

Southeast Coast Network

National Park Service
Inventory & Monitoring Program



Standard Operating Procedure (SOP) #1.3.10 Requirements for SECN Salt Marsh Elevation and Vegetation Community Monitoring Field Season Preparation, Equipment and Training

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Summary

The following Standard Operating Procedure (SOP) outlines information to prepare for the field season, including a list of field equipment needed and provides descriptions of field forms used during sampling, guidelines for the numbers of copies that are necessary for each sampling trip and example field forms. These procedures are adapted from Louisiana Department of Natural Resources Coastal Resource Division protocol (Folse and West 2004).

Revision Log

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
	04Aug2014	L.C. Baron	Minor organizational changes and updates for 2014.	Address reviewers comments and fluidity of protocol	1.1

General Preparations

In addition to staffing and establishing contracts for services, preparatory steps must be completed well in advance of entering the field. Field equipment must be thoroughly inspected, tested, and repaired or replaced as necessary; expendable supplies must be stocked; and field crews must receive safety and protocol training. The network must play an active role in methods training for field personnel to ensure the protocol is implemented properly and to assure data consistency and quality.

Whenever possible, field crews shall perform a thorough reconnaissance of the monitoring area in advance of the monitoring. This can be done initially during the field work associated with monitoring to reduce travel cost. They must become familiar with general navigation within the monitoring area, identify particular hazards to navigation, and attempt to identify stations that may be too shallow for sampling and any other potential problems they might face during the monitoring phase. Reconnaissance trips also provide an opportunity to make logistical preparations for fieldwork.

Every March, all observers should review the entire protocol, including all SOPs. Refreshing plant identification skills is particularly important. The following list includes key points to consider in preparing for the upcoming field season.

1. A field notebook for the survey year should be prepared with pages for entry of sampling schedules, observer names, field hours and unique happenings that may influence how the data is reported. Information included in trip reports is based on what is recorded in field notebooks so it is imperative that they are clearly organized for ease of field note entry.
2. Species lists from previous years as well as pressed plant specimens should be reviewed if available to identify any unique plants that may be encountered. Prior knowledge of species most likely to be encountered in a park will aid the field crew in preparing for the sampling season. Therefore, species lists from previous community monitoring efforts in a park or sample unit should be compiled and compared to reference manuals to identify species not recorded which have a probability of being recorded. Copies of these combined species list should be carried into the field as quick references.
3. Plant community monitoring will begin in May and extend no later than August, a period that coincides with the peak growing season across the Southeast Atlantic coast. Inclement weather, tides and personnel workloads will preclude the scheduling of sampling events to specific annual dates. Sampling dates should be scheduled and logistics organized prior to the start of year.
4. Monitoring efforts throughout the year will require a two person crew approximately five to twenty-one field days to complete one sampling tour. A single tour may contain two to three different parks.
5. An equipment list should be compiled and equipment organized and made ready for the field year several weeks prior to the first sampling tour. This allows time to make needed repairs

and order equipment. Table 1 is a list of field equipment needs for one crew, if two or more crews work simultaneously, equipment needs will change accordingly.

The following field data forms are used in sampling. Details on filling out the field forms are described in the corresponding SOP. Copies of the field data forms similar to those found in Appendix A should be made. All field data forms should be copied to write-in-the-rain paper.

