientation to the shoreline was maintained by surveying the horizontal and vertical relationship of the four structures at their historic location and carefully positioning them at the new site to match. After the light station was moved, the Keeper of the National Register approved of the light station retaining its National Register designation because the following three criteria were met:

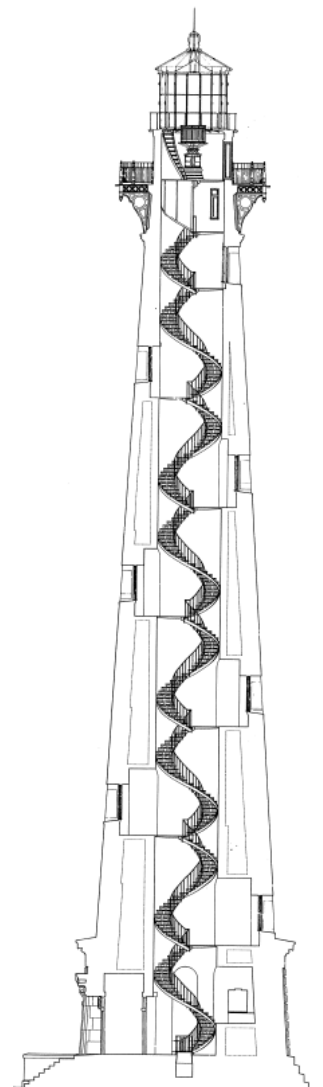
1. the coastal setting was maintained,
2. the original orientation to the shoreline and original spatial arrangement of historic structures were maintained, and
3. there was no structural damage to the resources resulting from the move (NPS 2003).

Because the original site of the Lighthouse retained no historic integrity after the move, a new National Historic Landmark boundary was created rather than simply expanding the original boundary to include the new location. The new boundary comprises 6 acres including the Lighthouse, Oil House, and both keepers' quarters. The historic circulation route between the Lighthouse and keepers' quarters is included in this NHL boundary revision justification.

The relocated light station is now positioned approximately 1,500 feet from the coastline but remains subjected to storms that occasionally cause flooding of the site or high winds. These storms may damage the structures on site. As the climate changes, storms may become more frequent and intense.

Cape Hatteras Lighthouse

The Cape Hatteras Lighthouse is 193 feet tall from the base to the top of the lantern roof. It is the tallest brick lighthouse in the United States and the second tallest in the world. The Lighthouse is built of brick, with an octagonal pink granite base. The signature black and white spiraling bands on the exterior (known as the daymarker) were first painted in 1873 to maximize its visibility for marine vessels in daylight. The interior is comprised of a single vertical,



Section through the Lighthouse showing the interior organization (NPS 2016, pg. 163)

cylindrical shaft from the first level to the ninth (service room) level. The shaft is just under 12 feet in diameter. The interior of the space is slightly divided by balconies at each of the floor levels and a cylindrical metal stair which joins each of the balcony floor levels. The original cast iron fence around the Lighthouse was removed circa 1920 and was replaced with a concrete post and pipe rail fence. The automated light that is currently used in the Lighthouse is operated and maintained by the US Coast Guard (NPS 2022a).

First-Order Fresnel Lens

The Lighthouse was originally fitted with a First-Order Fresnel lens. This type of lens is made of a series of prisms that bend light from a single source into parallel beams. The First-Order is the largest size of Fresnel lenses and was used for the largest seacoast lighthouses. The original Fresnel lens remained in the Lighthouse until circa 1949 when it was removed after it was vandalized and prisms were missing. The original pedestal remained in the Lighthouse, and a modern light beacon was installed. The original First-Order Fresnel lens was moved into NPS storage but was later loaned out to the Graveyard of the Atlantic Museum in 2002. The museum funded a restoration project for the lens in 2005, and the NPS removed the lens pedestal and clockwork from the lighthouse. In 2006 the lens, remaining prisms, pedestal, and railing pieces were reunited and put on display at the museum.



First-Order Fresnel lens and pedestal on display at the Graveyard of the Atlantic Museum. Note missing prisms.

Oil House

The Oil House is located 65 feet north of the Lighthouse and was constructed in 1892 to house oil drums for fueling the light. Later, it was used to house an auxiliary generator for the beacon when the US Coast Guard took over operation (NPS 1998a). Windows were added to the building circa 1934, at the end of the light station's National Historic Landmark period of significance (1870-1936). It is a small, square brick structure with a standing-seam metal, front-gable roof. Its window openings are currently boarded up with plywood. The building faces west, perpendicular to the Lighthouse. The Oil House is currently used for storage.

Principal Keeper's Quarters

The Principal Keeper's Quarters was constructed in 1871 and assigned to the principal keeper and his family. The house is a two-story brick and wood frame structure with a cross-gable roof covered in wood shingles. Two interior brick chimneys rise from the roof slope. Two one-story covered porches are located on the south and east elevations. The building faces south toward the Lighthouse and is accessed via the existing brick-colored concrete paver walkway. The exterior is painted white, though it was historically painted red until 1927 when a large addition was added on the east side (NPS 2016). The Principal Keeper's Quarters are used for NPS offices.



Principal Keeper's Quarters, October 2020

To reduce flooding risk to the Principal Keeper's Quarters, the Seashore may consider elevating the building as a separate project. Heavy rain events and storms in the Outer Banks frequently cause flooding at the site and pools of standing water on the landscape and near sidewalks. The Principal Keeper's Quarters would be elevated in place to allow water to flow beneath the structure instead of flooding it and causing damage.



Historic photograph of the keepers' quarters in 1893 (Source: NPS)

Double Keepers' Quarters

The Double Keepers' Quarters was built in 1854 to house two assistant keepers and their families. It was later expanded in 1892 to accommodate a third keeper and their family. It is a long, two-story wooden building topped with a side-gable roof covered in wood shingles. Two brick chimneys rise from the ridgeline. A one-story wing original to the 1854 building extends from the east side of the dwelling, set back from the main façade. A one-story, full-width covered front porch runs the length of the façade. The exterior is painted white. The building faces south toward the Lighthouse. Today, the Double Keepers' Quarters is used as the Museum of the Sea. The museum contains artifacts, interpretive exhibits, and space for film viewing. Similar to the Principal Keeper's Quarters, the Seashore may also consider elevating the Double Keepers' Quarters (as a separate project) to minimize flooding risk posed by heavy rain events and storms. The process for elevating the structure would be similar to that which is described above for the Principal Keeper's Quarters.



Double Keepers' Quarters, October 2020

Methodology

Potential impacts on historic structures are evaluated based on changes to character-defining features of the resource, which are the characteristics of a historic property that qualify the property for inclusion in the National Register. This approach is derived from the *Secretary of the Interior's Standards for Treatment of Historic Properties*, Director's Order #28: *Cultural Resource Management Guidelines*, as well as the regulations of the Advisory Council on Historic Preservation implementing the provisions of NHPA. Character-defining features contribute to a property's integrity, which is composed of location, design, setting, materials, workmanship, feeling, and/or association. The current conditions of historic structures, as presented under the "Affected Environment" section above, were compared with the alternatives described in chapter 2 to determine the impacts on historic structures.

The impacts described below are made under the CEQ's regulations for implementing NEPA, which call for the review of effects on historic and cultural resources (40 CFR Part 1508.1[g]). A separate Assessment of Effect under Section 106 of the NHPA is being prepared concurrently with this EA.

Impacts of Alternative A: No-Action

Under the no-action alternative, the existing appearance of the historic structures would remain, including the unsympathetic modern treatments, and certain character-defining features would remain missing. Although this would not introduce new impacts to historic structures, the current loss of historic character due to the existing appearance would continue. Repairs to the Lighthouse and Oil House would be conducted as needed by the NPS, but no major changes to the existing appearance or character would be implemented. The existing metal elements would remain and would continue to corrode due to the harsh salt air to which the historic structures are exposed. The site would continue to represent changes that occurred during the latter part of the light station's National Historic Landmark period of significance (1870-1936), most notably due to the existing window openings on the Oil House and the lack of fencing around the keepers' quarters. Under the no-action alternative, the existing rotating light beacon on a metal platform would continue to be operated by the US Coast Guard and may be replaced with a modern beacon in the foreseeable future. The existing beacon or another modern beacon would continue to detract from the historic character of the lantern because its appearance and function are different than that of the original Fresnel lens. Under the no-action alternative, no changes would be made to the setting of the historic structures. The landscape would continue to be impacted from soil erosion from the high levels of visitor use and the limited width and number of pathways currently present. The existing grassy landscape would continue to be compacted leading to larger bare spots where heavy foot traffic occurs, which would continue to diminish the appearance and character of the recreated historic setting.

Impacts of Alternative B: Circulation Modified and Lens Restored

Interior rehabilitation and exterior restoration of the Lighthouse would restore some lost historic integrity of materials and design through repair of damaged and deteriorated elements such as corroded metal, deteriorated paint, broken glass, deteriorated brickwork and mortar, and cracked marble. Removal of some of the unsympathetic modern elements would restore the historic integrity of design and feeling that was lost due to these additions. This would include removal of the non-historic wood louver above the first-level bronze doors, the non-historic diamond-patterned metal fence barrier, and the vinyl perimeter fence. Replacement, either through restoration or recreation, of missing elements of the Lighthouse would also restore some of the lost historic character and appearance. This would include elements such as the missing exterior ornamental pedimented hoods and brackets above the windows, the first-level interior wooden doors and transom, the tenth-level interior wooden door, and the decorative cast iron and granite perimeter fence. Some non-historic material would be introduced to the Lighthouse through new non-corrosive metal elements, such as bronze; however, these new materials would be compatible with the historic design and appearance of the Lighthouse. Repointing and repairing masonry as well as replacing corroded metal elements would stabilize the



Historic photo of the Lighthouse dated 1899. Note the pedimented hood and brackets on the top of the window (Source: NPS).

structure of the Lighthouse, and thereby preserve and protect its remaining historic materials, appearance, and character. Replicating the decorative cast iron perimeter fence around the Lighthouse would restore the appearance of the Lighthouse to its pre-1920 historic appearance, which would in turn restore some of the historic spatial arrangement and integrity of setting that was lost when the original fence was removed, as described in the *Cultural Landscape Report* (NPS 2003).

The use of non-corrosive metal elements to replace deteriorated historic materials would improve the sustainability of the Lighthouse and its ability to withstand the harsh salt air to which it is exposed. Non-corrosive materials would not deteriorate as quickly as the historic metal materials (cast iron), even as storm events are expected to become more frequent and more intense as climate change continues. Overall, this would allow the structure of the Lighthouse to be more resilient and require less frequent repairs in the long term.

Under alternative B, restoring the original First-Order Fresnel lens and reinstalling it into the Lighthouse would restore a missing character-defining feature of the Lighthouse. A comprehensive restoration would return the historic appearance of the lantern to the period when the Lighthouse was constructed and operated, which would be consistent with the other proposed changes such as the reintroduction of the cast iron fence around the Lighthouse. Under any level of restoration, the light may function differently than it would have historically because the beacon may not rotate or flash through the bullseye prisms. However, restoration of the original lens would restore the setting and association of the artifact by replacing it in the Lighthouse where it was intended to be.

Restoration of the original Fresnel lens to any degree would restore the historic design and appearance that were lost when so many of the original prisms and panels were removed. New prisms to replace those missing would be cut from acrylic rather than glass, but they would be similar in appearance to the original. In order to stabilize the pedestal and lens frame to withstand the restoration and reinstallation, some parts of the metal frame and pedestal may have to be repaired or replaced in kind. The specific repairs needed would be dependent on a full conditions assessment of the original lens.

Similar to the Lighthouse, restoration of the Oil House would restore some of its lost historic character. These actions would include infilling the window openings added circa 1934 with brick, removing unsympathetic modern additions, such as the exterior canopy and the modern six-panel door, and replicating and restoring missing elements, such as the metal door. The use of non-corrosive metal elements would improve the sustainability of the Oil House and its ability to withstand the harsh salt air to which it is exposed. Infilling the window openings with brick would restore the Oil House to its historic appearance prior to 1920, which would be consistent with the time period that would be represented by the proposed metal fence around the Lighthouse, discussed in “Elements Common to Both Action Alternatives.” The infill would be differentiated from the existing brick exterior, and a wayside panel would interpret the changes to the Oil House over time to avoid creating a false sense of history. Repointing and repairing masonry would preserve the building and protect the remaining historic character and appearance.

Under alternative B, changes to the setting of the historic structures would be minimal but would introduce new features to the landscape. The proposed fencing and re-establishment of lawn grasses around the Lighthouse and keepers’ quarters would restore some of the historic spatial arrangement and appearance of the setting that was diminished with the loss of the original fence (NPS 2003). Reintroducing the fencing around the keepers’ quarters would restore the setting of the structures to that before 1920; however,

changes made to the buildings in the decades since, including the large addition on the Principal Keeper's Quarters and the loss of small outbuildings, would remain within the vicinity. This would result in features on the site that never existed together in history. To avoid creating a false sense of history, interpretive wayside panels would identify these elements and show visitors images of the site's historic appearance pre-1920 and tell the story of the changes implemented over time. Proposed new walkways would be noticeable within the setting of the historic structures but would not impede views from or to the historic structures. Furthermore, proposed walkways would help improve connections to historic structures.

Impacts of Alternative C: Circulation Enhanced and Lens Replicated (NPS Preferred / Proposed Action)

Interior rehabilitation and exterior restoration of the Lighthouse would result in the same beneficial impacts as described above for alternative B; impacts related to the treatment of the lens under the proposed action are described below.

Replicating the original Fresnel lens under the proposed action would restore the historic appearance of the lantern by reintroducing a lens that looks and functions similar to the historic Fresnel lens. Although modern materials such as acrylic for the recreated prisms would be introduced into the Lighthouse, it would not detract from the historic character of the Lighthouse overall because the replicated lens would restore the function of the lantern during the Lighthouse's National Historic Landmark period of significance (1870-1936) when it rotated and light flashed through the bullseye prisms. This would restore the historic design and appearance that was lost when the original lens was replaced with the existing modern beacon and would result in an overall beneficial impact on the Lighthouse.

