

## **DRAFT Interim Guidance Observational Data Plan (re: data collection)**

### **NOTE:**

*The Council staff acknowledges that there may need to be exceptions made on specific elements contained in this interim guidance because of the wide range of project types (planning, implementation, ecosystem restoration, infrastructure, etc.). A number of examples have also been included in the appendices to help provide clarity. Please contact Alyssa Dausman at [Alyssa.Dausman@restorethegulf.gov](mailto:Alyssa.Dausman@restorethegulf.gov) or Jessica Henkel at [Jessica.Henkel@restorethegulf.gov](mailto:Jessica.Henkel@restorethegulf.gov) if you have questions about an exception(s) and would like to discuss.*

*This interim guidance is DRAFT only and will be subsequently updated with programmatic guidance developed by the Council Monitoring and Assessment Workgroup (CMAWG) in 2016/17. The CMAWG has representatives from all Council Members and will be making recommendations to the Council regarding programmatic minimum monitoring standards, monitoring plan formats, and reporting requirements. Elements of the observational data plan could necessitate updates in the future based on subsequent guidance from the Council (including CMAWG programmatic guidance).*

Observational data plans are necessary for RESTORE Council funded projects to facilitate the Council's compliance with the following federal laws and policies: GPRA Modernization Act (P.L. 111-352), OMB guidance (2 C.F.R. § 200.328), and the requirements of the RESTORE Act (Section 1603(t)(2)(C)(vii)(VII)(dd)).

### **Background:**

Under the RESTORE Act, the RESTORE Council (Council) is responsible for the administration of the Council-Selected Restoration Component and the Spill Impact Component of the Gulf Coast Restoration Trust Fund. In approving the initial Funded Priorities List (FPL) which focuses on key watersheds in the northern Gulf of Mexico region, and eventually the projects that will be in the State Expenditure Plans submitted under the Spill Impact Component, the Council recognizes the importance of comprehensive planning for the collection and compilation of data (i.e., any data collected, compiled, or utilized as part of a RESTORE funded project including compliance, engineering and design, baseline, post-implementation assessment data, etc.) at both the project-specific and regional scales. Managing and ensuring comparability of these foundational data require consistencies in data collection and management among the projects to enable reporting at both the project-specific and program-specific scale, as well as future assessment across the Gulf. As part of the Council's current process, projects are required to include an Observational Data Plan.

As part of the Council's current financial award process, projects or programs are required to include an:

- **Observational Data Plan (ODP)** that provides the Council information relevant to project *data collection and compilation*, for example to evaluate if funded projects are meeting or exceeding project goals and/or restoration targets. ODPs should clearly identify project goals and objectives and quantitative metrics by which projects can be assessed. Paired with ODP development, a
- **Preliminary Observational Data Management Plan (DMP)** which contains information relevant to project *data management and delivery*) will also be required to ensure that project data will be

compatible and comparable with data collection efforts for the Council throughout the Gulf of Mexico region and that data is managed in a way to support the necessary reporting requirements. Interim guidance on a preliminary DMP is provided separately.

**Purpose:**

For projects that are funded and administered through the Council-Selected Restoration Component and the Spill Impact Component, this document provides recipients interim guidance in developing an ODP ensuring the project documentation will (1) comply with Grant or Inter-Agency Agreement (IAA) reporting (collectively, the recipient community), and (2) meet future planning standards set forth by the Council as part of comprehensive planning.

To ensure appropriate planning and provisions for ODPs (and data management, see Preliminary Observational Data Management Plan Interim Guidance provided separately), all approved projects will be required to submit an ODP following the information in this interim guidance for Council approval prior to being awarded funds.

The Council recognizes that the projects funded under the Council-Selected Restoration Component and the Spill Impact Component vary in scope and stage of project development, as well as vary by type. For example, some projects are in the early stages of the project planning phase, whereas others have completed engineering and design and are ready for implementation. The majority of projects are ecosystem restoration projects, however there are some infrastructure projects as well. All of these projects need to be able to provide ODPs. It is understood that projects that have completed the planning and design process will be able to provide ODPs with a greater level of detail than projects initiating a planning effort. Observational data plans are living documents and the elements should be based on currently available information. Elements of the ODP could necessitate updates in the future based on subsequent guidance from the Council (including CMAWG programmatic guidance), evolving project components, coordination with existing local and regional programs, and other new information.

**Interim Guidance:**

The following guidelines have been prepared to assist in the development of appropriate observational data plans for projects administered by the RESTORE Council in order to ensure that any data collected as part of a project is collected so it can be utilized to (1) ensure projects are compliant with financial award requirements, (2) determine whether projects are meeting or are expected to meet their intended objectives and outcomes, and (3) allows for future adaptive management actions, if warranted.

Specifically, implementation projects are required to complete adequate pre- and post-implementation observational data collection in order to:

- Assess if the project was constructed per the planning effort;
- Evaluate if the project has achieved, or is on track to achieve, the specific goals and objectives outlined in the project description;
- Understand why the project has, or has not, performed as anticipated;
- Inform potential adaptive management actions; and
- Improve the effectiveness and efficiency of implementation of future projects.

All data collection efforts are to be included in the ODP including data as required by regulatory agencies for compliance (e.g., Threatened and Endangered species) and/or engineering and design data (e.g., soil

coring data) for planning projects; this data supports the metrics being reported on in RAAMS for grants or through the IAA.

Applicants will be expected to adopt and utilize standard monitoring protocols of Gulf resource agencies and leverage ongoing monitoring efforts, as appropriate, to facilitate cross-program assessment of project performance within Gulf ecosystem recovery efforts (i.e., NRDA and NFWF programs). The adopted protocols should be clearly identified and deviations from the monitoring protocol standards should be disclaimed. Leveraged activities should also be identified in the plan. It is expected that ODPs will be prepared during the financial award application process, but before funds are awarded.

**The information outlined in this section must be prepared, submitted, and approved by the Council prior to award of funds for planning and implementation projects.**

The Observational Data Plan (ODP) should include the following components.