Data Field Forms Used at All Sample Units

1. **RSET Site Selection Criteria** - This form is used to document each site during the site selection process. This form is used in SOP 1.3.1 Saltmarsh Community Monitoring: Conducting Field Site Suitability Assessments (Asper and Curtis 2012c).
2. **Site Characterization Sheet** – This form is used to document the site characterization and installation of the RSET. The form is also used for documenting geodetic survey results. Additional information on the data associated with this form is found in SOP 1.3.2 Salt Marsh Elevation and Vegetation Community Monitoring Site Platform Construction and Installation (Asper and Curtis 2012a).
3. **Rod Surface Elevation Table Field Form** – This form is used when documenting elevation change associated with the rod surface elevation table. Found in SOP 1.3.6 Salt Marsh Elevation Monitoring (Asper and Curtis 2013).
4. **Soil Porewater Salinity Field Form** – This form is used to document the field findings when performing soil porewater monitoring. Found in SOP 1.3.8 Soil Porewater Equipment Construction and Data Collection (Curtis 2013).
5. **Hand-held Salinity Meter Calibration Field Form** – This form is used to document the pre-field calibration of the YSI Model 30 before performing soil porewater monitoring. Found in SOP 1.3.8 Soil Porewater Equipment Construction and Data Collection (Curtis 2013).
6. **Salt Marsh Vegetation Sampling Field Form** – This form is used to document salt marsh vegetation monitoring field efforts. Found in SOP 1.3.9 Photoplot-based Monitoring of Salt Marsh Vegetation (Curtis et al. 2013).
7. **Site Establishment Form** – This form is used to establish erosion and accretion monitoring sites. Found in SOP 1.3.7 Measuring Accretion with Feldspar Marker Horizon (Asper and Curtis 2012b).
8. **Accretion Measurement Field Form** – This form is used to document measurements during monitoring events. Found in SOP 1.3.7 Measuring Accretion with Feldspar Marker Horizon (Asper and Curtis 2012b).

Table 1. Equipment needs associated with salt marsh community monitoring.

Activity	Equipment
Boat Operation	Lifejackets (as described in the Boat Safety SOP (SOP 3.1.2 Asper and Curtis 2013)) Fire Extinguisher Throwable Device Flares and daylight markers Sound producing device (air horn, whistle, bell, etc.) VHF Radio GPS unit Hardcopy maps for navigation First Aid Kit Push Pole (for manual movement of boat in extremely shallow conditions) Paddle Boat hook Anchor and rope Manual bilge pump Extra fuel Tool kit Rescue rope Cell phone Phone list for local Coast Guard stations (Appendix B)
Saltmarsh Site Assessment	Site Forms (RSET Site Selection) Camera GPS Batteries (if required) Site Maps
Tooth Construction	Circular saw Safety Glasses Drill 7/16" Spade bit 3/8" Socket Crescent and Socket Wrenches Tape Measure
Site Construction	Seven constructed teeth (6 for platform construction and one extra) Nine 2 in. × 8 in. × 10 ft pressure treated boards Minimum of 48 stainless steel 3" deck screws Hand or battery powered circular saw to cut boards Cordless drill Spare Batteries (for drill and circular saw) 7/16" Spade bits Screw bits (that fit the deck screws) Crescent wrench Socket wrench 9/16" deep socket Vice Grips Sledge hammer 2 lb Mallet Tape measure (m/ft) Gloves Safety glasses (for use with saw/drill) Tooth Anvil (for driving teeth without splintering the wood)
Site Documentation	Site Characterization Sheets Camera Compass Measuring Tape GPS Batteries (if required)

Table 1. Continued.

Activity	Equipment
RSET Installation	Two, 2 in. × 12 in. × 10 ft. treated boards with lowering rope Measuring tape Pruning saw Post hole digger 5 Gallon Bucket (for mud) Personal protective equipment • Eye protection • Gloves • Ear protection • Dust masks Level Steel drive pin for 9/16" diameter rod 2 lb sledge hammer Manual driving adapter Generator Fuel/oil (for generator) Extension cord Power driving device (25 lb Bosch hammer) Power driving adapter 2 pipe wrenches 1-2 Vice grip wrenches 9/16 in. wrench Stopwatch Grinder (with extra discs) Bilge pump Cement mixing equipment • Small bucket • Square trowel • Rubber gloves Metal scoop Stamp set Small Hammer (for stamp set) Compass Camera GPS
Geodetic Benchmark Search	Map showing approximate locations of your site and bench marks Printed NGS IDB and OPUS-DB datasheets Safety vest Sharp shooter-type (narrow) shovel Work gloves Probe (a long screw driver can do) 50m flexible measuring tape Bright orange or pink survey flags Camera Rain-proof note pad and pencil Magnetic locator or metal detector Compass Clinometer

Table 1. Continued.

