National Park Service
U.S. Department of the Interior

Everglades National Park
Monroe, Miami-Dade, and Collier County, Florida

CAPE SABLE PLUGS RESTORATION – PHASE II

Finding of No Significant Impact
August 2016

Implementation of the Selected Alternatives does not constitute an action that normally requires preparation of an Environmental Impact Statement (EIS). The Selected Alternatives are the environmentally preferable alternatives and will not have a significant effect on the human environment. Negative environmental impacts that could occur are short- or long-term and minor or moderate in intensity. Most impacts will be beneficial and long-term. There will be no significant impacts on public health, public safety, threatened or endangered species, historic properties either listed in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the Selected Alternatives will not violate any federal, state, or local environmental protection law.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended: _____ 8/24/2016
Pedro M. Ramos — Date
Superintendent,
Everglades National Park

Approved: _____ SEP 13 2016
Stan Austin — Date
Regional Director, Southeast Region

INTRODUCTION

In compliance with the National Environmental Policy Act of 1969 (NEPA) the National Park Service (NPS) prepared an Environmental Assessment (EA) to examine alternative actions and environmental impacts associated with the proposed project to repair the plugs at House and Slagle Ditches and replace the failed plug at Raulerson Canal in Everglades National Park.

This finding of no significant impact (FONSI) and the EA constitute the record of the environmental impact analysis and decision-making process as required by NEPA.

PURPOSE AND NEED

The NPS proposes to repair the plugs on House and Slagle Ditches and replace the failed plug at Raulerson Canal within the Cape Sable area of Everglades National Park (EVER). The purpose of this project is to reestablish the natural function of the marl ridge and restore natural ecological processes to the Cape Sable region by eliminating the unnatural exchange of salt and freshwater through man-made canals.

The Cape Sable region extends from the southwestern tip of Florida, into the Gulf of Mexico and Florida Bay. The cape contains stretches of shell beaches fringed by a mix of mangrove trees and marsh. Beyond the mangroves lies Lake Ingraham, the largest of the cape's lakes. The lake is backed by a narrow marl ridge that shelters the cape's numerous interior wetlands.

In the early 20th century, a network of canals was dredged through the marl ridge to drain the cape's interior wetlands for use in agriculture and cattle grazing. These man-made canals have triggered substantial changes in the ecology of the area. Incoming tides now push marine waters and sediments inland, increasing salinity and transporting sediments to lakes and wetlands. Outgoing tides flush freshwater from wetlands north of the marl ridge and transport sediments toward Lake Ingraham and Florida Bay.

As a result, the previously freshwater and brackish ecosystems of Cape Sable have experienced substantial change from exposure to the saltwater. The incursion of saltwater into formally freshwater marsh systems as the result of man-made connections between fresh and saltwater habitats has led to an ecological collapse of these wetlands. Soil has been lost from the interior wetlands communities of Cape Sable and has been replaced by open water and more saline communities. The unnatural exchange of water through the canals has altered vegetation communities, reduced the quality of wildlife habitat, and lowered the productivity of forage fishes, potentially impacting the survival of various wading birds. These changes are compromising the function of coastal habitats that are important to recreational fish, and other plants and animals dependent on the cape for survival.

The NPS has long recognized the importance of addressing impacts from the Cape Sable canals. During the late 1950s and early 1960s, the NPS plugged the canals at the marl ridge with earthen plugs. However, over time all of the earthen plugs have either been breached or severely compromised by the forces of weathering and/or erosion. The constant movement of water through man-made canals on the cape has led to their rapid widening. The expansion of these canals has exacerbated sediment deposition in the cape's open waters and is converting Lake Ingraham into a tidal mud flat. As the canals on Cape Sable continue to widen, it is believed the rate of change will continue to accelerate, emphasizing the need for timely corrective action. The Homestead and East Cape Canals were re-plugged in 2010-2011 with 100-foot earthen plugs, which are intended to have structural longevity for at least 50 years.

Stopping the unnatural exchange of water through the man-made waterways is key to stabilizing the natural function of the interior wetlands. While this landscape is naturally dynamic, slowing the rate of

human-induced change on this landscape may also bring about greater resilience to the cape in the face of predicted sea level rise and the possibility of more frequent and intense hurricanes.

Thus, based on preliminary analysis, internal scoping, and public input, the NPS developed a range of new design alternatives to either repair or replace the existing plugs at the House and Slagle Ditches and the failed plug at Raulerson Canal. Each alternative design also considers the need for structural longevity (at least 50 years). Two action alternatives for the House and Slagle Ditches and two action alternatives for the Raulerson Canal were carried forward for analysis in the EA along with the No Action alternatives for both plug sites. One action alternative for the House and Slagle Ditches and one action alternative for the Raulerson canal were identified as the Preferred Alternatives in the EA.

SELECTED ALTERNATIVES

House and Slagle Ditches

The Selected Alternative for the House and Slagle ditches is Alternative 2, Re-backfill Eroded Plug Area. This alternative was identified as the NPS Preferred Alternative in the EA because it meets the objectives associated with the purpose and need for the project and is the environmentally preferable alternative at both locations. At Slagle Ditch, the NPS will repair the eroded plug which is currently leaking and considered to be near failure. At House Ditch, the NPS will monitor the condition of the plug, and should it begin leaking, repair it in the same manner as at Slagle Ditch. Alternative 2 involves re-backfilling the eroded plug areas with a course grade limestone and rock fill containing silty binder-type fines and would essentially restore the plugs at the existing locations on House and Slagle Ditches. This alternative will minimize the amount of backfill material needed to conduct the restoration work and will consequently minimize costs as well.

Raulerson Canal

The Selected Alternative for the Raulerson Canal is Alternative 4A, Construct a New Sheet Pile and Fill Plug with Erosion Protection. This alternative was identified as the NPS Preferred Alternative in the EA because it meets the objectives associated with the purpose and need for the project and is the environmentally preferable alternative.

Alternative 4A includes the construction of an earthen plug by installing two sheet pile walls - one upstream and one downstream within the canal. The area between the two sheet pile walls will be filled with sand that will be pumped in from a barge. Sheet pile wingwalls will also be installed in all four quadrants of the plug to deflect surface sheet flow away from the structure. Riprap or similar material will be placed along the plug walls and along the deflector wingwalls and canal banks to provide erosion protection. This design is similar to that used at East Cape Canal and has proven to be effective and stable. The top of the plug surface will be covered by geotextile fabric and then a hard surface (or similar) to minimize potential erosion. The exact design of surface cover material will be determined during the final design phase of the project; it will consider surfaces that would promote and support vegetation across the entire structure while still providing sufficient erosion protection.

Under the Selected Alternatives, the plugs are expected to function for a 50-year life cycle, the natural and cultural resources will be protected, and safety hazards from the failed plug at Raulerson Canal will be removed. The plugs will also prevent illegal motorized boat entry into the Marjory Stoneman Douglas Wilderness Area.

MITIGATION MEASURES

The Selected Alternatives incorporate mitigation measures and best management practices (BMPs) listed in **Appendix A**. These practices and measures will be incorporated into project implementation documents and plans.

OTHER ALTERNATIVES CONSIDERED

In addition to the Selected Alternatives, the following alternatives were fully analyzed in the EA.

House and Slagle Ditches Alternatives

No Action Alternative: The No Action Alternative involves leaving House and Slagle Ditches in their current conditions and would allow the existing plugs to continue to be exposed to the current and potential future erosional processes. Eventually, the plugs would become breached and tidal flows would be capable of propagating north past the Old Ingraham Highway (also known as the Coastal Prairie Trail or the Coastal Prairie Highway) to EVER's inland wetlands. Currently, erosion is evident at the House and Slagle Ditches plug sites on the north side and is expected to continue.

Alternative 3: Re-Backfill Eroded Plug Areas, Include Slope and Erosion Protection, and Sand Drain for Seepage Protection: Alternative 3 is an expanded variation of Alternative 2, which re-establishes the plug section at its existing location, but includes slope and erosion protection measures as well as a geotextile fabric-wrapped sand drain for seepage protection. Sand drains consist of a boring through the silt that is filled with sand (or gravel) to allow the soil to drain and are helpful to accelerate the process of consolidation settlement of the plugs. In addition to backfilling the eroded plug areas, the slopes of the repaired plug (and a few feet each side thereof) would be covered with a geotextile fabric. In order to mitigate against future erosion at the existing plug locations, the slopes would be covered with erosion protection. A gravel-filled geoweb system would allow for future re-growth of vegetation through the geoweb matrix. In addition, a geotextile fabric-wrapped sand drain would provide for seepage protection and would also be covered with erosion protection. The slotted Polyvinyl Chloride (PVC) drainpipe would be inserted into the sand drain material to collect and discharge of any seepage water that would pass through the earthen plug fill and enter the drain.

Raulerson Canal Alternatives

No Action Alternative: The No Action Alternative involves taking no action and allowing Raulerson Canal to continue to function in its current state. Leaving the failed plug in its existing condition would allow the canal to continue to erode, widen, and transport suspended sediment to the interior wetlands as well as to Lake Ingraham, Florida Bay, and the Gulf of Mexico.

Alternative 4B: Construct a New Sheet Pile and Fill Plug with Riprap Erosion Protection with an Option for a Canoe Ramp: This alternative is similar to Alternative 4A with an additional option of constructing a safe passage over the restored plug for non-motorized boaters (i.e., canoeists and kayakers). To provide safe portage, a floating dock structure (approximately 10-feet by 10-feet) would be constructed in the center of each plug entrance. The dock would be constructed using a wood-plastic composite lumber composed of wood and recycled plastics. The dock structure would be constructed so that a portion of the structure would extend over the water. A ladder would be placed on each dock to allow for access. A hardened path would be installed across the proposed plug using articulated block riprap (i.e., interlocking mats or equivalent) to provide safe and sustainable passage across the plug. All other construction features would be similar to Alternative 4A.