1) **“Planning” project ODPs are *required* to include:**

- a. Brief description of the overall project goals and objectives.
- b. Specific goals and objectives for observational data collection.
- c. Listing of “umbrella” metrics ( what was entered into the Metrics section of RAAMS as part of a grants or IAA, e.g. “PRM010 - # of studies used to inform management”) to be monitored in the assessment of progress toward both short-term and long-term desired outcomes (i.e., planning, compliance, engineering and design, construction, operations, maintenance and monitoring), and listing of all measures/variables/parameters to be monitored in support of those metrics (i.e. supporting data to be collected, but not entered directly into RAAMS).
- d. Identification of success criteria for both “umbrella” metrics and measures/variables/parameters collected in support of those metrics. These criteria will be used to assess project effectiveness.
- e. Budget for observational data review and reporting and final observational data report preparation and distribution (details provided in Appendix A). At a minimum, these reports should be prepared and submitted on an annual basis as part of the programmatic reporting requirements outlined in the funding agreement. The ODP budget must include:
  - i. Overall budget for observational data collection
  - ii. Indication of where in the Overall Project Budget, Budget Narrative or Milestones in the RAAMS application the Observational Data Plan costs are found (i.e., if a person’s is budgeted to work approximately \$30k in the Overall Project Budget, but ~\$5k of their salary is on data collection/compilation, please indicate that in the ODP budget). Note: ODP budgets cannot be their own line item cost in the overall project budget, but can be included in the description within a line item. (*See templates for examples*)
- f. Completed Data Management Plan per Council Interim Guidance (see Preliminary Observational Data Management Plan Interim Guidance provided separately).

**In addition, the following components are *desired* for planning projects in the advanced stages of development:**

- g. Detailed plan for sampling and data mining to be used in establishing baseline conditions in the project area. This plan should identify anticipated sampling frequency and parameters to be sampled.
- h. Identification and discussion of the reference sites/conditions that will be used to provide an appropriate assessment of baseline conditions including location and methods used in site selection.
- i. Description of potential corrective actions that could be implemented to modify project performance if data indicate the project is not performing as expected.

**2) “Implementation” project ODPs are *required* to include:**

**All information listed above in (a) through (i), AND**

- j. Detailed plan for collection of observational data in the project area and appropriate reference sites during and after project implementation. This should include observational data collection methods, timing and frequency, sample size, site locations, and schedule for executing data collection.
- k. Description of quality assurance/quality control (QA/QC) procedures or approach.
- l. Description of planned statistical analyses of observational data.
- m. Provisions for additional monitoring following an unforeseen event, natural or man-made, that may impact project performance in order to assess whether/how the event impacted the project.
- n. Documentation of consistency with, or deviation from, local or regional planning/monitoring efforts.

The Council acknowledges that there may need to be exceptions made on specific elements required on a.-n. above because of the wide range of project types (planning, implementation, ecosystem restoration, infrastructure, etc.). However, those exceptions need to be discussed with Council staff before they are applied (please contact Alyssa Dausman at [Alyssa.Dausman@restorethegulf.gov](mailto:Alyssa.Dausman@restorethegulf.gov) or Kristin Smith at [Kristin.Smith@restorethegulf.gov](mailto:Kristin.Smith@restorethegulf.gov) if you have questions about an exception).

A checklist to assist with Observational Data Plan completion is provided on the [grants website](#). A template for Observational Data Plans is provided in Appendix A. If project level observational data plans have been developed prior to selection by the RESTORE program, recipients may provide the pre-existing plan as long as it contains all of the elements outlined above (items a.-n.). Sample Observational Data Plans are provided in Appendices B-D.

Questions regarding the overall preparation of an appropriate Plan may be directed to Alyssa Dausman ([Alyssa.dausman@restorethegulf.gov](mailto:Alyssa.dausman@restorethegulf.gov)) or Jessica Henkel ([Jessica.Henkel@restorethegulf.gov](mailto:Jessica.Henkel@restorethegulf.gov)).

## Appendix A. Observational Data Plan Template

Complete documentation, including descriptions of all observational data collection elements will be required by grantees for consideration and approval by the Council prior to Plan implementation. Where applicable, metric units are required in all cases (e.g., horizontal, geospatial, measurements, etc.) except when dealing with vertical datums (i.e., ft. NAVD88.)

**Project Name:** \_\_\_\_\_

**Agency:** \_\_\_\_\_

**Current Project Phase:** \_\_\_ Planning \_\_\_ Implementation \_\_\_ Post-Implementation

**Observational Data Plan Element Type (check all that apply):** \_\_\_\_\_ Planning

\_\_\_\_\_ Implementation \_\_\_\_\_ Post-implementation

**Project Observational Data Plan Point of Contact(s):**

(name, phone, email) \_\_\_\_\_

**Expected observational data collection start and end date for overall project:**

**Short description of the project location:**

**Short description of the overall project construction features (if applicable):**

**Consistency with Local or Regional Planning/Monitoring Efforts (if applicable):**

**Overall Project Goals and Objectives:**

**Specific Goals and Objectives:**

**Metrics (as part of a RAAMS grant or IAA):**

**Identification of Metrics and Associated Measures/Variables/Parameters and Success Criteria:**

**Metric X (e.g. PRM010 - # studies to inform management ( entered into the Metrics Section of RAAMS as part of grant or IAA):**

**Success Criteria for Metric X:**

**Supporting Measures** (*Statistical analyses of the supporting measures enable reporting on Metric in RAAMS. Metrics may require multiple measures to enable reporting, some Metrics only necessitate one measure for reporting*):

