6.0 MONITORING PROTOCOLS

Monitoring protocols presented in this section include construction compliance, post-construction monitoring, and management monitoring. Construction compliance includes turbidity monitoring and adherence to permit specific conditions and standard measures for the protection of threatened and endangered species. Post-construction monitoring includes the qualitative and/or quantitative methods used to define the success of a restoration effort over time. Different post-construction monitoring methodologies are utilized depending on the seagrass restoration alternatives selected for a given restoration project. These monitoring methods are discussed in detail in Section 6.3.2 below. Management monitoring is utilized to determine the success of a management method (e.g., exclusion areas, channel marking, hazard identification) and if the management action is controlling natural resource damage. Appendix B provides an "at-a-glance" checklist for ENP management describing the steps and equipment needed for the various phases of the monitoring protocols.

6.1 DESCRIPTION OF PROJECT TEAM/EQUIPMENT UTILIZED

Monitoring protocols consist of construction compliance and post-construction monitoring and includes the following project team members (Appendix B):

- Trained biologists with expertise in seagrass, coral/hardbottom, and mangrove sciences;
- Project manager (typically biological or cultural resource branch chief or ERDAR representative (19jj cases only));
- Local, state, and federal agency representatives;
- Boat operator that meets NPS training requirements; and
- Trained individual to conduct turbidity monitoring.

The project biologists prepare a monitoring plan, detailing the monitoring schedule, methods, and success criteria for the restoration project. The project manager provides overall supervision of the monitoring program and reviews the monitoring approach, techniques, and observations of the biologists or other trained individuals. The local, state, and federal agency representatives ensure compliance with project permits through review of monitoring plans and monitoring reports. The responsibilities of the remaining team members are described in Sections 6.2 and 6.3 below.

All team members should be familiar with the details of the SHRMP prior to conducting any step of the monitoring protocols. All biologists should be trained in seagrass, coral/hardbottom, and mangrove species identification. Biologists and other individuals conducting monitoring activities should be familiar with the techniques presented in Sections 6.2 and 6.3 and "leave no trace" skills and ethics (e.g., retrieving all equipment used during monitoring events, swimming as much as possible to avoid trampling of substrate) are emphasized by all team members

(NWSC 2006, NPS 2013d, Appendix C). Equipment potentially utilized during the monitoring protocols is provided in Table 10.

Table 10. Equipment potentially utilized during monitoring protocols (based on restoration alternative implemented).

Turbidity Monitoring	Sediment Placement	Seagrass Transplantation	Bird Stakes or Fertilizer Spikes
Water sampling device (e.g., Kemmerer bottle)	Snorkel or scuba gear	Snorkel or scuba gear	Snorkel or scuba gear
Turbidimeter	Survey-grade DGPS unit	Survey-grade DGPS unit	Survey-grade DGPS unit
GPS unit	Waterproof datasheets	Waterproof datasheets	Waterproof datasheets
Field datasheets	Quadrat(s)	Quadrat(s)	Quadrat(s)
Boat*	Float or inflatable boat	Float or inflatable boat	Float or inflatable boat
	Camera with underwater housing	Camera with underwater housing	Camera with underwater housing
	Depth sounder	Smaller quadrat	½-in diameter PVC pipes
	Transect tape(s)	Boat*	Wood roosting blocks (2x2x4 in)
	Stakes/weights		Reflective tape (optional)
	Metric ruler		Boat*
	Boat*		

* Depending on the size and location of the restoration site and the number of team members required to conduct monitoring, the boats needed for transit may vary in size. However, all boats must be compatible with the shallow water depths that are characteristic of Florida Bay.

6.2 CONSTRUCTION COMPLIANCE

6.2.1 Turbidity Monitoring

Regulatory agencies typically require turbidity monitoring for coastal or in-water construction projects. Turbidity monitoring may be necessary if sediment placement and/or installation of signage are selected as a restoration alternative (Sections 4.4.1 and 4.4.5). Turbidity is a measure of water clarity and is associated with suspended particles and reduced visibility (USGS 2012). Coarse material, such as limestone pea rock used in some sediment placement activities, easily drops out of suspension near the point of disturbance and only stays suspended in the water column if there is a significant amount of energy present (e.g., waves or current). Fine material, on the other hand, easily remains in suspension and is the largest contributor to turbidity and reduction in light penetration. High turbidity levels increase water temperatures, which can result in various effects, including decreased concentrations of dissolved oxygen in the water column, reduced light penetration (resulting in decreased photosynthesis and production of

dissolved oxygen), and settlement of particles can smother underlying benthic communities (EPA 2012). In order to prevent these environmental consequences, turbidity levels are measured throughout project construction. Prior to project commencement, a turbidity monitoring plan is developed in compliance with Chapter 62-302 F.A.C and generally provides the following information (PBSJ 2008):

- Description of other construction/restoration projects in the area (if present);
- Description and proximity to other sources of land based pollution (if present);
- Adverse weather conditions and contingency monitoring plan;
- Monitoring schedule and protocol;
- Establishment of background locations;
- Establishment of compliance locations;
- Current direction and flow data;
- Light attenuation data;
- QA/QC protocol; and
- Location and description of resources that may be impacted.

Turbidity monitoring is conducted by a trained individual during restoration construction. Water samples are typically collected every two hours at background and compliance locations (BNP Programmatic Categorical Exclusion) using a water sampling device (e.g., Kemmerer bottle) at water depths specified in the project permits. The background location is up-current from the construction/restoration site outside of any turbidity generated by the restoration project. This serves as the natural background against which other turbidity readings are compared. The compliance location is down-current of the work site and within the densest portion of any visible turbidity plume, if present. GPS coordinates are collected at all background and compliance locations using a GPS unit. The water samples are transferred from the water sampling device to a turbidimeter. The turbidimeter is calibrated on a daily basis to ensure accurate turbidity readings. For each water sample collected, the turbidity results, recorded in Nephelometric Turbidity Units (NTU), and collection date and time are recorded. Turbidity values should not significantly exceed background levels at any compliance location during construction. If background levels are significantly exceeded, all construction operations cease until turbidity levels at the compliance location return to background levels.

Turbidity monitoring reports are prepared and submitted to the appropriate local, state, and federal agencies in compliance with any restoration project permits. Turbidity monitoring reports typically include:

- Permit numbers for the restoration project;
- Dates and times of sampling;
- Weather, including wind direction and velocity;
- Tidal stage, direction, and flow;
- Description of collection methods;
- Map showing sampling locations (background and compliance locations) and water depths; and
- Sampling results.

6.2.2 Protected Species Provisions

Regulatory agencies require adherence to standard measures for the protection of threatened and endangered species during all in-water construction projects, including restoration projects. Standard manatee, marine turtle, and smalltooth sawfish construction conditions for in-water work are listed below (FDEP 2012, NOAA NMFS 2006).

- Notify project personnel about the potential presence of marine turtles, manatees, smalltooth sawfish, and manatee speed zones in the project area, and the need to avoid collisions with (and injury to) these protected marine species.
- Notify project personnel about civil and criminal penalties associated with harming, harassing, or killing manatees, sea turtles, or smalltooth sawfish, which are protected under state and federal law.
- Operate vessels in "Idle Speed/No Wake" at all times while in the construction area and in water depths where the draft of the vessel provides less than 4-ft clearance from the bottom. Deep water routes (e.g., marked channels) should be utilized whenever possible.
- Construct turbidity curtains in material that cannot entangle or obstruct movement of manatees, marine turtles, or smalltooth sawfish. Turbidity curtains are properly secured and are regularly monitored to avoid entanglement or entrapment.
- Survey for marine turtles, manatees, and smalltooth sawfish during project construction and shutdown project equipment if these protected species are observed in 50-ft project radius. Activities resume when protected species have departed the project area.
- Report any collision with or injury to manatees, sea turtles, or smalltooth sawfish to the FFWCC, the USFWS, and the NMFS Protected Resources Division.

- Post temporary signs concerning manatees prior to and during all in-water project activities (Figure 24).

- Address all site-specific additional requirements, as prescribed by the regulatory agencies.

6.3 POST-CONSTRUCTION MONITORING

Post-construction monitoring of restoration projects is typically conducted to: (1) determine if restoration projects are meeting success criteria, (2) assess the potential need for corrective action or supplemental restoration, and (3) advise future restoration planning efforts. The following sections will discuss post-construction monitoring schedules, the various methods that may be used to measure success, success criteria, and corrective actions or supplemental restoration. In addition, at the end of a monitoring program, the monitoring data and success criteria can be analyzed to determine if the restoration action selected for a given damage site was appropriate and if any recommendations or "lessons learned" may be applied to future restoration efforts in similar environmental conditions.

6.3.1 Monitoring Schedule

Restoration sites are typically monitored for a period of five years (Uhrin et al. 2011). With the exception of seagrass transplantation, monitoring events typically occur at six-month intervals for the first two years and one-year intervals for an additional three years (0, 6, 12, 18, 24, 36, 48, and 60 months). The baseline event (0-month) is conducted at construction completion and should occur within seagrass growing season (June 1 to September 30), if possible. This ensures that the maximum possible seagrass coverage is being represented at the restoration site during a majority of the monitoring events. Two monitoring events (6-month and 18-month) could potentially occur during the dormant season but could still be informative in terms of overall restoration success.

If seagrass transplantation is performed at a restoration site, monitoring events typically occur quarterly for the first year and biannually for an additional four years (0, 3, 6, 9, 12, 18, 24, 30, 36, 42, 48, 54, and 60 months) (Fonseca et al. 1998).

6.3.2 Methods

6.3.2.1 Seagrass Visual Assessment Method

The visual assessment method is used to quantitatively determine the percent coverage of seagrass within the restoration site compared to the surrounding reference areas. This method is used at all restoration sites, regardless of restoration method utilized. If seagrass transplantation is implemented, the first year of monitoring should focus on the survivability of the PUs within the restoration site (Section 6.3.2.3), while also quantitatively monitoring the surrounding reference areas (within 1-3 m of restored site) using the visual assessment methodology described below.