ALTERNATIVES CONSIDERED BUT DISMISSED

Based on the preliminary analysis, internal scoping with the NPS, and public scoping, the following alternatives were considered and dismissed from further analysis:

East Side Creek

The East Side Creek alternatives considered placing a plug in East Side Creek upstream of the confluence with East Cape Canal. Two plug types were considered - a sheet pile only plug, and a sheet pile plug with fill, identical to the plug currently in place on East Cape Canal. The NPS also considered including a flow discharge structure in the design of the plug, which would allow water to flow over the plug during high water events and would provide fish and other aquatic wildlife access to the interior wetlands of Cape Sable. After careful consideration of internal and public scoping comments, the available biological, hydrological, and topographic data for the area, and sea level rise projections, the decision to remove East Side Creek from consideration was made for the following reasons:

Protection of Threatened and Endangered Species. During the first phase of the Cape Sable project, the continued free flow of East Side Creek was a condition of permit issuance by the National Marine Fisheries Service. This agency cited the importance of East Side Creek for access of the endangered smalltooth sawfish to pupping areas in the interior wetlands. Cape Sable was designated critical habitat for the smalltooth sawfish in late 2009, and East Side Creek, as a natural creek in the area, is included in this designation (http://www.nmfs.noaa.gov/pr/pdfs/fr/fr74-45353.pdf). In contrast to East Side Creek, Raulerson Canal does not qualify as critical habitat because there was a plug in 2009 when the area was designated, and the waterway behind the plug is a canal. "Areas not accessible (i.e., areas behind water control structures existing at the time of this final designation that prevent sawfish passage) to sawfish are not part of this designation."

Wilderness Considerations. Cape Sable is located inside the Marjory Stoneman Douglas Wilderness Area. Although East Side Creek is influenced by the East Cape Canal, it is not a canal and was formed by natural processes. Plugs existed at Raulerson Canal, Slagle Ditch, and House Ditch at the time of the Everglades Wilderness designation. No plugs have ever existed on East Side Creek. Impacts to wilderness character are analyzed with respect to five qualities: natural, untrammeled, undeveloped, opportunity for solitude, and primitive/unconfined recreation. From a wilderness perspective, the benefits to the natural quality of wilderness character would need to outweigh the combined permanent negative effects on the untrammeled, undeveloped, and opportunities for solitude and primitive recreation qualities of wilderness character. While the exchange of water through East Side Creek has similar impacts as the canals on the interior wetlands of Cape Sable, such as the intrusion of seawater, loss of freshwater and sediment exchange, NPS determined that the role this creek played in the area was natural and not contrary with the purpose of the project which is to restore the preeminence of natural processes in the Cape Sable ecosystem. This determination is consistent also with the EVER enabling legislation, which states: "The...area or areas shall be permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in the area."

Topography. Topographic data, collected by AECOM as part of this EA indicates that East Side Creek, through natural erosional processes, breached the marl ridge in a low-lying location. In the consideration of alternatives for plugging East Side Creek, eight locations were examined. Using Light Detection and Ranging (LIDAR) data, the locations where East Side Creek connects with the East Cape Canal were ruled out: these were too low-lying. The contractor then performed 6 surveys in the area along the presumed location of the marl ridge. The highest elevation surveyed by the contractor on each of these six transects was 0.93 feet using North American Vertical Datum of 1988 (NAVD88). Water level

data collected by the U.S. Geological Survey at a platform in East Side Creek (http://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=250802081035500) was compared to the measured elevations. Water level exceeded the highest ground surface elevation 110 times in 2015. Although a plug could be engineered to withstand overtopping, water would be able to move around the side banks. It's likely that the creek would begin to erode a new channel and the plug would become completely ineffective.

Using Mules to Transport Supplies and Equipment to House and Slagle Ditches

The NPS considered using pack mule trains to transport supplies and equipment to House and Slagle Ditches. Mule trains were considered because using animals for transport would require no prohibited uses under the Wilderness Act. However, this alternative was dismissed from further consideration because of the long period of time that would be required for the mules to deliver supplies, the lack of a recognized park trail beyond Clubhouse Beach, and the potential environmental impacts of the mule train.

Under Alternative 2, it would take a train of 15 mules an estimated 17 days (20 trips) to deliver supplies and equipment to the project area. Under Alternative 3, it would take the mule train 21 days (25 trips) to deliver supplies. These deliveries would occur during the time of year that Old Ingraham Highway (also known as Coastal Prairie Trail) is most heavily utilized by visitors. Old Ingraham Highway is a dirt trail, subject to regular wetting. The many trips required to deliver supplies would cause ruts, particularly if the work period was rainy. The extra traffic on the trail would likely require substantial trail repair once the deliveries were completed. Because the Old Ingraham Highway does not extend past Clubhouse Beach, an additional 1.6 miles of trail would have to be created and cleared to access House Ditch. A water tank would need to be placed at Slagle Ditch for the mules to use. Mules are prone to ingesting seeds from their food, which would be deposited in their droppings in the park. These seeds could lead to the growth of invasive plant species. Mule droppings could contaminate water supplies and could contain harmful trace chemicals that could affect the natural environment. Mule droppings and urine may be offensive to park visitors such as hikers and boaters.

In contrast, under the Selected Alternative a helicopter will be used for 1.5 days for each plug, with 6-8 lifts for House Ditch and 6-8 lifts for Slagle's Ditch. This includes materials, equipment, and incidentals. There will be a 1/8 acre drop zone near the plug sites. Some limited clearing and ground planking will be required from inland drop areas near the plug to the Coastal Prairie trail. Personnel will hand carry supplies and equipment. The substantial adverse effects on the wilderness character of the Coastal Prairie Trail from mule use would be avoided.

Complete Backfilling of Canals

This alternative proposed to backfill the entire length of the Raulerson Canal and House and Slagle Ditches. The extensive size and volume of fill required for this alternative makes it economically infeasible. Further, due to the scale, this alternative would not be implemented in a timely manner. In addition, the canal and two ditches are recommended as eligible for listing on the National Register of Historic Places as they were part of Henry Flagler's 20th century land development plans for Cape Sable. Backfilling substantial portions of the canal and ditches would substantially affect the historic character of these resources. For these reasons, this alternative was dismissed from further consideration.

Re-Backfill Eroded Plug Areas, Include Slope and Erosion Protection at the Mouth of House and Slagle Ditches

This alternative proposed to backfill the eroded areas of the existing earthen plug, placing erosion protection along the downslope areas of the existing plug, and constructing a new plug structure at the

mouths of House and Slagle Ditches. The proposed location for the new plug at the mouth of both House and Slagle Ditches is topographically lower than the existing plug location and/or the marl ridge; therefore, a plug in this location would be more susceptible to overtopping from tidal influence and resulting erosional processes. Adding a second plug would also have short and long-term impacts to the untrammeled and undeveloped qualities of wilderness. The plugs that are currently located in House and Slagle Ditches have been in place for over 60 years. This alternative was dismissed from further consideration because the existing plugs have been effective for a long period of time, they meet the objectives of the project without additional wilderness impacts, and a new plug at a lower elevation would be more susceptible to overtopping.

Construct a New Plug the Width of the Marl Ridge at House and Slagle Ditches

This alternative proposed to construct a new plug the width of the marl ridge at House and Slagle Ditches. Backfilling a large section of the ditches would be much more expensive; there would be increased fill and transport costs associated with filling longer reaches of the waterways. The deliveries would also be logistically difficult. The project would rely on helicopter transport, so many more trips may be necessary to transport the fill to a remote location to create a wider plug. While they now require repair, the plugs on House and Slagle Ditches have been in place since the 1950s and have been successful at fulfilling the objectives of this project. It is unnecessary to create a larger plug which would have additional wilderness impacts, including negative impacts to the untrammeled and undeveloped qualities of wilderness. Areas of the proposed location are topographically lower than the existing plug location; therefore, a plug in this location would be more susceptible to overtopping from tidal influence and resulting erosional processes. For these reasons, this alternative was dismissed from further consideration.

Re-Backfill Eroded Plug Areas and Canal Approaching Plug, Include Slope and Erosion Protection, and Sand Drain for Seepage Protection

This alternative proposed extending the footprint of the plugs on House and Slagle Ditch to the width of the marl ridge. In addition to backfilling the eroded plug areas, the ditches approaching the plug would be backfilled to the prevailing adjacent ground level to a distance of ten feet from the toe of the plug slope with limerock fill. Erosion protection would be added to the slopes of the plugs and the sloped end of the refilled ditch area. The extensive size and volume of the fill and armoring necessary make this alternative more logistically difficult and much more expensive. The additional cost and difficulty in constructing this alternative seem unnecessary; particularly when past performance of the present plug seems to indicate that a heavily armored structure is not necessary. This alternative would impact the untrammeled and undeveloped quality of the Marjory Stoneman Douglas Wilderness by increasing the visibility of the plug, with very little benefit to the natural quality. For these reasons, this alternative was dismissed from further consideration.

Alternatives Using Hydraulic Pumping

This alternative proposed pumping fill material to the plug sites on House and/or Slagle Ditch from a barge positioned in Florida Bay. This alternative was determined to have greater impacts to the undeveloped and the solitude or primitive recreation qualities of wilderness character in the Marjory Stoneman Douglas Wilderness than the other alternatives being considered. The plugs are currently limestone fill. Other alternatives considered would also use limestone fill. It would be necessary to use sand as the fill for hydraulic pumping. Using sand would be more visually impacting, giving the perception of increased impacts to the undeveloped quality of wilderness character. Using hydraulic pumping would also increase the amount of time necessary for the transport of fill, increasing the impacts to the undeveloped and solitude or primitive recreation qualities of wilderness. For these

reasons, this alternative was dismissed from further consideration.

Construct a New Sheet Pile Only Plug at the Former Failed Plug Location along Raulerson Canal, Including Riprap Erosion Protection with/without Canoe Ramp

This alternative proposed constructing a cross-canal steel sheet pile only plug cut off (without an earthen plug) at the former failed plug location on Raulerson Canal. The construction would include sheet pile protected canal side banks extending up to 200 feet up and down stream of the plug cutoff for both sides of the cross canal sheet pile section. This design would provide a cross canal cutoff which would not be subject to internal erosion and end around seepage failure. After further review this alternative was removed from consideration because there were structural deficiencies with the design. As riprap would only be placed on one side of the sheet pile at the former failed plug location, there would be the potential for the sheet pile to move thereby dramatically reducing its structural strength. Unstable sheet piling would pose a safety hazard to the human and natural environments, for park visitors and wildlife alike, particularly during a heavy storm or high water event. For these reasons, this alternative was dismissed from further consideration.