**Measure/Variable/Parameter I** (*data collected to support the metric X*):

**Success Criteria for Measure I:**

**Measure/Variable/Parameter II** (*data collected to support the metric X*):

**Success Criteria for Measure II:**

**Metric Y:**

**Success Criteria for Metric X:**

**Measure/Variable/Parameter III** (*data collected to support the metric Y*):

**Success Criteria for Measure III:**

**Measure/Variable/Parameter IV** (*data collected to support the metric Y*):

**Success Criteria for Measure IV:**

**Identification and Discussion of the Reference Sites/Conditions:**

**Metric X: Measure I:**

**Metric X: Measure II:**

**Metric Y: Measure III:**

**Metric Y: Measure IV:**

**Potential Corrective Actions:**

**Metric X: Measure I:**

**Metric X: Measure II:**

**Metric Y: Measure III:**

**Metric Y: Measure IV:**

**Baseline Condition Sampling/Data Mining Plan:**

**Metric X: Measure I:**

**Metric X: Measure II:**

**Metric Y: Measure III:**

**Metric Y: Measure IV:**

**Observational Data Collection Plan:**

**Metric X:**

**Measure/Variable/Parameter I:**

**Purpose:**

**Methods:**

**Schedule/Timing and Frequency:**

**Sample Size:**

**Site Locations:**

**Quality Assurance and Quality Control:**

**Measure/Variable/Parameter II:**

**Purpose:**

**Methods:**

**Schedule/Timing and Frequency:**

**Sample Size:**

**Site Locations:**

**Quality Assurance and Quality Control:**

**Metric Y:**

**Measure/Variable/Parameter III:**

**Purpose:**

**Methods:**

**Schedule/Timing and Frequency:**

**Sample Size:**

**Site Locations:**

**Quality Assurance and Quality Control:**

**Measure/Variable/Parameter IV:**

**Purpose:**

**Methods:**

**Schedule/Timing and Frequency:**

**Sample Size:**

**Site Locations:**

**Quality Assurance and Quality Control:**

**Anticipated Statistical Analysis:**

**Measure I:**

**Measure II:**

**Measure III:**

**Measure IV:**

**Unforeseen Event Contingency:**

**Measure I:**

**Measure II:**

**Measure III:**

**Measure IV:**

**Data Review and Reporting:**

**Observational Data Collection Budget:**

**Metric X:**

**Measure/Variable/Parameter I:**

**Measure/Variable/Parameter II:**

**Metric Y:**

**Measure/Variable/Parameter III:**

**Measure/Variable/Parameter IV:**

**Estimated total budget for Observational Data Reporting:**

**Estimated budget for Contingency Monitoring:**

**Location of Observational Data Collection Costs in Overall Project Budget (e.g. Budget Summary line items) or Milestones:**

**Literature Cited:**

## Appendix B. Observational Data Plan EXAMPLE for Ecosystem Restoration Planning Project

**NOTE:** The following information is provided as an example using a hypothetical/fictitious project and provides information regarding only two observational data elements. The specifics provided below are not factual and do not reflect elements of a real project. The information serves simply as an example.

Complete documentation, including descriptions of all observational data collection elements will be required by grantees for consideration and approval by the Council prior to Plan implementation. Where applicable, metric units are required in all cases (e.g., horizontal, geospatial, measurements, etc.) except when dealing with vertical datums (i.e., ft NAVD88.)

**Project Name:** Golden Island Restoration

**Agency:** Department of Success

**Current Project Phase:**  Planning     Implementation     Post-Implementation

**Observational Data Plan Element Type (check all that apply):**  Planning     Implementation  
 Post-implementation

**Project Observational Data Plan Point of Contact(s):**

John Smith, (123) 456-7777, [john.smith@dos.gov](mailto:john.smith@dos.gov)

**Expected observational data collection start and end date for overall project:** Pre-implementation monitoring will begin prior to project construction and data collection is anticipated 10 years post construction.

**Short description of the project location:** An island 30 km south-southwest of Pascagoula, FL in the Gulf of Mexico (Figure X).

**Short description of the overall project construction features:** The dune creation phase of the project will extend for 2800 m along the Gulf of Mexico shoreline raising the supratidal, intertidal, and subtidal environments to dune and supratidal elevations on Golden Island. The marsh creation phase will elevate subtidal and intertidal areas directly behind the dune to intertidal and supratidal elevations (Figure X).

The marsh creation phase will consist of two project components, 1) earthen containment dikes and 2) marsh creation in open water areas. These dikes will be placed along the border of the marsh creation areas and will be built to an elevation of 5 ft NAVD88, have a 3 m crown, and a 1V:8H slope on each side. The containment dikes will be constructed using a sediment bucket dredged from the marsh creation borrow area which is approximately 10 km south of the project area. The sediments dredged for the marsh creation features will be pumped into the marsh creation cells and fill open water areas to a maximum elevation of 3.0 ft NAVD88 to create new marsh. Following consolidation, the marsh creation area is anticipated to have an average elevation of 1.5 ft NAVD88.

The dune creation phase of this project will be initiated by dredging subsurface sands from a borrow area 14.5 km west of the project area. The sand dredged from the dune borrow area will be pumped to the

project area and used to fill and shape the dune feature. The dune elevation will be 6 ft NAVD88, a 30 m crown, and a 1V:30H side slope above 1.0 ft NAVD88 and a 1V:60H side slope below 1 ft NAVD88 .

**Consistency with Local or Regional Planning/Monitoring Efforts (if applicable):** This project was developed through the Florida Barrier Islands Restoration Program (FBIRP) and proposed observational data types and methods are consistent with FBIRP standards.

**Overall Project Goals and Objectives:** Restore the barrier island morphology while creating/restoring dune and marsh habitats and preserving the natural resources of the island.

**Specific Goals and Objectives:** Restore barrier island structure via dune and marsh creation (construction of marsh platform through the use of dredge material) to provide a diversity of terrestrial and aquatic habitats.

**Metrics to be reported to RAAMS: Wetland Restoration – Number of Acres Restored**

*(Note: Only one metric used for this example, however most projects will have multiple Metrics to report on to RAAMS)*

**Identification of Metrics and Associated Measures/Variables/Parameters and Success Criteria:**

**Metric: Wetland Restoration – Number of Acres Restored**

**Metric Success Criteria: 100 Acres Restored**

**Supporting Measures:** Habitat composition and emergent vegetation cover

*(Note: For this example, detailed information is limited to habitat composition and emergent vegetation cover. However per the guidance, a complete Plan would require information about all observational data including bathymetry, topography, submerged aquatic vegetation, shorebird utilization, etc. Statistical analyses of all these supporting measures would help report out on the success criteria for each metric (i.e., number of acres restored))*

- **Measure 1.** Habitat Composition--Golden Island contains unique categories of terrestrial and aquatic habitats including beach and dune, intertidal flats, wetlands, and upland/scrub shrub.
  - **Success Criteria:**
    - a. Maintain habitat diversity of emergent and submerged habitats over time including beach and dune, intertidal flats, wetlands, and upland/scrub shrub.
    - b. Less than 23% of emergent habitat is lost within 10 years post construction relative to project-completion acreage. Acreage will be determined from the habitat mapping effort conducted immediately after project completion.
- **Measure 2.** Emergent vegetation--Determine vegetation species composition, and vegetation cover within marsh and dune habitats.
  - **Success Criterion:**
    - a. Live vegetation cover of saltmarsh and dune species is equal to or greater than 65% at year 5 within the marsh and dune creation areas.
- **Measure 3.** Bathymetry

- *Measure 4. Topography*
- *Measure 5. Submerged aquatic vegetation*
- *Measure 6. Shorebirds*

**Identification and Discussion of the Reference Sites/Conditions:**

**Metric: Wetland Restoration – Number of Acres Restored**

**Habitat composition--**The entire Golden Island will not be influenced by the restoration project, therefore areas outside of the project boundary will be used as reference condition for habitat composition (see attached map).

**Emergent vegetation--**Reference sites will be located along transects outside of the dune and marsh creation cells and will provide data on vegetation species composition and cover of areas outside of the influence of the restoration action (Figure X).