Prior to beginning each monitoring event, sampling locations within the restored site and surrounding reference areas (within 1-3 m of restored site) are randomly predetermined (using a software program similar to ArcGIS) and loaded into a survey-grade DGPS unit. The number of sampling locations for linear prop scars and blow holes (by size class) are depicted in Table 11. A minimum of two biologists use the DGPS unit to navigate to each sampling location. At each sampling location, a quadrat is temporarily placed on the substrate and B-B cover data are collected for each individual seagrass species and total seagrass (Section 3.7.3). To determine the percent coverage for each seagrass species and total seagrass within the restoration site, the B-B scores are converted to percentages (using range midpoints) and averaged over all of the quadrats assessed within the restoration site. The same calculations are performed for the quadrats within the surrounding reference areas. Differences between the restored site and the surrounding reference area help determine the overall success of the restoration project (Section 6.3.3). Photographs are also collected at restoration and reference site sampling locations for archival purposes.

Table 11. Number of sampling locations for linear prop scars and blow holes (by size class category).

Damage Type	Number of Sampling Locations in Restored Site	Number of Sampling Locations in Reference Area	Total Number of Sampling Locations
Prop Scar	**10**	**10**	**20**
Blow Hole (size class categories)			
10-20 m^2	5	5	10
20-50 m^2	10	10	20
50-150 m^2	20	20	40
150-300 m^2	40	40	80
300-500 m^2	80	80	160
> 500 m^2	120	120	240

Comparisons between the restoration site and surrounding reference areas can also be used to determine if a potentially poor restoration success may be due to a failed restoration effort or the result of a wider environmental issue (e.g., poor water quality, disease, etc). For example, if low comparable percent coverage values of seagrass are observed within the restoration site and surrounding reference areas, it may be an indication that an environmental issue is the cause of the low values, rather than a failed restoration attempt.

6.3.2.2 Additional Sediment Placement Methods (Sediment Elevation)

In addition to the visual assessment method, biologists must also record sediment elevation (relative to the elevation of un-impacted adjacent areas) and condition of the sediment tubes (if deployed). Sediment elevation can be measured electronically with a depth sounder or manually. A depth sounder, integrated with DGPS, is mounted on an inflatable boat or float and guided back and forth across the restoration site and surrounding reference areas by a biologist using snorkel gear (Uhrin et al. 2011). The depth readings and DGPS data (collected at predetermined

intervals) are downloaded to a computer and a software program, such as ESRI ArcMap, which displays the sediment elevation of the restoration site, compared to the reference areas.

Using the manual method, a marked transect tape is stretched laterally across the width of the restoration site. The ends of the transect tape are secured to the adjacent substrate on either side of the restoration site using stakes or lead weights. A diver/snorkeler measures the vertical distance between the transect tape and the surface of the sediment fill material at 0.5-m intervals. Measurements are recorded with a ruler to the nearest 5 cm. Multiple transects are conducted across the restoration site at 5-m intervals to determine sediment elevation throughout the site (McNeese et al. 2003).

6.3.2.3 Additional Seagrass Transplantation Methods (PU Survival and Shoot Density)

In addition to the visual assessment method, measurements of PU survival and shoot density are collected at the restoration site (Fonseca et al. 1998, Farrer 2010). If the restoration site is small, all PUs are surveyed for PU survival. If the restoration site is large, at least 10% of all PU planting lines should be randomly selected and sampled. Note that the existence of a single short shoot indicates PU survival (Fonseca et al. 1998). Ancillary data including epiphyte loading (if present), epiphyte description (if present), and overall seagrass appearance are also collected for each PU sampled. Shoot density is calculated by counting the number of short shoots in a smaller quadrat placed in the center of the quadrat used during the visual assessment. The short shoot counts within each quadrat are then averaged over the total number of quadrats assessed within the restoration area and compared over time.

Monitoring is also conducted at the donor site. Prior to any seagrass collection effort (pre-construction), the donor site should be quantitatively assessed for the percent coverage of seagrasses. Using snorkel or scuba equipment, a minimum of two biologists will acquire seagrass species and percent cover data from the donor site using the B-B method (NOAA DARRP 2013, Uhrin et al. 2011). This method involves temporarily placing a quadrat on the substrate and visually inspecting the content inside the quadrat. The same quantitative assessment also occurs during each monitoring event. Differences between pre-construction seagrass coverage and seagrass coverage calculated during each monitoring event will determine the natural recovery rate at the donor site. If the plugging device or peat pot method is used, biologists may also revisit a small subset of the plugging locations in the donor site during each monitoring event and perform a qualitative assessment describing sediment and seagrass recruitment into the plugging location.

6.3.2.4 Additional Bird Stake Methods

In addition to the visual assessment method, biologists must also record the condition or structural integrity of the bird stakes during each monitoring event. Individual maintenance or replacement may be required throughout the length of the monitoring period to ensure a successful restoration project.

6.3.3 Success Criteria

The desired endpoint of restoration is to obtain seagrass percent coverage values within the restoration site that are equivalent to values within the reference sites. By restoring a damage

site to pre-disturbed conditions, not only is the physical appearance of the site improved but the wilderness character and overall ecological function (e.g., utilization of seagrass habitat by wildlife) of the seagrass habitat is restored. Success criteria for a given restoration project are stipulated in local, state, and federal permits. Typical success criteria include:

- No net erosion (greater than 10 cm) in filled areas over five-year monitoring period (BNP Programmatic Categorical Exclusion);
- PU survival rate of 75% or better after the first year (BNP Programmatic Categorical Exclusion). If less than 75%, corrective action in the form of remedial action is taken during the next available planting period (NOAA and FDEP 2004); and
- Seagrass coverage within the restoration site contains a minimum of 80% of the seagrass species composition and density of the surrounding reference area (Atkins 2013).

6.3.4 Corrective Action/Supplemental Restoration

During the course of the post-construction monitoring effort, corrective action or supplemental restoration may be conducted at a damage site if recovered funds are available or if the monitoring success criteria are not being met (Section 6.3.3). Example supplemental restoration actions include installation of the following:

- Supplemental sediment tubes or loose fill if sediment subsidence has occurred over time, preventing the successful recruitment of neighboring seagrasses into the damage site;
- Supplemental seagrass PUs if PU mortality is high;
- Supplemental bird stakes if bird stakes are damaged or missing; and/or
- Relocation of bird stakes from a completely recovered area to an area needing additional restoration.

6.3.5 Post-Construction Monitoring Reports

Monitoring reports are prepared by project biologists within 45 days of each monitoring event and submitted to the project manager and appropriate local, state, and federal agencies. The monitoring reports include the following:

- Project background and description including a brief description of the damage site, results of the damage assessment, and the restoration conducted;
- Restoration success criteria;
- Technical approach including detailed description of monitoring methods;
- Monitoring results;

- Discussion including (1) comparisons between the restoration site and surrounding reference areas, (2) comparison of current monitoring data with previous monitoring events (i.e., restoration progress over time), and (3) comparison of monitoring results to project success criteria; and

- Any recommendations or corrective actions taken.

6.4 CONSIDERATION OF WILDERNESS CHARACTER

Sections 6.2 and 6.3 provide a detailed description of each of the restoration monitoring techniques. Table 12 presents the potential benefits and impacts to wilderness character from each of the proposed restoration monitoring tools/techniques utilized. Each of the restoration monitoring techniques in Table 12 represents the minimum concept/tool with regard to wilderness character; however, the need for a specific restoration monitoring activity will be determined on a site-specific basis and will depend on the restoration alternative selected and implemented at the damage site (see Section 1.1.9.2 for additional information regarding the minimum concept/tool with regard to wilderness character). As such, the selected site-specific restoration monitoring techniques constitute the best approach to achieve restoration at the damage site with the least impact to wilderness character.

Table 12. Potential benefits and impacts to wilderness character from the proposed tools/techniques utilized in monitoring protocols.

Tools/Technique	Potential Benefits to Wilderness Character (WC)	Potential Impact to Wilderness Character (WC)
Construction Compliance		
Turbidity Monitoring	• Temporary benefit to the natural quality of WC by minimizing impacts to the seagrass community and benthic biota from potential sedimentation/smothering during construction.	• Temporary impact to the untrammeled and natural qualities of WC from vessel anchoring (if necessary) within the damage/restoration site. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels and equipment at the damage/restoration site.
Protected Species Provisions	• Temporary benefit to the natural quality of WC by minimizing impacts to protected marine species associated with the wilderness ecosystem from potential impacts during construction.	• None
Post-Construction Monitoring		
Seagrass Visual Assessment	• Permanent benefit to the untrammeled and natural qualities of WC at the damage/restoration site. This technique represents the minimum tool to collect sufficient and accurate data to determine the success of the implemented restoration action over time.	• Temporary, minor impact to the untrammeled and natural qualities of WC from the placement of quadrats on the bottom and vessel anchoring (if necessary) within the damage/restoration site. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the damage/restoration site.
Sediment Elevation	• Permanent benefit to the untrammeled and natural qualities of WC at the damage/restoration site. This technique represents the minimum tool to collect sufficient and accurate data to determine whether the sediment elevation within the damage/restoration site is appropriate to allow for seagrass recruitment. This tool allows for adaptive management of a sediment placement restoration action (as needed).	• Temporary, minor impact to the untrammeled and natural qualities of WC from the placement of measuring tapes, stakes and/or weights on the bottom and vessel anchoring (if necessary) within the damage/restoration site. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the damage/restoration site.

Table 12 (continued). Potential benefits/impacts to wilderness character from the proposed tools/techniques in monitoring protocols.