Flow Discharge Structure at Raulerson Canal

This alternative proposed a flow discharge structure at Raulerson Canal that would allow water to flow over the plug during a high water events, thereby preventing damage to the top of the plug and allowing fish and other wildlife continued access to the interior regions of Cape Sable. A flow discharge structure would not conform with the purpose of the project to reduce the unnatural exchange of salt and freshwater through the canals of Cape Sable. Access for fish and wildlife to the interior wetlands of Cape Sable would be maintained through East Side Creek and the wetlands south of Whitewater Bay. The flow discharge structure could also be hazardous to wildlife and visitors - it would not be a controlled structure, and so it may open or close unexpectedly. There could be long-term maintenance issues and costs associated with the flow discharge structure. For these reasons, this alternative was dismissed from further consideration.

Construct a New Sheet Pile Only Plug at the Center of the Marl Ridge on Raulerson Canal, Include Riprap Erosion Protection

This alternative proposed constructing a cross-canal steel sheet pile only plug cut off (without an earthen plug) at the center of the marl ridge on Raulerson Canal. The construction would include sheet pile protected canal side banks extending up to 200 feet up and down stream of the plug cutoff for both sides of the cross canal sheet pile section. This design would provide a cross canal cutoff which would not be subject to internal erosion and end around seepage failure. In addition to the structural deficiencies and drawbacks with the flow discharge option (which has also been dismissed), the available topographic data at Raulerson Canal indicates that proposed location for this alternative is at a topographically low elevation compared to the failed plug location, making it more susceptible to overtopping from tidal influence and resulting erosional processes. For these reasons, this alternative was dismissed from further consideration.

Construct a New Sheet Pile and Fill Plug the Width of the Marl Ridge on Raulerson Canal

This alternative proposed the construction of an earthen plug by installing two sheet pile walls and filling the area between the two walls with sand on Raulerson Canal. Additional sheet pile would be installed in all four quadrants of the plug to form flow deflector wingwalls to promote surface sheet flow away from the plug structures and thus prevent seepage and tunneling through the marl ridge. Additionally, fill material would be placed adjacent to each sheet pile wall to substantially increase the

lateral support for the plugs. Graded riprap would be placed on top of the fill material along the outside face of the sheet pile walls and along the deflector wingwalls and canal banks to provide erosion resistance. The available topographic data indicates that the proposed location for this alternative is at a topographically low elevation, making it more susceptible to overtopping from tidal influence and resulting erosional processes. For this reason, this alternative was dismissed from further consideration.

ENVIRONMENTALLY PREFERABLE ALTERNATIVES

U.S. Department of the Interior regulations that implement NEPA define the environmentally preferable alternative as the alternative that "causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the responsible official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative." (43 CFR Section 46.30)

For House and Slagle Ditches, the environmentally preferable alternative is Alternative 2, Re-backfill Eroded Plug Area. At Slagle Ditch, water is currently passing through the eroded plug, which is considered a precursor to failure. Reinforcement of the plug is needed soon to prevent breaching and the subsequent adverse impacts to the interior wetlands, wildlife habitat, and marine resources that have resulted from plug failures on other canals. This alternative will provide the environmental benefits of maintaining the function of the marl ridge, without the added impacts to wilderness character that would result from the additional erosion protection features under Alternative 3.

At House Ditch, the eroded plug is not yet leaking and failure is not imminent. NPS will monitor the condition of the plug and should it begin leaking, Alternative 2 will be the preferable repair method. This scenario will provide the environmental benefits of repairing the plug when breaching is imminent, without the added impacts to wilderness character that would result from backfilling before it is needed or the additional erosion protection features under Alternative 3.

Alternative 4A, Construct a New Sheet Pile and Fill Plug with Erosion Protection, is the environmentally preferable alternative at the Raulerson Canal. The failed plug at Raulerson Canal allows the canal to continue to erode, widen, and transport sediment to the inland wetlands as well as to Lake Ingraham, Florida Bay, and the Gulf of Mexico. The unnatural exchange of water and sediment through the marl ridge is degrading the habitat for wading birds, juvenile crocodiles, and other wildlife. Installing a new plug with erosion protection will halt the unnatural flows of water and sediment through the ridge, and improve the quality of wildlife habitat. Implementing Alternative 4A will restore the function of the marl ridge without the added impacts to wilderness character that would result from installing a boat dock, hardened footpath, and canoe ramp under Alternative 4B.

MITIGATION MEASURES

The Selected Alternatives incorporate mitigation measures and BMPs listed in **Appendix A** of this document.

WHY THE SELECTED ALTERNATIVES WILL NOT HAVE A SIGNIFICANT EFFECT ON THE HUMAN ENVIRONMENT

As defined in 40 CFR §1508.27, significance is determined by examining the following criteria:

- **Impacts that may have both beneficial and adverse aspects and which on balance may be beneficial, but that may still have significant adverse impacts which require analysis in an EIS:**

No major adverse impacts were identified that would require analysis in an Environmental Impact Statement (EIS). Construction related impacts to geology, topography, soils, water quality, vegetation and wetlands, wildlife and habitat, marine resources and essential fish habitat, wilderness, and cultural resources will be adverse, minor to moderate, and short term.

Long-term impacts of the Selected Alternatives to geology, topography, soils, water resources, wetlands, wildlife and habitat, marine resources and essential fish habitat, protected species, cultural resources, and visitor use and experience will be beneficial. The only aspect that would experience long term, minor adverse impacts will be park operations and management. The only aspect that would experience long term, minor to moderate adverse impacts will be wilderness.

- **Degree of effect on public health or safety:**

Under Alternative 2, the eroding earthen plugs at House and Slagle Ditches will be repaired. Conditions pertaining to visitor safety at the plug sites would improve after construction has been completed. Under Alternatives 4A, the failed earthen plug at Raulerson Canal will be renovated with a sheet pile plug structure. Conditions pertaining to visitor safety at the Raulerson plug site will improve and visitors canoeing, kayaking or fishing will not be subjected to the current rapid flows of water. During high water events during which water levels overtop the plug, water flows will be dissipated over the length of the plug.

Impacts to visitor use and experience would occur during construction and would consist of temporarily blocked access to Raulerson Canal and construction-related noise. These impacts would be short-term and temporary and would not extend beyond the construction timeframe. By improving both the conditions for safety and passive recreational experience with the repair of the Raulerson Canal plug, it would be expected that existing park visitors would continue to use Cape Sable area. The visitor experience will be very slightly hindered by the presence of the unnatural plug structure. However, the improvements to visitor safety and the natural environment far outweigh any detriment to the visitor experience.

- **Unique characteristics of the geographic area such as proximity to historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas:**

As described in the EA, parklands, prime farmlands, wild and scenic rivers, and ecologically critical areas will not be affected.

Historical and cultural resources: For Alternatives 2 and 4A construction activities would have minor adverse impacts on the National Register of Historic Places (NRHP) eligible plugs, ditches, and canals due to the construction occurring within the overall footprint of these historic structures. However, since there would be a deceleration of erosional processes, the action alternatives would result in long-term beneficial impacts to historic structures and a potential historic district.

Wetlands: For Alternatives 2 and 4A, construction activities would result in short-term, minor adverse, localized, direct effects to vegetation as well as long-term beneficial effects.

As a result of repairing/reinforcing the plugs at House and Slagle Ditches, direct permanent impacts of approximately 0.021 acres and 0.019 acres within wetlands/surface waters would occur for the House Ditch and Slagle Ditch, respectively. These direct impacts will result from backfilling the eroded plug areas. In addition, temporary impacts resulting from the clearing of woody vegetation within the designated work zone for each plug (outside the limits of the direct impacts), the helicopter drop areas and the accessways from the helicopter drop areas to the plug sites equate to approximately 0.112 acres and 0.120 acres within wetlands/surface waters for the House Ditch and Slagle Ditch, respectively.

As a result of replacing the Raulerson Canal plug, direct permanent impacts of approximately 0.147 acres within wetlands/surface waters would occur. These direct impacts will result from placement of the new sheet pile, earthen fill, and riprap for the new plug; stabilization and armoring; and placement of the additional sheet pile needed for the deflector wingwalls. In addition, temporary impacts resulting from the clearing of woody vegetation within the designated work zone (outside the limits of the direct impacts) and trimming of overhanging mangrove trees along the canal accessway equate to approximately 0.519 acres within wetlands/surface waters.

No adverse impacts are anticipated to occur to the watershed as a result of the proposed project due to the derived benefits. Although a small area of existing wetland vegetation will be permanently impacted with construction of the Selected Alternatives, the upstream and downstream benefits to existing wetland functions for Lake Ingraham (approximately 1,863 acres) and the interior Cape Sable wetlands (approximately 55,894 acres based on the aerial extent of this area from just north of the marl ridge to the southern edge of Whitewater Bay) outweighs the wetland functional loss attributed to implementation of the Selected Alternatives.

- **Degree to which effects on the quality of the human environment are likely to be highly controversial:**

There were no highly controversial effects identified during either preparation of the EA or the public review period.

- **Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks:**

There were no highly uncertain, unique, or unknown risks identified during either preparation of the EA or the public review period.

- **Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration:**

Implementation of the Selected Alternatives will neither establish an NPS precedent for future actions with significant effects, nor will it represent a decision in principle about a future consideration.

- **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts:**

It was determined that the cumulative projects and actions discussed in the EA will have only negligible impacts on resources in the project area, and that any of the action alternatives will contribute only a negligible increment to the overall impact on resources within the region. Accordingly, cumulative effects were considered so small as to be undetectable, and thus discountable. Therefore, no cumulative impacts are anticipated as a result of this project.

- **Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources:**

In September 2015, New South Associates, Inc. (New South) conducted an archaeological survey of the Cape Sable plugs restoration project area on behalf of EVER. Three previously known historic structures were investigated: Raulerson Brothers Canal, House Ditch and plug, and Slagle Ditch and plug. New South determined that these resources are eligible for the NRHP. No prehistoric resources were identified within the Area of Potential Effect.