**Baseline Condition Sampling/Data Mining Plan:**

Available existing data sets for the Golden Island project area were inventoried and applicable data sets compiled. The datasets will be used to provide baseline information in conjunction with the proposed pre-implementation sampling.

**Metric: Wetland Restoration – Number of Acres Restored**

**The following baseline conditions for current project area will be established according to the habitat composition and emergent vegetation. Details regarding data mining for establishing those baselines are described below.**

**Habitat composition--** A habitat classification was conducted in 2012 for Golden Island through the FBIRP (See Golden Island Habitat Analysis Map 2012). The historic classification includes the entire project and reference area boundary for this project. The project area consisted of supratidal, intertidal and subtidal habitats. This imagery will be used to help determine historic acreages and habitat diversity.

**Emergent vegetation--**Based on historic habitat classification of Golden Island prior to restoration efforts the project area consists of supratidal, intertidal and subtidal habitats of which large portions had elevations insufficient for emergent vegetation growth. This imagery will be used to help determine historic acreages and habitat diversity.

**Potential Corrective Actions:**

**Metric: Wetland Restoration – Number of Acres Restored:**

**Habitat composition:** Perform operational corrections to achieve the required target elevation range including adding sediment and/or regrading

**Emergent vegetation:** Plant saltmarsh and dune species and/or remove undesirable species

**Observational Data Collection:**

**Metric: Wetland Restoration – Number of Acres Restored**

**Habitat Composition--**

**Purpose:** Document changes in habitat diversity and acreage of terrestrial and aquatic habitats over time and use these data with supporting datasets (bathymetry, topography, emergent vegetation cover, submerged aquatic vegetation, and shorebird utilization) to develop relationships between emergent habitat types and habitat utilization on Golden Island. This observational data will be used to measure project performance as a success criterion.

**Methods:** High resolution aerial photography will be used to map emergent habitats on Golden Island using the technical framework established by the USFWS National Wetlands Inventory (NWI) Classification of Wetlands and Deepwater Habitats (Cowardin *et al.* 1979). Aerial photography will be collected annually before and for two years post-implementation. Aerial photography will be analyzed and mapped as part of this observational data collection effort. Field investigations will be conducted to ground-truth various geomorphic and vegetation habitats in the field with corresponding signatures on aerial photography.

Near-vertical color-infrared (CIR) digital aerial photography will be the primary data source for information on wetland and associated environments. Photointerpreters will use stereo heads-up-display to determine habitat classification, including the location and extents of wetlands, upland, and seagrass habitats from the imagery. Habitat categories will consist of a combination of NWI and Anderson Land Use/Land Cover Classification Systems, as well as special modifiers to characterize critical habitat for the identified species of interest. Historically, 15 NWI habitat classes comprise the majority of the barrier island land area in Florida. With respect to aquatic habitat, intertidal, tidal flats, beaches and bars will be mapped. Those habitats will be classified then further collapsed into a subset of classes for use by the program.

All habitat photointerpretation will follow protocols and standards described in Cowardin *et al.* (1979). Uplands are derived from a land use and land cover classification system for use with remote sensor data (Anderson *et al.*, 1976). The digital mosaic of the high resolution color infrared aerial photography project area is brought into ESRI ArcMap Software (Redlands, CA.) where photointerpretation begins. Habitat types are delineated by overlaying project area boundaries onto the imagery and editing features. Ancillary data sets from 1998 through 2012, with similar resolutions, are utilized to help classify areas that may be difficult to identify. Imagery of the project area is also viewed on screen in stereo which helps determine vegetation height and proper habitat classification.

**Schedule/Timing and Frequency:** Data collection will begin with pre-implementation (year 0) and will continue post-implementation (years 1, 2, 5, and 10). Habitat mapping is scheduled to be conducted at regular intervals post-implementation and success criteria can be assessed at each interval. Habitat classification data will be made available within 12 months of acquisition of digital aerial photography and satellite imagery.

**Sample Size:** Five (i.e., planning [year 0]), annually for 2 years immediately post-implementation [years 1, 2, 5, and 10]).

**Site Locations:** Full extent of Golden Island will be classified to include project restoration and reference sites. See attached map.

**Quality Assurance and Quality Control:** A field verification process will be conducted using photosignature verification of cover types and checking problematic areas by field personnel at the request of the photointerpreters during the quality control phase of the mapping. After completion of habitat classifications, the photointerpreter will perform a Quality Assurance self-check. In addition, a second photointerpreter will perform a final in-house Quality Control, assuring accuracy and data integrity.

### **Emergent Vegetation--**

**Purpose:** Document establishment of vegetation cover following marsh and dune creation and determine species composition and percent cover within the major habitat types through time. This observational data will be used to measure project performance as a success criterion.

**Methods:** 10 cross-shore transects will be established at 300m intervals in the project area bisecting dune and marsh creation areas. Each transect will contain ten randomly located vegetation stations, for a total of 100 vegetation stations. Vegetation stations will consist of 2X2m plots and sampling protocol will be consistent with Folse et. al. 2014 using a modified version of Braun-Blanquet method (Ellenberg and Mueller-Dombois 1974, Steyer et al. 1995).

**Schedule/Timing and Frequency:** As-built (implementation phase) vegetation cover will be surveyed approximately 90-180 days following completion of construction within the marsh and dune cells. Post-implementation vegetation cover will be surveyed late summer/early fall of years 2 and 5.

**Sample Size:** 100 randomly located stations will be established across the project site and surveys will be collected at each station.

**Site Locations:** Randomly selected locations will be established representing the full extent of marsh and dune creation areas of Golden Island.

**Quality Assurance and Quality Control:** *Field QA:* Vegetation cover estimates should reflect the independent professional judgement of at least two field personnel. If estimates differ by greater than 5 percent both individuals should independently reestimate cover values until a consensus is reached. *Office QA:* Review plot photograph for data accuracy and/or identification errors. After data transcription is complete, review datasheets versus transcribed data for omissions, duplications, completion, and consistency with field collection.

### **Anticipated Statistical Analysis:**

**Metric: Wetland Restoration – Number of Acres Restored**

**The statistical analysis described below will enable reporting on the Number of Acres Restored for this project to RAAMS.**

**Habitat Composition**--Detect changes in habitat composition and acreage of terrestrial and aquatic habitats over time. Comparisons will be made on historical data, data from aerial photography collected, and habitat composition maps created during pre- and post-implementation to assess habitat composition and acreage changes over time.