Tools/Technique	Potential Benefits to Wilderness Character (WC)	Potential Impact to Wilderness Character (WC)
PU Survival and Shoot Density	• Permanent benefit to the untrammeled and natural qualities of WC at the damage/restoration site and donor site. This technique represents the minimum tool to collect sufficient and accurate data to determine the success of the seagrass transplantation action over time at the damage/restoration site, as well as the success of natural recovery at the seagrass donor site. This tool allows for adaptive management of a seagrass transplantation restoration action (as needed).	• Temporary, minor impact to the untrammeled and natural qualities of WC at the donor site and damage/restoration site from the placement of quadrats on the bottom and vessel anchoring (if necessary). • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the donor site and damage/restoration site.
Bird Stake Monitoring	• Permanent benefit to the untrammeled and natural qualities of WC at the damage/restoration site. This technique represents the minimum tool to determine the condition and structural integrity of installed bird stakes over time. This tool allows for adaptive management of a restoration action utilizing the installation of bird stakes (as needed).	• Temporary impact to the untrammeled and natural qualities of WC at the damage/restoration site from the replacement or repair of bird stakes (as needed). • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the damage/restoration site.
Corrective Action/Supplemental Restoration		
Supplemental Loose Fill/Sediment Tubes	• Permanent benefit to the untrammeled and natural qualities of WC by restoring the grade of the seafloor to match the surrounding undisturbed area, which is essential for restoration of seagrasses.	Loose Fill: • Temporary impact to the untrammeled and natural qualities of WC within the damage/restoration site from installation of the fill material, from vessel/barge anchoring and spudding (if necessary) and human traversal (if necessary to level the fill material). • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels and equipment at the damage/restoration site during fill installation. Sediment Tubes: • Temporary impact to the untrammeled and natural qualities of WC from installation of the sediment tubes (the fabric casing biodegrades over time) at the damage/restoration site. • Temporary impact to the untrammeled and natural qualities of WC if vessel anchoring is necessary and if human traversal is required to transport sediment tubes within the damage/restoration site. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels and equipment at the damage/restoration site during sediment tube installation.

Table 12 (continued). Potential benefits/impacts to wilderness character from the proposed tools/techniques in monitoring protocols.

Tools/Technique	Potential Benefits to Wilderness Character (WC)	Potential Impact to Wilderness Character (WC)
Additional Seagrass PUs	• Permanent benefit to the untrammeled and natural qualities of WC by stabilizing sediments at the damage/restoration site and decreasing the recovery time of the seagrass community within the damage/restoration site by installing seagrass plugs.	Donor Site: • Temporary impact to the untrammeled and natural qualities of WC from collection of seagrass PUs, from vessel anchoring (if necessary), and human traversal within the donor site to collect and transport the PUs. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the donor site during seagrass collection. Damage/Restoration Site: • Temporary impact to the untrammeled and natural qualities of WC from installation of PUs, from vessel anchoring (if necessary), and human traversal within the damage/restoration site to install the PUs. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels at the damage/restoration site during PU installation.
Supplemental Bird Stakes	• Permanent benefit to the untrammeled and natural qualities of WC by decreasing the recovery time of the seagrass community within a nutrient-limited damage/restoration site.	• Temporary impact to the untrammeled, natural, and undeveloped qualities of WC from the installation of bird stakes within the damage/restoration site. Bird stakes remain in place for ~18 months. • Temporary impact to the untrammeled and natural qualities of WC if vessel anchoring is necessary within the damage/restoration site during installation. • Temporary impact to the undeveloped quality of WC from the presence of motorized vessels and equipment at the damage/restoration site during bird stake installation.

6.5 MANAGEMENT MONITORING

It is NPS policy to assess the results of a management action involving park plant and animal populations by conducting monitoring (NPS 2006). Monitoring allows the NPS to determine the impacts of a management method on both targeted and non-targeted ecosystem components (NPS 2006). Management monitoring is currently being conducted in Florida Bay for the Snake Bight PTZ Project (Section 1.1.6.3). In December 2010 (baseline monitoring event), high resolution aerial photography was collected and individual prop scars within Snake Bight, Treatment Area 1, and Treatment Area 2 (Figure 11) were digitized. During the field validation task, a subset of the digitized scars were field validated to determine accuracy of the aerial interpretation and *in situ* monitoring stations were established to track individual prop scars over time and describe changes in prop scar geometry based on passive restoration. The data collected during the baseline event will be compared to future monitoring events in order to determine the effectives of a PTZ as a management strategy within ENP. The next aerial flight and prop scar digitization and field validation tasks are likely to be scheduled for late 2013 or early 2014 (Atkins 2011). Monitoring of managed areas will need to be considered if other management methods (e.g., exclusion areas, channel marking, hazard identification) are implemented to control natural resource damage within ENP.

7.0 PRIORITY RESTORATION AREAS

7.1 PREVIOUS AND ONGOING RESTORATION/MITIGATION ACTIVITIES IN FLORIDA BAY

To date, seagrass restoration efforts within ENP have focused on Cross Bank with two separate efforts in 2007 and 2010. The 2007 restoration effort carried out by ENP involved filling scars with sediment tubes and transplanted seagrass, while the 2010 effort organized by Coastal Conservation Association of Florida utilized bird stakes under NPS approval.

7.2 DETERMINING PRIORITY AREAS FOR FUTURE RESTORATION

For this SHRMP, priority seagrass restoration areas were identified within Florida Bay. These priority restoration areas appear to be suitable for future restoration projects and have a high likelihood of success. These areas have been selected based on several factors including (Fonseca 2006, BNP 1996):

- Accessibility – priority restoration areas are more easily accessible and located in close proximity to boat ramps and potential construction staging areas;

- Proximity to high traffic areas – priority areas are located outside of high traffic areas to reduce risk of additional vessel-related damage;

- Proximity to areas already subject to management – priority restoration areas are located in close proximity to areas currently subject to ENP management (e.g., closed areas);

- Proximity to areas potentially subject to management – priority restoration areas are located in close proximity to areas potentially subject to ENP management (e.g., areas designated as PTZs in the March 2013 Draft GMP preferred alternative);

- Susceptibility to high energy disturbance – priority restoration areas are located outside of high energy environments or high wave action areas; and

- Possibility of rapid, natural re-colonization – priority restoration areas are located in areas with a high potential to recover naturally through re-colonization from the surrounding environment.

According to the Everglades Compendium (dated December 14, 2012), the waters immediately adjacent to Porjoe, Sandy, Duck, and the Tern Keys, as well as the moats and internal creeks associated with the Buchanan Keys, are prohibited to public entry (Section 1.1.6.3). ENP law enforcement also enforces buffer zones (~300 ft) around these closed areas. Because Porjoe, Duck, Tern, and Buchanan Keys are (1) already subject to ENP management and law enforcement and would potentially be protected from additional vessel-related damage, (2) accessible from the upper and middle Florida Keys, and (3) outside of high traffic areas, these areas are designated as priority areas for seagrass restoration. Sandy Key was not included as a priority restoration area because it is located in western Florida Bay without nearby boat access

or potential construction staging areas. Additionally, restoration activities at Sandy Key may be cost-prohibitive because of the remote location of the site.

Figures 26-29 depict the locations of Porjoe, Duck, Tern, and Buchanan Keys in Florida Bay (along with a 300-ft enforced buffer areas), and potential restoration sites (e.g., prop scars and blow holes) within the buffer areas. Potential restoration sites were digitized using aerial imagery collected in December 2010. Prior to any restoration activity, field validation should be conducted at all potential restoration locations to determine the presence of vessel-related damages and to confirm that these features are not recovering naturally or located in high energy environments. The damage assessment and restoration determination protocols (Sections 3.2 and 4.2) would then be used to determine the condition of the damage site and the appropriate restoration action. The number of staff, volunteers, and resources needed to successfully complete a restoration activity directly correlates to the size of the damage site and the restoration method selected. Both Porjoe and Buchanan Keys contain a variety of vessel-related damages (e.g., potential prop scars, blow holes) and a variety of restoration methods are available for these sites. Thus, an assortment of restoration options is available to ENP within these priority areas, dependent upon the staffing and financial resources available for a particular restoration project.

Potential restoration sites could not be determined from the December 2010 aerial imagery at Duck and Tern Keys (Figures 27 and 28). These areas would need to be evaluated in the field (using snorkel and scuba gear) for the presence of vessel-related damages. The damage assessment and restoration determination protocols (Sections 3.2 and 4.2), which include the cultural resource assessment and minimum requirement concept, would then be used to determine the condition of the potential restoration location and the appropriate restoration action.

In addition to the closed areas listed in the Everglades Compendium, the March 2013 Draft GMP's Preferred Alternative proposes the implementation of PTZs in a majority of Florida Bay's shallowest areas (Figure 30, NPS 2013a). The "Preferred Alternative Zones" (Figure 31) should be considered as additional priority restoration areas if the March 2013 Draft Preferred Alternative is implemented. These zones were selected based on close proximity to boat ramps and potential construction staging areas, distance from high traffic areas, and potential for ENP management. The "Preferred Alternative Zones" were identified using previous prop scarring data (2004) and represent those areas with a high frequency of vessel grounding incidents. Potential restoration locations within the "Preferred Alternative Zones" were determined using the December 2010 aerial imagery. Field validation efforts should be conducted at all potential restoration locations to determine the presence of vessel-related damages and to confirm that these features are not recovering naturally or located in high energy environments. The damage assessment and restoration determination protocols (Sections 3.2 and 4.2), which include the cultural resource assessment and minimum requirement concept, would then be used to determine the condition of the potential restoration site and the appropriate restoration action.

Additional priority seagrass restoration areas will be identified over time using the techniques described in this SHRMP.