Restoration of the Oil House would have the same impacts as described under alternative B.

Changes to the landscape would approximate the historic setting of the historic buildings, including the Lighthouse, the Oil House, and the keepers' quarters. The proposed fencing and re-establishment of lawn grasses around the Lighthouse and keepers' quarters would restore some of the historic spatial arrangement and integrity of setting that was diminished with the loss of the original fence (NPS 2003). Reintroducing the stockade fencing around the keepers' quarters would restore the appearance of the keepers' quarters to that before 1920; however, changes made to the buildings in the decades since, including the large addition on the Principal Keeper's Quarters and the loss of small outbuildings, remain within the vicinity. This would result in features on the site that never existed together in history. To avoid creating a false sense of history, interpretive wayside panels would identify these elements and show visitors images of the site's historic appearance pre-1920 and tell the story of the changes implemented over time. Proposed walkways and the contoured landscape would be conspicuous (more noticeable than in alternative B) within the viewshed between the Lighthouse and the keepers' quarters; however, these features would be low enough (1-3 feet) that they would not obscure the views between the Lighthouse and keepers' quarters, from the existing pavilion in the move corridor back to the Lighthouse, or from the top of the Lighthouse outward and down to the site below (including the view down the move corridor to the northeast). The proposed action would not include any physical changes to either the Principal Keeper's Quarters or the Double Keepers' Quarters.

Conclusion

Under the no-action alternative, the site would continue to represent the recreated historic setting of the light station but would allow the continuation and severe degradation of lighthouse materials such as

metal, masonry, paint, and other structural and cosmetic interior and exterior features. It would also allow a continued display of missing character-defining features and unsympathetic modern elements that contribute to the overall diminished character and appearance of the historic structures. Although no changes to the setting of these historic structures would be implemented, a continued degradation of the landscape due to heavy visitor foot traffic would continue to diminish the recreated historic setting. Overall, the no-action alternative would not introduce new impacts on the historic structures, but it would allow the continuation of the existing adverse impacts on the historic character, appearance, and setting of the historic structures.

Implementation of alternative B would result in beneficial changes to historic structures. Beneficial impacts would result from restoring the historic setting and appearance of the historic structures at the light station. Repairing damaged and deteriorated elements of the Lighthouse and Oil House and removing unsympathetic modern elements would result in a beneficial impact on the historic structures because the historic character and appearance would be restored and protected. A full restoration of the original lens would restore the historic character and appearance of the lens to its pre-1920 appearance, which would be consistent with other proposed changes to the Lighthouse. Overall, alternative B would result in a beneficial impact on historic structures due to the restoration and protection of historic character and appearance, as well as the improved sustainability of the materials through the use of non-corrosive metal elements.

Under the proposed action impacts on the historic structures due to restoration and rehabilitation actions as well as due to recreation of historic fencing would be the same as described under alternative B. Differences would occur due to the treatment of the Fresnel lens and the recreated historic setting. Replicating the original Fresnel lens under the proposed action would restore the historic appearance and function of the lantern during the Lighthouse's National Historic Landmark period of significance (1870-1936), which would offset the impact of introducing non-historic materials (i.e., acrylic) into the historic structure. Changes to the landscape under the proposed action would recreate the historic setting of the historic structures within the light station to an appearance closer to the CCC-era rather than that of the pre-1920 time period to which the NPS would be interpreting the historic structures. Adverse impacts related to these landscape changes would be mitigated through the installation of interpretive wayside exhibits that would show the historic setting of the structures. The new walkways and contoured landscape would result in protection of the landscape from damage due to heavy foot traffic, which would protect the overall character of the recreated historic setting in the long term. All new walkways and the contoured landscape or plantings would be designed to not obscure views of or from the Lighthouse or other historic structures, and adverse impacts on the setting of the historic structures would be mitigated through the planning and design process to the extent practicable. Overall, the proposed action would result in a benefit to historic structures through their restoration, preservation, and protection.

In the future, if the keepers' quarters buildings are elevated as part of a separate project, impacts would occur to these historic structures in addition to the impacts occurring from this restoration and rehabilitation project. For example, raising the keepers' quarters may result in the loss of some historic fabric that is removed during the foundation raising, and it may change the look of the historic buildings. It would also include the addition of modern elements (treated wood pilings placed under the foundation) that are not original to the structures. However, the NPS would work to minimize impacts to the character-defining features of the buildings. Completing a project to raise the buildings would result in a beneficial impact on historic structures due to the protection of the buildings from future flood damage,

which could further deteriorate historic fabric. If the separate project to raise the keepers' quarters buildings is implemented, it would complement the restoration and rehabilitation project by continuing to protect the historic structures and make them more resilient to future flooding.

CULTURAL LANDSCAPE

Affected Environment

NPS *Management Policies 2006*, the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, Director's Order #28: *Cultural Resource Management Guideline*, and the regulations of the Advisory Council on Historic Preservation implementing the provisions of NHPA require the consideration of impacts on any cultural resource that might be affected by a proposed federal action. This includes cultural landscapes within the project area. The Cape Hatteras Light Station cultural landscape (in its current location) comprises the overall spatial arrangement, orientation toward the sea, period circulation patterns, and historic structures at the site (NPS 2003). This cultural landscape is documented in the 2003 *Cape Hatteras Light Station, Cape Hatteras National Seashore Cultural Landscape Report*. The landscape is commemorative in nature and contributing resources within the project area include the buildings and structures, circulation patterns, topography and vegetation, and views. The proposed action has the potential to result in changes to these resources (including the addition of new circulation patterns and other features into the cultural landscape and recreated historic setting); changes to the existing topography and vegetation that contribute to the site's integrity of setting and association (NPS 2003); and changes to structures through rehabilitation and restoration.

Buildings and Structures

Buildings within the project area that contribute to the cultural landscape include the Lighthouse, the Oil House, and both keepers' quarters. Descriptions of these buildings are included in the "Historic Structures" section above. All of these historic buildings retain their original orientation and spatial relationships that existed at the original site. Other buildings and structures within the cultural landscape were added after the move and do not contribute to the cultural landscape. These include the restrooms, bookstore, pavilion, and generator building (see figure 2 on page 6).

The Keepers of the Light Amphitheater consists of three semi-circular rows of large granite stones on a gravel pad facing west towards the lighthouse. A central gravel path splits each row into two, with the lighthouse centralized in the distance. These stones are the original, below-ground foundation stones from the Lighthouse prior to its move. The names of the original Lighthouse keepers are carved into the stones. The stones serve as benches for visitors to enjoy the view of the Lighthouse and the move corridor. The amphitheater is not considered a historic or character-defining feature of the cultural landscape.



View of the Lighthouse down the move corridor from the Keepers of the Light Amphitheater, October 2020

Circulation

Visitors enter the site from the parking lot and bookstore complex via a 10-foot-wide concrete path leading to the southwest. The path winds through the wooded area to the west of the bookstore, entering the historic core and connecting to the paver walkway near the entrance to the Lighthouse. Visitors then follow the 4.5-foot-wide paver walkway that replicates the historic circulation patterns between the Lighthouse and the keepers' quarters. According to the cultural landscape report, the recreated historic circulation pattern along the paver walkway between the Lighthouse and the keepers' quarters contributes



View of brick walkway with degradation of grassy landscape due to heavy visitor use, October 2020

to the site's integrity of design, setting, and feeling (NPS 2003). There are no comprehensive pedestrian paths through the rest of the site, which is consistent with the historic circulation patterns at the original site. Visitors frequently walk off of the established paths throughout the grassy landscape, including along the move corridor. The existing 10-foot-wide concrete path was added after the move and does not contribute to the landscape. Similarly, the parking lot does not contribute to the historic integrity of materials, design, and feeling, and intrudes on the recreated historic setting due to its proximity to the light station.

Topography and Vegetation

The light station site is generally flat due to the grading completed prior to the 1999 move. All of the buildings on the site are slightly elevated for proper drainage. The site is clear of trees and shrubs, though it is buffered by a pine and oak forest to the west and north and by a dense shrub-thicket to the south. The forest buffer reflects the outcome of a 1930s CCC revegetation project. Figure 2 on page 6 depicts the National Historic Landmark boundary, as well as contributing and non-contributing resources to the National Register listing and National Historic Landmarks designation. The interior of the site consists of Bermuda grass that was planted in 2001, but much of the area is bare due to overuse by visitors. There are no foundation plantings or other ornamental vegetation within the site. Overall, the site has the appearance of a flat landscape, which was similar to the original site prior to the CCC efforts to create dunes and vegetate the site. The existing non-historic facilities are generally screened from view from the historic core by trees. According to the cultural landscape report, the existing topography and vegetation at the site contribute to the site's integrity of setting and association (NPS 2003).

Views

Important views within the project area include the unimpeded, open views between the Lighthouse and keepers' quarters, from the top of the Lighthouse outward and down to the site below, from the Lighthouse down the move corridor to the northeast (particularly as viewed from the top of the Lighthouse), and from the existing pavilion in the move corridor back to the Lighthouse. These open views contribute to the site's integrity of setting and association. Views of non-historic buildings from the

historic core of the site are screened by vegetation, minimizing any visual impact. Missing historic views include the vistas to the sea and surrounding area that was so prevalent during the historic period.

It should be noted that the current geothermic heating, ventilation, and air conditioning (HVAC) system in the Visitor Center/Bookstore uses underground components within the viewshed of the Lighthouse. This system may be replaced in the future as a separate project. Future activities that may remove and replace the existing system including underground components would require excavation and temporary disturbance to the landscape. After the system is removed and replaced, the landscape would be restored.



View of move corridor from the top of the Lighthouse, October 2020

Methodology

Potential impacts on the cultural landscape are evaluated based on changes to character-defining features of the resource, which are the characteristics of a historic property that qualify the property for inclusion in the National Register. This approach is derived from the *Secretary of the Interior's Standards for Treatment of Historic Properties*, Director's Order #28: *Cultural Resource Management Guideline*, as well as the regulations of the Advisory Council on Historic Preservation implementing the provisions of NHPA. Character-defining features contribute to a property's integrity, which is composed of location, design, setting, materials, workmanship, feeling, and/or association. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, as well as a visual chronicle of its history. The current conditions of the cultural landscape, as presented under the "Affected Environment" section above, were compared with the alternatives described in chapter 2 to determine the impacts on the cultural landscape. The impacts described below are made under the CEQ's regulations for implementing NEPA, which call for the review of effects on historic and cultural resources (40 CFR Part 1508.1[g]). A separate Assessment of Effect under Section 106 of the NHPA is being prepared concurrently with this EA.

Impacts of Alternative A: No-Action

Under the no-action alternative, there would continue to be a lack of improved pedestrian circulation routes, which, although consistent with the historic circulation patterns at the original site, often results in visitors leaving without fully experiencing the light station. The existing topography and vegetation would remain unaltered. The landscape would continue to be impacted from soil erosion from the high levels of visitor use and the limited width and number of pathways currently present. The existing grassy landscape would continue to be compacted leading to larger bare spots and large-scale exposure of the existing honeycomb plastic soil stabilization system, where heavy foot traffic occurs, which would continue to diminish the appearance and character of the recreated historic landscape. The project area would continue to pond occasionally from rainfall events. The Keepers of the Light Amphitheater would remain in its current location and visitors would likely continue to walk along the move corridor between the amphitheater and Lighthouse. Open views within the project area that contribute to the cultural landscape would remain unimpeded and there would continue to be no fencing around the keepers' quarters.

Impacts of Alternative B: Circulation Modified and Lens Restored

Under alternative B, the proposed new concrete pedestrian walkways would introduce a new circulation pattern throughout the site to connect the Lighthouse and the keepers' quarters. It would also introduce walkways that are wider and cover a larger area of the landscape than the historic walkways. The concrete walkways would create an intrusion on the overall rustic setting due to the crisp edges and regularly spaced joints, which would diminish the open feeling of the site. These walkways would also be highly visible when viewed from the top of the Lighthouse, though they would not obstruct any important views. Because of the width and length of the new walkways compared with the existing paver walkways, the proposed concrete walkways would become the visually dominant circulation path throughout the site; however, the visual intrusion would be minimized due to the use of a colored concrete that is compatible with the setting. Additionally, the concrete walkways would have a different appearance of material than the pavers of the recreated historic paths, which would ensure they are clearly differentiated from the historic circulation patterns. The proposed concrete walkways would be further differentiated from the historic circulation patterns because they would be curvilinear while the recreated historic paths are generally straight with angled turns. Stockade fencing added around the Principal Keeper's Quarters and the Double Keepers' Quarters would contribute to the historic character of the site by mimicking the landscape of the 1870-1920 time period.

Providing pathways that accommodate the site's heavy visitation would improve sustainability as storm events are expected to become more frequent and more intense as climate change continues. Heavily trodden lawn has become compacted and bare of vegetation, both conditions that can increase erosion and cause localized flooding issues.

The existing recreated historic circulation route between the Lighthouse and keepers' quarters would remain in its current configuration and retain its historic width. The existing concrete paver walkway would be replaced with clay brick pavers, which is more consistent with the pre-1920s time period to which the site would be interpreted. Additionally, the clay brick pavers would help differentiate and focus visitors' attention on this historic route in contrast with the proposed new pedestrian circulation paths, highlighting a contributing element of the cultural landscape.

The proposed fencing and re-establishment of lawn grasses around the Lighthouse and keepers' quarters would restore some of the historic spatial arrangement and appearance of the landscape that was diminished with the loss of the original fence (NPS 2003). Reintroducing the fencing around the keepers' quarters would recreate the landscape's pre-1920 appearance; however, changes made to the buildings in the decades since, including the large addition on the Principal Keeper's Quarters and the loss of small outbuildings, would remain within the vicinity. This would result in features on the landscape that never existed together in history. To avoid creating a false sense of history, interpretive wayside panels would identify these elements and show visitors images of the landscape's historic appearance pre-1920 and tell the story of the changes implemented over time.