**Emergent Vegetation**--Analysis of Variance (ANOVA), descriptive and summary statistics for vegetation will be used to determine spatial and temporal differences in species composition and cover within the major habitat types. Analysis will be based on percent cover of the species present. The ANOVA approach may include terms in the model to adjust for station locations and elevation. This ANOVA will allow for the analysis and long-term documentation of vegetative coverage changes on the Golden Island from time 0 (i.e., as-built) through year 5 of the project.

### **Unforeseen Event Contingency:**

**Metric: Wetland Restoration – Number of Acres Restored**

**Habitat Composition**--Loss in acreage of more than 23% of emergent habitats at year 5 including beach and dune, intertidal flats, wetlands, and upland/scrub shrub. The contingency response would include additional sediment placement to restore emergent land.

**Emergent Vegetation**--Live vegetation cover of saltmarsh and dune species is less than 65% at year 5 within the marsh and dune creation areas. The contingency response option would be to promote establishment of saltmarsh and dune species through vegetative planting.

### **Data Review and Reporting:**

Annual observational data reports will be developed and submitted in compliance with the grants reporting cycle as outlined in the RESTORE Council Financial Assistance Standard Terms and Conditions and Part IV, Chapter II, Section G of the Recipient Guidance. Following completion of all data collection a final observational data report will be prepared and distributed.

In years where observational data are collected, data will be reviewed and then used to assess and evaluate overall project performance. Collected data will be assessed to define magnitudes of difference (e.g., statistical differences, significance levels) between the values of monitored project performance and the desired values. Annual reports will be developed documenting the progress towards project goals and objectives as characterized by the selected performance measures and success criteria.

### **Observational Data Collection and Reporting Budget: \$575,000**

**Estimated total budget for Observational Data Collection: \$450,000**

**Metric: Wetland Restoration – Number of Acres Restored**

**Habitat Composition:**

- Aerial Photography acquisition- \$175,000 (\$35,000 each year)

- Habitat Classification-\$230,000 (\$50,000 first year, \$45,000 subsequent years)

**Emergent Vegetation:**

- Vegetation surveys- \$45,000 (\$15,000 per event, 3 events total)

**Estimated total budget for Observational Data Reporting: \$30,000**

- Reporting- \$6,000 each year for 5 years

**Estimated budget for Contingency Monitoring: \$95,000**

- Additional aerial photography acquisition-\$35,000
- Additional habitat classification-\$45,000
- Additional vegetation survey-\$15,000

**Location of Observational Data costs in Overall Project Budget, Budget Narrative or Milestones:**

- Observational Data Collection costs: \$450, 000 distributed among Milestones 1-3
- Observational Data Reporting costs: \$30,000 in Data Management and Reporting Milestone
- Contingency Monitoring: \$95, 000 in Post-implementation monitoring Milestone

**Literature Cited:**

Anderson, J.R., E.E., Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data: U.S. Geological Survey Professional Paper 964, 28 pp.

Cowardin, L. M., V. Carter, F.C. Golet & E.T LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. US Department of the Interior, US Fish and Wildlife Service.

Ellenberg, D., and D. Mueller-Dombois. 1974. Aims and methods of vegetation ecology. New York, NY: Wiley.

Folse, T. M., L. A. Sharp, J. L. West, M. K. Hymel, J. P. Troutman, T. E. McGinnis, D. Weifenbach, W. M. Boshart, L.B. Rodrigue, D. C. Richardi, W. B. Wood, and C. M. Miller. 2014. A Standard Operating Procedures Manual for the Coast-wide Reference Monitoring System-*Wetlands*: Methods for Site Establishment, Data Collection, and Quality Assurance/Quality Control. Louisiana Coastal Protection and Restoration Authority. Baton Rouge, LA. 228 pp.

Steyer, G.D., R.C. Raynie, D.L. Steller, D. Fuller and E. Swenson 1995. Quality management plan for Coastal Wetlands Planning, Protection, and Restoration Act monitoring program. Open-file series no. 95-01 (Revised June 2000). Baton Rouge: Louisiana Department of Natural Resources, Coastal Restoration Division. 97 pp.

## **Appendix C. Observational Data Plan EXAMPLE for Implementation of a Training/Jobs Corps Project/Program**

**NOTE:** The following information is provided as an example using a hypothetical/fictitious project and provides information regarding only two observational data elements. The specifics provided below are not factual and do not reflect elements of a real project. The information serves simply as an example.

Complete documentation, including descriptions of all observational data collection elements will be required by grantees for consideration and approval by the Council prior to Plan implementation. Where applicable to ecosystem restoration metric units are required in all cases where (e.g., horizontal, geospatial, measurements, etc.) except when dealing with vertical datums (i.e., ft. NAVD88.)

**Project Name:** \_\_\_ Gulf of Mexico Youth and Veteran Conservation Corps (GYVCC)\_\_\_

**Agency:** \_\_DOI/NPS\_\_\_\_\_

**Current Project Phase:** \_\_\_ Planning \_\_\_  Implementation \_\_\_ Post-Implementation

**Observational Data Plan Element Type (check all that apply):** \_\_\_  Planning  
\_\_\_  Implementation \_\_\_\_\_ Post-implementation

**Project Observational Data Plan Point of Contact(s):**

(name, phone, email) Ellie North, 555-534-6576, [ellie.north@nps.gov](mailto:ellie.north@nps.gov)

**Expected observational data collection start and end date for overall project:**

March 2016-December 2018

**Short description of the project location:**

Project activities will take place in National Parks across the 5 Gulf States. Training for corps recruits will take place in coordination with the Department of Veteran Affairs (VA), local existing conservation groups, state labor offices, and community colleges in coastal areas of the Gulf.

**Short description of the overall project construction features:**

All GVVCC crew members will work on fully environmentally compliant projects.

**Consistency with Local or Regional Planning/Monitoring Efforts (if applicable):**

DOI/NPS will complete an evaluation of leveraging opportunities (ELO) and, working with the VA, will contract local or regional conservation groups experienced in corps education and training to assist in program development and execution as scoped and overseen by DOI/NPS. Training will be orchestrated by DOI/NPS, in collaboration with the VA and state partners, to focus on those skill sets required of the restoration tasks selected. Training logistics will be established to provide efficiencies across corps member groups, where knowledge and experience can be leveraged throughout the region.