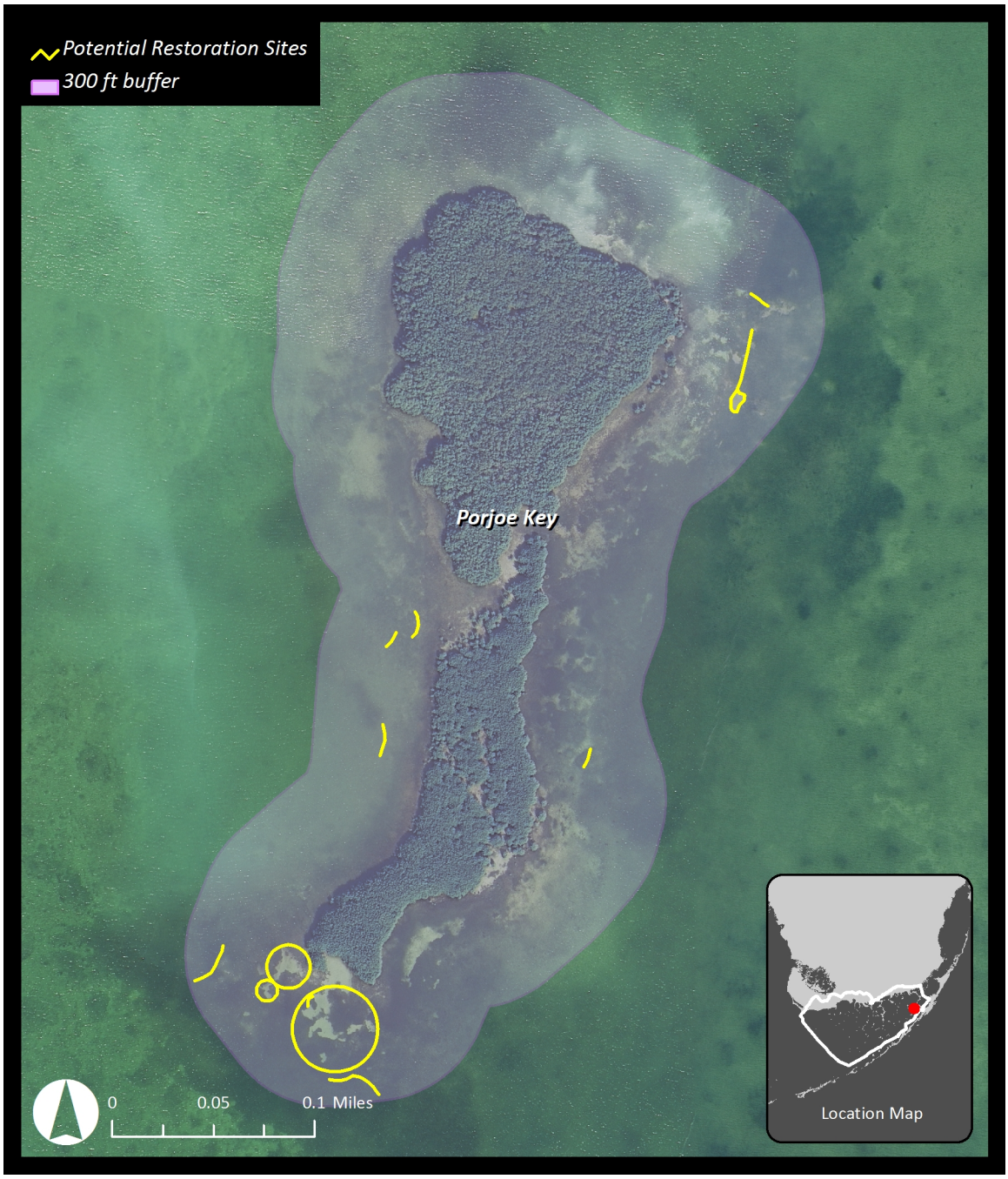

Figure 26. Location of Porjoe Key in Florida Bay (inset map), 300-ft buffer, and potential restoration sites.

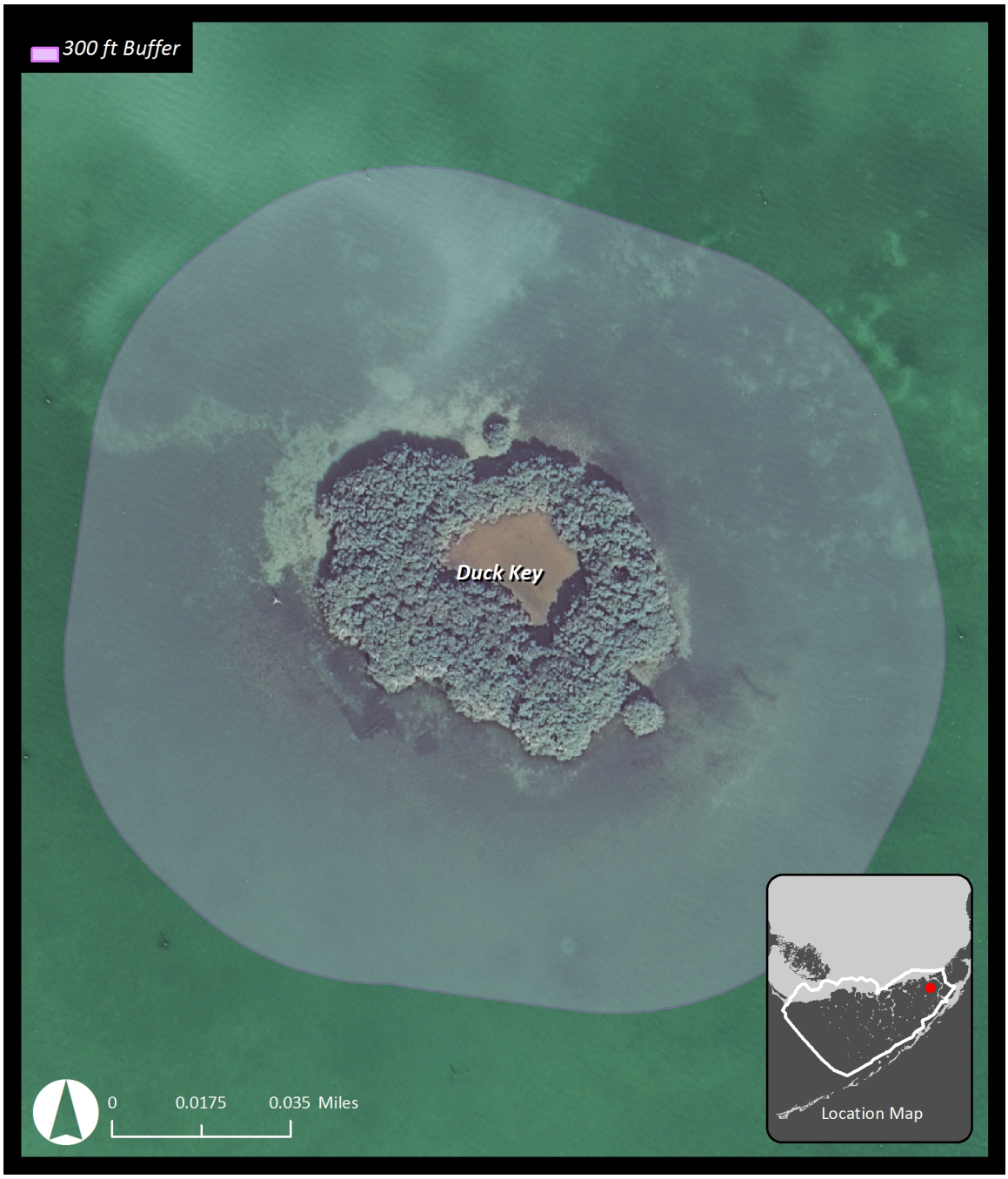

Figure 27. Location of Duck Key in Florida Bay (inset map) and 300-ft buffer. No potential restoration locations were found during analysis of 2010 aerial imagery.

Figure 28. Location of the Tern Keys in Florida Bay (inset map) and 300-ft buffer. No potential restoration locations were found during analysis of 2010 aerial imagery.

Figure 29. Location of Buchanan Keys in Florida Bay (inset map), 300-ft buffer, and potential restoration sites. Locations of closed area markers (stating no entry into the moat and tidal creeks) are also depicted.

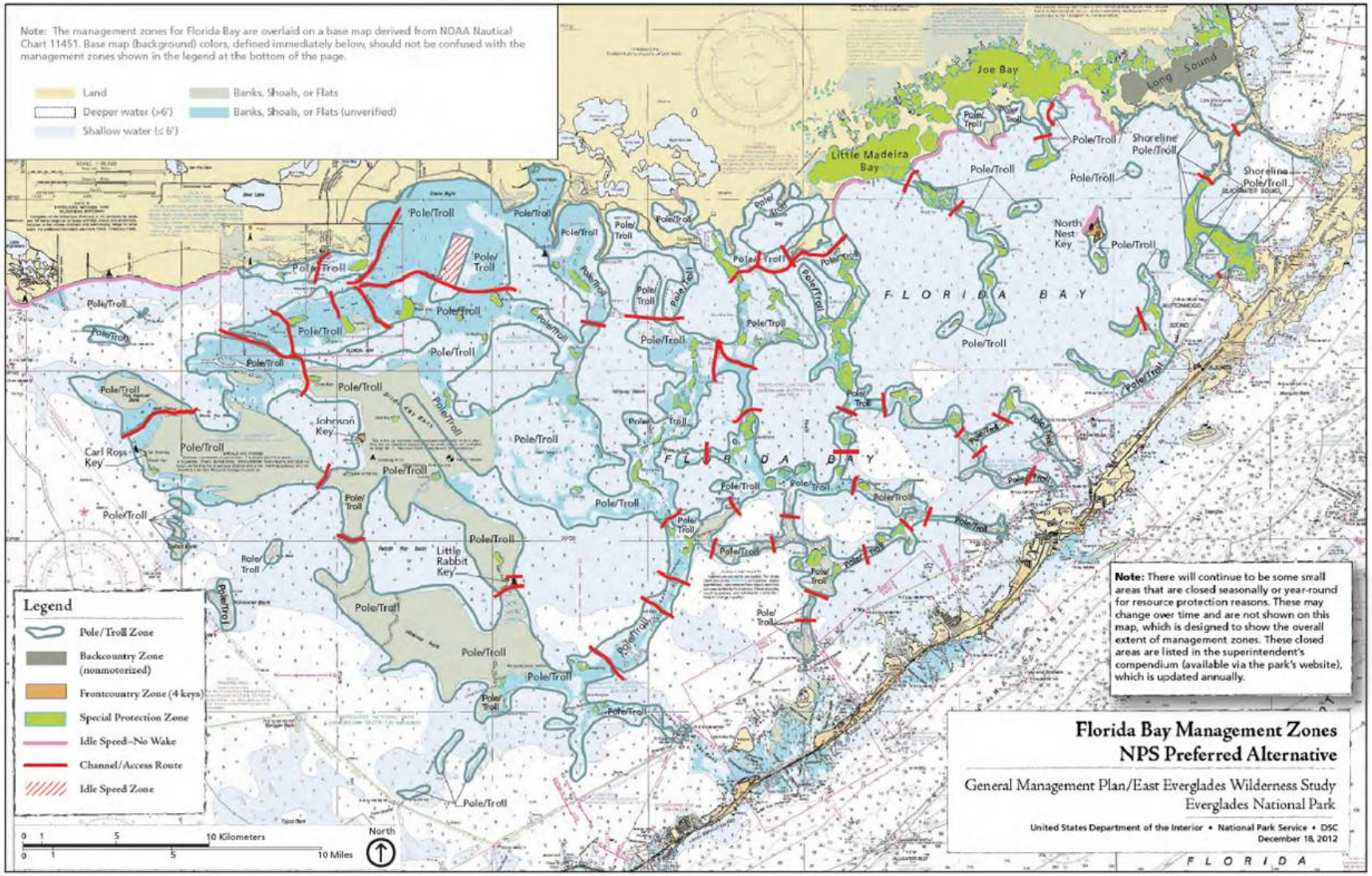

Figure 30. NPS Preferred Alternative management zones including PTZs. Figure provided by ENP.

