Deepwater Horizon/Mississippi Canyon 252 Spill

Each laboratory shall simultaneously deliver raw data, including all necessary metadata, generated as part of this work plan as a Laboratory Analytical Data Package (LADP) to the trustee Data Management Team (DMT), the Louisiana Oil Spill Coordinator's Office (LOSCO) on behalf of the State of Louisiana. The electronic data deliverable (EDD) spreadsheet with pre-validated analytical results, which is a component of the complete LADP, will also be delivered to the secure FTP drop box maintained by the trustees' Data Management Team (DMT). Any preliminary data distributed to the DMT shall also be distributed to LOSCO. Thereafter, the DMT will validate and perform quality assurance/quality control (QA/QC) procedures on the LADP consistent with the authorized Quality Assurance Project Plan, after which time the validated/QA/QC-ed data shall be made available simultaneously to all trustees. Any questions raised on the validated/QA/QC results shall be handled per the procedures in the Quality Assurance Project Plan and the issue and results shall be distributed to all parties. In the interest of maintaining one consistent data set for use by all parties, only the validated/QA/QC-ed data set released by the DMT shall be considered the consensus data set. In order to assure reliability of the consensus data and full review by the parties, no party shall publish consensus data until seven days after such data has been made available to the parties. Also, the LADP shall not be released by the DMT or LOSCO prior to validation/QA/QC absent a showing of critical operational need. Should any party show a critical operational need for data prior to validation/QA/QC, any released data will be clearly marked "preliminary/un-validated" and will be made available equally to all trustees.

All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, except those consumed as a consequence of the applicable sampling or analytical process, must be retained unless and until approval is given for their disposal in accordance with the retention requirements set forth in paragraph 14 of Pretrial Order # 1 (issued August 10, 2010) and any other applicable Court Orders governing tangible items that are or may be issued in MDL No. 2179 IN RE: Oil Spill by the Oil Rig "DEEPWATER HORIZON" (E.D. LA 2010). Such approval to dispose must be given in writing and by a person authorized to direct such action on behalf of the state or federal agency whose employees or contractors are in possession or control of such materials.

This plan will be implemented consistent with existing trustee regulations and policies. All applicable state and federal permits must be obtained prior to conducting work.

Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment (NRDA). Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

Mississippi Canyon 252 Spill

2014 Oyster Quadrat Abundance Monitoring Plan

July 30, 2014

Introduction

A Technical Working Group ("Oyster TWG") of experts and trustee agency and BP representatives was assembled following the Mississippi Canyon 252 Spill to develop work plans appropriate to carry out both baseline (pre-impact) and post-impact assessments of oysters throughout the northern Gulf of Mexico. The Oyster TWG has been conducting sampling efforts from 2010 through the spring of 2014. Four of those plans, Amendment 2 to the Phase I – High Priority Sites Plan ("Phase I Amendment 2"), the 2011 Oyster Quadrat and Sediment Sampling Plan ("2011 Quadrat Plan"), the 2012 Oyster Quadrat Abundance Monitoring Plan ("2012 Quadrat Plan"), and the 2013 Oyster Quadrat Abundance Monitoring Plan ("2013 Quadrat Plan") included quadrat sampling to measure adult and juvenile oyster abundance and biomass. The Trustees have decided to complete additional quadrat sampling in 2014 to monitor for potential signs of recovery in the oyster resource in the north-central Gulf of Mexico. This document presents the plan for completing diver-assisted oyster reef quadrat sampling in 2014 that will produce the monitoring data needed to assess the current state of oyster resource following the MC 252 spill. This plan is funded by the United States Coast Guard National Pollution Funds Center.

Objective/Purpose

After reviewing data collected under the Phase I Amendment 2, 2011 Quadrat, 2012 Quadrat, and 2013 Quadrat Plans, the Trustees have concluded continued quadrat sampling is warranted to estimate recovery of the oyster resource potentially injured due to: 1) potential exposure of oysters to contaminants released into the environment as a result of the Deepwater Horizon Oil Spill; and/or 2) potential exposure of oysters to changes in water quality (e.g. salinity) resulting from actions undertaken by the state of Louisiana in response to the spill. Additional sampling may also help further characterize potential impacts to oyster resources resulting from the opening of the Morganza and Bonnet Carre spillways by the Army Corps of Engineers in May 2011.