**Overall Project Goals and Objectives:**

The GYVCC Program will establish a regional workforce-training program to benefit local veteran and youth communities and support Gulf-coast NPS restoration implementation. Individuals trained under the

program will help to execute priority restoration projects selected for implementation by the NPS. GYVCC benefits include recruiting and training local workers in a variety of habitat restoration techniques and providing paid, hands-on work experience in on-the-ground restoration projects. The GYVCC Program will have two primary activities – the first overseen by DOI/NPS and tailored to the unique needs and communities of each State, and the second overseen by DOI/VA focused on veterans. DOI/VA will work with the VA organizations within the Gulf Region to engage veterans in support of environmental restoration and implementation of projects selected by the NPS. The GYVCC Program will leverage existing partnerships among federal, state, academic and non-profit organizations and provide opportunities for local citizens to gain part of the knowledge, skills and training necessary for implementation and management of restoration projects.

### **Specific Goals and Objectives:**

#### **Program Planning and Development**

Developing this program will require program planning, training, recruitment, capacity building, and an evaluation of leveraging opportunities and partnership development. DOI/NPS will complete thorough program planning, prior to mobilization of crewmembers. NPS is planning to contract out portions of the project to knowledgeable local or regional organization(s) to assist in the administration and operational development of this program. Such activities will include developing and conducting recruitment strategies, managing and overseeing corps members, facilitating training, and conducting education and outreach. This will be done through a competitive bidding process. Program planning efforts, described in more detail below, will help to shape the competitive Federal Funding Opportunity (FFO) solicitation.

#### **Continuing Education and Training**

The Program will support appropriate habitat restoration within the National Parks of the 5 Gulf States, as well as other regional restoration opportunities. Where feasible, crewmembers will be trained in monitoring techniques to assist in accurate data collection and to provide an additional technical skill set.

#### **Metrics to be reported to RAAMS:**

**A) Percentage of program contracted to existing local organizations**

**B) Number participants that completed training**

**C) Land Restoration – Acres Restored**

#### **Identification of Metrics and Associated Measures/Variables/Parameters and Success Criteria:**

**Metric A: Percentage of program contracted to existing local organizations**

**Metric A Success Criteria: Over 80% of program contracted to existing local organizations**

**Measure I:** Funding amount in local contracts

**Success Criteria:** Funding amount in local contracts exceed 80% of total program costs

**Metric B: Number participants that completed training**

**Metric B Success Criteria: At least 250 tribal youth and veteran participants annually**

**Measure II:** Number of youth participants who gained or improved technical skills

**Success Criteria:** 50 students per year

**Measure III:** Number of veteran participants who gained or improved technical skills  
**Success Criteria:** 100 veterans per year

**Measure IV:** Total labor hours for veteran participants  
**Success Criteria:** 1000 hours per participant/per year

**Metric C: Land Restoration – Acres Restored**

**Metric C Success Criteria:** TBD and updated in a revised ODP within 3 months of project identification

**Measure V:** Acres of habitat surveyed for vegetative planting  
**Success Criteria:** TBD and updated in a revised ODP within 3 months of project identification

**Measure VI:** Acres of habitat replanted with native vegetation  
**Success Criteria:** TBD and updated in a revised ODP within 3 months of project identification

**Identification and Discussion of the Reference Sites/Conditions:**

N/A

**Baseline Condition Sampling/Data Mining Plan:**

**Measure I:** 0% of programs contracted out to existing local organizations

**Measure II:** Number of youth participants in existing local programs

**Measure III:** Number of veteran participants in existing local programs

**Measure IV:** 0 labor hours for veteran participants

**Measure V:** 0 acres of habitat surveyed

**Measure VI:** 0 acres of habitat replanted with native vegetation

**Potential Corrective Actions:**

**Metric A: Percentage of program contracted to existing local organizations**

**Measure I:** Funding amount in local contracts

**Potential Corrective Action:** Implement outreach with local or regional groups, beyond those groups historically involved in conservation, to engage groups experienced in education and training.

**Metric B: Number participants that completed training**

**Measure II:** Number of youth participants who gained or improved technical skills

**Potential Corrective Action:** Implement outreach efforts to a broader audience engaged in youth activities.

**Measure III:** Number of veteran participants who gained or improved technical skills

**Potential Corrective Action:** Implement outreach efforts to a broader audience engaged in veteran activities.

**Measure IV:** Total labor hours for veteran participants

**Potential Corrective Action:** Implement flexible working hours and projects to accommodate participation as veterans are available.

**Metric C: Land Restoration – Acres Restored**

**Measure V:** Acres of habitat surveyed for vegetative planting

**Potential Corrective Action:** TBD based on success criteria update in a revised ODP within 3 months of project identification

**Measure VI:** Acres of habitat replanted with native vegetation

**Potential Corrective Action:** TBD based on success criteria update in a revised ODP within 3 months of project identification

**Observational Data Collection Plan:**

**Measure I:** Percentage of program contracted to existing local organizations

**Purpose:** To provide efficiencies across corps member groups, where knowledge and experience can be leveraged throughout the region.

**Methods:** Complete an evaluation of leveraging opportunities (ELO)

**Schedule/Timing and Frequency:** ELO completed in first year prior to project implementation, with reevaluation of ELOs annually

**Sample Size:** N/A

**Site Locations:** N/A

**Quality Assurance and Quality Control:** Review ELOs for completion and accurate reporting.

**Measure II:** Number of youth participants who gained or improved technical skills

**Purpose:** To evaluate corps contribution to youth community

**Methods:** Compile list of youth participants who completed training activities

**Schedule/Timing and Frequency:** Annually

**Sample Size:** N/A

**Site Locations:** N/A

**Quality Assurance and Quality Control:** Review and verify list of youth participants for accuracy and completion

**Measure III:** Number of veteran participants who gained or improved technical skills

**Purpose:** To evaluate corps contribution to veteran community

**Methods:** Compile list of veteran participants who completed training activities

**Schedule/Timing and Frequency:** Annually

**Sample Size:** N/A

**Site Locations:** N/A

**Quality Assurance and Quality Control:** Review and verify list of veteran participants for accuracy and completion

**Measure IV:** Total labor hours for veteran participants

**Purpose:** To evaluate economic benefit to veteran participants

**Methods:** Accurate management of individual participant labor hours

**Schedule/Timing and Frequency:** Annually

**Sample Size:** N/A

**Site Locations:** N/A

**Quality Assurance and Quality Control:** Review and verify list of individual veteran participation for accuracy and completion

**Measure V:** Acres of habitat surveyed for vegetative planting

**Purpose:** To evaluate GYVCC benefit to habitat restoration

**Methods:** TBD and updated in a revised ODP within 3 months of project identification

**Schedule/Timing and Frequency:** At project completion

**Sample Size:** TBD and updated in a revised ODP within 3 months of project identification  
**Site Locations:** TBD and updated in a revised ODP within 3 months of project identification  
**Quality Assurance and Quality Control:** TBD based on success criteria update in a revised ODP within 3 months of project identification