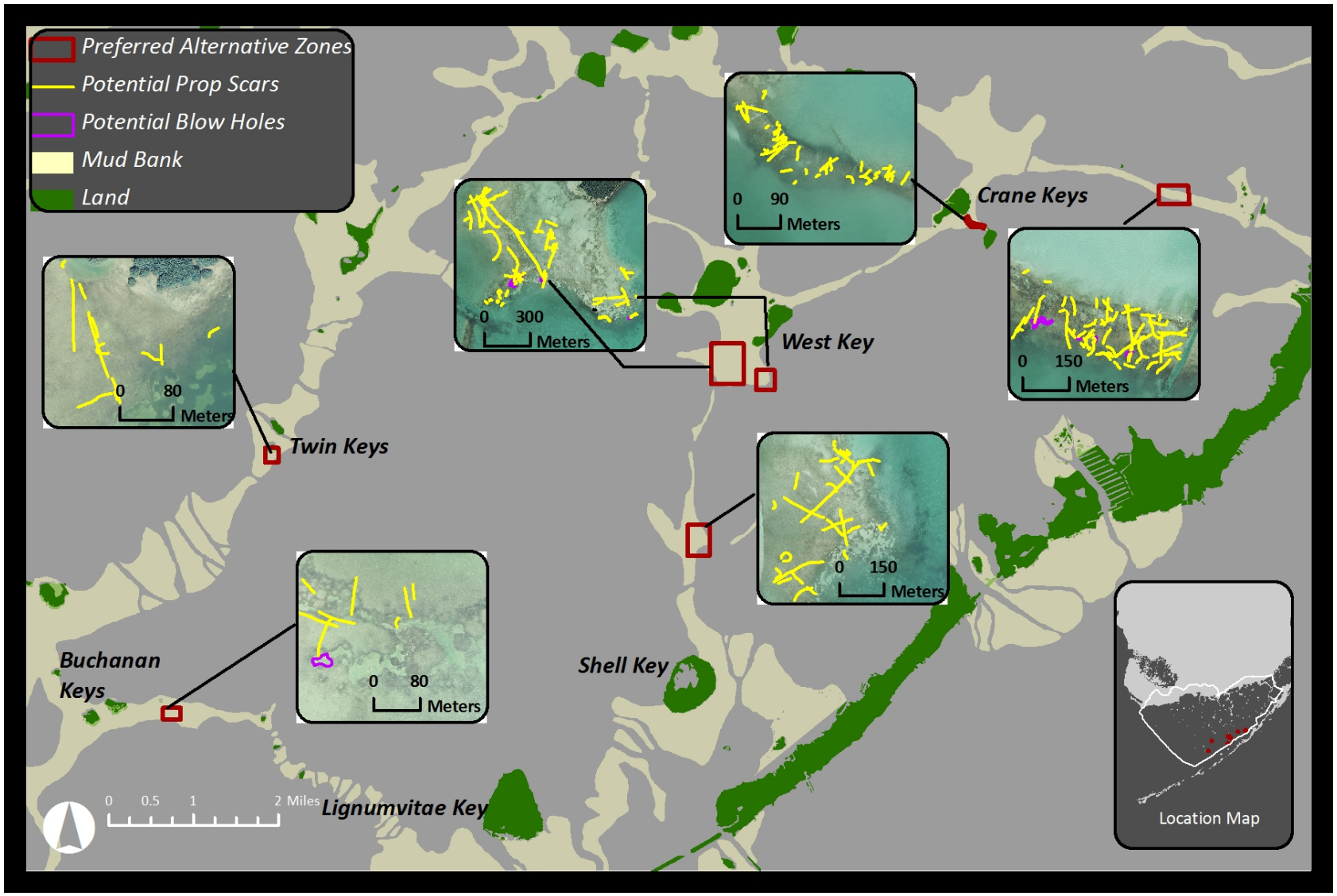

Figure 31. Potential restoration locations within Preferred Alternative Zones.

8.0 PUBLIC INVOLVEMENT

8.1 NPS AND PUBLIC INVOLVEMENT

The NPS's commitment to civic engagement is essential for creating and developing plans and programs that improve the condition of parks, enhance public service, and integrate parks into sustainable ecological, cultural, and socioeconomic systems (NPS 2006, 2007). Civic engagement, an open and continuous conversation with the public on many levels, serves the following functions: (1) to inform and strengthen plans and programs in the short- and long-term, (2) to promote environmental, historical, and cultural stewardship, (3) to foster historical and cultural diversity through collaboration, and (4) to extend and expand civic responsibility by building long-term collaborative relationships with a broad range of communities. The public includes all individuals, organizations, and entities that have an interest in or knowledge about parks and programs administered by the NPS (NPS 2007).

To accomplish the NPS mission (specified in the NPS Organic Act) and in compliance with public laws, departmental policy, and Director's Orders, the NPS is required to provide timely and accurate information to the public during planning and programming processes (NPS 2006, 2007). Public involvement includes (NPS 2007):

- Planning a variety of opportunities for the public to learn about and express their opinions on potential NPS actions and policies;
- Informing and educating the public about scientific studies used to inform management decisions and strategies;
- Consulting with the public to obtain any information they may have that might contribute to or inform park management;
- Learning about the public's concerns, values, and preferences and considering their input when making decisions;
- Responding to public suggestions or comments in a timely, honest, and respectful manner; and
- Engaging the public in NPS' work and in the sustainable enjoyment of park ecosystems.

Public involvement is beneficial to the NPS because it promotes information sharing, an understanding of NPS missions and objectives, and collaboration with other agency programs. Public involvement also minimizes the potential for duplication of effort and for contradictory or conflicting activities among NPS and other agencies (NPS 2007).

8.2 SHRMP AND PUBLIC INVOLVEMENT

Public involvement was considered prior to and during development of this SHRMP. The substantial public input and discussion collected by ENP during the review and comment phases

for the March 2013 Draft GMP and the Snake Bight PTZ projects has been incorporated into this SHRMP. Prior to development of the SHRMP, ENP coordinated and consulted with the following agencies and tribes (Appendix E):

- USACE;
- USFWS;
- NMFS;
- FDEP;
- FFWCC;
- Florida SHPO;
- Monroe County Department of Marine Resources;
- Miccosukee Tribe of Indians;
- Seminole Tribe of Florida; and
- ENP Wilderness Committee.

The results of this coordination and consultation were used to develop this SHRMP document. This Draft SHRMP document will be subject to a 30-day public review and comment period which will include issuance of a press release, posting on the NPS Planning, Environment, and Public Comment (PEPC) website for on-line public review and input during the comment period, and holding a public meeting that will include a presentation of key plan information, opportunity for public comments and discussion with project team members. All comments received during the 30-day comment period will be reviewed and incorporated into the Final SHRMP document, as appropriate.

9.0 REGULATORY CONSISTENCY

NPS management policies must be consistent with U.S. laws and regulations (e.g., U.S. Constitution, public laws, treaties, proclamations, executive orders, and regulations), as well as directives from the Secretary of the Interior and the DOI's Assistant Secretary for Fish and Wildlife and Parks. Proposed NPS projects, activities, or administrative actions with the potential to impact wilderness resources must be compliant with the NEPA (NPS 1999). NPS management policies are updated periodically as new information becomes available and updates may take the form of a Director's Order (for interim updates or amendments), which serve to clarify or supplement existing management policies. Handbooks and reference manuals issued by NPS associate directors provide the most detailed and comprehensive guidance regarding NPS management policies (NPS 2006).

This SHRMP is intended to be both fluid and evolving. It is consistent with the existing federal regulations and management plans. Relevant federal regulatory acts and NPS management plans/policies that were used as guidance for establishing the process, procedures, and consistency of this SHRMP are listed below.

9.1 WILDERNESS ACT OF 1964

On September 3, 1964, Congress established the Wilderness Act (Public Law 88-577; 16 U.S. C. 1131-1136), which designated specific federally owned areas as "wilderness areas" to be administered, preserved, and protected for present and future generations of Americans. The definition of a wilderness, as defined by the Wilderness Act of 1964, is:

> *"..an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."*

The Wilderness Act established the National Wilderness Preservation System, which currently includes 757 wilderness areas totaling 110 million acres in 44 states and Puerto Rico (www.wilderness.net). The Wilderness Act dictates that agencies administering a wilderness area are responsible for preserving its wilderness character. Wilderness areas are to be devoted to maintaining the area for the purposes of public recreational, scenic, scientific, educational, conservation, and historical use.

As part of ENP, Florida Bay falls within the designated MSD Wilderness. Florida Bay's SAV and bottom habitat are defined as federally designated submerged marine wilderness. It is the responsibility of the NPS to manage and preserve the wilderness character of the MSD Wilderness, including Florida Bay's submerged wilderness (i.e., the seagrass and other benthic

communities). This SHRMP considers the preservation of wilderness character, as well as the minimum requirement/activity concept, through each step of the damage assessment and seagrass restoration process.