The re-establishment of lawn grasses would alter the vegetation of the recreated historic site that was created after the Lighthouse move. In addition, the potential plantings proposed around the amphitheater to discourage visitors from walking along the move corridor would change the existing vegetation layout. However, this vegetation would be low enough that it would not obstruct any important views throughout the site, and it would function to protect the lawn from being trampled and worn down. The increase in

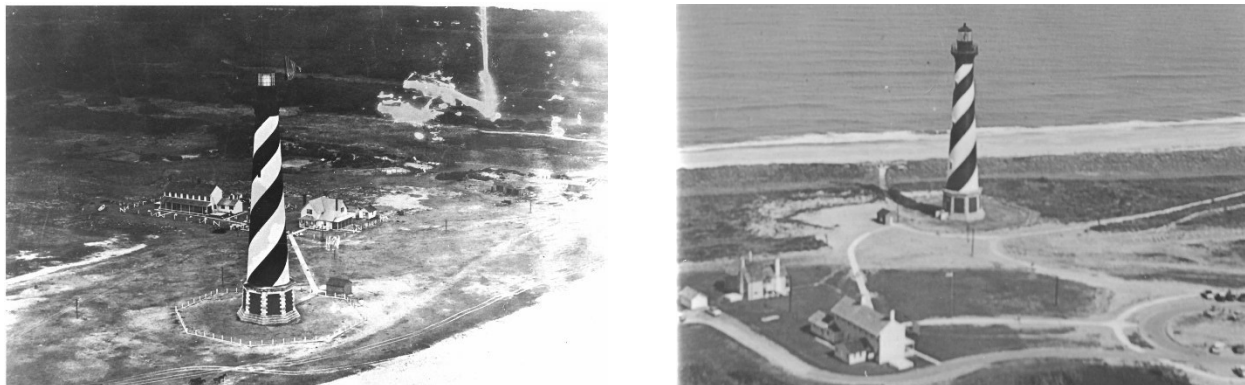
vegetation may also improve resiliency of the landscape through increased evapotranspiration and more robust root structure that would improve uptake of stormwater by plants and stabilize the soil.

The interpretive panels proposed along the pedestrian trails throughout the landscape would introduce non-historic elements into the open landscape, which would somewhat detract from the historic feeling of the site, as well as from the overall setting. However, these panels would be designed and placed so as not to obstruct any important views throughout the landscape, and they would be sited to minimize intrusion on the landscape. Additionally, the panels would be fully reversible (meaning that they could be removed from the landscape in the future if desired) and would not physically alter any historic material. These interpretive panels would educate the visitor on the historic appearance of the site at different periods of time to avoid creating a false sense of history.

Impacts of Alternative C: Circulation Enhanced and Lens Replicated (NPS Preferred / Proposed Action)

The proposed action would result in changes to the cultural landscape in the form of new circulation patterns and the addition of stockade fencing around the Principal Keeper's Quarters and the Double Keepers' Quarters. Impacts to the cultural landscape would be similar to those described above under alternative B.

The existing recreated historic circulation route between the Lighthouse and keepers' quarters would remain in its current configuration but would be widened from 4.5 feet to 7 feet, which would alter the appearance on the landscape. The increased width would be differentiated from the historic width through a different pattern of brick that would be integrated on either side of the walkway. This would allow visitors to see the historic width of the walkway. This differentiation would also be evident when viewed from the top of the Lighthouse, and visitors would continue to be able to discern the historic circulation patterns when looking down upon the landscape. The new and wider walkways proposed throughout the site would slightly diminish the site's integrity of design, setting, and feeling; however, the historic circulation patterns would continue to be evident through the use of different materials and design, which would avoid creating a false sense of history. The proposed changes to the circulation patterns would not require any removal or physical changes to historic materials, and they would not obstruct any important views throughout the site. Photographs below illustrate the original (historic) circulation and some modifications made in the 1960s (outside the period of significance but before the Lighthouse move).



Comparison of circulation patterns at the light station in 1932 and 1960 (Source: NPS)
Left: the light station in 1932 with an angular walkway between the Lighthouse, the keepers' quarters
Right: the light station in 1960 with curvilinear walkways that diverge from the original routes

The proposed contoured landscape throughout the site would alter the topography and vegetation of the recreated historic site that was created for the Lighthouse move. Although the contoured landscape would be conspicuous, these changes would be low enough (1-3 feet) that they would not obstruct any important views between the Lighthouse and keepers' quarters, from the existing pavilion in the move corridor back to the Lighthouse, or from the top of the Lighthouse outward and down to the site below (including the view down the move corridor to the northeast) and they would function to somewhat (but not completely, depending on the contours' height) visually shield the proposed pedestrian walkways and interpretive panels when viewed from a distance. The contoured landscape and native grasses would create a more naturalized feeling for the site, which was similar to the native grasses planted by the CCC at the historic location in the 1930s. To avoid creating a false sense of history due to having elements together that did not exist together in history (e.g., the contoured landscape and the cast iron fence around the Lighthouse), interpretive wayside panels with images of the historic appearance of the light station would be added to inform visitors of changes to the site over time.

The interpretive panels proposed along the pedestrian trails throughout the landscape would result in a visual intrusion on the open landscape, which would somewhat detract from the historic feeling of the site, as well as from the overall setting. However, these panels would be designed and placed so as not to obstruct any important views throughout the landscape, such as views between the Lighthouse and keepers' quarters, from the existing pavilion in the move corridor back to the Lighthouse, or from the top of the Lighthouse outward and down to the site below (including the view down the move corridor to the northeast). Panels would be sited to minimize intrusion on the landscape. Additionally, the panels would be fully reversible and would not physically alter any historic material.

The proposed shade structure would introduce a non-historic structure along the edge of the historic area, which would somewhat intrude upon the landscape. The intrusion would be minimized because the shade structure would be sited within an existing wooded area that bounds the historic zone on the east. Trees and shrubs would partially screen the structure from view and the structure would not visually compete with the Lighthouse. Though it would be within view from the top of the Lighthouse, only the roof would be visible, and it would be partially covered by the canopy of surrounding mature trees. To construct the proposed shade structure, approximately one tree and surrounding coastal vegetation would need to be removed to clear the area, encompassing approximately 730 square feet. The structure would have a natural, rustic appearance with the open-air structure and wood material to match the existing visitor pavilion, which would distinguish it from the historic structures on the site. Although it would be visible from within the historic area and from the top of the Lighthouse, it would not be visually intrusive due to the location, color, material, and scale. Because of its placement at the edge of the historic area and set into the wooded area, it would not obstruct any important views and would not result in any loss of historic material.

Removal of the Keepers of the Light Amphitheater from its current location would remove a non-historic feature from the move corridor. Allowing the reuse of the stones as benches along the proposed walkways to the south of the Lighthouse would allow the original below-ground foundation stones to maintain their connection to the Lighthouse while remaining unintrusive upon the open viewshed between the Lighthouse and the keepers' quarters.

Conclusion

Under the no-action alternative, the overall historic character as well as the site's setting and association would remain intact. No changes would be made to the character-defining features of the cultural landscape in a manner that would diminish their overall integrity in terms of location, setting, or association. Site features would remain in their existing locations and topography and vegetation would remain unaltered. Historic circulation patterns would be maintained and there would be no changes to interpretive elements. Although no changes to the landscape would be implemented, a continued degradation of the landscape due to heavy visitor foot traffic would continue to diminish the recreated historic appearance. Overall, the no-action alternative would not introduce new impacts on the cultural landscape, but it would allow the continuation of the existing adverse impacts on the historic character and appearance through landscape degradation.

Under alternative B, changes implemented would not obstruct any important views, such as open views between the Lighthouse and keepers' quarters, from the top of the Lighthouse outward and down to the site below, from the Lighthouse down the move corridor to the northeast (particularly as viewed from the top of the Lighthouse), and from the existing pavilion in the move corridor back to the Lighthouse. The vegetation changes would alter the landscape to an appearance closer to the CCC-era rather than that of the pre-1920 time period to which the site would be interpreted. Adverse impacts related to these vegetation changes would be mitigated through the installation of interpretive wayside exhibits that would show the historic appearance of the landscape. The new interpretive panels proposed along the pedestrian trails would visually intrude on the landscape which may detract from the site's historic feeling and setting. However, panels would be designed to stand at a height that would not obstruct important views and sited in areas so as not to intrude on the cultural landscape. The concrete walkways would create an intrusion on the overall cultural landscape, which would somewhat diminish the open feeling of the site. These walkways would also be highly visible when viewed from the top of the Lighthouse and would become the visually dominant circulation path throughout the site; however, the visual intrusion would be minimized due to the use of a colored concrete that is compatible with the setting. The new walkways and landforms would result in protection of the landscape from damage due to heavy foot traffic, which would protect the overall character of the cultural landscape in the long term.

Under the proposed action, the addition of a contoured landscape and vegetation would alter the landscape to an appearance closer to the CCC-era rather than that of the pre-1920 time period to which the site would be interpreted. Adverse impacts related to these landscape changes would be mitigated through the installation of interpretive wayside exhibits that would show the historic appearance of the landscape. The new interpretive panels proposed along the pedestrian trails would visually intrude on the landscape which may detract from the site's historic feeling and setting. However, panels would be designed to stand at a height that would not obstruct important views and sited in areas so as not to intrude on the cultural landscape. The new walkways and contoured landscape would result in protection of the landscape from damage due to heavy foot traffic, which would protect the overall character of the cultural landscape in the long term. All new walkways and the contoured landscape or plantings would be designed to not obscure views of or from the Lighthouse or other historic structures, and adverse impacts on historic structures would be mitigated through the planning and design process to the extent practicable. Under the proposed action, constructing a new shade structure would introduce a non-historic element along the edge of the historic area and would somewhat impose on the cultural landscape. However, adverse impacts from this new structure would be mitigated by the materials and design used

for the structure and by partially screening the structure with woody vegetation within the area which it would be sited. Finally, under the proposed action, moving the Keepers of the Light Amphitheater from its current location to the walkways south of the Lighthouse would result in a beneficial impact to the cultural landscape. This change would allow the original below-ground foundation stones to maintain their connection to the Lighthouse while remaining unintrusive upon the open viewshed. Overall, the changes on the landscape would not result in the removal of any historic material and would not obstruct any important views.

Raising the keepers' quarters buildings under a separate project would change the look of the historic buildings which contribute to the cultural landscape due to the treated wood pilings that would be used to raise the foundations. This would result in the loss of some historic integrity of design and feeling on the cultural landscape because the buildings were not originally elevated. However, completing this project would result in a beneficial impact on the cultural landscape due to the protection of the buildings from future flood damage, which could further damage their appearance. Replacing the geothermic HVAC system would result in temporary adverse impacts to the cultural landscape because excavating outdated elements would disturb the area. However, once the system was removed, the landscape would be restored to its condition prior to the excavation. Although both actions would result in some adverse impacts, the resources contributing to the cultural landscape would retain their original orientation and spatial relationships which existed at the original site.

VISITOR USE AND EXPERIENCE

Recreation related to and enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all national parks (NPS 2006). Proposed improvements have the potential to enhance the way visitors experience the project area, including improvements to wayfinding and comfort in the form of new circulation routes and the new pavilion. Improvements proposed in this EA also have the potential to provide new interpretive experiences for visitors through new landscape features and restored historic elements.

Affected Environment

In 2021, over 3.2 million people visited the Seashore for recreation; the months with the highest visitation levels were June, July, and August (NPS 2022c). While visitation fluctuates over time, annual visitation has been increasing since 2014 (NPS 2022c). Visitors to the light station have the opportunity to learn about the Lighthouse and its historic operations through the commemorative landscape and interpretive features. The Hatteras Island Visitor Center and Museum of the Sea are located on the light station grounds. The visitor center offers orientation information and a park store; just beyond the visitor center, there are restroom facilities and a pavilion for ranger programs (NPS 2021a). The two-floor Museum of the Sea is housed in the Double Keepers' Quarters and contains exhibits on Outer Banks cultural and natural history; video presentations are available to visitors here upon request (NPS 2021a). Outside the museum and visitor center, visitors have the opportunity to learn more about the light station at a number of interpretive sites. These include the Lighthouse, Oil House, Principal Keeper's Quarters, Double Keepers' Quarters, Keepers of the Light Amphitheater, move corridor, and historic circulation patterns.

Visitors enter the project area from Lighthouse Road via an entrance road that leads directly into the visitor parking lot, which sits to the northeast of the project area. The vehicle drop-off/pick-up location,

which is often used by bus groups, is currently on the western side of the parking lot closest to the visitor center, sharing space with the main drive aisle around the perimeter of the parking lot. Visitors enter the site from the parking lot via the entrance plaza, where they approach the visitor services area (including the visitor center; restroom; visitor contact station which includes an information desk, ticket sales, and book sales; and pavilion) directly in front of them. The Keepers of the Light Amphitheater is located to their left and can be accessed via a separate sidewalk that stems off of the entrance sidewalk bordering the parking lot. If sitting at the amphitheater, visitors can directly view the Lighthouse across the open landscape. The amphitheater consists of large granite stones on a gravel pad facing west towards the Lighthouse. The stones serve as benches for visitors to enjoy the view of the Lighthouse and the move corridor. After visiting the amphitheater, some visitors walk on the grassy landscape directly along the move corridor to the Lighthouse.



View of the existing entrance plaza facing the visitor services area, with Lighthouse in the background, October 2020

Visitors can also access the historic core of the site when they arrive at the entrance plaza via a 10-foot-wide concrete path leading to the southwest. The path winds through the wooded area to the west of the bookstore, entering the historic core and connecting to the paver walkway near the entrance to the Lighthouse. Visitors then follow the paver walkway that replicates the historic circulation patterns between the Lighthouse and the keepers' quarters. Views of non-historic buildings from the historic core of the site are mostly screened by vegetation. There are no comprehensive pedestrian paths through the rest of the site, which is consistent with the historic circulation patterns at the original site. Visitors frequently walk off of the established paths throughout the grassy landscape, including along the move corridor. This has caused bare spots to be worn on the landscape.