Activity	Equipment
Accretion and Erosion Measurement	Feldspar G-200 white feldspar clay, Minspar 200 or equivalent 50 cm × 50 cm PVC square Markers (1.25 in. PVC pipes 5 ft long. Minimum of two per plot) Spreader / Sieve Eye protection Gloves Respirator One gallon garden/pesticide sprayer Trashcan (with bottom cut off) (optional) Meter Stick Gloves and eye protection. Digital Camera
Salt Marsh Elevation Monitoring	RSET unit Field form(s) Millimeter scaled ruler Field notebook Pencils Two 2 in. x 12 in. x 10-ft boards or expandable aluminum planks Kneeling pad Compass Digital camera Cleaning supplies (brushes, towels, WD40®, etc.)
Soil Porewater Monitoring	Porewater sipper tube Hand-held salinity meter (YSI 30 Meter) 50 mL Centrifuge Tube Distilled Water Calibration Fluids Cheesecloth Tape measure Camera 0.5 m x 0.5 m PVC square frame. Field form(s)

Table 1. Continued.

Activity	Equipment
Salt Marsh Vegetation Monitoring	Plot Establishment • 10 – 1.25 in. PVC pipe, 5 ft in length (per platform) • 1 m x 1 m PVC square • Meter stick • Tape measure (meters) • Mallet • Level • GPS receiver, range pole and antenna • Field form(s) Camera Frame Assembly • 8 meters, 1 in. stainless steel (SS) round tubing • 4- 1 in. SS 90 degree elbows • 2- 1 in. SS T-joints • 1.25 in. stainless steel round tubing (for upright joint) • 1 m, 1 in. stainless steel square tubing • 10 Clevis pins with wire stays • 1 camera mount (Manfrotto 577) • Pelican storage case (rifle case) • Saw with blade capable of cutting SS • Drill • Drill bits Vegetation photo equipment list • Camera frame • Camera (digital single lens reflect or equivalent) • In waterproof case (EWA-Marine or equivalent) • Remote shutter release, either powered or cabled (24" or greater) • Wide-angle fixed focal length lens, 24 or 28mm • Memory card (with ample space) • Batteries (charged) • Point and Shoot Camera • Compass • Meter stick • Meter tape measure • Field forms

Training

Safety Training

The Standard Operating Procedures included in this document are intended to be a comprehensive description of the methods associated with Vital Signs Monitoring in NPS Southeast Region salt marshes. They are not, however, intended to be a comprehensive training manual for field or laboratory personnel. Whether staffed by NPS employees, independent contractors, or volunteers, Vital Signs personnel will need additional training and support in order to successfully and safely complete the work described herein. Safety, in particular, must always be the highest priority.

Specific safety guidance is not provided in this SOP. This was a deliberate decision intended to avoid distributing incomplete, inaccurate, or outdated guidance. A recommended safety resource for NPS or other Department of the Interior (DOI) agencies is DOI SafetyNet (<http://safetynet.smis.doi.gov/>). SafetyNet is a shared, one-stop information source for the safety and health community of the DOI. It is regularly updated, and serves as a gateway to information on DOI safety standards, training requirements, training resources, and personnel contact information. Program safety should be addressed following guidance from NPS Collateral Duty Safety Officers and the office of the applicable Designated Agency Safety and Health Official (DASHO). Non-DOI cooperators conducting work for NPS as part monitoring efforts may have other or additional safety and training requirements to consider.

It is important to note that fielding a properly trained field crew can take considerable time. All NPS employees performing field work should be trained in cardiopulmonary resuscitation (CPR) and basic first aid. They must also be proficient in swimming, and have general knowledge about boats and near shore navigation.

All U.S. Department of Interior employees who operate motorboats must receive training and safety certification to do so (DOI Motorboat Operator Certification Course). A basic assumption of this program is that all DOI and NPS safety guidelines will be followed while completing the work. Regardless of the training guidelines provided in SECN protocols and SOPs, and regardless of existing DOI and NPS safety guidance (or lack thereof), it is the job of each employee to work safely. Should the methods in this document contradict your own sense of safety, then it is your obligation to discuss this concern with network supervisors.