9.2 NATIONAL HISTORIC PRESERVATION ACT (SECTION 106)

The NHPA of 1966 (16 U.S.C. Sec. 470) was enacted "to preserve, conserve, and encourage the continuation of the diverse traditional prehistoric, historic, ethnic, and folk cultural traditions that underlie and are a living expression of our American heritage" (NPS 2006). Section 106 of the NHPA (16 U.S.C. Sec. 470f) requires that any federally-funded undertaking consider effects on "any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register." The federal agency with jurisdiction over the undertaking is to give the Advisory Council on Historic Preservation (established under Title II of the NHPA) a "reasonable opportunity to comment with regard to such undertaking." The NPS is responsible to protecting and preserving cultural resources within the ENP, as well as fostering appreciation of those cultural resources within ENP (NPS 2006).

9.3 ARCHAEOLOGICAL RESOURCE PROTECTION ACT

The ARPA was passed on October 31, 1979 (Public Law 96-95; 16 U.S.C. Sec. 470aa-mm), and has been amended four times. The ARPA is a federal law that governs the excavation, removal, and disposition of archeological resources located on public (federal) lands and Indian lands. The purpose of the ARPA is to secure the protection of the valuable and irreplaceable archeological resources on public and Indian lands. The ARPA defines archeological resources as "any material remains of past human life or activities which are of archeological interest" which might include pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, and human skeletal materials.

The NPS may issue permits to excavate or remove archeological resources from public or Indian lands, pursuant to the regulations under the ARPA, and the curation and disposition of these resources is regulated under the ARPA. The ARPA also describes prohibited actions (e.g., damage/defacement, unpermitted excavation or removal, and illegal sale or purchase of archeological resources from public or Indian lands), as well as enforcement of punitive penalties for ARPA violations.

9.4 NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT

The NAGPRA was enacted on November 16, 1990 (Public Law 101-601; 25 U.S.C. Sec. 3001 *et seq.*). The NAGPRA states that any Native American cultural items (i.e., remains, funerary objects, sacred objects, or other cultural patrimony) that are excavated or discovered on Federal or tribal lands shall be returned to the lineal descendants (or, if the lineal descendants cannot be ascertained, to the appropriate Indian tribe or Native Hawaiian organization) of the Native American. The NAGPRA also establishes the process for intentional excavation and removal of Native American human remains and objects. The Act dictates the process that should be followed if any Native American cultural items are inadvertently discovered on Federal or tribal lands and establishes that illegal trafficking of Native American cultural items will result in civil and criminal penalties.

9.5 ABANDONED SHIPWRECK ACT OF 1987 (P.L. 100-298)

The Abandoned Shipwreck Act of 1987, signed into law on April 28, 1988, asserts the Federal government's title to three categories of abandoned shipwrecks: those embedded in a State's submerged lands, those embedded in coralline formations protected by a State on its submerged lands, and those located on a State's submerged lands and included in, or determined eligible for, inclusion on the NRHP. The term "embedded" means that excavation tools are required to remove bottom sediments or substrate to access the shipwreck, its cargo, or any part thereof.

Abandoned shipwrecks are defined as any wreck where the owner has voluntarily given up the title without investing ownership in any other person and with the intent of never claiming rights or interests in its future. The title for abandoned shipwrecks is subsequently transferred to the State, unless it is in or on Federal or Indian lands, in which case the shipwreck is property of that respective authority. The laws of salvage and finds do not apply to abandoned shipwrecks. Not taking action to mark and remove a wreck or its cargo or provide legal notice to the USCG and USACE under provision of the Rivers and Harbors Act (33 U.S.C. Sec. 409) is considered intent to give up title, and the vessel is treated as abandoned after a period of 30 days. This does not apply to cases where the owner is paid the full value of the vessel (such as an insurance payment) or a sunken warship or other vessel entitled to sovereign immunity. The Abandoned Shipwreck Act also directs the NPS to prepare guidelines to assist state and federal agencies in developing legislation and regulations to effectively manage shipwrecks in waters under their ownership or control.

9.6 ENDANGERED SPECIES ACT

The ESA (16 U.S.C. Sec. 1531 *et seq.*) was enacted on December 28, 1973. The purpose of the ESA is to protect and recover imperiled plant and animal species, subspecies, and distinct population segments and the ecosystems that support them. Both the USFWS and the NMFS are responsible for administering the ESA. The USFWS has jurisdiction over terrestrial and freshwater wildlife, sea turtles engaged in nesting activities ashore, manatees, and sea otters. The NMFS has jurisdiction over marine and anadromous fishes, marine plants and invertebrates, sea turtles in the marine environment, cetaceans, and pinnipeds.

Under Section 4 of the ESA, species are evaluated for listing by five factors, one or more of which may merit protective action:

- Damage or destruction of habitat;
- Overutilization of habitat;
- Disease or predation;
- Inadequate existing protection; and/or
- Other natural or anthropogenic factors affecting the continued existence of the species.

The "take" of a listed animal, which is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" is illegal without the appropriate federal permits. Habitat modification and degradation may fall under the definition of "harm," as these actions may kill or injure wildlife by impairing key behavioral patterns such as reproduction, shelter, and feeding. Listed plants, while not protected from "take," are protected from collection or "malicious harm" on Federal lands.

Under Section 7 of the ESA, Federal agencies are directed to use their legal authority to promote the ESA and ensure that actions authorized, funded, or carried out are unlikely to adversely impact the existence of listed species. Federal agencies are directed to consult with USFWS and/or NMFS, as appropriate, to address proposed actions that may impact listed species. This may include critical habitat, which is a designated geographic area containing features deemed essential for the conservation of a species. The ESA prohibits Federal agencies from destroying or adversely modifying critical habitat.

9.7 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fisheries Conservation and Management Act of 1976 (amended 1996, reauthorized 2006) under Title III established a national fishery management program administered by the NMFS and composed of Regional Fishery Management Councils responsible for formulating science-based management plans for federally managed fish species. Said management plans ideally include EFH, defined under 16 U.S.C. Sec. 1802(10) as waters and substrate necessary to fish for spawning, breeding, feeding, or growth. Federal agencies are required to provide consultation to NMFS on activities which may adversely affect EFH. Impacts to EFH may be direct or indirect, and may be restricted to a particular portion of the habitat or may affect the habitat as a whole.

This SHRMP intends to restore EFH (seagrass beds) damaged by vessel groundings to a state matching surrounding undamaged habitat. In a letter dated March 15, 2013 (Appendix A), NMFS concurred with ENP's determination that implementation of the proposed Florida Bay SHRMP will have a beneficial effect on EFH. NMFS also requested that the SHRMP include several BMPs to avoid potential adverse impacts and to monitoring restoration performance. These BMPs have been incorporated into this SHRMP (Sections 4.4 and 6.3).

9.8 PARK SERVICE ORGANIC ACT

The NPS Organic Act, signed on August 26, 1916, established the NPS under the DOI. Under the Organic Act, and the associated NPS General Authorities Act of 1970, it is the responsibility of the NPS to "promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified... by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 U.S.C. Sec. 1, 16 U.S.C. Sec. 1a-1).

The fundamental purpose of the NPS is to conserve park resources and values. According to the NPS Management Policies (NPS 2006), park resources and values include:

- "The park's scenery, natural and historic objects, and wildlife, and the processes and conditions 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 and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, 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."

One of the reasons parks have been designated under the NPS is to provide public use and enjoyment of park resources and values (NPS 2006). However, when there is a conflict between conserving park resources and values and providing public enjoyment, then conservation takes priority (NPS 2006). Under the Organic Act, NPS managers are responsible for avoiding, or minimizing to the greatest extent practicable, adverse impacts on park resources and values. The NPS may impact park resources and values when determined to be necessary and appropriate in order to fulfill park purposes. However, an impact can not impair (i.e., impact the integrity of) the affected park resources and values (NPS 2006).

9.9 EVERGLADES NATIONAL PARK ENABLING LEGISLATION OF 1934 (48 STAT. 816)

The ENP Enabling Legislation of 1934, approved May 30, 1934, authorized the Secretary of the Interior to acquire an area of approximately 2,000 square miles in the Everglades region and stated that "said lands shall be, and are hereby, established, dedicated, and set apart as a public park for the benefit and enjoyment of the people …" with "administration, protection, and development" under the direction of the NPS. Section 4 states that:

> *"The said 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 this area."*

9.10 EVERGLADES NATIONAL PARK WILDERNESS ACT OF 1978 (P.L. 95-625)

Section 404 of the ENP Wilderness Act of 1978, approved November 10, 1978, states that ENP is to be administered by the Secretary of the Interior according to the applicable provisions of the Wilderness Act, specifying that references to the effective date of the Wilderness Act be taken as

a reference to the effective date of the 1978 legislation and that where appropriate all references to the Secretary of Agriculture be taken to refer to the Secretary of the Interior Section 405 specifies that the USCG and Federal Aviation Administration retain the authority to use these wilderness areas for navigational and maritime safety purposes.

9.11 EVERGLADES NATIONAL PARK PROTECTION AND EXPANSION ACT OF 1989 (P.L. 101-229)

The ENP Protection and Expansion Act of 1989 added the East Everglades Expansion Area (109,506 acres) to the northeastern corner of ENP. The primary objective of this legislation was to place the northeastern Shark River Slough under ENP control to allow for long-range planning to restore of natural water flows through ENP and into Florida Bay. This was done to "assure that the park is managed in order to maintain the natural abundance, diversity, and the ecological integrity of the native plants and animals, as well as the behavior of native animals, as a part of their ecosystem." The legislation specifically cites a decline in fisheries and a population loss of wading birds as rationales for this acquisition.

9.12 PARK SYSTEM RESOURCE PROTECTION ACT (16 U.S.C. SEC. 19JJ) AND DIRECTOR'S ORDER 14

The PSRPA, also known as 16 U.S.C. Sec. 19jj, is a statute that allows the NPS to recover civil damages and agency costs from the destruction, loss of, or injury to a park system resource by a third party. An "injury" refers to an observable or measurable adverse impact to a resource, or a loss or diminishment of services provided by a resource. "Resources" include natural resources (e.g., land, fish, wildlife, biota, air, water, ground water, drinking water supplies) as well as park system resources (i.e., living or non-living resources within a unit of NPS, including natural resources, cultural resources, and physical facilities, with the exception of resources owned by a non-Federal entity). "Services" refer to the functions or uses provided by a resource, and can include both ecological services (e.g., provision of food and refuge for wildlife) and human services (e.g., fishing, hiking, as well as archeological, historical, cultural, and geological resources).