The local climate includes hot summers with high heat indices. According to the North Carolina State Climate Office, the average temperature in the summer at Cape Hatteras has been trending upward with an average increase of 0.12 degrees per decade since 1880 (NC State Climate Office 2022). Because of the site's open nature, there are very limited opportunities for visitors to sit and rest in the shade, particularly as they wait to climb the Lighthouse. The existing open-air pavilion provides some shade for visitors to rest and cool off and is also used for interpretive programs in the summer. The pavilion is not directly adjacent to the Lighthouse and visitors are unable to use it while waiting for Lighthouse climbs, so they often must wait in the sun or stop in the shade of the Lighthouse's shadow.

Primary activities at the site include visiting the structures and buildings associated with the Lighthouse, as well as climbing the Lighthouse itself. Although the Lighthouse was closed to public climbing in 2021 due to restoration activities, typically, it is open daily during the climbing season with the purchase of a ticket (NPS 2021b). Climbs are self-paced and provide views from the top of the Lighthouse, which include much of Hatteras Island and the adjacent shoreline (NPS 2021b). Currently, for visitors interested

in seeing the original Fresnel lens and pedestal, they must visit the Graveyard of the Atlantic Museum in Hatteras, NC where these artifacts are on display 10 miles away.

Another project underway that is expected to connect to the project area is the Lighthouse Road Multi-Use Path. Outer Banks Forever, a non-profit partner of the NPS Outer Banks Group, is spearheading a project called “Pathways to Your National Parks.” The purpose of the project is to fund and construct three new multi-use pathways at the most popular sites in three national parks, including the Cape Hatteras Lighthouse. The pathway would provide an opportunity for visitors and residents to safely ride their bicycles or walk to the Lighthouse area, especially during the busiest seasons of the year when traffic is heaviest. The marked path would be 8 to 12 feet wide depending on the design and presence of adjacent wetlands, and it would be paved or of a hardened sustainable surface. It would be located on one side of the entrance road from North Carolina Highway 12 (NC 12) and would extend to the old Lighthouse site, the current Lighthouse site, and the campground. The project is multi-phased over the next 5-7 years and is still in the early planning stages (NPS 2022b).

Methodology

Potential impacts on visitor use and experience are assessed based on changes to the way people use the project area, as well as how the alternatives would alter visitors’ experiences. The Seashore strives to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in parks. The current conditions of visitor use and experience, as presented in the “Affected Environment” section above, were compared with the alternatives described in chapter 2 to determine how visitor use and experience would be affected.

Impacts of Alternative A: No-Action

Under the no-action alternative, the existing condition of features at the site would result in continued impacts to the visitor experience. Visitors’ arrival at the site would remain the same, with limited direction about which circulation route to follow. This may result in confusion about how to view all the features at the site and visitors missing the opportunity to take in elements of the recreated historic setting. Visitors would continue to visit the Keepers of the Light Amphitheater, sitting on the large granite stones and enjoying direct views of the Lighthouse across the open landscape. However, in their current location, the stones are not conducive to effective resource understanding because the Seashore is unable to use them for programming due to the direct sunlight and extreme temperatures visitors would have to sit in during the summer. Heavy visitation of the site in combination with limited pedestrian circulation routes may continue to result in visitors walking across the landscape, trampling vegetation to the point of wearing bare spots in the lawn and along the edges of the one paved walkway. The lawn and topography would remain in its existing condition, with visitors continuing to wander across the landscape due to the lack of comprehensive pedestrian paths. Primary recreational activities at the site would remain the same, including Lighthouse climbs and viewing the surrounding landscape from the top of the Lighthouse. While waiting to climb the Lighthouse, visitors may continue to experience discomfort waiting in the heat of the sun without a shade structure under which to rest. With no new interpretive signage throughout the site, visitors may continue to miss out on opportunities for interpretation about the light station buildings and other site features. With no extensive Lighthouse or Oil House rehabilitation undertaken, visitors would continue to see elements in disrepair as well as unsympathetic modern treatments which diminish the historic integrity of materials and design of the Lighthouse and their experience in visiting the light station. During both day and night-time, visitors would not see a Fresnel lens at the top of the lighthouse

and, therefore, they would receive a false sense of history because the modern rotating beacon would continue to be inconsistent with the period of interpretation.

Impacts of Alternative B: Circulation Modified and Lens Restored

Under alternative B, there would be a beneficial impact on the visitor experience overall due to various changes. An additional pedestrian walkway would improve connection throughout the site, stemming from the bookstore path and connecting the Lighthouse and keepers' quarters. Existing use patterns demonstrate visitors' desire to walk around the site beyond the existing walkways; the additional pedestrian walkway would provide visitors an additional, convenient route to tour the project area, offering a walkway to new locations, and creating new experiences for visitors. It would offer visitors a more diverse range of activities by connecting them to additional areas of the site. The new pedestrian walkway would allow visitors to circulate through the site in a loop, eliminating the need to walk across the lawn to exit. The exit route would remain through the existing plaza where visitors also currently enter. In addition, new clay brick pavers and retaining the width of the historic circulation route between the Lighthouse and keepers' quarters would help visitors better understand the location of the historic route in contrast with the new walkway.

Other changes under alternative B would also encourage visitors to remain on formalized walkways. For example, potentially re-establishing lawn grasses around the amphitheater may discourage visitors from walking along the move corridor to the Lighthouse and would also screen pavement associated with pedestrian walkways. These vegetation changes would also recreate the look from the 1930s CCC project, during which the site was vegetated with native grasses. This, in combination with landscaping the site with native grasses between the walkways to help mitigate the visual intrusion of the walkways on the landscape, would result in visitors experiencing a more natural setting that enhances the historic integrity of feeling at the site.

Providing pathways that accommodate the site's heavy visitation would improve sustainability as storm events are expected to become more frequent and more intense as climate change continues. Heavily trodden lawn has become compacted and bare of vegetation, both conditions that can increase erosion and cause localized flooding issues. The increase in vegetation may also improve resiliency of the landscape through increased evapotranspiration and more robust root structure that would improve uptake of stormwater by plants and stabilize the soil.

Rehabilitating and repairing the Lighthouse and Oil House would also improve visitors' experience and understanding of the recreated historic setting and features of the site. Restoring missing character-defining features and removing unsympathetic treatments from historic structures would re-establish some of the lost historic design and character of these structures. This would allow visitors to experience the light station closer in appearance to its historic setting, designed during the site's National Historic Landmark period of significance (1870-1936), enabling them to learn more during their visit. Stabilizing the structure of the Lighthouse and Oil House would also help preserve these buildings and protect their remaining historic character and appearance for generations of visitors to come. Under alternative B, restoration of the historic Fresnel lens and pedestal to any degree, and reinstallation of it in the Lighthouse would restore the historic integrity of design and feeling. Under any level of restoration, the light may function differently than it would have historically because the beacon may not rotate or flash through the bullseye prisms. However, visitors would be able to view the historic artifact in the Lighthouse where it was intended to be. This would

improve the visitor experience as compared to the current condition of visitors traveling to the Graveyard of the Atlantic Museum to see the artifacts, outside of their original location. Having the original lens and pedestal reinstalled in their original location would restore the historic appearance and association, providing visitors with a more authentic experience.

Under alternative B, interpretive wayside sign panels located throughout the landscape would improve visitors' understanding of the light station's history, which would contribute to a more educational and immersive experience during their visit. Visitors could learn more about the 1999 light station move and move corridor as compared to the lack of interpretation that is currently available in this area of the site. Although these panels may detract from visitors' views of the landscape, the panels would be designed to minimize their intrusion on the landscape and would not obstruct important views, such as unimpeded open views between the Lighthouse and keepers' quarters, from the top of the Lighthouse outward and down to the site below, from the Lighthouse down the move corridor to the northeast (particularly as viewed from the top of the Lighthouse), and from the existing pavilion in the move corridor back to the Lighthouse. Overall, these panels would help improve visitors' interpretation of the site and experience of the recreated historic setting.

Changes to emergency and maintenance vehicle access would also be made under alternative B. A new access route created at the northern portion of the site would allow vehicles easier access to the central part of the site when needed. In case of visitor health emergencies, emergency personnel would be able to attend to visitors more efficiently, overall improving their safety and comfort.

Construction of the proposed changes throughout the project area would result in temporary adverse impacts on visitor use and experience. These impacts would include temporary closures of areas of the project area (including the Lighthouse), as well as visual and noise disturbances due to construction activity and equipment on site. Overall, construction of all improvements would span up to three years. The specific closures would vary based on the feature being constructed. For example, restoration and rehabilitation of the Lighthouse would require closure of the structure and would prevent visitors from being able to climb the Lighthouse for a limited period of time. Although restoring the original Fresnel lens would be done off-site, reinstalling it in the top of the Lighthouse would require heavy machinery near the Lighthouse and closure of the area. Although these closures may disrupt visitors' plans, these closures would be brief and NPS would notify visitors of scheduled closures through its existing communication channels to allow visitors to plan accordingly.

Installing the new pedestrian pathway would result in parts of the landscape being cordoned off from visitor entry and would temporarily change pedestrian circulation routes. These intrusions would distract visitors' attention from the historic feeling of the site and may somewhat diminish the overall experience of the project area. The intensity of these construction impacts would depend on final design and the sequencing of the proposed changes. For example, if multiple structures are rehabilitated (or in the case of pathways, constructed) concurrently, more of the area may be closed off at one time. However, if multiple features are rehabilitated or constructed sequentially, overall construction duration may last a longer time. When possible, construction should be performed over the late fall and winter months when visitation is lowest in order to minimize the impact on the visitor experience. These impacts related to construction would be temporary and would cease once construction activities are completed.

Impacts of Alternative C: Circulation Enhanced and Lens Replicated (NPS Preferred / Proposed Action)

Under the proposed action, there would be a beneficial impact on the visitor experience overall, from the time visitors enter the project area. A new entrance walkway at the northern portion of the site would provide visitors with a new entry experience and would separate those entering from those exiting so that the area would be less crowded. The new walkway would guide visitors into the historic core, improving their access to more light station buildings than is currently available. Existing use patterns demonstrate visitors' desire to walk beyond the existing pathways to tour the site; the new pedestrian circulation loop would provide visitors a convenient route to comprehensively tour the site. The pathway would guide them in front of the keepers' quarters and connect to the paver walkway to provide access to the Museum of the Sea. Visitors could then follow the path to the Lighthouse and either keep following the path around the Lighthouse to view the move corridor or head directly to the Lighthouse entrance for a climbing tour. When ready to leave, visitors could easily find the walkway to take them to the exit through the plaza with the bookstore and restrooms, finally leading back to the parking lot. Visitors would have a clearer understanding of the entrance and exit because the existing entrance walkway would be deemphasized to be understood as an exit.

In addition, replacing the existing pavers comprising the historic circulation route between the Lighthouse and keepers' quarters with clay brick pavers would help differentiate this historic path from the new, modern pedestrian pathway. Widening this path to accommodate more visitors would also improve visitors' ease walking between the historic structures. This proposed new circulation path throughout the site would provide visitors an additional route to tour the full site, offering clearer wayfinding to new locations due to improved pedestrian circulation routes. These routes may create new experiences for visitors, providing a more diverse range of activities to connect visitors to more areas of the site. For instance, more visitors may visit the Museum of the Sea with a defined path to the Double Keepers' Quarters, which may enhance their understanding and experience of the light station. After visiting the museum, they could follow the path to the Lighthouse, where they could sit on the stones from the Keepers of the Light Amphitheater. The new pedestrian path would allow visitors to circulate through the

light station in a loop, reducing the need to walk across the lawn to exit.



Visitors walk along the move corridor between the Lighthouse and amphitheater, October 2020

Throughout the site, the proposed contoured landscape and potential revegetation would alter how visitors visually experience the project area. This contoured landscape would mimic dunes but would be developed as static features (in contrast to dynamic natural dunes). New plantings 1-3 feet high within the proposed fences around the Lighthouse and keepers' quarters would change visitors' views of the light station grounds from the top of the Lighthouse and while walking through the historic core. This contoured landscape and potential vegetation changes

may also change the way visitors tour the site because it would discourage people from walking across the lawn in certain areas, especially along the move corridor. Landscape changes would also improve stormwater circulation at the site and limit standing water on the grounds. This would improve the visitor experience because flooding and pooling would be minimized on and around walkways during heavy storm/rain events.

Under the proposed action, impacts to visitor use and experience from rehabilitating and repairing the Lighthouse and Oil House would be the same as described under alternative B. Under the proposed action, installing a replica of the original Fresnel lens in the Lighthouse would introduce a non-historic element which would somewhat diminish the Lighthouse's historic integrity of materials. However, the appearance of this lens would restore the historic appearance and function of the lantern, which would restore the lost character and design when the original lens was replaced with the existing modern beacon. If the beacon rotates, or even if it does not, this could improve visitors' experience of the Lighthouse beacon by allowing them to experience it as it historically operated, rotating and flashing through bullseye prisms.

Similar to alternative B, the proposed action would include installing interpretive wayside sign panels throughout the landscape and improving emergency and maintenance vehicles access. Impacts from these actions would be the same as described above under alternative B.

Under the proposed action, the NPS would construct a new shade structure north of the Lighthouse and Oil House. This structure would be similar in appearance to the existing visitor pavilion and would be set into the wooded area along the edge of the historic area. Although this new structure would change the visitor experience visually, it would not be visually intrusive due to the color, material, and scale used. In addition, its placement would not obstruct any important views of the landscape. Furthermore, the addition of this shade structure would improve visitor comfort in the project area. With benches integrated into the design of the structure, visitors would have more opportunities to sit and rest than under current conditions. Visitors would also have the ability to seek respite from the sun during periods of hot weather. These comfort features may allow some visitors to experience more of the site because they may be able to spend more time in the area than they could have otherwise without places to sit and rest or shady places to escape the hot sun. This would improve the visitor experience overall, both in terms of comfort and in terms of the variety of sites at the light station they are able to visit. Similar to alternative B, the proposed action would result in changes to emergency and maintenance vehicle access.