In summer 2010, the oyster working group collected quantitative samples from oyster reefs as part of its Phase I Amendment 2 plan to assess potential injury to oysters and oyster habitat resulting from the Deepwater Horizon oil spill and response activities conducted by the state of Louisiana to address the spill. Field teams used diver-assisted quadrat sampling methods to obtain those quantitative samples, which were then processed to provide estimates of oyster abundance and biomass by size class at a set of historically sampled locations across the Gulf of Mexico in Louisiana, Mississippi, Alabama, and Florida. The field effort also included collection of sediment samples for contaminant analysis at each site. In fall 2011, additional quadrat sampling was conducted to collect quantitative samples a year later at the same sites under the 2011 Quadrat Plan. The 2011 sampling was expanded to also include quadrat sampling sites from the Transition Plan, which had not previously been sampled using quadrats. The plan also included collection of sediment samples for contaminant analysis at all sites. In 2012, Trustees collected quadrats at sites sampled under the 2011 Quadrat Plan. The Trustees examined results of abundance

sampling through 2012 and believe they suggest that abundance in many areas of the Gulf remains low. Preliminary data from the 2013 Quadrat Plan continue to show low abundances across much of the north-central Gulf. The Trustees concluded that continued abundance monitoring is warranted in 2014.

The results of this plan (hereafter referred to as the "2014 Abundance Monitoring Plan") will be used to support the assessment of any potential injury to oyster abundance and biomass, the recovery of oyster resource from such possible injury, and to inform and support restoration planning efforts.

The Plan specifically addresses the following topics:

1. Approach and rationale: This section describes the overall purpose and need for abundance monitoring in 2014.

2. Health and safety: This section summarizes pertinent health and safety protocols applicable to this effort. It includes a number of procedures by reference, all of which should be carefully reviewed and adhered to by all team members.

3. Site selection: This section describes the proposed approach to identifying sites for evaluation.

4. Estimated Study Cost: This section provides an estimate of the cost of implementing the 2014 Abundance Monitoring Plan.

Approach and Rationale

As noted previously in the Phase I plan, quadrat sampling provides valuable data on abundance and biomass of oysters and related fauna because it achieves a highly quantitative sample (i.e. the area and effort of the sample are well defined).[1]

Historic quadrat abundance data show a general range of zero to 300 settled oysters per square meter (total of spat, seed and adult) in the Northern Gulf of Mexico. The Trustees believe that preliminary analysis of data collected from 2010 through 2013 shows widespread low abundance through the 2013 season. More specifically, the Trustees believe that preliminary data obtained from the Phase I Amendment 2 quadrat sampling indicate continued widespread low or zero abundance values generally across much of the Phase I study area, including areas that may have been impacted by contaminants from the Deepwater Horizon spill, and/or from freshwater diversions instituted by the state of Louisiana in 2010 in response to the spill. In addition, the Trustees believe that the results from dredge-based abundance assessments at Transition Plan sites show similarly low findings. The Trustees also believe that preliminary data from the 2011 to 2013 Quadrat Plans continue to indicate low abundance across much of the Gulf. After reviewing these initial results, the Trustees believe that follow-up assessments of abundance and biomass metrics at the Phase I/Amendment 2 Plan and Transition Plan sites using quadrat

[1] Quantitative sampling of oyster reefs is commonly accomplished by randomly placing on the reef a quadrat made of PVC that covers an area of a full meter square (1 m x 1 m), and then collecting all biota and other material encompassed within that quadrat up to a specified depth equivalent to about the size of a diver's gloved hand.

sampling are warranted. Sampling in 2014 will contribute to understanding of the geographical and temporal extent of potential injuries to the adult and juvenile oyster populations, and counts of spat-sized oysters from the quadrat samples will complement data on oyster settlement monitoring that the Trustees have collected cooperatively with the RP under the Phase I, Transition, and Spring 2011 Oyster Recruitment Sampling Plans, and data collected under the 2012 Oyster Recruitment Monitoring Plan and the 2013 Oyster Abundance Monitoring Plan

Below is a summary of the key aspects of the 2014 Abundance Monitoring Plan:

- The plan collects samples at 147 locations (see Site Selection section below). The set of sample sites includes 100 sites in Louisiana, 25 in Mississippi, ten in Alabama, and 12 in Florida.