Under the Selected Alternatives, construction activities would have minor adverse impacts on the NRHP-eligible plugs, ditches, and canal due to the construction occurring within the overall footprint of these historic structures. However, since there would be a deceleration of erosional processes, these alternatives would result in long-term beneficial impacts to historic structures and a potential historic district. The NPS initiated consultation with the Florida State Historic Preservation Officer (SHPO) on May 13, 2016 seeking concurrence that the proposed undertaking will not adversely affect historic properties listed, or eligible for listing, on the NRHP. By letter dated June 20, 2016, the SHPO concurred that the proposed undertaking will have no adverse effect on three previously identified historic properties.

- **Degree to which the action may adversely affect an endangered or threatened species or its critical habitat:**

Impacts to the majority of federally listed species and impacts to species of special concern as a whole would be nearly identical under each of the action alternatives. Each of the federally listed species with the potential to occur in the project areas would benefit from improved hydrologic conditions and reduced saltwater intrusion. The Selected Alternatives would address the issues associated with the eroding plugs at House and Slagle Ditches and the failed earthen plug on Raulerson Canal and would result in reducing the erosional processes within these waterways and the greater Cape Sable area. Construction activities could affect the individual behavior of different species, causing them to avoid the project areas. However, such impacts would be minimal (affecting a relatively small area), temporary (lasting only for the duration of construction), and are not expected to jeopardize the continued existence of the species within the greater Cape Sable area. No measurable long-term effects are anticipated during operation of these facilities.

The NPS made section 7 determinations of effect for each of the action alternatives for federally listed species in the project area. The NPS concluded that implementation of the Selected Alternatives *may affect, not likely to adversely affect* the following species; Florida bonneted bat, Florida panther, West Indian manatee, Bald eagle, Piping Plover, Red knot, Roseate tern, Snail Kite, Wood stork, American crocodile and its designated critical habitat, and Eastern indigo snake. The NPS also determined that there will be *no effect* on the Garber's spurge, Cape Sable thoroughwort, and the Miami blue butterfly.

On April 26, 2016, NPS requested initiation of informal section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for the Cape Sable Phase II Plugs Restoration Project. In their July 6, 2016 response, USFWS concurred with the NPS effect determinations and indicated that the proposed action is not likely to adversely affect resources protected by the Endangered Species Act. In their August 16, 2016 response, NMFS also concurred with the NPS effect determinations and indicated that the proposed action is not likely to adversely affect listed species and critical habitat.

- **Whether the action threatens a violation of federal, state, or local environmental protection law:**

The Selected Alternatives will not violate any federal, state, or local environmental protection laws.

PUBLIC INVOLVEMENT AND CONSULTATION

Public Scoping

A public scoping newsletter was prepared that provided background information on the project and described the options being considered to repair the canal plugs. The newsletter was available for public review and comment for a period of 32 days from February 4 through March 8, 2015. The newsletter was posted on the Planning, Environment, and Public Comment (PEPC) website and copies were distributed via email and conventional mail to over 3,000 individuals, organizations, agencies, elected officials and Native American tribes on the park's mailing list. A news release was distributed to media outlets and posted on the park's website. A Miami Herald article published on March 7, 2015 discussed the canal induced problems and how the public could provide comments for the EA.

The April 2012 *Engineering Analysis and Feasibility of Repairing or Replacing Failed Dams and Limiting Salt Water Intrusion in Cape Sable, Everglades National Park*, was also posted on the PEPC website to provide in-depth information on the project and preliminary alternatives.

Forty-two (42) correspondences containing 162 comments were generated from distribution of the newsletter. Comments ranged from strong support to strong opposition to the project.

Comments on the Environmental Assessment

The EA was made available for public review and comment during a 34-day period ending May 27, 2016. The EA was posted on the PEPC website, and the NPS notified individuals, organizations, businesses, state, county and local governments, federal agencies, elected officials, American Indian tribes via email and conventional mail that the EA was available for review and comment. A news release was distributed to media outlets and posted on the park's website.

Eight (8) individual correspondences were received. All commenters were in support of the Selected Alternative 4A at Raulerson Canal. For the alternatives at House and Slagle Ditches, commenters expressed favor for both Alternatives 2 and 3. Several commenters disagreed with the NPS dismissal of alternatives for plugging East Side Creek. Substantive comments on the EA and the National Park Service responses are included in **Appendix B** of this document.

Agency Consultation

The NPS contacted the NMFS by letter on February 15, 2015 to provide project information and request identification of Essential Fish Habitat (EFH) that should be considered in the EA. On April 26, 2016 the NPS sent a letter to NMFS providing the EA and requesting consultation under the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act. In their May 26, 2016 response, NMFS agreed with the NPS that implementation of the Selected Alternatives would likely have long-term benefits to EFH and the minor temporary construction impacts would be offset through the proposed BMPs. Consequently, NMFS offered no EFH conservation recommendations pursuant to the Magnuson-Stevens Fishery Conservation and Management Act and no recommendations under the Fish and Wildlife Coordination Act.

In accordance with Section 7 of the Endangered Species Act (16 United States Code [U.S.C.] 1531 et seq.), the NPS contacted the USFWS and NMFS by letter on February 15, 2015 to request verification of the list of threatened and endangered species that may occur within the project area. On April 26, 2016 NPS transmitted the EA to USFWS and NMFS and requested initiation of informal section 7 consultation. The NPS made section 7 determinations of effect for each of the alternatives (including the Selected Alternative) for federally listed species in the project area. In their July 6, 2016 response, USFWS concurred with the NPS effect determinations and indicated that the proposed action is not likely to adversely affect resources protected by the Endangered Species Act. In their August 16, 2016 response, NMFS also concurred with the NPS effect determination that the proposed action is not likely to adversely affect listed species and critical habitat.

On April 26, 2016 NPS transmitted the EA to the Advisory Council on Historic Preservation (ACHP). The transmittal letter indicated that NPS intended to use the NEPA process for Section 106 of the National Historic Preservation Act (NHPA). This statement was in error. The response letter received on May 6, 2016 from the ACHP expressed concern that the NPS had not notified the appropriate State and/or Tribal Historic Preservation Officer (SHPO/THPO) and the ACHP of its intent to use the substitution process in advance (see 36 CFR800.8(c)). The ACHP recommended that the NPS consult with the Florida SHPO and Indian tribes to seek concurrence on the finding of No Historic Properties Adversely Affected. The NPS has used the standard regulatory process to comply with Section 106 of the NHPA and consulted with Indian Tribes and the Florida SHPO as described below.

In accordance with Section 106 of the NHPA and its implementing regulation, 36 CFR Part 800, NPS initiated SHPO consultation on May 13, 2016, seeking concurrence that the proposed undertaking will not adversely affect historic properties listed, or eligible for listing, on the National Register of Historic Places. In their letter dated June 20, 2016, the SHPO concurred that the proposed undertaking will have no adverse effect on three previously identified historic properties.

The NPS provided the Florida State Clearinghouse with the scoping notice and the EA for processing through the appropriate state agencies. Representatives from several State of Florida agencies have been engaged in consultations concerning the project. Two of the state agencies commented on the EA. In their letters dated June 15 and June 23, 2016, the Florida Fish and Wildlife Conservation Commission (FWC) and the Florida Department of Environmental Protection (FDEP) (respectively) on behalf of the State of Florida, found the project to be consistent with Florida's Coastal Management Program and consistent with their authorities under Presidential Executive Order 12372; 403.061(42), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. 4321-4347, as amended. In addition, FWC staff made several additional comments to reduce the projects impacts to wading birds and manatees as well as recreation opportunities in the area surrounding the project. These specific recommendations and NPS responses are included in Appendix B.

Native American Tribes Consultation

A scoping letter and project newsletter were sent to the Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, and the Seminole Nation of Oklahoma on February 5, 2015. The letters invited the tribes to participate in government-to-government consultation and to provide information or concerns regarding cultural and/or natural resources in the area of the proposed project. The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) responded with a comment letter stating that the project lies within an area of historical importance to the Tribe and requested that consultation continue between STOF-THPO and the NPS throughout the project. No response was received from the Miccosukee Tribe or the Seminole Nation of Oklahoma.

In December 2015, NPS transmitted the Archaeological Survey of the Raulerson Brothers Canal, House Ditch, and Slagle Ditch, Cape Sable, Everglades National Park, Monroe County to the tribes for review. In a letter dated January 8, 2016, the STOF-THPO stated it "has no objection to your finding of "no adverse effect affect to historic properties" at this time. However, the STOF-THPO would like to be informed in the event that any archaeological, historical, or burial resources are inadvertently discovered during execution of the undertaking."

On April 26, 2016 letters and copies of the EA were sent to the tribes to notify recipients of the opportunity to review and comment. No comments were received.

Appendices

A. Mitigation Measures
B. Responses to Substantive Comments Received During Public Review of the EA
C. Non-Impairment Determination

APPENDIX A: MITIGATION MEASURES

Mitigation measures will be used to prevent or minimize potential adverse impacts associated with the Selected Alternative, and these measures have been included in the evaluation of impacts of all action alternatives. Mitigation measures that will be undertaken during project implementation include, but are not limited to, those listed below.

General Construction Mitigation Measures

- Pre- and post-construction erosion control BMPs will be implemented, including the installation and inspection of silt fences, straw bale barriers, sediment traps, or other equivalent measures, and revegetation of area to control erosion, preserve water quality, protect wildlife and habitat, protect marine resources and EFH, and prevent soil contamination. Erosion and sediment control BMPs will be inspected and maintained on a regular basis and after each measurable rainfall to ensure they are functioning properly.
- Steps will be taken to minimize the introduction of non-native species and will include washing equipment before entering the park; minimizing disturbances; and initiating revegetation of disturbed areas immediately after construction. The NPS will follow all of the guidelines outlined in the South Florida and Caribbean Parks Exotic Plant Management Plan and the EVER Hurricane Plan (see Section 1.5.5.1 of the EA).
- Environmental training will be implemented to help educate construction personnel with the intent of reducing impacts on water quality, wetland resources, wildlife, and marine resources and EFH.
- All construction areas will be protected to confine potentially adverse activities to the minimum area required for construction. All protection measures will be clearly stated in the construction specifications, and workers will be instructed to avoid conducting activities beyond the construction zone. The use of previously undisturbed areas will be minimized to the extent possible by selectively choosing staging areas and clearly defining and marking construction zones and perimeters.