**Measure VI:** Acres of habitat replanted with native vegetation

**Purpose:** To evaluate GYCC benefit to habitat restoration

**Methods:** TBD and updated in a revised ODP within 3 months of project identification

**Schedule/Timing and Frequency:** At project completion

**Sample Size:** TBD and updated in a revised ODP within 3 months of project identification

**Site Locations:** TBD and updated in a revised ODP within 3 months of project identification

**Quality Assurance and Quality Control:** TBD based on success criteria update in a revised ODP within 3 months of project identification

#### **Anticipated Statistical Analysis:**

**Metrics A-C:** For metric associated measures (**Measures I-IV**) data will be compiled in the GYCC database, and mathematical and budgetary analyses will be completed in Excel. For metric associated measures (**Measures V-VI**) habitat mapping in coordination with data collection will aid in establishing number of acres restored.

#### **Unforeseen Event Contingency:**

**Measure I:** No existing local organizations identified

**Contingency:** DOI/NPS will work within the local community to identify opportunities to develop new programs, and the 80% success criteria would be waived for that area/state

**Measure II:** Not enough Youth interested in program

**Contingency:** Additional funding allocated into outreach to reach Youth

**Measure III:** Not enough Veterans interested in program

**Contingency:** Additional funding allocated into outreach to reach Veterans

**Measure IV:** No Veterans recruited for program

**Contingency:** Additional funding allocated into outreach to reach Veterans

**Measure V:** Unforeseen natural event damaged project area

**Contingency:** Additional funding pursued by DOI/NPS to rebuild project area

**Measure VI:** Unforeseen natural event damaged project area

**Contingency:** Additional funding pursued by DOI/NPS to rebuild project area

#### **Data Review and Reporting:**

Data will be reviewed internally for completion and submitted to NPS for external review annually. Annual reports will also be developed and submitted in compliance with the grants reporting cycle as outlined in the RESTORE Council Financial Assistance Standard Terms and Conditions and Part IV, Chapter II, Section G of the Recipient Guidance. Following completion of all data collection a final observational data report will be prepared and distributed.

Data will be reviewed and then used to assess and evaluate overall project performance annually. Annual reports will be developed documenting the progress towards project goals and objectives as characterized by the selected metrics/measures and success criteria.

**Observational Data Collection and Reporting Budget: \$765,000**

**Estimated total budget for Observational Data Collection: \$600,000**

**Measure I:** ELO and planning: \$100,00

**Measures II-VI:** Performance monitoring during and following project completions: \$500,000

**Estimated total budget for Observational Data Reporting: \$100,00**

**Estimated budget for Contingency Monitoring: \$65,000**

**Location of Observational Data Costs in Overall Project Budget or Milestones:**

Costs for Measures I-VI are found in the project budget for subrecipients and contractors (\$600,000)

Costs for Observational Data Reporting and Contingency Monitoring:

- \$100,000 for salaries and fringe benefits in project budget summary
- 65,000 in subcontractors (Advertising costs) in project budget summary

**Literature Cited:** N/A

## Appendix D. Observational Data Plan EXAMPLE for Infrastructure Planning Project

**NOTE:** The following information is provided as an example using a hypothetical/fictitious project and provides information regarding only two observational data elements. The specifics provided below are not factual and do not reflect elements of a real project. The information serves simply as an example.

Complete documentation, including descriptions of all observational data collection elements will be required by grantees for consideration and approval by the Council prior to Plan implementation. Where applicable, metric units are required in all cases where (e.g., horizontal, geospatial measurements, etc.) except when dealing with vertical datums (i.e., ft. NAVD88.)

**Project Name:** Dauphin Island Public Pier

**Agency:** AL

**Current Project Phase:**  **Planning**     **Implementation**     **Post-Implementation**

**Observational Data Plan Element Type (check all that apply):**  **Planning**

**Implementation**     **Post-implementation**

**Project Observational Data Plan Point of Contact(s):**

**(name, phone, email)** Ellie North, 555-534-6576, ellie.north@state.al.gov

**Expected observational data collection start and end date for overall project:**

March 2016-March 2017

**Short description of the project location:**

Project activities will take place on the barrier island of Dauphin Island, AL, at the public beach on the south-facing side of the island.

**Short description of the overall project construction features:**

Project is a planning project. No construction will occur during the course of this funding cycle.

**Consistency with Local or Regional Planning/Monitoring Efforts (if applicable):**

Planning efforts will be coordinated with Mobile County, AL, and the town of Dauphin Island.

**Overall Project Goals and Objectives:**

Alabama will complete planning, design, engineering and feasibility assessments for a public fishing pier to be built on the south facing side of the Dauphin Island, AL. Once these planning activities are completed, the state would have a full understanding of the feasibility of building the pier complete with environmental impact and public benefit metrics.

**Specific Goals and Objectives:**

- 1) Field Surveys, Investigations, Studies and Reports
- 2) Draft Construction Plans and Order of Magnitude Construction Estimate Projection

**Metrics to be reported RAAMS:**

**A) Number of studies reported to management**

**B) Number of Engineering and Design plans developed**

**Identification of Metrics and Associated Criteria/Measures and Success Criteria:**

**Metric A: Number of studies reported to management (i.e. this could support development of Engineering and Design plans or environmental compliance)**

**Metric A Success Criteria: 4 reports compiled in support of Engineering and Design plans**

**Measure I:** Beach and nearshore profile assessments

**Success Criteria:** Profiles from a period of 10 years compiled and assessed for maximum difference for Erosion and Scour Report

**Measure II:** Wave height prediction

**Success Criteria:** Wave climate data for recent extreme wave events for previous 5 years compiled and assessed for Wave Height Prediction Report

**Measure III:** Construction site sediment analysis

**Success Criteria:** Collection of sediment cores, and sediment analysis report completed

**Measure IV:** Water quality and turbidity analyses

**Success Criteria:** Pre-construction water quality and turbidity analyses completed during four total assessments. Water quality and turbidity data report completed.

**Metric B: Number of Engineering and Design plans developed**

**Metric B Success Criteria: One complete and certified pier Engineering and Design plan and report submitted through RAAMS after public comment**

**Measure V:** Draft Construction Plans

**Success Criteria:** Draft construction plans completed and certified after public comment

*(Note: Likely several additional performance measure data categories to be collected during a project of this type)*

**Identification and Discussion of the Reference Sites/Conditions:**

During the planning phase, baseline reference conditions will be documented (see performance criteria above).