Changes proposed to the Keepers of the Light Amphitheater would impact the visitor experience. The large granite stones that are currently used as benches in the amphitheater would be moved to another part of the project area. However, removing the stones from their current location and reusing them as benches along the proposed walkways to the south of the Lighthouse would improve visitor comfort and their interpretive experience because the stones would offer visitors a place to sit and rest in closer proximity to the Lighthouse, especially for groups waiting to climb the Lighthouse. This would allow visitors to interact with these features more comfortably and allow interpretive rangers to effectively use them in interpretive walks and programs. Placing the stones closer to the Lighthouse would also allow for more effective interpretation and visitor understanding of the role of the Lighthouse keepers and for the original below-ground foundation stones to maintain their connection to the Lighthouse. Removing the stones from their existing location would also help restore the viewshed to the original light station site and Atlantic Ocean.

Similar to alternative B, the proposed action would result in construction throughout the project area and cause temporary adverse impacts on visitor use and experience. These impacts may include temporary closures of areas of the project area (including the Lighthouse), as well as visual and noise disturbances due to construction activity and equipment on site. The specific impacts, including duration and intensity would vary based on the feature being constructed. For example, restoration and rehabilitation of the Lighthouse would require closure of the structure and would prevent visitors from being able to climb the Lighthouse for a limited period of time. Installing the new pedestrian pathway would result in parts of the landscape being cordoned off from visitor entry and would temporarily change pedestrian circulation routes. These intrusions would distract visitors' attention from the historic feeling of the site and may somewhat diminish the overall experience of the project area. The intensity of these construction impacts would depend on final design and the sequencing of the proposed changes. For example, if multiple structures are rehabilitated (or in the case of pathways, constructed) concurrently, more of the project area may be closed off at one time. However, if multiple features are rehabilitated or constructed sequentially, overall construction duration may last a longer time. When possible, construction should be performed over the late fall and winter months when visitation is lowest in order to minimize the impact on the visitor experience. These impacts related to construction would be temporary and would cease once construction activities are completed.

Conclusion

Under the no-action alternative, ongoing impacts on visitor use and experience would continue. These include limited comprehensive pedestrian pathways that do not guide visitors through the full site, a minimized interpretive experience visiting the light station due to non-characteristic historic materials in place and missing character-defining features, and a lack of shaded sitting areas under which to rest. Visitors would also have to continue traveling off-site to the Graveyard of the Atlantic Museum to see the original Fresnel lens and pedestal on display, which may detract from their overall experience. The Keepers of the Light Amphitheater would remain intact near the entrance to the project area and continue to provide seating for visitors wanting to view the Lighthouse across the open landscape, though would offer limited opportunities for the Seashore to conduct interpretive programming.

Alternative B and the proposed action would result in a beneficial impact to visitor use and experience overall, though they would also result in some temporary adverse impacts during construction. Under alternative B, the additional pedestrian walkway would improve connection throughout the site, providing visitors another route to tour the light station and experience new locations. Under the proposed action, establishment of a new visitor entrance would create more intuitive wayfinding and reduce congestion in the vicinity of the bookstore, dispersing visitors more effectively throughout the site, especially during times of peak visitation in the summer when crowding is at its highest. The proposed new circulation path would connect visitors to more areas of the site than existing paths do, improving visitors' options for fully touring the light station and creating new experiences for visitors. This would also offer visitors access to a more diverse range of activities and improve their understanding of the light station. New paths under both alternatives help reduce the number of bare spots worn on the lawn created from visitors walking off pathways, which could improve the aesthetics of the site and beneficially impact the visitor experience.

Under alternative B and the proposed action, new wayside sign panels would also improve visitors' understanding of the light station's history, contributing to a more immersive experience as compared to the current experience with a lack of panels explaining the site's story. Although the panels may

adversely impact visitors' views of the landscape, changes to views would be minimal considering the open nature of the site relative to the height of the panels, and the panels would be designed and placed to minimize any visual obstruction. Vegetation changes proposed under alternative B would help mitigate the visual intrusion of the walkways on the landscape, providing a more natural setting that enhances the project area's historic integrity of feeling for visitors to experience.

Vegetation changes and changes to the contours of the landscape under the proposed action would alter visitors' views of the landscape because new plantings 1-3 feet high within the proposed fences around the Lighthouse and keepers' quarters would change visitors' views of the light station grounds from the top of the Lighthouse and while walking through the historic core. Landscape changes would also help reduce flooding in the project area and pooling around walkways during heavy rain/storm events, which would improve the visitor experience.

Under both alternative B and the proposed action, the visitor experience would also be improved by the rehabilitation and repair of the Lighthouse and Oil House because it would restore historic integrity of design and feeling to these structures, allowing visitors to experience them closer in appearance to their historic setting, enabling them to learn more during their visit. Restoring and reinstalling the original Fresnel lens and pedestal into the Lighthouse under alternative B would allow visitors to see the historic artifacts back in the Lighthouse where they were intended to be, offering a more authentic visitor experience. Under the proposed action, the appearance of the new lens would restore the historic appearance of the lantern, as well as its function if it rotates as it historically did, which would improve visitors' experience by allowing them to view the beacon as it originally operated.

Visitor safety would be improved under alternative B and the proposed action due to the more efficient emergency access afforded by the new access route at the northern portion of the site. Overall visitor comfort would also be improved under the proposed action through the addition of a shade structure with benches, as well as the relocation of the Keepers of the Light Amphitheater stones to an area closer to the Lighthouse, which would also maintain the stones' connection to the Lighthouse and allow the Seashore to use the stones in interpretive programming, improving visitors' interpretation of the site. These changes would provide opportunities to rest in areas where they currently do not exist and to sit in the shade, especially during peak seasons of heat when temperatures regularly exceed 90 degrees Fahrenheit. Under both action alternatives, construction activities would result in closures of specific areas and would add visual and noise disturbances at the site. However, these impacts would be temporary and would cease at the completion of construction activities. NPS would consider the impact on visitor use and experience when planning and designing construction activities, particularly if closures and other impacts would overlap.

Other reasonably foreseeable projects (i.e., the Lighthouse Road Multi-Use Path project, raising the keepers' quarters, and replacing the geothermic HVAC system) would enhance visitor use and experience in the long term by protecting the Principal Keeper's Quarters and providing new interpretive connections and experiences. Raising the keepers' quarters buildings would change the look of the historic buildings and would introduce a non-historic element which would somewhat diminish the keepers' quarters' historic integrity of materials. However, protecting the buildings from future flood damage would help preserve them for future generations, which would improve the visitor experience. The Lighthouse Road Multi-Use Path project proposes to construct a pathway from the NC 12 entrance road to the old Lighthouse site, the current Lighthouse site, and the campground (NPS 2022b). Completing this project would result in a beneficial impact on visitor use and experience due to additional opportunities for visitors to access and

experience the project area and surrounding sites. Furthermore, improved access to the old Lighthouse site would improve visitors' connection to and interpretation of the Lighthouse's story. This multi-use path would also provide an alternative form of transport for visitors and residents wanting to visit the project area, especially during peak months when traffic on NC 12 gets heavy.

Removal or replacement of the geothermal elements buried at the site may temporarily diminish visitor use and experience at the site during site excavation due to restricted access to portions of the site; however, there would be no changes in visitor use and experience from this project in the long term.

In summary, the proposed action would provide much-needed visitor accommodations in an area subject to increasing visitation and warming summers. The new walkways, shade structure, and seating along the fringes of the forest would improve visitor convenience and provide a more enjoyable way to experience the light station. Visitors would gain some of these improvements in experience under alternative B; however, more narrow walkways may result in some ongoing wearing of bare spots in the lawn (especially with increasing heat stress for the lawn grasses). No additional shade structure or seating are proposed under alternative B, leaving visitors with existing facilities for shade. Visitors would be likely to better understand the history of the site through rehabilitation and restoration of historic structures under both action alternatives.

CHAPTER 4: CONSULTATION AND COORDINATION

NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* requires the Seashore to make "diligent" efforts to involve the interested and affected public in the NEPA process. This process helps to achieve the following: determine the important issues and eliminate those that are not; allocate assignments among the interdisciplinary team members and/or other participating agencies; identify related projects and associated documents; identify other permits, surveys, consultations, etc. required by other agencies; and create a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. A press release and notice of public scoping open comment period was published on September 17, 2021, and was open through October 17, 2021. During this comment period, the NPS released information about the project background, objectives, key issues, and preliminary alternatives. Two public meetings were held during the scoping period: one was in person on September 28, 2021, and the second was held virtually on September 29, 2021. This chapter documents the agencies and Tribes consulted during the NEPA process and summarizes the public review process for this EA.

AGENCY AND TRIBAL CONSULTATION

Tribal Consultation

During the planning process for this environmental assessment, the following Tribes were contacted to initiate consultation:

- Absentee Shawnee Tribe
- Catawba Indian Nation
- Cherokee Nation
- Eastern Band of Cherokee
- Tuscarona Nation
- United Keetoowah Band of Cherokee
- Shawnee Tribe

National Historic Preservation Act, Section 106

As required by Section 106 of the NHPA, the Seashore consulted with the North Carolina State Historic Preservation Office, the National Historic Landmarks Program, and the above-listed Tribes to assess the effect of the project on historic properties. The Section 106 consultation process is being conducted separately from but concurrently to the NEPA process. Consultation under Section 106 is ongoing but will be completed prior to the selection of an alternative and the release of a NEPA decision document. The Seashore will continue consultation as appropriate during project implementation.

Endangered Species Act, Section 7

Based on a review of the project area and the federally listed species known to occur in the vicinity of the project area, Seashore staff determined that project activities would have no effect on special status species. There are no critical habitats for special status species within the vicinity of the project area. Therefore, no formal consultation with the US Fish and Wildlife Service is required under Section 7 of the Endangered Species Act.

Coastal Zone Management Act

As required by the Coastal Zone Management Act and the North Carolina Coastal Area Management Act, the Seashore is completing a Federal Consistency Determination to assess the project's consistency with these acts. The Seashore consulted with the North Carolina Division of Coastal Management through this process. A copy of the Federal Consistency Determination is available in appendix B.

PUBLIC REVIEW

The EA will be available for public and agency comment for 30 days and has been distributed to a variety of interested individuals, agencies, and organizations. It also is available on the internet at https://parkplanning.nps.gov/caha_lighthouse, and hard copies are available by request.

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APPENDIX A: IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

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IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following presents an overview of impact topics that were considered for full analysis but were ultimately dismissed from further analysis in this EA. An impact topic was initially considered for but dismissed from further analysis if it did not meet any of the following conditions:

- the environmental impacts associated with the issue are central to the proposal or of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue.

Socioeconomics and Adjacent Communities

The implementation of these proposed improvements may have temporary impacts on the local economy, which is largely tourism and recreation-based. Alternative B would involve reinstalling the original historic Fresnel lens and pedestal back in the Lighthouse with a new light source. Currently, the original lens and pedestal are on display at the Graveyard of the Atlantic Museum in Hatteras, NC, on loan from the NPS. The lens has been on loan since 2002 and the pedestal since 2006 (NPS 2016). Considering that millions of people visit the seashore annually, and that 2021 saw record-breaking visitation levels (NPS 2022), it is unlikely that removing the lens and pedestal from the museum and reinstalling them in the Lighthouse under alternative B would negatively impact local socioeconomics. Other recreational activities at the Seashore would likely continue to draw visitors to the area, and local businesses and communities would continue to experience high levels of visitation.

Communities adjacent to the Lighthouse may also experience changes from proposed improvements to the light beacon and light source. Residents in these communities are accustomed to the existing beacon and the light that is cast from it. This rotating beacon casts light visible for up to 24 nautical miles. The proposed changes to the light beacon and light source would not substantially change the visible range. The actions proposed in the alternatives would not illuminate properties that were not historically illuminated by the Lighthouse beacon, nor would the light no longer be visible from properties where it historically has been visible. The character of the light may change based on the alternative chosen. For example, the beacon may rotate and flash as it did historically, or a modern LED light source may be added and the historic lens would be stationary (would not rotate). Although the change in character, including flash pattern, may be perceivable from historic properties within the project area, the change would not alter any historic characteristics or diminish any historic setting or feeling of these properties. Therefore, there would be no adverse impacts on historic properties as a result of the change in light cast from the new beacon or light source.

For the reasons noted above, this impact topic was dismissed from further analysis.

Environmental Justice

Presidential Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human

health or environmental effects of their programs and policies on minorities and low-income populations and communities.

According to the EPA, environmental justice is the:

“...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.”

The goal of ‘fair treatment’ is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and identify alternatives that may mitigate these impacts.

Communities in the vicinity of the project area do not contain high proportions of minority or low-income populations; therefore, environmental justice is dismissed as an impact topic. Furthermore, the impacts on the socioeconomic environment resulting from implementation of the proposed action would be beneficial but have a negligible effect upon nearby communities.

Floodplains

During the planning process, the impact topic of floodplains was considered for analysis in this EA, per NPS Director’s Order #77-2, *Floodplain Management*. According to the Federal Emergency Management Agency’s (FEMA) flood map, portions of the project area are within the 100-year floodplain (FEMA flood map 3730053600K, effective date of June 19, 2020). Although much of the project area is not currently within a regulatory floodplain, some areas are subject to standing water after storm events (due to relatively high ground water levels, not ocean overwash). The risk of flooding would likely increase for the foreseeable future due to relative sea level rise. Current sea level rise rates measured at Oregon Inlet from 1977-2020 are 5.32 +/- 1.12 millimeters (mm) per year (NOAA 2021). Factoring in sea level rise acceleration documented in coastal North Carolina, the Seashore can expect 1.3 to 1 feet of rise above the 1992 mean sea level by 2050 (Boon et al. 2018). Elements of the proposed action have been sited and designed to consider this ongoing and anticipated flood risk in order to protect life and property in the case of a flood event. Landscaping elements would be designed and sited to be flood resilient and to impede floodwaters as little as possible. Additionally, structures would be designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60). Because most improvements do not overlap with a regulatory floodplain, and because design considerations have been implemented for project elements, there is little to no potential that the proposed action will adversely affect floodplains with respect to human health/life, capital (NPS) investment, and/or natural and beneficial floodplain values. Therefore, the impact topic of floodplains was dismissed from further analysis.