Geology, Topography, and Soils

- Spill prevention, control, and countermeasure procedures, as well as storm water pollution prevention measures, will be implemented to protect soils from erosion and contamination.
- The use of tarps or similar cover materials will be used on stockpiled fill and other erosion prone areas during construction to minimize erosion because of storm and other high water events.

Water Resources

- A spill prevention, control, and counter-measures plan will be completed and implemented for any fuel storage tanks, which will meet all applicable standards for construction and leak detection. Areas used for refueling will be limited to areas where these activities currently occur.
- Equipment containing fuels will be checked frequently for leaks.
- Construction procedures will include the use of turbidity curtains to contain disturbed sediments and reduce water quality impacts.
- A turbidity monitoring plan will be implemented to ensure compliance with state water quality criteria.
- A temporary "no wake zone" will be established in and near the project area during construction to eliminate further dispersal of suspended sediments.

- Impacts to wetland resources will be avoided and minimized to the maximum extent feasible through the implementation of construction BMPs.

Wildlife and Habitat

- Revegetation efforts may include use of seeds or nursery grown plant species native to the Cape Sable area; monitoring reclamation; and implementing exotic species control as necessary. All revegetation efforts will be reviewed and approved by Everglades National Park, Biological Resources Branch prior to implementation.
- Pre- and post-survey construction surveys for selected species (e.g. crocodiles, Eastern indigo snakes, and smalltooth sawfish) will be implemented.
- Spill prevention, control, and countermeasure procedures, as well as storm water pollution prevention measures, will be implemented to reduce the potential for petroleum products from leaking equipment or vehicles to reach surface waters.
- Per NPS Management Policies (2006), artificial lighting will not be used in locations where its presence will disrupt wildlife dependent on the dark; minimal-impact lighting techniques will be used (e.g., consideration of yellow versus white lights, use of timers). Artificial lighting will be shielded and directed, where necessary, with regard for natural night sky conditions. The use of lighting is not anticipated; construction activities are expected to take place during daylight hours. However, construction crews may carry emergency/safety lights, as necessary.

Marine Resources and EFH

- Construction procedures will include the use of turbidity curtains to contain disturbed sediments and reduce water quality impacts.
- A turbidity monitoring plan will be implemented to ensure compliance with State water quality criteria.
- Impacts to marine resources will be avoided and minimized to the maximum extent feasible through the implementation of construction BMPs and standard USFWS, NOAA, and FWC protection measures.

Special Status Species

- To reduce potential impacts on wildlife, construction activities occurring near sensitive habitats will be scheduled to minimize potential impacts to breeding, nesting, and rearing of young (particularly the American crocodile-nesting season). Construction will occur only during daylight hours to reduce effects on nocturnal foraging or rest.
- Pre-construction surveys will be conducted to identify any federal- and state-listed species occurring in the project area. Should individuals or nests be identified, additional measures will be taken to avoid impacts (e.g., fencing nest sites, providing information to contractors about the species).
- Construction will include all applicable environmental regulatory agencies' standard protection measures (including, but not limited to manatee, sea turtle, and smalltooth sawfish), including no wake zones and monitoring during construction. Additional specific measures may be identified during Section 7 consultation with the agencies for the project permits.
- Measures listed under "Wildlife and Habitat" and other resource protection mitigation will serve to reduce impacts on special status species.

Wilderness

- Measures listed above, including those under "Water Resources" and "Wildlife and Habitat," will serve to protect wilderness values and the natural quality of wilderness character.

- Construction procedures will follow the minimum requirement analysis for construction and will include provisions to minimize impacts to natural resources that contribute to wilderness values and the natural quality of wilderness character. The Minimum Requirement analysis will determine the mitigation requirements for wilderness.
- If the NPS determines that the canal plugs no longer serve their intended purpose, the NPS will examine the feasibility, environmental impacts, and costs of removing the plugs in order to reduce impacts on wilderness character. This will apply to plugs at House and Slagle Ditches, the Raulerson, Homestead and East Cape Canals, and any additional plugs that may be constructed in the future.

Cultural Resources

- If any archaeological resources are encountered during construction activities, mitigation of project impacts (in consultation with SHPO and other agencies as appropriate) or adjustment of the project design will occur to avoid or limit the adverse effects on prehistoric and historic archaeological resources. Stop-work provisions will be included in the construction documents should archaeological or paleontological resources be uncovered. It should be noted there is a low probability that the project area contains undiscovered archeological resources.
- Monitoring will be done if any excavation exceeds the depth of existing ground disturbance. In the event that cultural resources are encountered during any necessary excavation work, project work will be halted and the discovery process will be initiated.
- If previously unknown archaeological resources are discovered, work will be stopped in the area of any discovery and the NPS will consult with affiliated tribes, pursuant to the NAGPRA and its implementing regulations (43 CFR § 10).

Visitor Use and Experience

- Construction information and general information about the project will be posted at the park, distributed to visitors, and made available on the park's web site. Signage and notices will be used to inform visitors about the purpose of the project and to protect visitor and staff safety during construction activities.
- Artificial lighting, including minimum illumination levels, light-emitting diodes (LED), limited color spectrum (e.g., yellow) lights, and timers and sensors will be used, where applicable, to ensure safety.
- The use of artificial lighting will be restricted to areas where security, human safety, and specific cultural resource requirements must be met.

Noise/Soundscapes

- Restoration activities will involve multiple pieces of heavy equipment for placement of sheet pile and/or fill material. Best management practices for noise, such as using mufflers on heavy equipment and noise muffling construction materials, will be implemented at Cape Sable, resulting in short term minor impacts to soundscapes. Typically, heavy equipment operates at 80 to 90 decibels (dB). Sound levels decrease approximately 6 dB with the doubling of distance (Harmon 2006). Therefore, it is estimated that natural attenuation will decrease the noise from these activities to no greater than 32 to 42 dB at a distance of about 1,500 feet from the work area; noise will continue to dissipate with increased distances from the area.

Air Quality

- EVER enjoys a Class I clean air status. If dust were generated during construction, best management practices for dust suppression will be initiated. Emissions from construction vehicles will be kept to a minimum by restricting idling time.

APPENDIX B: RESPONSES TO SELECTED COMMENTS RECEIVED DURING THE PUBLIC REVIEW OF THE ENVIRONMENTAL ASSESSMENT

The following substantive comments and concerns were received during the public review of the EA. Substantive comments are those that 1) question the accuracy of the information in the EA, 2) question the adequacy of the environmental analysis, 3) present reasonable alternatives that were not presented in the EA, or 4) cause changes or revisions in the proposal.

Substantive comments from individuals and organizations have been summarized below along with NPS responses. The substantive comments are presented as either direct excerpts (or representative quotes) from the original comments or as text that has been paraphrased from the original comments.

Comment(s) or Concern(s)	Response
Comment: "Try plugging middle cape canal and east cape canal at the same time, which is the greatest source of the problem. Then get the gov't out of the way so mother nature can take care of herself."	The feasibility of plugging the Middle Cape and East Cape Canals was explored in the first phase of the Cape Sable project (NPS, 2009) under Action Alternative K – Repair Middle Cape and Gulf and East Cape Canal at Florida Bay (page 49). This alternative proposed repairing the Middle Cape Canal at the Gulf of Mexico and the East Cape Canal at Florida Bay. Blocking these larger canals at the coast may have substantially limited tidal incursions into the interior marshes; however, due to the extensive size and volume of fill required for this alternative, it was found to be economically infeasible and could not be implemented in a timely manner. In addition, filling of the Middle Cape Canal and East Cape Canal would entirely sever boat access to Lake Ingraham and the backcountry, prohibiting park visitors from traveling into these areas. This change would potentially result in a moderate to major adverse effect on visitor use and experience.
Several commenters felt that the purpose of the project cannot be met if East Side Creek is not plugged. Flow through the creek would continue to negatively impact the interior wetlands of Cape Sable if it is not plugged. Representative Comments: "Removing East Side Creek plugging from consideration during this EA is a poor management decision based on the purpose of the project. Please consider the plugging of this creek in the future as it is contributing to as much of the problems of the Cape interior listed in the EA as Raulerson Canal is."	The National Park Service agrees that the flow through East Side Creek is influenced by the seaward portion of the East Cape Canal. The altered flow of this creek reaches the interior wetlands of the Cape through a breach in the marl ridge. Park staff agrees that the altered flow is affecting the environment in the Cape Sable area through increased access of saltwater to the interior, and by sediment movement in and out of the creek. However, the decision to remove East Side Creek from consideration of plugging was a carefully considered management decision that was made for the following reasons: 1) Protection of Threatened and Endangered Species. During the first phase of the Cape Sable

Comment(s) or Concern(s)	Response
"The "desired outcome" of this project as outlined in the "Purpose of the Project" is seriously compromised with the dismissal of a plug or other water control structure at East Side Creek. The future negative impacts to the quality of the habitat by not addressing flow through East Side Creek in a timely manner will outweigh short-term benefits to the natural quality of wilderness character."	project, the continued free flow of East Side Creek was a condition of permit issuance by the National Marine Fisheries Service. This agency cited the importance of East Side Creek for access of the endangered smalltooth sawfish to pupping areas in the interior wetlands. Cape Sable was designated critical habitat for the smalltooth sawfish in late 2009, and East Side Creek, as a natural creek in the area, is included in this designation (http://www.nmfs.noaa.gov/pr/pdfs/fr/fr74-45353.pdf). In contrast to East Side Creek, Raulerson Canal does not qualify as critical habitat because there was a plug in 2009 when the area was designated, and the waterway behind the plug is a canal. "Areas not accessible (i.e., areas behind water control structures existing at the time of this final designation that prevent sawfish passage) to sawfish are not part of this designation." 2) Wilderness Considerations. Cape Sable is located inside the Marjory Stoneman Douglas Wilderness Area. Although East Side Creek is influenced by the East Cape Canal, it is not a canal and was formed by natural processes. Plugs existed at Raulerson Canal, Slagle Ditch, and House Ditch at the time of the Everglades Wilderness designation. No plugs have ever existed on East Side Creek. Impacts to wilderness character are analyzed with respect to four qualities: natural, untrammeled, undeveloped, opportunity for solitude and primitive/unconfined recreation. From a wilderness perspective, the benefits to the natural quality of wilderness character would need to outweigh the combined permanent negative effects on the untrammeled, undeveloped, and opportunities for solitude and primitive recreation qualities of wilderness character. While the exchange of water through East Side Creek has similar impacts as the canals on the interior wetlands of Cape Sable, such as the intrusion of seawater, loss of freshwater and sediment exchange, NPS determined that the role this creek played in the area was natural and not contrary with the purpose of the project which is to restore the preeminence of natural processes in the Cape Sable ecosystem. This determination is consistent also with the Everglades NP enabling legislation, which states: "The...area or