**Potential Corrective Actions:**

**Metric A: Number of studies reported to management**

**Measure I:** Beach and nearshore profile assessments

**Potential Corrective Action:** N/A - assessments must be completed to meet success criteria.

**Measure II:** Wave height prediction

**Potential Corrective Action:** N/A - report must be completed to meet success criteria.

**Measure III:** Construction site sediment analysis

**Potential Corrective Action:** N/A - analysis must be completed to meet success criteria.

**Measure IV:** Water quality and turbidity analyses

**Potential Corrective Action:** Increase number of total assessments until success criteria met and data report complete.

**Metric B: Number of Engineering and Design plans developed**

**Measure V:** Draft Construction Plans

**Potential Corrective Action:** N/A - plans must be completed to meet success criteria.

**Baseline Condition Sampling/Data Mining Plan:**

**A) Number of studies reported to management**

**Measure I:** Profile data is available from the Bureau of Beach and Coastal Systems at <http://www.dep.state.al.us/beaches/data/data.htm>

**Measure II:** U.S. Army Corps of Engineers, Coastal & Hydraulics Laboratory (CHL) Wave Information Studies (WIS) hindcast data is available at <http://chl.erdc.usace.mil/>

**Measure III:** Sediment characteristics to be identified during planning stage

**Measure IV:** Baseline turbidity and water quality to be determined during the planning stage

**B) Number of Engineering and Design plans developed**

**Measure V:** Draft construction plans to be developed during planning stage

**Observational Data Collection Plan:**

**Measure I:** Beach and nearshore profile assessments

**Purpose:** Erosion and Scour Report

**Methods:** Profile data is available from the Bureau of Beach and Coastal Systems at <http://www.dep.state.al.us/beaches/data/data.htm>

**Schedule/Timing and Frequency:** Completed 3 months after receiving funding

**Sample Size:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient

**Site Locations:** Proposed pier construction site

**Quality Assurance and Quality Control:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient to ensure all data elements are accounted for in QA/QC

**Measure II:** Wave height prediction

**Purpose:** To develop wave height prediction report

**Methods:** Wave climate data to be assessed from Wave Information Studies (WIS) hindcast data available at <http://chl.erdc.usace.mil/>

**Schedule/Timing and Frequency:** Completed 3 months after receiving funding

**Sample Size:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient

**Site Locations:** Proposed pier construction site

**Quality Assurance and Quality Control:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient to ensure all data elements are accounted for in QA/QC

**Measure III:** Construction site Sediment analysis

**Purpose:** To determine pier design and building methods

**Methods:** Comprehensive sediment core analysis to be conducted

**Schedule/Timing and Frequency:** Completed 4 months after receiving funding

**Sample Size:** 100 sediment cores to be analyzed

**Site Locations:** Proposed pier construction site

**Quality Assurance and Quality Control:** Review sediment core analyses and reporting for completion, accuracy, and data appropriateness.

**Measure IV:** Water quality and turbidity analyses

**Purpose:** To complete water quality and turbidity data report

**Methods:** Time series water-quality data; include temperature, specific conductance, dissolved oxygen and turbidity, collected at a minimum of one-hour intervals at two locations. Additionally, core borings obtained beyond the depth anticipated for pile embedment will provide geotechnical data to assess the potential for generated turbidity during pile jetting.

**Schedule/Timing and Frequency:** Sites will be sampled every 6-8 weeks for a total of 8 samples during the first year pre-construction.

**Sample Size:** 2 locations

**Site Locations:** The first location will be near the proposed work area, and the second at a control location proximate to the first to allow the determination of natural or background water quality variations.

**Quality Assurance and Quality Control:** Complete and document instrument calibration per specifications of the data logger manufacturer and at intervals as established by industry standards. Review dataset for completion and omit unexplained data anomalies and/or erroneous data.

**Measure V:** Draft construction plans to be developed during planning stage

**Purpose:** To develop Order of Magnitude Construction Estimate Projection

**Methods:** Incorporate data from field surveys and analysis reports to develop design and building plans using best management practices

**Schedule/Timing and Frequency:** Complete at end of project period

**Sample Size:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient

**Site Locations:** Proposed pier construction site

**Quality Assurance and Quality Control:** TBD and updated in a revised ODP within 3 months of contracting sub-recipient to ensure all data and information are incorporated into QA/QC plan for construction plan.

**Anticipated Statistical Analysis:**

**Measure I:** Beach profile data will be transferred into Regional Morphology Analysis Package (RMAP). RMAP is part of the Coastal Engineering Design & Analysis System developed by the U.S. Army Corps of Engineers. RMAP will be used to analyze beach-profile characteristics, interpolate data points at equal intervals, and calculate volumes above different contours.

**Measure II:** STWAVE model to be used to compute wave propagation from 100 miles offshore to the proposed Dauphin Island Pier location (Conrad et al. 2007)

**Measure III:** Laser diffraction will be used for particle sizing

**Measure IV:** Appropriate statistical comparisons (e.g., hypothesis testing, ANOVA, multivariate methods, etc.) will be used to summarize the water quality data and compare these data with the decision criteria.

**Measure V:** Appropriate statistical analyses will be conducted in developing Draft construction plans

**Unforeseen Event Contingency:**

**Measures I-V:** N/A to this planning project

**Data Review and Reporting:** The state will document each of the performed assessments and communicate the results to the public. The state will produce a final annual report for submission through RAAMS that will measure progress towards project goals and objectives.

**High-Level Budget: \$110,000**

**Estimated total budget for Observational Data Collection: \$40,000**

**A) Metric: Number of studies reported to management: \$40,000**

**Measure I:** Profile data recovery and analysis - \$5,000

**Measure II:** Wave Information data recovery and analysis - \$5,000

**Measure III:** Sediment grain size analysis - \$10,000

**Measure IV:** Baseline turbidity and water quality testing - \$20,000

**B) Metric: Number of Engineering and Design plans developed: \$70,000**

**Measure V:** Draft construction planning/analysis and environmental compliance permitting - \$70,000

**Estimated total budget for Observational Data Reporting: \$110,000**

**Location of Observational Data Costs in Overall Project Budget or Milestones:**

- \$40,000 represented in the costs indicated for Milestones 1-4
- \$70,000 represented in the costs indicated for Milestone 5

**Literature Cited:** Conrad, D.L. et al., 2007. *Navarre Beach Fishing Pier, Final Design Report*, PBS&J®, 644 p.