Archeological Resources

The proposed landscape improvements would require ground disturbance, which has the potential to impact archeological resources if any exist within the project area. However, archeological testing of the site and move corridor was completed by the NPS’s Southeast Archeological Center (SEAC) in 1999

prior to the Lighthouse move. No archeological resources or cultural material were found during this testing, and no further archeological investigation was recommended for the project area. Based on the results of this testing, it is concluded that there are no archeological resources within the project area (NPS 2003). If, in the unlikely event archeological resources are discovered during construction or the implementation of the project, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented. If significant resources could not be preserved *in situ*, an appropriate mitigation strategy (e.g., the excavation, documentation, and mapping of cultural remains prior to disturbance to ensure the recovery of archeological data that otherwise would be lost) would be developed in consultation with SEAC, the State Historic Preservation Officer, and, as appropriate, associated Native American Tribes. Because previous testing of the project area has determined there are no archeological resources within the project area, and because an unanticipated discovery plan will be in place during construction, the impact topic of archeological resources was considered but dismissed from further analysis.

Endangered Species

Based on NPS's review of the project area and the federally listed species known to occur in the vicinity, NPS determined there are no impacts anticipated on special status species. If avoidance measures noted not be feasible during future design or implementation, the NPS will consult with the US Fish and Wildlife Service (USFWS) on the potential effects of the proposed action on federally listed species as required by Section 7 of the Endangered Species Act. Because a review of the project area determined there are no special status species in the vicinity, and because avoidance measures along with USFWS consultation would be used as appropriate, the impact topic of endangered species was considered but dismissed from further analysis.

Climate Change

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring as a result of rising greenhouse gas (GHG) emissions and could accelerate in the coming decades. While climate change is a global phenomenon, it manifests differently depending on regional and local factors. General changes that are expected to occur in the future as a result of climate change include hotter, drier summers; warmer winters; warmer water; higher ocean levels; more severe wildfires; degraded air quality, more heavy downpours and flooding, and increased drought. Climate change is a far-reaching, long-term issue that could affect the Seashore, its resources, visitors, and management. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature continues to rise and whether global emissions of GHGs can be reduced or mitigated. Climate change science is a rapidly advancing field and new information is being collected and released continually.

Construction activities associated with implementation of the proposed action would contribute to increased GHG emissions, but such emissions would be short-term, ending with the cessation of construction, and it is not possible to meaningfully link the GHG emissions of such individual project actions to quantitative effects on regional or global climatic patterns. Any effects on climate change would not be discernible at a regional scale. Therefore, climate change was dismissed from further analysis.

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APPENDIX B: COASTAL ZONE MANAGEMENT ACT FEDERAL CONSISTENCY DETERMINATION

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Coastal Zone Management Act Federal Consistency Determination

for

Cape Hatteras Lighthouse Repair and
Landscape Improvement Project

Cape Hatteras National Seashore

March 2022

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1

Federal Agency Purpose and Action

The Cape Hatteras Lighthouse (the Lighthouse) is located in Dare County, North Carolina, within the Cape Hatteras National Seashore (the Seashore) on Hatteras Island, one of a string of barrier islands known as the Outer Banks. See figure 1 for a map of the location. The Lighthouse was constructed in 1870, replacing a smaller 1803 lighthouse, to guide mariners around the shallow, shifting sands of the Diamond Shoals located just off the coast. Several buildings associated with the Lighthouse were constructed to accommodate the light keepers and their families. These buildings include the Oil House where fuel for the beacon was stored as well as quarters to house the principal keeper and assistant keepers and their families. These buildings and their grounds are collectively referred to as the light station. The light station was added as part of the Cape Hatteras National Seashore in 1937. Encroaching shorelines at the time compelled the NPS to take action to protect the Lighthouse. Construction of artificial dunes by the Civilian Conservation Corps (CCC) in 1935-36 protected the Lighthouse by halting westward movement of the shoreline for about 30 years. Other methods employed to protect the Lighthouse included steel groins and beach nourishment. Eventually, the protection measures were destroyed by storms and constant scouring of the shoreline. As a result, in 1999 the entire light station was moved 2,900 feet southwest of its original location to a new site approximately 1,800 feet from the shoreline, where it stands today. The open path used to move the light station buildings is known as the move corridor and connects the new site to the former Lighthouse location physically and thematically (NPS 2003). From the top of the Lighthouse, visitors have an uninterrupted view along the move corridor (NPS 2003). The Cape Hatteras Light Station was designated as a National Historic Landmark on August 5, 1998, with a boundary revision on December 20, 2000.

The project area for the proposed actions includes approximately 6.5 acres of land encompassing the open landscape where the Lighthouse, Oil House, and keepers' quarters are situated; the portion of the move corridor between the Lighthouse and the parking lot; and the visitor services area where the visitor center, restrooms, pavilion, and Keepers of the Light Amphitheater are located. The project area is bound by forested area to the north, south, and west. The eastern boundary crosses a small portion of the existing parking lot where pedestrian accommodations would occur. See figure 2 for a map of the project area.

The National Park Service (NPS) proposes to rehabilitate and restore the Lighthouse and to implement related site and adjacent landscape improvements. Improvements would be made to several elements of the project area: the Lighthouse, the light beacon, the Oil House, and the landscape. The Cape Hatteras Light Station (the light station), which includes the Lighthouse as well as its associated support buildings and grounds, was designated as a National Historic Landmark on August 5, 1998, with a boundary revision in the National Register on December 20, 2000. The purpose of this project is to rehabilitate the interior and restore the exterior of the Lighthouse and its character-defining features, to repair deteriorated materials and finishes, and to selectively reverse unsympathetic treatments added after the period of significance (1870-1936). Additionally, the project purpose includes providing a more immersive experience of the light station (by defining pedestrian circulation patterns) and considering ways to improve the resiliency of the light station and grounds.

This project is needed because there are deteriorated elements of the interior and exterior Lighthouse that are in need of repair or replacement. There are also missing character-defining features that were important to the historic design and construction of the Lighthouse as well as unsympathetic modern treatments that were added after the period of significance, both of which diminish the historic integrity of the Lighthouse. Heavy visitation of the site in combination with limited formal pedestrian walkways has resulted in visitors walking across the landscape surrounding the Lighthouse, trampling vegetation to the point of wearing bare spots in the lawn and along the edges of the single paved walkway. Visitors arriving at the site are not provided a clear circulation route along which to visit the site, which results in visitors walking off of the established path (including along the open move corridor) and perhaps not visiting the museum at the far terminus of the walkway. The following describes the changes and improvements that would occur under the proposed action.

Lighthouse Rehabilitation

The Lighthouse would be rehabilitated on the interior and restored on the exterior in accordance with Secretary of the Interior Standards for the Treatment of Historic Properties, including repair of the character-defining features and deteriorated and damaged elements. Some modern, unsympathetic treatments, materials, and finishes that were added after the period of significance would be reversed. There would be no change in footprint of the Lighthouse structure.

Light Beacon

Under the proposed action, the existing rotating light beacon and metal platform would be removed from the Lighthouse lantern. Also, a complete recreation of the original lens would be produced and installed in the Lighthouse, and the artifact would remain on museum display. The recreation would be constructed of a steel skeleton with brass frame panels and cast acrylic lenses and bullseye prisms. It would be the same size and overall appearance as the original, aided by 3D modeling of the original. A modern light source would be used inside the lens such as LED bulbs. The beacon would rotate and flash through the bullseye prism as it did historically. A modern precision ball bearing system would be used to rotate the lens but give the appearance that it is rotating on the chariot wheels.

Oil House Rehabilitation

Similar to the Lighthouse rehabilitation, both action alternatives would include rehabilitation and repair to the Oil House. Actions would be taken to stabilize the structure, some missing historic features would be replicated using historic drawings, and some non-sympathetic modern intrusions would be removed. There would be no change in footprint of the Oil House structure.

Landscape Improvements

Pedestrian Circulation

Under the proposed action, a new visitor portal to the light station would be created to the north of the bookstore to foster a one-way pedestrian circulation. Visitors would be encouraged to enter the site from the parking lot via a new entrance walkway at the northern portion of the site. The walkway would run along the edge of the tree line, entering the historic core east of the Principal Keeper's Quarters. The walkway would then continue west in front of the Keepers' Quarters and connect to the paver walkway that provides access into the museum in the Double Keepers' Quarters. After visiting the museum, visitors would then follow the path to the southeast, leading to the Lighthouse. There, visitors could either continue southeast and follow the path around the Lighthouse to view the move corridor, or head east directly to the Lighthouse entrance. Both options would converge at the proposed shade pavilion to the north of the Lighthouse (discussed below). After visiting the Lighthouse, visitors would follow the walkway to the northeast along the existing entrance/exit route through the plaza with the bookstore and restrooms, and finally back to the parking lot. The existing entrance walkway would be deemphasized to be understood as an exit rather than an entrance.

The historic circulation route along the paver walkway between the Lighthouse and the Keepers' Quarters would be retained. The existing concrete pavers would be replaced with clay brick pavers, and the walkway would be widened to 7 feet in key areas to accommodate a large number of visitors. This circulation route would provide a more direct route for visitors between the Keepers' Quarters and the Lighthouse, while the same looped walkways would provide a route for visitors to experience the full site, disperse along a formalized

walkway for additional interpretive and photograph opportunities, and perhaps rest in the shade of the wooded areas near the Lighthouse.

The new pedestrian walkway loop circulating between the Keepers' Quarters and the Lighthouse would follow the same alignment as under alternative B but would be approximately 10-12 feet wide to accommodate heavy visitor traffic and to facilitate emergency vehicle access. The material would be a colored concrete, though the specific material and color would be determined during a future design phase.

Emergency and Maintenance Vehicle Access

An additional vehicle access route for emergency and maintenance vehicles would be created at the northern portion of the project site, to allow these vehicles easier access the central part of the site. This new route would connect to the pedestrian walkway that would connect the Lighthouse and Keepers' Quarters. The existing emergency and maintenance vehicle access would remain in the southern portion of the site, utilizing the move corridor for access. The new concrete walkway would be wide enough to accommodate these vehicles and provide a new access route via the new northern entry to the historic core of the site.

Topography and Vegetation

The project would include the creation of natural landforms with native landscape planting 2-3 feet high in strategic locations around the site to move stormwater to the edges of the landscaped area and limit standing water. The landscape would be revegetated throughout the site with native grasses. Once revegetation is complete, the mowing schedule for the site would be reduced in most areas to allow natural growth to occur. Lawn grasses, such as Bermuda grass, would be established within the proposed fences (see below) around the Lighthouse and the Keepers' Quarters and would be maintained as mown lawn. The project would also include grading the proposed walkways to shed water away from the surfaces to minimize standing water on and around walkways during heavy storm/rain events.

Interpretation

Interpretive wayside sign panels would be added in strategic locations throughout the landscape. These panels would describe important historic and natural resources within the project area and tell the story of the light station. The story of the 1999 light station move and the move corridor would be interpreted via these panels. The panels would be set in the ground on a small concrete pad with an area for visitors to stand to view the panels. The specific location and design of these panels would be determined during a future design phase of the project; however, the design and specific location for each panel would be carefully considered to minimize intrusion on the landscape.

Queuing and Shading

A new shade pavilion would be constructed to accommodate waiting tour groups near the Lighthouse. The pavilion would be located to the north of the Lighthouse and Oil House,

adjacent to the proposed pedestrian walkway (see figure 5). The pavilion would be partially set back into the wooded area to limit the visual dominance it would have on the landscape. It would be a wooden, open-air shelter with a pyramidal hipped roof with open ceiling. It would be approximately 17 by 17 feet. Benches would be integrated into the design to provide areas for visitors to sit; benches may be floating or fixed. The design would mimic that of the existing pavilion to the northeast of the Lighthouse near the restrooms and bookstore.

Relocation of the granite blocks comprising the Keepers of the Light Amphitheater (described below) would provide another opportunity for visitors to rest in the shade.

Small-Scale Features

The existing non-historic vinyl perimeter fence around the Lighthouse would be removed. A replica decorative metal octagonal fence with granite bases would be created based on a fragment of an original base in the NPS museum collections. The new fence would be constructed of a non-corrosive metal with a materially compatible coating.

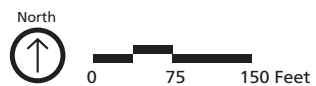
A stockade fence would be added around both the Principal Keeper's Quarters and Double Keepers' Quarters to mimic the landscape of the early historic period (1870-1890s). This would be a rectangular fence that would enclose both buildings with a wide buffer of lawn grasses surrounding the dwellings.

The Keepers of the Light Amphitheater would be disassembled and removed from the move corridor. The granite blocks would be salvaged and relocated along the perimeter of the proposed walkway south of the Lighthouse. The blocks would be placed in the shady areas along the path to provide respite to visitors from the hot sun.