Comment(s) or Concern(s)	Response
	areas shall be permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in the area." 3) Topography. Topographic data, collected by the Park's consultant as part of this EA, indicates that East Side Creek, through natural erosional processes, breached the marl ridge in a low-lying location. In the consideration of alternatives for plugging East Side Creek, eight different locations were examined. Using LIDAR data, the locations where East Side Creek connects with the East Cape Canal were ruled out: each of these locations was too low lying. The contractor then performed six surveys in the area along the presumed location of the marl ridge. The highest elevation surveyed by the contractor on each of these six transects was 0.93 feet NAVD88. Water level data collected by the U.S. Geological Survey at a platform in East Side Creek was compared to the measured elevations (http://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=250802081035500). Water level exceeded the highest ground surface elevation 110 times in 2015. Although a plug could be engineered to withstand overtopping, water would be able to move around the side banks. It's likely that the creek would begin to erode a new channel and the plug would become completely ineffective.
Comment: "If there is no plug at East Side Creek than at least a buoy and chain line makes sense to stop the illegal access. This creek should be addressed in the same fashion as Raulerson Canal."	There are signs at both entrances to East Side Creek to notify boaters that motors are not permitted in wilderness. NPS law enforcement conducts aerial patrols and responds to reports of violations. Boaters illegally accessing wilderness are given tickets. Officers respond to two to three violations per year. A buoy line and chain were in place before East Cape Canal and Homestead Canal were replaced. Boaters were able to bypass the chains. Adding a buoy and chain line would have wilderness impacts at East Side Creek. The installation of a buoy and chain would cause additional minor impacts to the undeveloped quality with little to no benefit to the solitude or primitive and unconfined recreation quality.

Comment(s) or Concern(s)	Response
Although generally supportive of Alternative 2 for House and Slagle Ditch, several respondents felt that Alternative 3 would provide better value. The increased costs of the alternative would be offset by the increased resilience of a structurally reinforced plug. Representative Comments: "However, we believe Alternative 3 is a better alternative for Slagle and House Ditches as it would provide a more effective long-term solution by increasing the stability of these two plugs. We realize there are added costs and impacts to surrounding wilderness habitat with increased construction effort at these two plugs; however, we believe it would be worth the extra cost and effort to produce a resilient solution." "Alternative 3 would increase erosion protection, adding to long term stability of these two plugs" "Based on the analyses presented, it is abundantly clear to us that Alternative 3 is far more cost-effective than Alternative 2, and should be the Selected Alternative for the House and Slagle Ditches."	The plugs at Slagle Ditch and House Ditch have been in place since Everglades National Park installed them in the 1950s. The plugs were constructed from limestone fill, which was compacted by cars driving the Old Ingraham Highway to reach Cape Sable. The plugs have successfully fulfilled their purpose for more than 60 years. The plug on Slagle Ditch is nearing failure; however, the plug at House Ditch remains functional. Adding armoring to the plugs might increase their longevity, however the erosion protection features will increase the impacts of the project on the undeveloped quality of wilderness character from minor adverse to highly localized moderate adverse. The long-term stability of the earthen plugs and the increased impacts to wilderness character support the selection of Alternative 2 for House and Slagle Ditches.
Comment: "While no explicit explanation of why the National Park Service summarily dismissed even investigating alternatives, the implied reason is that East Side Creek is a "natural" feature."	The National Park Service investigated three alternatives for East Side Creek at a total of nine locations. The NPS contracted with their consultant (URS) in 2009 to identify and develop alternatives for the potential construction of a new plug on East Side Creek. The Engineering Analysis and Feasibility Report (2012) presented the results of the field assessments, preliminary engineering analysis, cost estimates, and concept design alternatives. The report presented two action alternatives for East Side Creek in the Feasibility Report - a sheet pile only plug with riprap erosion protection, and a sheet pile plug with flow-through capacity and riprap erosion protection. Four potential plug locations were presented in the Feasibility Report. A third action alternative, plugging East Side Creek the width of the marl ridge, was added prior to internal scoping. The NPS examined these alternatives and locations for East Side Creek through internal and initial public scoping. Surveys were

Comment(s) or Concern(s)	Response
	performed at six locations on the presumed location of the marl ridge to determine the most effective location for a plug. Physical parameters and light measurements were performed at East Side Creek to determine possible effects of restoration on benthic communities. A wetlands/surface waters and mangrove assessment was performed at East Side Creek. In August 2015, the park reviewed the 2012 alternatives. An internal seminar was held August 6, 2015 to examine the available data at Cape Sable. Presentations included information about: 1) the available hydrologic data, including flow, salinity, and water level, 2) sea level rise projections for the Cape Sable region, 3) endangered species effects, including information on crocodiles and smalltooth sawfish, 4) changes in vegetation at Cape Sable since 1978, 5) an assessment of the Cape Sable II project's effects on wilderness, and 6) a review of creek morphology changes (including Little Sable and Middle Creeks) in the Cape Sable area. In addition, the National Audubon Society was invited to give presentation on the data they have collected on Cape Sable since the late 1980s. After reviewing the available biological and hydrologic data in the area, the decision was made to eliminate East Side Creek from consideration. This decision was based on wilderness and endangered species considerations as well as the lack of quantifiable benefits from the first phase of the project. (Please see response to earlier comments.) Since that time, the park has analyzed topographic data collected by their consultant as part of the topographic and bathymetric survey. Of the six survey cross sections performed, the highest elevation found on the banks was 0.93 feet NAVD88. Water level data collected by the USGS at a platform in East Side Creek exceeded that elevation 110 times in 2015. The maximum water level at the station is 2.07 feet recorded on May 5, 2016. Although the plug will be constructed to tolerate overtopping, the canal banks outside the plug area will not be and will be subject to erosional forces. The number of exceedances is likely to increase as sea levels rise. Erosion of the banks and the formation of a new channel is the likely result and will eliminate

Comment(s) or Concern(s)	Response
	any benefit to plugging the previous channel.
Comment: "A plug at the intersection of East Side Creek and East Cape Canal is required to prevent further anthropogenic impacts to the creek but the topography at the intersection makes this possibility prohibitively expensive if not hydrologically impossible. Therefore, we support a plug in East Side Creek at an effective location along the marl ridge that would effectively eliminate the artificial connection between creek and canal. The increasing erosion and water moving capacity of East Side Creek must be addressed if this project is going to be a success and meet the objectives."	The NPS agrees that plugging the plugging East Side Creek at the intersection with East Cape Canal is not economically or hydrologically feasible. It is also not feasible to plug East Cape Canal below the mouth of East Side Creek. The NPS has determined that plugging East Side Creek at the marl ridge would be ineffective because of the low topography of the ridge and the large tidal range in the area. The banks of the creek would be frequency overtopped and would begin to erode and may form a new channel, entirely bypassing the plug. Although not all flow into the interior wetlands of Cape Sable will be blocked by this project, repairing the plugs at House and Slagle Ditches and replacing the plug at Raulerson Canal will have beneficial effects north of the marl ridge. Repairing House and Slagle plugs will prevent additional openings into the interior of Cape Sable and prevent the unnatural movement of nutrients and sediment through the ditches. Plugging Raulerson Canal will decrease the exchange of salt and freshwater in the western area of the Cape and prevent sediment and nutrient transport. The plug in Raulerson Canal will also reduce the tidal energy in the wetlands near the canal, dampening the tidal cycle and restoring a more natural hydrology to the area.
Comment: "We also feel that neglecting this creek would jeopardize the integrity of any other new structures at the three other sites under consideration."	There has been no evidence that flow through East Side Creek is likely to negatively affect the plugs that are planned in this project, nor the previously constructed plugs. The plugs at East Cape and Homestead failed repeatedly over the past 30 years, before they were plugged in 2011. East Cape plug is very close to East Side Creek. Since 2011, there has been no detected impact to the structural integrity of the plug as a result of flow through East Side Creek. The earthen plugs in House and Slagle Ditches have been in place for over 60 years. While the earthen plugs at House and Slagle Ditches have eroded significantly, they remain in place and House Ditch plug is structurally sound.
Comment: "Slowing the rate of human-induced change on this landscape by addressing East Side Creek would also bring about greater	While the National Park Service agrees that East Side Creek is currently affecting the interior wetlands of Cape Sable, the benefits of plugging

Comment(s) or Concern(s)	Response
resilience to Cape Sable in the face of sea level rise and the possibility of more frequent and intense hurricanes."	the creek are not definite. Water level data from East Side Creek indicates that at current water levels, flow over the maximum measured bank elevation exceeds an average of 70 events per year (2009-2015). The NPS has determined that plugging East Side Creek at the marl ridge would be ineffective because of the low topography of the ridge in that location and the height of the high water line. The banks of the creek would be frequently overtopped and would begin to erode and may form a new channel, entirely bypassing the plug. Wanless and Vlaswinkel (2005) recorded flow overtopping the marl ridge north of Lake Ingraham on at least 80 occasions in 2004. Although this water is moving slowly and has much less of an impact on the wetlands than the channelized flow present in the canals and creek, the number of flood events will continue to increase as sea level rises. At some point the marl ridge will cease to function and the interior wetlands will be open to the Gulf of Mexico and Florida Bay. Although the plugs are constructed to last 50 years, it is possible that they would not be able to withstand a catastrophic hurricane event. If storm frequency and intensity increase with climate change, the chance that a strong hurricane will breach one or several of the plugs will increase.
Comment: "If not corrected, the rate of marsh collapse will continue to accelerate, jeopardizing this vital wildlife habitat. The National Park Service has taken great strides in the effort to protect Cape Sable by completing the first phase of restoration and by progression of this second phase. However, we feel these accomplishments may be futile if the conduit of flow through the marl ridge at East Side Creek is not accounted for."	In his report to the National Park Service titled "Coastal Landscape and Channel Evolution Affecting Critical Habitats at Cape Sable, Everglades National Park, Florida." Dr. Hal Wanless and Brigitte Vlaswinkel presented photographic evidence of marsh collapse to open water occurring between 1928 and 1953 at Cape Sable. Taylor et al. (personal communication) used satellite imagery to determine the rate and extent of marsh collapse in the Cape Sable area, over the period 1978 through 2015. The authors did detect changes to vegetation in the study area. Open water or mud replaced mangroves along the southern boundary of the area of formerly collapsed marsh. Along the northern portion of the formerly collapsed marsh area vegetation replaced open water or mud in each successive study year. And in the central portion