The NPS authority to collect civil damages is derived from the delegated authority of the Secretary of the Interior. The liability of the third party is compensatory in nature, rather than punitive. The NPS is authorized to collect damages for injury to any park system resource, including natural resources, cultural resources, and park facilities. NPS can also recover the costs of those actions taken to respond to the injury incident, the costs of assessing the nature and extent of the injury, and the cost of actions taken to abate or minimize the imminent risk of injury to park system resources caused by the incident. The recovered damages are used for restoration, replacement, or acquisition of resources equivalent to those lost or injured. The PSRPA allows the NPS to recover damages, through settlements and/or litigation resources, to protect and restore injured resources to their baseline conditions (i.e., the condition of the resource/service that would have existed if the injury had not occurred).

Director's Order #14: Resource Damage Assessment and Restoration, along with its associated *Damage Assessment and Restoration Handbook*, present the policies, procedures, and requirements of the NPS to collect civil damages under the PSRPA. Once the NPS has

recovered damages from an incident, the NPS must utilize those damages to restore the injured park system resources in a timely manner. Recovered damages can only be used for restoration, replacement, or acquisition of resources and services, as well as for monitoring and scientific study of resources to evaluate restoration success, as needed.

When the park superintendent is assessing injury and possible restoration actions, the restoration needs should be considered in the context of existing resource/park management objectives (e.g., in accordance with existing management plans). On-site and in-kind restoration actions are preferred. In addition, where appropriate, restoration of lost park services (i.e., ecological or physical and human use functions provided by a park system resource) should be restored. In the case of damage to archeological resources, restoration is not an option; thus, the damaged archeological resource must be documented, studied, and stabilized or mitigated.

Under the PSRPA, the NPS is required to employ a case team consisting of a group of individuals that manage and oversee assessment of the injury and to determine what restoration action to recommend. The case team should include at least a case officer (assigned by the NPS ERDAR), a park representative (assigned by NPS managers), and an attorney (assigned by the DOI's Office of the Solicitor). The case team is responsible for managing the case in order to achieve a successful recovery of damages to accomplish restoration of the injury.

9.13 NATIONAL PARK SERVICE MANAGEMENT POLICIES

The current edition of the NPS Management Policies, issued in 2006, is designed to serve as a means of interpreting and executing the pertinent laws passed by Congress within the national parks system. NPS Management Policies (NPS 2006) are the highest level of guidance documentation within the NPS directives system. Management policies are revised as the NPS takes into account new policies, laws, technologies, understandings of park resources, or factors affecting parks. New revisions of management policies serve to impose consistency across the entire national parks system.

9.13.1 Natural Resource Management

The NPS Management Policies (NPS 2006) state that "The Service will reestablish natural functions and processes in the parks unless otherwise directed by Congress." While natural disturbances resulting from weather or geologic phenomena are to be allowed to recover naturally unless intervention is necessary to protect other park resources, developments, or human lives, impacts resulting from human disturbances are to be returned "to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated." In such cases, a damage assessment provides the initial basis to determine restoration and compensation required to reach the ultimate goal of "restoration, replacement, and/or reclamation of resources for the American public" (NPS 2006). The NPS is directed to use all available legal authority for protection and restoration of natural resources and their environmental benefits, including recovering all appropriate costs from the party responsible for the damage.

9.13.2 Cultural Resource Management

Laws pertinent to historic preservation still apply within a designated wilderness area, but where applicable must be carried out in a manner that preserves wilderness character. Under the PSRPA, the NPS is to take all required and appropriate steps to recover damages and costs from a responsible party in case of actions damaging cultural resources. In such cases, the NPS is expected to prevent or minimize further loss or damage to cultural resources. Resources in danger of natural deterioration are to be stabilized with a minimum of intrusive or destructive action after initial conditions have been documented. Significant archeological finds at risk of loss to uncontrolled degradation should be recovered and preserved.

9.13.3 Wilderness Preservation and Management

As described in detail within Section 1.1.9, management decisions affecting wilderness areas must follow the concept of minimum requirement. Maintenance of wilderness character is to be given priority, both in terms of planning sequence and consideration, over economic efficiency and convenience. Unavoidable impacts to wilderness character and resources are only acceptable if the action preserves wilderness character and/or has only local, short-term impacts. Permanent storage caches and borrow pits are not permitted within wilderness areas. Signage is not to be placed in wilderness areas unless necessary for visitor safety or resource protection.

9.14 NPS DIRECTOR'S ORDERS #12, #28, AND #41

NPS Director's Orders are the second-highest level of guidance documentation within the NPS Directives System. Director's Orders serve as interim updates, amendments, clarifications, or supplements to Management Policies.

9.14.1 Director's Order #12

Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making was initially issued in 1982 and most recently reissued on October 5, 2011 to address NPS compliance with NEPA, which is discussed further in Section 10 of this document. Under NEPA, Federal agencies are required to produce comprehensive studies of impacts and alternatives for any Federal action, including actions not directly conducted by a Federal agency but receiving Federal funds or permits. These studies will then be used to decide whether to proceed with, modify, or reject the intended action after a mandatory public comment period. Director's Order #12 notes that this approach is consonant with the provisions of the NPS Organic Act. At the individual park level, the superintendant has responsibility for implementing conservation planning and impact analysis. This includes designating a park resource specialist to coordinate NEPA and related impact analysis activities. The park resource specialist must have technical and scientific knowledge of the park's resources, including any needs for additional information, and works with contracting officers to ensure mitigation measures identified in NEPA documents are included in project contract documents.

9.14.2 Director's Order #28

Director's Order #28: Cultural Resource Management (NPS 1998a) was issued on June 11, 1998 with a sunset period of 4 years. While Director's Order #28 has since expired, it is currently being updated for re-issue and was incorporated into the fifth and current release of the

NPS-28: Cultural Resource Management Guideline Handbook (NPS 1998b), also in effect since June 11, 1998. NPS-28 elaborates upon the cultural resource management principles of the NPS Management Policies and describes how to apply them to cultural resources research, planning, and stewardship. Archeological resources are to be left undisturbed *in situ* unless intervention or removal is justified, as in cases where significant archeological data may be otherwise lost. Archeologists are to review all proposed actions that may affect archeological resources and record their assessments in planning and compliance documentation.

9.14.3 Director's Order #41

Reference Manual RM 41: Wilderness Preservation and Management (NPS 1999), dated July 1999, was created to inform NPS resource managers of the laws, management policies, and procedures that should be followed to achieve their responsibilities regarding wilderness. This document includes *Director's Order #41: Wilderness Stewardship*, effective August 2, 1999 and revised May 13, 2013, which provides additional clarification regarding NPS wilderness policies. Specifically, the purpose of Director's Order #41 is "to provide accountability, consistency, and continuity to the NPS's wilderness management program, and to otherwise guide Servicewide efforts in meeting the letter and spirit of the 1964 Wilderness Act." Director's Order #41 establishes a set of management responsibility and accountability criteria that instruct park managers on wilderness identification and designation, wilderness management planning, establishing management accountability for NPS employees, and establishing stewardship responsibilities for appropriate NPS staff. Director's Order #41 is meant to be applied to management actions that are carried out in accordance with a park's GMP, as well as the Government Performance and Results Act, the park's natural and cultural resources plans, and the park's wilderness planning document.

Wilderness Management Plan. A Wilderness Management Plan (WMP), or equivalent planning document such as a Wilderness Stewardship Plan (WSP), must be developed and maintained for each park containing wilderness resources. An environmental compliance document demonstrating compliance with both NEPA and NHPA, and incorporating public involvement, must accompany the WMP/WSP. In addition, the plan must be in compliance with, and coordinated with, other park management documents (e.g., GMP, Strategic Plan, Natural and Cultural Resources Management Plan, etc.).

Minimum Requirements Analysis. Director's Order #41 requires that park managers establish a MRA. The intent of the minimum requirement concept is to guide management actions within a wilderness area in order to minimize impacts to wilderness resources and character. The minimum requirement concept is discussed in detail in Section 1.1.9.2.

Cultural Resources. Wilderness area may contain properties that are also designated cultural resources. Those laws that preserve cultural resources, such as the NHPA, ARPA, and the NAGPRA, are all applicable within wilderness areas and park managers must maintain a cultural resource management program within each wilderness area. However, cultural resources must be treated in a manner that preserves wilderness resources and character. The inventory and protection of cultural resources in wilderness areas must comply with Wilderness Act Provisions and MRA provisions.

10.0 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

Decisions affecting future land or resource use as part of a plan or program trigger NEPA based on the need for public input into policy-level decisions, which is essential to NPS decision-making. In addition, according to the Council on Environmental Quality (CEQ), "Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts" (40 CFR 1501.2). The criteria used to decide whether NEPA is required for NPS plans are the same as those used for major projects (i.e., whether a plan alternative under consideration will ultimately affect the human environment). For the NPS, CEs are applicable to actions that, under normal circumstances, are not considered major federal actions and have no measurable impacts on the human environment. This is true under NEPA, whether the impact is beneficial or adverse.

A preliminary determination has been made that approval of the proposed project would qualify as a CE for which documentation is required under NEPA (42 U.S.C. Sec. 4321–4347 *et seq.*), as provided by NEPA implementing regulations in the Code of Federal Regulations (40 CFR 1500,5(k), 1507.3(b)(2), 1508.4), by DOI regulations (43 CFR 46.205, 46.210, 46.215), and by the DM regarding NEPA management by the NPS (516 DM, 12). The proposed project is:

- Part of previously-approved NEPA documentation;
- An action listed as a CE in Director's Order #12; and
- Not an exception to a CE in Director's Order #12 (no measureable impacts to the human environment).