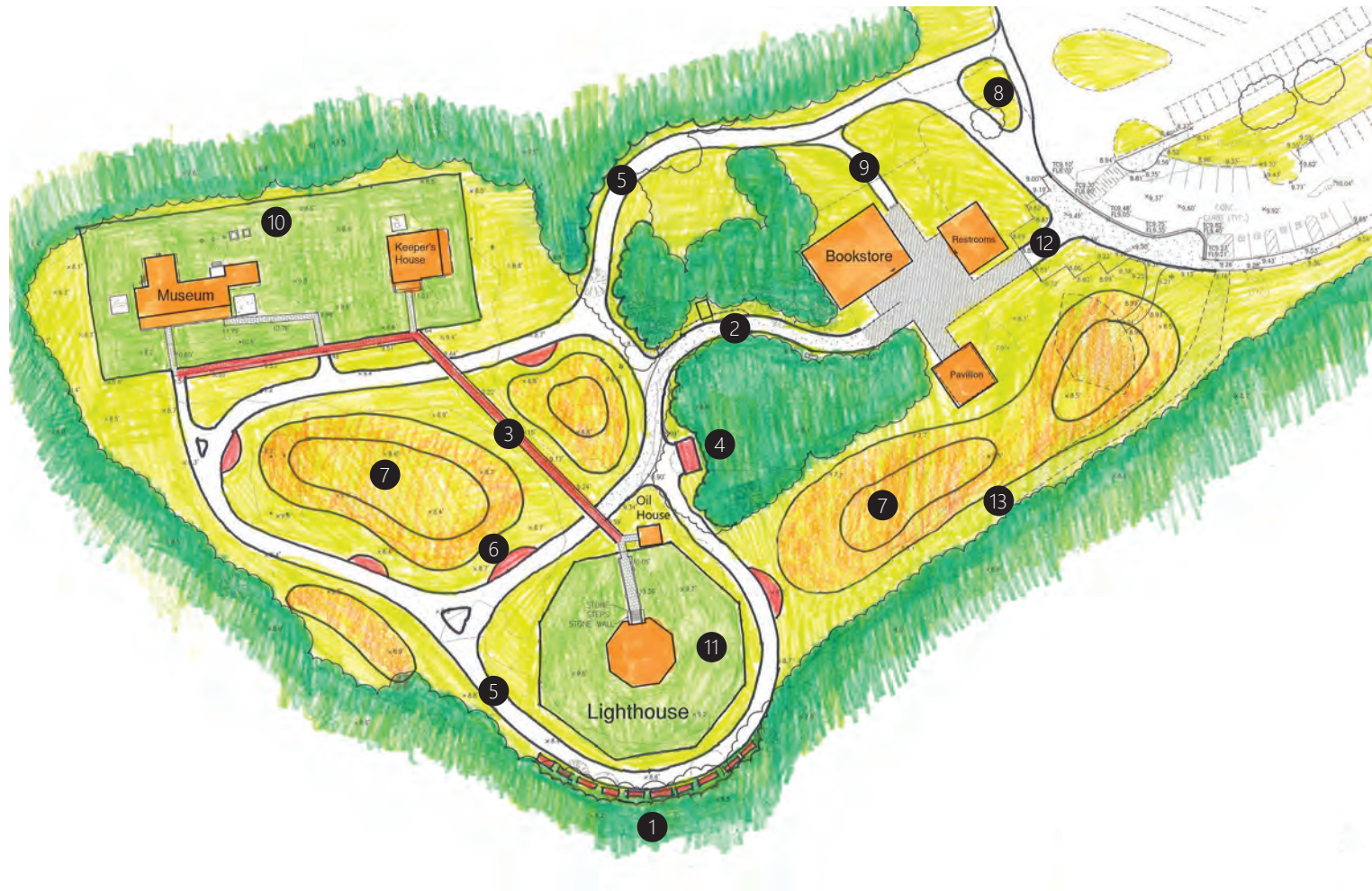
Cape Hatteras Lighthouse Repair and
Landscape Improvement Project
CZMA Consistency Determination

Figure 1. Project Location Map



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Figure 2. Project Area Map

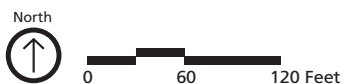


Legend

- 1 Re-purpose Keeper's Stones
- 2 Replace Concrete Walkway (Colored)
- 3 Widen Paver Walkway to 7'
- 4 Lighthouse Tour Shade Structure
- 5 12' Colored Concrete Walkway
- 6 Visitor Interpretive Station (TYP)
- 7 Natural Landforms and Native Plantings (TYP)
- 8 New Visitor Entrance
- 9 Pedestrian Connection
- 10 Reconstructed Wood Fence
- 11 Reconstructed Metal Fence
- 12 Visitor Exit
- 13 Existing Maintenance Access Road to Remain

Note

Location and scale of all improvements are approximate and subject to refinement during future design phases.



Cape Hatteras Lighthouse Repair and
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Figure 3. Alternative C:
Circulation Enhanced and Lens Recreated

2

North Carolina Coastal Area Management Act

In 1972, Congress passed the Coastal Zone Management Act (CZMA), which encouraged states to keep the coasts healthy by establishing programs to manage, protect, and promote the country's fragile coastal resources. Two years later, the North Carolina General Assembly passed the landmark Coastal Area Management Act (CAMA). CAMA required local land use planning in 20 coastal counties and provided for a program for regulating development. The North Carolina Coastal Management Program was federally approved in 1978 by the National Oceanic and Atmospheric Administration (NOAA).

2.1 Areas of Environmental Concern

North Carolina's coastal zone includes the 20 counties that are adjacent to, adjoining, intersected by, or bounded by the Atlantic Ocean or any coastal sound, including Dare County where the Proposed Action would occur. There are two tiers of regulatory review for projects within the coastal zone. The first tier includes Areas of Environmental Concern (AECs) as designated by the state. AECs have more thorough regulatory controls in place than other areas and include coastal wetlands, coastal estuarine waters, public trust areas, coastal estuarine shorelines, ocean beaches, frontal dunes, ocean erosion areas, inlet lands, small surface water supply watersheds, public water supply well fields, and fragile natural resource areas. The second tier includes areas with land uses that have the potential to affect coastal waters, even though they are not defined as AECs. The coastal zone extends seaward to the three-nautical-mile territorial sea.

An AEC is an area of natural importance, and its classification protects the area from uncontrolled development. AECs include almost all coastal waters and about three percent of the land in the 20 coastal counties. The four AECs are as follows:

1. The Estuarine and Ocean System, which includes public trust areas, estuarine coastal waters, coastal shorelines, and coastal wetlands.
2. The Ocean Hazard System, which includes components of barrier island systems.
3. Public Water Supplies, which include certain small surface water supply watersheds and public water supply well fields.
4. Natural and Cultural Resource Areas, which include coastal complex natural areas; areas providing habitat for federal or state designated rare, threatened, or endangered species; unique coastal geologic formations; or significant coastal archaeological or historic resources.

The following is an analysis of the applicability of policies designed to protect AECs to the proposed plan and the NPS determination of no impact to North Carolina's coastal zone.

2.1.1 15A NCAC 07H .0200 (Estuarine and Ocean System)

15A NCAC 07H .0205 defines and establishes management objectives for coastal wetlands in order "to conserve and manage coastal wetlands so as to safeguard and perpetuate their biological, social, economic and aesthetic values, and to coordinate and establish a management system capable of conserving and utilizing coastal wetlands as a natural resource necessary to the functioning of the entire estuarine system." The proposed project would be located entirely within uplands and would not impact coastal wetlands. A professional wetland scientist performed both a desktop review of the soils and National Wetlands Inventory followed by a site inspection of the project area for the presence of any jurisdictional features. No wetlands were found within the project area.

While the topsoil at the site has been compacted by foot traffic and is subject to standing water after heavy rainfall, these flooded areas drain via infiltration. There are no hydrologic connections between the project area and Pamlico Sound (nor any other wetland features). The primary flow path to the sound begins with ditches located nearly a mile from the project area, at the intersection of NC-12 and Lighthouse Rd, which then continue along a canal behind Buxton Back Rd then parallel to NC-12 before discharging to the Pamlico Sound. Infiltration rather than conveyance would be the primary means for onsite stormwater. For these reasons, the project is consistent within these management objectives and policies.

15A NCAC 07H .0206 defines and establishes management objectives for estuarine waters in order "to conserve and manage the important features of estuarine waters so as to safeguard and perpetuate their biological, social, aesthetic, and economic values; to coordinate and establish a management system capable of conserving and utilizing estuarine waters so as to maximize their benefits to man and the estuarine and ocean system." The proposed project would not impact estuarine or ocean systems; therefore, implementation of the proposed improvements would be consistent with these management objectives and policies.

15A NCAC 07H .0207 defines and establishes management objectives for public trust areas in order "to protect public rights for navigation and recreation, and to conserve and manage the public trust areas so as to safeguard and perpetuate their biological, economic, and aesthetic values." The proposed development would be located entirely within upland areas and would not extend into a navigable waterway or public trust area; therefore, the project is consistent with these management objectives and policies.

15A NCAC 07H .0209 defines and establishes management objectives for estuarine shorelines and public trust shorelines in order to ensure that shoreline development is "compatible with the dynamic nature of coastal shorelines as well as the values and the management objectives of the estuarine and ocean system." The following key development standards were reviewed and considered during project development, as relevant:

- › preserving natural erosion barriers (peat marshland, resistant clay shorelines, and cypress-gum fringe areas)
- › minimizing the construction of impervious surfaces
- › observing mandatory standards of the NC Sedimentation Pollution Control Act of 1973
- › minimizing impacts to estuarine resources, including coastal wetlands, submerged aquatic vegetation (SAV), and shellfish beds

Infiltration is the primary means of stormwater handling within the project area. The proposed action would require a total of approximately 1.21 acres of land disturbance. This includes land disturbance for the construction of the shade structure, construction and expansion of walkways, relocation of the stones comprising the Keepers of Light Amphitheater, and installation of low landforms populated with native, coastal vegetation. Because the project may disturb more than 1 acre of land, the park would submit an erosion and sediment control plan to the Land Quality Section of the North Carolina Department of Environmental Quality.

There would be an increase of up to 0.42 acres of impervious surfaces throughout the site under the proposed project due to the addition of walkways and a shade structure. The increase in stormwater runoff would be negligible due to the stormwater considerations incorporated into the design plan and location within well-drained soils. The NPS would acquire any required stormwater permits prior to implementation. Therefore, impacts to water quality and quantity would be minimized. Therefore, the Cape Hatteras Lighthouse Repair and Landscape Improvement Project would be consistent with these management objectives and policies.

2.1.2 15A NCAC 07H .0300 (Ocean Hazard Areas)

15A NCAC 07H .0303 defines and establishes management objectives for ocean hazard areas in order "to eliminate unreasonable danger to life and property and achieve a balance between the financial, safety, and social factors that are involved in hazard area development." The proposed Cape Hatteras Lighthouse Repair and Landscape Improvement Project would not impact any Ocean Hazard Areas. It is consistent with these management objectives and policies.

2.1.3 15A NCAC 07H .0400 (Public Water Supplies)

15A NCAC 07H .0403 defines and establishes management objectives for public water supplies. The objective in regulating development within critical water supply areas is the "protection and preservation of public water supply well fields and A-II streams and to coordinate and establish a management system capable of maintaining public water supplies so as to perpetuate their values to the public health, safety, and welfare." The proposed Cape Hatteras Lighthouse improvements would not have any impact on public water supplies; therefore, it is consistent with these management objectives and policies.

2.1.4 15A NCAC 07H .0500 (Natural and Cultural Resource Areas)

15A NCAC 07H .0501 defines fragile coastal natural and cultural resource areas as "areas containing environmental, natural or cultural resources of more than local significance in which uncontrolled or incompatible development could result in major or irreversible damage to natural systems or cultural resources, scientific, educational, or associative values, or aesthetic qualities." The AECs within this category are coastal complex natural areas, coastal areas that sustain remnant species, unique coastal geologic formations, significant coastal archaeological resources, and significant coastal historic or architectural resources. Of these resources, this project area contains coastal historic and architectural resources.

The Cape Hatteras Lighthouse and associated structures (including the Oil House, the Principal Keeper's Quarters, and the Double Keepers' Quarters) are listed in the National Register of Historic Places as the Cape Hatteras Light Station Historic District. The light station, which includes the Lighthouse as well as its associated support buildings and grounds, was designated as a National Historic Landmark on August 5, 1998. Its boundary was revised on December 20, 2000, after decades of shoreline erosion put the Lighthouse at risk of damage or loss. In 1999 the Lighthouse and associated structures were relocated 2,900 feet southwest from their original location to a new site approximately 1,800 feet from the shoreline; the landscape was recreated at the new location. Today, the light station is designated a cultural landscape with character-defining features that include the lighthouse and associated structures, circulation patterns for both vehicles and pedestrians, vegetation, views, structures, and small-scale features. The proposed action has the potential to result in changes to these resources, including the addition of new circulation patterns, structures, and small-scale features into the cultural landscape and setting of the National Historic Landmark. Proposed improvements have the potential to enhance the way visitors experience the park by improving viewsheds and providing improved interpretive/education opportunities to convey the significance of the Light Station. The improvements would not result in major or irreversible damage to natural systems nor cultural resources; therefore, the project is consistent with this management goal. Consistency with specific objectives and policies are included under each code heading that follows.

15A NCAC 07H .0505 defines and establishes management objectives "to protect unique habitat conditions that are necessary to the continued survival of threatened and endangered native plants and animals and to minimize land use impacts that might jeopardize these conditions." Cape Hatteras National Seashore as a whole is known to support nesting habitat for numerous threatened or endangered sea turtle and shorebird

species, as well as species protected under the Migratory Bird Treaty Act; however, the project area surrounding the Lighthouse has been highly disturbed by the Lighthouse relocation and is heavily visited. Due to these conditions, the area offers very poor habitat. Based on a review of the project area and the federally listed species known to occur in the vicinity of the project area, Seashore staff determined that project activities would have no effect on special status species. There are no critical habitats for special status species within the vicinity of the project area. As such, construction of the proposed improvements would not affect listed species nor noticeably affect other native plants and animals. Therefore, the project is consistent with these management objectives and this policy.