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	of the study area, several relatively large and contiguous areas of open water were largely replaced by vegetation. However, the analysis did not detect an appreciable amount of conversion from marsh vegetation to open water in recent years. The NPS does not believe that restoration attempts at Raulerson, House, and Slagle will be futile if East Side Creek is not blocked. Repairing the plugs at House and Slagle Ditches will prevent additional openings into the interior of Cape Sable and prevent the unnatural movement of nutrients and sediment through the ditches. Plugging Raulerson Canal will decrease the exchange of salt and freshwater in the western area of the Cape and prevent sediment and nutrient transport. The plug in Raulerson Canal will also reduce the tidal energy in the wetlands near the canal, dampening the tidal cycle and restoring a more natural hydrology to the area.
Comment: "If a plug at East Side Creek remains dismissed from this project, we encourage the Park to explore alternative ways to "Improve the wilderness visitor experience by reducing the opportunity for illegal motorized access into the Marjory Stoneman Douglas Wilderness Area." In regards to the Raulerson Canal, within section 3.10.1 of the EA it is noted, "Additionally, the wilderness visitor experience is being hindered for such visitors by the presence of motorized boaters illegally trespassing into the backcountry past the breached plug." It has been our experience over the past several years that illegal motorized entry into the interior wetlands through East Side Creek has been increasing and that this illegal entry is much more of a problem at this location than at Raulerson Canal."	The National Park Service agrees that illegal entry to the wilderness is more of a concern at East Side Creek than at Raulerson Canal. However, Everglades National Park does not have data that support the claim of an increase in violations since the plugging of East Cape Canal. There are signs at both entrances to East Side Creek to notify boaters that motors are not permitted in wilderness. NPS law enforcement conducts aerial patrols and responds to reports of violations. Boaters illegally accessing wilderness are given tickets. Officers respond to two to three violations per year. A buoy line and chain were in place before East Cape Canal and Homestead Canal were replaced. Boaters were able to bypass the chains. Adding a barrier to boat access would have wilderness impacts at East Side Creek. The installation of a buoy and chain would cause additional minor impacts to the undeveloped quality with little to no benefit to the solitude or primitive and unconfined recreation quality.
House Ditch plug should be repaired at the same time as Slagle Ditch plug. Representative Comments: "If plug restoration begins, we strongly	The plugs at House and Slagle Ditches have been in place since the 1950s. Slagle Ditch requires immediate repairs. The plug is leaking and in danger of failure. While House Ditch plug has been eroded, it remains functional and shows no signs of failure. The wilderness committee has

Comment(s) or Concern(s)	Response
recommend the repairing of House Ditch regardless if monitoring has indicated it has not begun leaking." "It does not make sense to wait to repair House Ditch until it starts leaking if efforts are being made to repair Slagle. It will leak and fail eventually. It makes sense to get House Ditch repaired if funds are available and crew/equipment are already mobilized."	recommended immediate repair of Slagle Ditch. However, because the low risk of imminent failure and the impacts of the construction to the untrammeled, undeveloped, and solitude or primitive and unconfined recreation wilderness qualities, the Park feels that it would be prudent to wait and monitor the situation at House Ditch. Everglades National Park is committed to monitoring the plug on House Ditch to assess changes to the plug and respond rapidly when conditions of the plug degrade. Monitoring of the conditions at House Ditch would be performed annually and after major storms. The width of the plug would be measured at three set locations. The walls of the plug would be examined for holes, visible flow through the plug, and other signs of potential plug failure. The condition of the plug will be documented and photographed. When the condition of the plug at House Ditch has deteriorated such that there is lateral seepage through the plug, the park will take action. Unless conditions on Cape Sable change substantially, this EA will provide all the required compliance for this action. The plug will be repaired, using the techniques described in Alternative 2.
Comment: "We also question the monitoring methods at House Ditch as it is not indicated in the EA."	Everglades National Park is committed to monitoring House Ditch to assess changes to the plug and respond rapidly when conditions of the plug degrade. Monitoring of the conditions of House Ditch would be performed annually and after major storms. The width of the plug would be measured at three set locations. The walls of the plug would be examined for holes, visible flow through the plug, and other signs of potential plug failure. The condition of the plug would be documented and photographed. When the condition of the plug at House Ditch has deteriorated such that there is lateral seepage through the plug, the park will take action. Unless conditions on Cape Sable change substantially, this EA will provide all the required compliance for this action. The plug will be repaired, using the techniques described in Alternative 2.
Comment: "We also encourage and would like to emphasize the removal of any remaining, unneeded construction materials after completion of the project, including pilings. We	Wood marker pilings were placed in the Ingraham Canal and Lake Ingraham to the Homestead Canal entry during the first phase of the Cape Sable project. During construction, the

Comment(s) or Concern(s)	Response
feel that the large pilings that were left in the southeastern section of Lake Ingraham after completion of Phase I diminish from the wilderness setting and are a navigational safety concern in such a small channel. It is our understanding that the intention was to remove these pilings upon completion of Phase I. To conform to the wilderness setting that exists and reduce safety hazard, we suggest, if possible, the removal of these large incompatible pilings during Phase II with replacement to standard park markers that exist elsewhere in Lake Ingraham."	pilings were placed as aids to navigation to minimize boat-related impact to the adjacent shallow-water mud flats in Lake Ingraham. The markers comply with Florida Fish and Wildlife Conservation Commission (FWC) Uniform Waterway Marker regulations. The pilings were scheduled to be removed after construction was complete; however Everglades National Park requested that the pilings be left in place to replace the dilapidated channel markers that were present. Everglades National Park agrees that less obtrusive markers would be more compliant with wilderness values. However, removal of the markers is not included as part of this project. Park management will consider removing or replacing the markers in Lake Ingraham at a later date.
Comment: "We also suggest independent environmental monitoring during the duration of the project to see that mitigation measures and BMP's are followed, such as minimal woody vegetation and debris clearing."	The NPS will ensure that the awarded contractor adheres to all of the BMPs, mitigation measures, conditions of the environmental permits as well as Federal and State wildlife regulations, including no wake zones and monitoring during construction. An independent construction management service was contracted during Phase I of the Cape Sable project to inspect the work of the construction contractor for progress, workmanship, and conformance with the contract documents and existing codes. The construction manager at-risk (CMR) worked with the contractor on vegetation clearing, endangered species monitoring, and revegetation of the plugs after construction was complete.
Comment: "Regarding statements from Table 2.5 "Wilderness Objective 2", we agree that Alternative 4B would have "localized moderate adverse impacts to the undeveloped quality" but believe that "impacts to the solitude or primitive and unconfined recreation quality" would also be "moderately adverse" as opposed to "minor" under this alternative. Our experience with the two new ramps on Homestead and East Cape Canal plugs are that they are often used for portaging small skiffs, contributing to continued violations of the non-motorized region. This has led to increased disturbance to wildlife as well. Minimizing human disturbance is going to be a principal component to preserving integrity of these wetlands."	Everglades National Park has received no reports of visitors carrying small skiffs across the plugs at East Cape or Homestead Canal, nor has this type of violation been observed directly by our staff. Some skiff usage in the backcountry may be the result of scientific research activities in these areas for which the use of a motorized skiff was approved. The definition of a "moderate" impact is that "attributes of wilderness character and wilderness experience would be affected in a substantial way in a single distinct area, or the impact would affect multiple areas but would not be permanent and would not affect an entire visitor season." The lack of any previous reports of these types of violations at the plugs at Homestead and East Cape Canals, means that

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	while they may be occurring, they are not substantial, and so do not qualify as a moderate impact.
Comment: "In regards to the timing of the repairs, we feel that Slagle and House Ditches should be expedited over other components of this restoration effort. Repairing these plugs as soon as possible would reduce the potential for a catastrophic breach and subsequent canal expansion similar to what occurred at Raulerson Canal following Hurricane Wilma. Should funding for this project be acquired over time instead of in a single lump sum, Slagle and House Ditches should be repaired as soon as sufficient funds are gathered rather than waiting for the acquisition of funds for the entire project budget."	While timing the project components based on available funding may make sense at this time, circumstances may change in the future and the National Park Service must retain the ability to make decisions based on the current conditions. Decisions on timing do not need to be part of the Environmental Assessment and will be deferred to the future.
The Florida Fish and Wildlife Conservation Commission (FWC) recommended that nest surveys for state-listed wading birds identified above also be conducted during their breeding season (March through August).	Everglades National Park routinely conducts region-wide surveys for nesting wading birds within breeding seasons, and have not previously recorded wading bird nesting in that area. However, the park will conduct wading bird surveys prior to initiating work, if that work will begin during a period when wading bird nesting may occur. At this time, it is anticipated that construction will begin in the fall, outside the period when wading birds nest. If monitoring determines that wading bird nesting is occurring in close proximity to work sites during construction, FWC staff will be contacted as requested.
The FWC requested that prior to the replacement of the Raulerson Canal plug, the NPS shall coordinate with the FWC Imperiled Species Management Section to prevent possible entrapment of manatees east of the Raulerson Canal.	The construction area will be routinely surveyed for manatee activity during construction. Manatees will be able to travel to Florida Bay and Whitewater Bay from the east side of the proposed Raulerson Canal plug through other waterways, so entrapment upstream is not expected to be an issue. This assumption will be re-assessed prior to construction and surveys will be conducted as needed based on the results. The National Park Service will also ensure that manatees do not become entrapped between sheet pile walls prior to backfilling at the canal plug site.
The FWC supported Alternative 4B for implementation at Raulerson Canal:	The National Park Service agrees that recreational opportunities are important for the public. The plugs at East Cape Canal and

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"Alternative 4B contains the same construction features as Alternative 4A to construct a new sheet pile and fill plug with riprap erosion protection, however, Alternative 4B includes an additional option of a safe portage area over the restored Raulerson Canal plug for non-motorized boaters (i.e. canoeists and kayakers). FWC staff supports design features that enhance access to recreational opportunities for the public."	Homestead Canal both provide canoe access to the interior of Cape Sable via boat docks and canoe ramps. These locations are closer to Flamingo, which is the access point for most of the visitation on Cape Sable. Because visitor access is available via these two routes, it is not necessary to provide additional access via the Raulerson Canal. By selecting Alternative 4A, the Park will avoid additional impacts to the Marjory Stoneman Douglas Wilderness. Protecting access to the solitude and primitive and unconfined recreation quality of wilderness character is an important part of the wilderness designation and ensures the opportunity for visitors to experience wilderness. Recreational facilities, such as a boat dock and canoe ramp, would affect these opportunities. Although there will be no features constructed specifically for visitor use, canoeists and kayakers will have the ability to cross the plug. The plug will also increase the safety for visitors who use Raulerson Canal to access the interior; the turbulent currents that now exist in the canal will be blocked by the plug. Visitor use at Homestead and East Cape does not exceed the capacity of the facilities located at the plugs.