Training Observers in Plant Identification

Field botany differs from taxonomy in that field identification must often rely on vegetative characteristics. Hired observers are expected to be familiar with the differences in terminology and definitions for vegetative characteristics, as well as be trained in plant taxonomy.

Suggestions for training field biologists are listed below:

1. Provide a plant species list including all plant species likely to be encountered throughout the year to all crew members prior to the first tour.

2. Prior to the start of the field season, all field staff should be encouraged to become familiar with the plants on the species list prior to the initiation of sampling, regardless of skill level. This includes one or more of the following:
 - a. Review notes on field plant identification and taxonomy.
 - b. Practice plant identification skills and make use of herbarium specimens when possible.
 - c. Obtain a plant taxonomy guide and begin to attach descriptive terms utilized taxonomically in describing plant characteristics to what you are observing in the field.
 - d. Review live specimens in the field.
3. Focus field botany training efforts on species-level information rather than on formal taxonomy.
4. Provide standardized species lists and descriptions that list the key vegetative characteristics used in field identification.
5. Before each sampling trip during the field season, all field botanists should be instructed to:
 - a. Review the park-specific and plot-specific species lists.
 - b. Read through field notes collected on problem species and the unknown records in the field notebook.
 - c. Study herbarium specimens and problem species keys in preparation for the upcoming trip.
6. Conduct review sessions throughout the year. Incorporate challenging plant identification quizzes into the session for testing purposes and motivation. Review species identification of known difficult and problem species, and those that are suggested by the crew. Sessions are most successful when viewed as a relaxed but challenging experience, and can serve to correct misidentifications.
7. There are numerous reference materials that are useful plant identification guides and references. Providing copies for perusal and study throughout the summer strengthens plant identification. Major references include:

Table 2. Titles and authors for useful plant identification guides and references.

Title	Author(s)
Seaside Plants of the Gulf and Atlantic Coasts (1987)	Duncan, W. H., and M. B. Duncan
Aquatic and Wetland Plants of Southeastern United States: Dicotyledons (1981)	Godfrey, R. K., and J. W. Wooten
Aquatic and Wetland Plants of Southeastern United States: Monocotyledons (1979)	Godfrey, R. K., and J. W. Wooten
Plant Identification Terminology: An Illustrated Glossary	Harris, J. G., and M. W. Harris
Field Guide to the Grasses, Sedges, and Rushes of the United States (1994)	Knobel, E.
Manual of Vascular Flora of the Carolinas (1968)	Radford, A. E., H. E. Ahles, and C. R. Bell
Coastal Plants from Cape Cod to Cape Canaveral (2000)	Stucky, I. H., and L. L. Gould
A Field Guide to Coastal Wetland Plants of the Northeastern United States (1987)	Tiner, R. W.
A Field Guide to Coastal Wetland Plants of the Southeastern United States (1993)	Tiner, R. W.
Guide to Vascular Plants of Florida (2003)	Wunderland, R. P., and B. F. Hansen

Protocol Methods Training

In addition to the safety training, field crews will need general training on protocol implementation for conducting all salt marsh vegetation, elevation, soil porewater and accretion monitoring.

Prior to each field season, personnel responsible for conducting RSET measurements must be certified for data collection. This is done by successfully reading elevation measurements on an artificial RSET station (where elevations to a fixed substrate are known) to ensure that measurements can be taken within acceptable accuracy standards ($\pm 1.5\text{mm}$). Additionally, personnel must be able to successfully read elevations at the Network's training station at Whitehall Experimental forest to ensure that SOPs for placement of pins can be successfully followed. This is done annually through a combination of repeat measures and double-observer readings.

Additionally, personnel will require detailed training on calibration, programming and use of the YSI instruments and the safe use of a liquid nitrogen dewar. It is outside the scope of this protocol to review all of the information and methods that are required to operate geodetic GPS instruments.

It is imperative that field personnel familiarize themselves with the entire YSI Model 30 Handheld Salinity, Conductivity and Temperature System Operations Manual, and any Technical Notes and Technical Documents available from YSI at their web site.

Literature Cited

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