15A NCAC 07H .0506 defines and establishes management objectives "to protect the features of a designated coastal complex natural area in order to safeguard its biological relationships, educational and scientific values, and aesthetic qualities." Coastal complex natural areas are defined as "lands that support native plant and animal communities and provide habitat qualities which have remained essentially unchanged by human activity." The project area was altered during the relocation of the Lighthouse and the associated facilities. No designated coastal complex natural areas are present within the proposed project area. Therefore, the proposed project is consistent with these policies.

15A NCAC 07H .0507 establishes management objectives to protect unique coastal geologic formations for the purpose of preserving formations' physical components that serve as important scientific and educational sites, or as valuable scenic resources. Currently, the only designated unique coastal geologic formation in North Carolina is Jockey's Ridge [15A NCAC 07H.0507(c)(3)], located in the Town of Nags Head in Dare County, approximately 53 miles from the project area. Therefore, the proposed project would have no effect on this unique geologic formation and is consistent with this policy.

15A NCAC 07H .0508 defines and establishes use standards for development in designated fragile coastal natural or cultural areas. As described under "15A NCAC 07H .0501," the project area contains coastal historic and architectural resources (no fragile coastal natural areas).

As noted earlier, the proposed improvements to the Cape Hatteras Lighthouse and associated structures would cause no major or irreversible damage to the values of the cultural resources within the project area. The proposed improvements shall be consistent with the aesthetic values and historic character of the designated cultural landscape. Measures are in place to minimize or mitigate impacts on the cultural landscape due to introduction of new circulation patterns and small-scale features. All new features would be designed and sited in a manner that is compatible with the historic character in terms of materials, color, and scale. Interpretive signage would be introduced to describe the 1999 Lighthouse move and to illustrate the changes in the light station over time. The NPS would continue to consult with the NC State Historic Preservation Officer during design of these features and prior to implementation. Therefore, the proposed project is consistent with these use standards.

15A NCAC 07H .0509 establishes management objectives to conserve significant coastal archeological resources for the purpose of preserving their value as scientific, educational, and aesthetic resources. Currently, the only designated significant coastal archeological resource in North Carolina is Permuda Island [15A NCAC 07H .0509(e)], which is a former barrier island located within Stump Sound in Southwestern Onslow County, over 200 miles

south of the project area. There are no known significant coastal archeological resources that would be affected by the proposed project. Archeological testing of the new site and move corridor was completed by the NPS's Southeast Archeological Center in 1999 prior to the Lighthouse move. No archeological resources or cultural material was found during this testing, and no further archeological investigation was recommended for the area that encompasses the project area. Therefore, the proposed project is consistent with this policy.

15A NCAC 07H .0510 defines and establishes management objectives "to conserve coastal historic architectural resources of more than local significance which are valuable educational, scientific, associative or aesthetic resources." The Cape Hatteras Lighthouse is a National Historic Landmark and is a contributing resource to the park's National Register historic district as well as a contributing resource to the cultural landscape. This project is needed to address the deteriorated elements of the interior and exterior of the Lighthouse that are in need of repair or replacement. There are also missing character-defining features that were important to the historic design and construction of the Lighthouse as well as non-sympathetic modern treatments that were added after the period of significance, both of which diminish the historic integrity of the Lighthouse. Heavy visitation of the site in combination with limited formal pedestrian walkways has resulted in visitors walking across the landscape surrounding the Lighthouse, trampling vegetation to the point of wearing bare spots in the lawn and along the edges of the single paved walkway. Although the historic setting of the lighthouse may be altered slightly through the introduction of non-historic pathways and a shade structure, the building itself would remain unchanged from its current condition. Measures are in place to minimize or mitigate impacts on the historic setting, and all new features would be designed and sited to be compatible with the historic character. Therefore, the proposed improvements would be consistent with these objectives.

2.2 General Policy Guidelines

The North Carolina CAMA sets forth eleven General Policy Guidelines, addressing:

- › Shoreline erosion policies
- › Shorefront access policies
- › Coastal energy policies
- › Post-disaster policies
- › Floating structure policies
- › Mitigation policies
- › Coastal water quality policies
- › Policies on use of coastal airspace
- › Policies on water- and wetland-based target areas for military training areas
- › Policies on beneficial use and availability of materials resulting from the excavation or maintenance of navigational channels
- › Policies on ocean mining

The purpose of these rules is to establish generally applicable objectives and policies to be followed in the public and private use of land and water areas within the coastal area of North Carolina. The following is an analysis of the applicability of these policies to the proposed action.

2.2.1 15A NCAC 7M .0200 (Shoreline Erosion Policies)

The project is not within estuarine waters, coastal wetlands, public trust areas, and estuarine and public trust shorelines and would not significantly affect the estuarine and ocean system. Therefore, these policies are not applicable.

2.2.2 15A NCAC 7M .0300 (Shorefront Access Policies)

The proposed project is located on NPS land. The site of the Cape Hatteras Lighthouse has direct access to shorefront areas. No changes to shorefront access are proposed by the project; therefore, the project is consistent with these policies.

2.2.3 15A NCAC 7M .0400 (Coastal Energy Policies)

The proposed project does not involve the development of any major energy facilities. Therefore, these policies are not applicable.

2.2.4 15A NCAC 7M .0500 (Post-Disaster Policies)

These policies require that all state agencies prepare for disasters and to coordinate their activities in the event of a coastal disaster. The NPS Outer Banks Group, under which the park is administered, has a long history of working with state and local agencies for disaster preparation and recovery. Current technology offers plenty of advanced warning of major

storms (i.e., tropical storms and nor'easters), and the park has developed a Hurricane Response Plan to minimize risks to human health and safety and to minimize potential property damage during storm events. To help protect life, access to the site is closed when storm systems are approaching. The proposed new features that would be added to the site would be designed in such a way as to withstand flood events resulting from these storms systems. Structures and facilities would be designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60). Mitigation to minimize storm damage would include utilization of sustainable design principles and using best management practices during and after construction. Therefore, the project is consistent with these policies.

2.2.5 15A NCAC 7M .0600 (Floating Structure Policies)

The Cape Hatteras Lighthouse Repair and Rehabilitation Project does not propose for the implementation of any floating structures. Therefore, these policies are not applicable.

2.2.6 15A NCAC 7M .0700 (Mitigation Policy)

North Carolina's mitigation policy states that "Coastal ecosystems shall be protected and maintained as complete and functional systems by mitigating the adverse impacts of development as much as feasible, by enhancing, creating, or restoring areas with the goal of improving or maintaining ecosystem function and areal proportion."

The project area is developed and is dominated by mowed Bermuda grass lawn, although due to heavy visitation and many visitors leaving the paved walkways, the ground is bare soil in many places. The project area is bordered by a pine and oak forest to the west and north, and by a dense shrub-thicket to the south. There is an isolated, small (approx. 0.75 acres) pocket of shrub-thicket centrally located between the parking lot and the Lighthouse. The site offers very limited ecosystem functions.

To minimize environmental impacts related to the proposed project, the NPS would implement mitigation measures wherever feasible. All installations of project elements would occur within uplands outside of AECs. Best management practices identified in an approved erosion and sediment control plan would be implemented to avoid and minimize the release of sediments into stormwater during construction activities. The approximately 730 square feet needed to construct the new shade structure may require some removal of some woody vegetation in the isolated thicket just north of the Lighthouse; park staff would survey this area for nesting wildlife prior to clearing.

Furthermore, this project anticipates replacement of non-native Bermuda grass with native plantings, including ground cover and shrubs. The design of new walkways is meant to better accommodate heavy visitation at the site and may reduce trampling of vegetation. This may provide some modest improvement in natural ecosystem functions at the site.

With the above best management practices in place, the proposed action would be consistent with this policy.

2.2.7 15A NCAC 7M .0800 (Coastal Water Quality Policies)

The proposed construction activities would not result in permanent adverse impacts to coastal water quality. There would be an increase of up to 0.42 acres of impervious surfaces throughout the site under the proposed project. The increase in stormwater runoff would be negligible due to the stormwater considerations incorporated into the design plan and location within well-drained soils. The NPS would acquire any required stormwater permits prior to implementation. Therefore, impacts to water quality and quantity would be minimized.

Best management practices would be used to avoid contamination of stormwater and mitigate for short-term (construction phase) impacts. Therefore, the project is considered consistent with policies protecting coastal water quality.

2.2.8 15A NCAC 7M .0900 (Policies on use of Coastal Airspace)

No use of coastal airspace would be part of the proposed action; therefore, these policies are not applicable.

2.2.9 15A NCAC 7M .1000 (Policies on Water- and Wetland-Based Target Areas for Military Training Areas)

No water-based or wetland-based target areas or military training areas would be part of the proposed action; therefore, these policies are not applicable.

2.2.10 15A NCAC 7M .1100 (Policies on Beneficial and Availability of Materials Resulting from the Excavation or Maintenance of Navigational Channels)

No channel excavation or maintenance of navigational channels would occur as part of this project; therefore, these policies are not applicable.

2.2.11 15A NCAC 7M .1200 (Policies on Ocean Mining)

No ocean mining would be part of the proposed action; therefore, these policies are not applicable.

3

North Carolina Dredge and Fill Law

The North Carolina Dredge and Fill Law (§ 113-229. Permits to dredge or fill in or about estuarine waters or State-owned lakes) states that, "...before any excavation or filling project is begun in any estuarine waters, tidelands, marshlands, or State-owned lakes, the party or parties desiring to do such shall first obtain a permit from the Department." The proposed Cape Hatteras Lighthouse Repair and Rehabilitation Project would not involve any dredge or fill activity within estuarine waters, ocean system, or State-owned lakes. Work would occur exclusively within upland areas. As such, this action would be considered a permissible activity by the North Carolina Department of Environmental Quality.

4

Dare County Coastal Management Policies

CAMA required local governments in each of the 20 coastal counties in North Carolina to prepare and implement a land use plan and ordinances for its enforcement consistent with established federal and state policies. Specifically, policy statements are required for resource protection, resource production and management, economic and community development, continuing public participation, storm hazard mitigation, post-disaster recovery, and evacuation plans. Upon approval by the North Carolina Coastal Resources Commission, the plan becomes part of the North Carolina Coastal Management Plan.

The Dare County Land Use Plan (LUP) was certified by the North Carolina Coastal Resources Commission in 2011 and addresses land use planning in relation to CAMA. Of these policies, the following are applicable to the Cape Hatteras Lighthouse Repair and Rehabilitation Project.

4.1 Redevelopment – Policy LUC#8

According to the LUC #8, “the redevelopment of under-utilized land or outdated structures will be become more of an issue of the next few years. Redevelopment of older structures shall be accomplished in a manner that is compatible with current NC building codes and federal flood insurance regulations and conforms with the Dare County Zoning Regulations. Energy efficient construction standards are encouraged.”

Under the proposed action, the NPS would rehabilitate the interior and restore the exterior of the Cape Hatteras Lighthouse. The NPS would also rehabilitate and repair the Oil House and would build a new shade structure. The NPS would meet building code requirements for

these structures. For work on the Lighthouse and Oil House, repair/rehabilitation actions would adhere to Existing Building Code while also adhering to the Secretary of the Interior *Standards for the Treatment of Historic Properties*. The new shade structure (and select new/replacement elements on the historic structures) would meet current building codes.

The currently developed site would undergo a modest amount of additional development. The NPS would remove the Keepers of Light Amphitheater (relocating the stones on site) and would reconstruct or expand footpaths to improve circulation. All improvements would follow applicable federal, state, and local codes and regulations. All improvements are located outside of regulated flood zones.

4.2 Archaeological/Historic Resources – Policy LUC #15

“The Dare County Board of Commissioners supports the protection of structures, lands, and artifacts that have been identified by the NC Department of Cultural Resources, Division of Archives and History, as archaeologically or historically significant. On a case-by-case basis individual protection/management strategies should be implemented to ensure archaeological and/or historical resources are not destroyed.”

The repair and rehabilitation of the Cape Hatteras Lighthouse and associated structures shall be consistent with the aesthetic values and historic character of the designated cultural landscape and recreated historic setting. Measures are in place to minimize or mitigate impacts on the cultural landscape and historic structures due to introduction of new, expanded, or rehabilitated elements. All new elements would be designed and sited in a manner that is compatible with the historic character in terms of materials, color, and scale; new elements such as the shade structure, walkways, and interpretive waysides would be fully reversible. The Cape Hatteras Lighthouse is designated as a National Historic Landmark. Proposed repairs and rehabilitation of the Lighthouse would restore historic integrity and ensure its continued stability. Although non-historic pathways, interpretive waysides, and a shade structure would be introduced into the historic setting, they would not obstruct any important views throughout the site. Additionally, archeological testing of the new site and move corridor was completed by the NPS’s Southeast Archeological Center in 1999 prior to the Lighthouse move. No archeological resources or cultural material was found during this testing, and no further archeological investigation was recommended for the area that encompasses the project area. The NPS will continue to consult with the SHPO throughout project design to final construction design approval.

5

Other Anticipated Permits

An environmental assessment (EA) is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4332[2] [C]); the implementing regulations of the Council on Environmental Quality (40 CFR 1500-1508); the Department of the Interior NEPA regulations (43 CFR Part 46); and NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis and Decision-Making* and the accompanying NEPA Handbook. A separate assessment of effect has been prepared to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.

Prior to the implementation of the proposed action, the NPS would need to obtain appropriate local, state, and federal approval for some of the proposed activities. Specific permits, approvals, and regulatory requirements would be determined during future design phases of the project. The NPS would coordinate with relevant federal, state, and local agencies as required as design for the project continues.

6

Conclusion

In conclusion, after careful consideration of the aforementioned elements, the NPS has determined that implementation of the proposed action would be fully consistent with the relevant enforceable policies of protecting North Carolina's coastal zone. This was based on the review of the proposed project against the relevant National Oceanographic Atmospheric Administration-approved enforceable policies of North Carolina's Coastal Management Program and Dare County's comprehensive plan policies.



As the nation's principal conservation agency, the Department of the Interior has responsibilities for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for American Indian reservation communities and for people who live in island territories under US administration.