APPENDIX C: NON-IMPAIRMENT DETERMINATION

WHY IS A NON-IMPAIRMENT DETERMINATION REQUIRED?

Section 1.4.7 of *Management Policies 2006* states that:

> [b]efore approving a proposed action that could lead to an impairment of park resources and values, an NPS decision-maker must consider the impacts of the proposed action and determine, in writing, that the activity will not lead to an impairment of park resources and values.

Actions that require preparation of EAs and EISs constitute actions that may have the potential to impair park resources or values. Therefore, a non-impairment determination must be made for any action Selected in a FONSI or ROD that could impact park resources and values and to which the NPS is a signatory. The non-impairment determination is completed only for the Selected action.

WHAT IS IMPAIRMENT?

Sections 1.4.5 and 1.4.6 of *Management Policies 2006* provide an explanation of impairment. Section 1.4.5 defines impairment as:

> an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

Section 1.4.5 goes on to state that:

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

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park,
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

Section 1.4.6 of *Management Policies 2006* identifies the park resources and values that are subject to the no-impairment standard:

The "park resources and values" that are subject to the no-impairment standard include:

- the park's scenery, natural and historic objects, and wildlife, and the processes and condition that sustain them, including, to the extent present in the park: the

ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes an smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structure, and objects; museum collections; and native plants and animals;

- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;

- the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and

- any additional attributes encompassed by the specific values and purposes for which the park was established.

HOW IS A NON-IMPAIRMENT DETERMINATION MADE?

Section 1.4.7 of *Management Policies 2006* states that

> "[I]n making a determination of whether there would be an impairment, an NPS decision make must use his or her professional judgment. This means that the decision-maker must consider any environmental assessments or environmental impact statements required by the National Environmental Policy Act of 1969 (NEPA); consultations required under Section 106 of the National Historic Preservation Act (NHPA); relevant scientific and scholarly studies; advice or insights offered by subject matter experts and others who have relevant knowledge or experience; and the results of civic engagement and public involvement activities relating to the decision.

Management Policies 2006 further define "professional judgment" as

> "a decision or opinion that is shaped by study and analysis and full consideration of all the relevant facts, and that takes into account the decision-maker's education, training, and experience; advice or insights offered by subject matter experts and others who have relevant knowledge and experience; good science and scholarship; and, whenever appropriate, the results of civic engagement and public involvement activities relation to the decision.

NON-IMPAIRMENT DETERMINATION FOR THE SELECTED ALTERNATIVES

This determination on impairment has been prepared for the Selected Alternatives described in the FONSI - Alternative 2: Re-Backfill Eroded Plug Areas on House and Slagle Ditches, and Alternative 4A: Construct a New Sheet Pile Plug and Fill Plug with Riprap Erosion Protection for Raulerson Canal. An impairment determination is made for all resource impact topics analyzed for the Selected Alternatives. An impairment determination is not made for visitor use and experience and park management and operations because impairment findings relate back to park resources and values, and these impact areas are not generally considered to be park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values.

Geology, Topography, and Soils

The Selected Alternative to repair the plugs in place at House and Slagle Ditches will not result in any long-term adverse impacts to geology, topography, and soils at either of the plug sites. However, during construction, short-term negligible to minor adverse impacts from turbidity/suspended soils will likely occur beyond the direct impact footprint (i.e., outside of the turbidity barriers and/or silt fence). Short-term moderate adverse impacts at the plug sites are also anticipated due to soil compaction in the work zones. Furthermore, there is increased certainty that unnatural water exchange through the canals will not occur and therefore there will be long-term beneficial effects resulting in the reduction of unnatural erosional processes.

Implementing the Selected Alternative at Raulerson Canal will not result in any long-term adverse impacts to the geology, soils, and topographic conditions of the site. However, short-term minor to moderate adverse impacts to geology, topography, and soils within the canal work zone will occur from turbidity/suspended soils. Short-term negligible to minor adverse impacts to geology, topography, and soils, from turbidity/suspended soils will occur beyond the direct impact footprint (outside of the turbidity barriers). Short-term moderate adverse impacts at the plug site are also expected to result from soil compaction in the work zones. Consequently, long-term beneficial effects will occur from the resulting reduction of erosional processes along the banks of Raulerson Canal.

There will be no impairment to the park's resources or values related to geology, topography, and soil resources because no major, long-term, adverse changes to these resources will occur from implementation of the Selected Alternatives.

Water Resources including Hydrology, Water Quality, and Vegetation/Wetlands

Hydrology. The Selected Alternatives (Alternatives 2 and 4A) will restore the local hydrologic regime to a more natural state. Reinforcing the House and Slagle plugs will prevent breaching of the marl ridge and the subsequent adverse effects to the interior wetlands, wildlife, and marine resources that have resulted from plug failures on other canals. Maintaining the plugs will prevent the intrusion of tidal flows through the ditches and the subsequent accelerated erosion of ditch banks such as is currently occurring in the Raulerson Canal. Installing a new plug in Raulerson Canal will halt the unnatural exchange of water and sediment through the ridge and slow down the erosion and widening of the canal.

High tidal fluxes will still overtop the marl ridge, potentially increasing the potential for bank/land scour and new channel/ditch formation. As a result, some erosion will continue to occur on the canal/ditch banks even if they are repaired and/or reinforced. However, the erosion from overtopping is considered a natural process and should not be viewed as an adverse impact. Thus, the Selected Alternatives will result in long-term beneficial effects to hydrology in the areas of House and Slagle Ditches and Raulerson Canal.

Water Quality. The Selected Alternatives will result in minor to moderate short-term adverse impacts to water quality with the repair/restoration of the plugs during construction activities; however, long-term beneficial effects to water quality are anticipated post construction. Therefore, following the completion of the restoration activities, long-term beneficial effects to park resources as related to water quality are expected.

Vegetation and Wetlands. Implementation of the Selected Alternatives will result in minor adverse, localized, direct effects on vegetation resulting from construction activities. However, the Selected Alternatives will also provide an overall benefit to local and regional wetlands in the greater Cape Sable area, which far outweighs the minor direct impacts associated with construction activities. The Selected

Alternatives will result in short-term, minor, adverse, and localized impacts as well as long-term beneficial effects.

There will be no impairment to the park's resources or values related to water resources because no major, long-term, adverse impacts to these resources will occur from implementation of the Selected Alternatives.

Wildlife and Habitat

The Selected Alternatives will result in minor short-term adverse impacts from construction activities, but beneficial long-term effects on wildlife and wildlife habitat from improved hydrologic conditions and reduced saltwater intrusion.

There will be no impairment to the park's resources or values related to wildlife and habitat because no major, long-term, adverse impacts to these resources will occur from implementation of the Selected Alternatives.

Marine Resources and Essential Fish Habitat

Implementing the Selected Alternative at House and Slagle Ditches will result in some short-term, minor, unavoidable adverse impacts to habitats designated as essential fish habitat (EFH) for several federally managed species. No long-term adverse EFH impacts are anticipated at House and Slagle Ditches. At Raulerson Canal, the Selected Alternative will result in some long-term minor unavoidable adverse impacts to habitats designated as EFH for federally managed species. This includes a small loss of habitat, and temporary disturbance to a small area of non-vegetated bottom and temporary degradation of the estuarine/marine water column due to an increase in suspended sediment concentrations. However, EFH and other marine resources will benefit from improved hydrologic conditions and reduced saltwater intrusion. The Selected Alternatives will result in short-term minor adverse effects and long-term beneficial impacts to EFH.

There will be no impairment to the park's resources or values related to marine resources and EFH because no major, long-term, adverse impacts to these resources will occur from implementation of the Selected Alternatives.

Special Status Species

Under the Selected Alternative, any direct adverse effect on federally listed species or their habitat resulting from construction will be temporary in nature. The Selected Alternatives will provide indirect long-term beneficial effects to the habitats of federally listed species. The Selected Alternatives will not likely adversely affect other special status species.

There will be no impairment to the park's resources or values related to special status species because no major, long-term, adverse impacts to these resources will occur from implementation of the Selected Alternatives.

Cultural Resources

Construction will have minor adverse impacts on the National Register of Historic Places (NRHP)-eligible plugs, ditches, and canal due to the construction occurring within the overall footprint of these historic structures. However, since there will be a deceleration of erosional processes, the Selected Alternatives will result in long-term beneficial impacts to historic structures and a potential historic district.

There will be no impairment to the park's resources or values related to cultural resources because no major, long-term, adverse impacts to these resources will occur from implementation of the Selected Alternatives.

CONCLUSION

The impact analyses summarized above demonstrate that the Selected Alternatives will not result in major adverse impacts on a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park; (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park; or (3) identified as a goal in the park's existing master plan or other NPS planning documents. Effects to park resources other than those discussed above have been determined to have no or negligible adverse impacts from the activities to be implemented. There will be no unacceptable impacts to park resources or values from implementing the Selected Alternatives.