10.1 PREVIOUS NATIONAL ENVIRONMENTAL POLICY ACT DOCUMENTATION

Environmental analysis of alternatives and public involvement required under section 102(2)(C) of NEPA (42 U.S.C. Sec. 4332(2)(C)) is conducted at any level of planning in which decisions to be made constitute a major federal action significantly affecting the quality of the human environment. NEPA analysis and public participation are implemented at the general management planning level, when the overall direction for the park's future is decided, and again at the implementation planning level before funding and resources are committed to specific actions. In keeping with the CEQ guidelines for NEPA compliance, environmental analysis for more specific programs or actions will follow, or flow from, earlier NEPA documents for the broader GMP. With respect to earlier NEPA documents, the SHRMP is part of, and consistent with, previously approved NEPA compliance documents: the 1978 Final ENP Wilderness Recommendation/Environmental Statement, 1979 ENP Master Plan, and 1981 ENP Backcountry Management Plan.

10.2 CATEGORICAL EXCLUSION

The proposed SHRMP is a categorically excluded action under the following DOI CE, pursuant to the DM (516 DM 12, section 12.5.E, *Actions Related to Resource Management and Protection*):

- (6) Restoration of noncontroversial (based on internal scoping requirements in section 2.6 of NPS-12) native species into suitable habitats within their historic range.

- (8) Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.

10.3 NOT LISTED AS AN EXCEPTION TO CATEGORICAL EXCLUSIONS

Before determining if a CE is appropriate for the proposed action, 516 DM, 2.3A (3) requires review of "extraordinary circumstances" listed in Director's Order #12 (includes list from 516 DM 2, Appendix 2, in addition to NPS-specific exceptions) to determine if an otherwise categorically excluded action would require additional environmental analysis and/or documentation as a result of adverse impacts to park resources. The interdisciplinary team (IDT) or the NPS decision-maker determines whether any of the 18 exceptions apply to a proposed action and whether the action may be categorically excluded.

At this time, the SHRMP IDT members have evaluated the proposed project and completed the ESF (Director's Order #12) and determined that no minor adverse impacts are anticipated as a result of the proposed SHRMP and that Mandatory Criteria will not be violated. The completed form is provided in Appendix E.

The appropriate NEPA pathway for the proposed project was followed to help determine the context, duration, and intensity of effects on resources, pursuant to section 5 of the ESF and the process described in Director's Order #12, 2.9 and 2.10; 3.5; 4.5(G) to (G)(5) and 5.4(F). To ensure that the proposed action does not have the potential for measurable impacts, the steps listed below have been followed (per Director's Order #12).

1. Using an interdisciplinary approach, determine whether any connected, cumulative, or similar actions are part of the proposed action. In other words, carefully consider whether it is a piece of a larger action that should be analyzed in a NEPA document.
   No adverse measureable impacts are anticipated as a consequence of the proposed project. The ESF used to make the preliminary determination for the CE is included in Appendix E.

2. Use the ESF to ascertain the important environmental issues, and visit the site if the IDT is not familiar with it.
   The ESF has been reviewed, the project site visited, and the proposed project evaluated by the IDT.

3. If no exceptional circumstances exist (Director's Order #12, section 3.5), and this fact is confirmed by the ESF, contact interested and affected local, state, and/or federal agencies

to see whether any object to the NPS determination that there is no potential for measurable impact.
Public involvement will be carried out as part of the proposed plan to ensure public input into the plan to the extent possible. A 30 day public comment period will be held during public scoping for the proposed project.

4. If interested or affected public exist, make a diligent effort to contact them and obtain their input.
Public involvement will be carried out as part of the proposed plan to ensure public input into the plan to the extent possible. Public involvement opportunities will be posted on the park website during project scoping, information will be e-mailed to the public and park stakeholders, and a press release will be issued.

Final steps for NEPA compliance include preparation and submittal of the CE. Scoping and consultation with all affected agencies, tribes, and stakeholders (e.g. USACE, USFWS, NMFS, FDEP, FFWCC, Florida SHPO, Monroe County Department of Marine Resources, Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, and the ENP Wilderness Steering Committee) will occur under the proposed action. Upon completion of public scoping, and agreement among the NPS team, other agencies, and the public that there is no potential for measurable impact, the CE will be documented and submitted to NPS for approval.

Under the "programmatic approach" of the SHRMP, final approval of the SHRMP by the Wilderness Committee and regulatory agencies indicates that the tools and techniques described in this SHRMP are satisfactory and conform to all applicable laws, regulations, and policies and that all restoration projects conducted in compliance with this SHRMP conform to NEPA and the Wilderness minimum requirement concept. Consistency with previous plans and NEPA documents does not eliminate the need for regulatory agency coordination and consultation on a project-specific basis.

11.0 CONCLUSIONS AND RECOMMENDATIONS

ENP is tasked with protecting natural, cultural, and wilderness resources in Florida Bay. Seagrass communities are integral to the ecological function of Florida Bay and provide food and shelter necessary to sustain the exceptional fisheries, bird, and wildlife populations found within the bay. Much of the bay's perceived economic and recreational value stems from the overall health of the bay's seagrass habitat. Furthermore, seagrass beds also constitute an integral, definitive part of Florida Bay's natural quality of wilderness character.

Florida Bay offers a premier fishing and wildlife viewing destination for national and international visitors. As a result, Florida Bay experiences heavy recreational boat use. The shallow nature and complex landscapes of the bay leave its benthic habitats susceptible to damage from motorized watercraft. In cases where damage is extensive (e.g., large damages or repetitive small damages over time), such damages also degrade natural resources and wilderness character.

This SHRMP represents a strategy to be implemented by ENP and its partners for many years to come. The SHRMP will allow ENP to effectively manage (i.e., restore and conserve) seagrasses within Florida Bay in a manner consistent with the laws protecting these important resource areas by providing guidance to ENP staff and managers for various procedural options for seagrass damage assessment, restoration, and monitoring. Specific goals of the SHRMP include:

- Providing guidance on appropriate response measures for a vessel damage incident;
- Providing guidance on appropriate seagrass restoration and monitoring actions;
- Identifying candidate "priority areas" for initial restoration efforts; and
- Ensuring consistency with applicable laws, regulations, and policies.

The Damage Assessment Protocols presented in this SHRMP include a description of the project team members, equipment, and protocols necessary to respond to a vessel-related damage incident in Florida Bay. A damage assessment decision protocol is presented which provides a step-by-step process for assessing damages to ENP resources within Florida Bay. There are two possible outcomes resulting from the damage assessment decision protocol: approval or rejection. Approval for potential restoration is granted if vessel-related damage is present and cultural resources of significance are not identified within the project vicinity. If a damage site is approved for potential restoration, the Restoration Protocols are implemented. Rejection occurs in the event that cultural resources of significance are identified within the project vicinity. Further damage assessment will be postponed until 1) consultation with the appropriate agencies (e.g., the SHPO) has been resolved and 2) the NPS has followed the protocols under ARPA (Section 9.3), as required. Restoration may eventually occur at damage sites with cultural resources of significance; however, individual review and compliance would be necessary for each specific site.

The Seagrass Restoration Protocols presented in this SHRMP include a description of project team members, equipment, a step-by-step flow chart for restoration determination, planning, implementation, and monitoring, and an evaluation flow chart of potential restoration options. The protocol assists ENP managers with determining whether restoration is warranted at a given damage site. If restoration is warranted, the SHRMP describes potential restoration alternative options that may be applicable for a restoration site, dependent upon the damage site conditions, including sediment placement, seagrass transplantation, nutrient evaluation and augmentation, installation of signage and temporary area closures, and monitoring only.

The implementation of restoration alternatives will require acquisition of the proper permits, compliance with local, state, and federal policies and regulations, and notification of the appropriate agencies and organizations before conducting the restoration activities. This plan identifies the relevant permits and agency coordination that may be required for a restoration action. The SHRMP falls under a "programmatic approach" and final approval of this SHRMP by the Wilderness Committee and regulatory agencies indicates that the tools and techniques described in this SHRMP are satisfactory and conform to all applicable laws, regulations, and policies and that all restoration projects conducted in compliance with this SHRMP conform to NEPA and the Wilderness minimum requirement concept. Consistency with previous plans and NEPA documents does not eliminate the need for regulatory agency coordination and consultation on a project-specific basis. The "programmatic approach" under which the SHRMP falls will greatly enhance the efficiency of the permitting process, since tiering-off of previous documents can reduce or eliminate redundant and duplicative analyses and effectively address cumulative effects.

Monitoring may be required during and after construction to determine restoration success. The monitoring protocols presented in this SHRMP describe the project team, equipment, and protocols for construction compliance monitoring and post-construction success monitoring. Monitoring of existing management and protective measures (e.g., PTZs, closed/limited access areas, channel marking) is also discussed.

This SHRMP acknowledges complex tasks of ENP managers to provide public use of wilderness areas such as Florida Bay while concurrently preserving wilderness character and value. The NPS must carefully assess any restoration action to ensure that it is consistent with NPS wilderness management policies. The "health" of Florida Bay is defined, in part, by the "health" of its seagrass habitat. The degradation in seagrass health, through continued impacts to seagrasses without management and restoration when necessary, could result in the degradation of the wilderness character and ecological value of Florida Bay. The SHRMP applies the preservation of wilderness character and the minimum requirement concept to all steps of restoration analysis and planning, including the Damage Assessment process (i.e., natural resource and damage assessment protocols), the Restoration Determination and Planning process (i.e., Restoration Determination Report and Restoration Plan), the Restoration Implementation process, and monitoring protocols.

This SHRMP document identified four priority seagrass restoration areas within Florida Bay: Porjoe Key, Duck Key, the Tern Keys, and the Buchanan Keys (along with a 300-ft enforced buffer area surrounding these islands). Potential restoration sites (e.g., prop scars and blow

holes) within the buffer areas were also identified using aerial imagery analysis. These four priority restoration areas are easily accessible, in close proximity to potential construction staging areas, outside of high traffic areas to reduce risk of additional vessel-related damage, currently or potentially subject to ENP management, outside of a high energy environment or high wave action area, and not recovering naturally. These areas could be used for compensatory restoration projects. These priority restoration areas appear to be suitable for future restoration projects and have a high likelihood of success. The damage assessment and restoration determination protocols would then be used to determine the condition of the potential restoration site and the appropriate restoration action.

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