- Table 1 shows the metrics to be assessed and samples to be collected as part of the 2014 Abundance Monitoring Plan. All samples will be taken in accordance with the protocols and standard operating procedures (SOPs) presented at the end of this document.

- Oyster abundance and biomass will be measured during one round of quadrat sampling. Quadrat sampling locations will be randomly selected from data on oyster reef locations from previous mapping efforts conducted under the Phase I or Transition Plans.

- Material collected from the quadrats will be bagged and sent to Dauphin Island Sea Lab (DISL) for abundance counts and biomass of oysters and other observed fauna, as well as shell height and condition index measurements of oysters collected from these locations.

Estimated samples from this activity

Field teams under this plan will sample up to 147 sites located across the northern Gulf of Mexico, where the term "site" refers to a sample grid cell as previously defined under either the Phase I or Transition Plans. Table 2 summarizes sampling activity in the 2014 Abundance Monitoring Plan. Assuming adequate oyster resource exists and is accessible to the dive sampling teams, the target number of samples resulting from this activity is 588 oyster quadrats (four per sample site) that will be analyzed for abundance and biomass measurements at Dauphin Island Sea Lab. Subsamples of each of the quadrats will be analyzed for shell height and condition index. For each quadrat sampled, shell heights of up to 20 oysters in each of the three size categories will be measured, for a total of up to 60 shell height measurements per quadrat. For each site sampled, 12 market-sized oysters will be randomly selected for condition index measurements from the 20 oysters used for shell height measurements. If fewer than 12 market sized oysters are available, seed sized oysters will be analyzed.

Table 1. Proposed Monitoring Metrics

Metric	Proposed Frequency of Sampling
Effect Metrics	
Oyster abundance and biomass by size class	
Associated fauna abundance and biomass	One event
Shell Height	
Condition Index	
Exposure metrics	
Oiling observations (qualitative)	Collected on each site visit

Health and Safety

This section provides a brief overview of safety requirements as stated in the DWH NOAA NRDA Site Safety Plan. The intent of the DWH NOAA NRDA Site Safety Plan is to establish a structured process and disciplined approach to the mitigation of health, safety, and environmental risks associated with our operations and activities.

Any Federal NRDA field team member must complete all applicable health and safety training as directed by NOAA. The following is a list of items required prior to sampling:

- Review the DWH NOAA NRDA Site Safety Plan (including all attachments)
- Participate in the Hazard Communication Program Training webinar
- Complete and sign the MS Canyon 252 Safety Confirmation Form
- Complete a minimum of 24-hour HAZWOPER Training
- Review the Heat Stress, Cold Stress, and Boater Safety Training/Awareness PowerPoint presentations
- Complete First Aid/CPR Training
- Review of Safety Messages (Safety Plan, Appendix E)

These documents can be found on noaanrda.org on the Field Ops wiki page - General Safety and Guidance documents (https://www.noaanrda.org/group/field-operations/wiki).

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Any encounters with protected species are to be reported to the appropriate authorities. Field crews are also to follow any guidance or BMPs provided by federal, states, or tribal historic preservation officers to avoid potential impacts to protected species or to historic or cultural resources. Any affected historic or

cultural resources are to be reported to the appropriate authorities as described in such guidance or BMPs.

Site Selection

The plan collects samples at locations previously mapped and sampled under prior DWH NRDA oyster plans. This includes Transition Plan locations in Louisiana and Mississippi that were characterized as known oyster habitat (i.e., they included either oyster reef mapped prior to the DWH spill or they were identified by state biologists to have a high probability of productive oyster habitat). It also includes Phase I sampling sites that were historically sampled prior to the DWH spill across all four states. This plan also includes the eight sites added to the 2013 Quadrat Abundance Plan to replace sites on which state cultch planting activities have recently occurred in Mississippi waters.

The set of sample sites includes 147 of the 149 previously sampled sites from the Phase I and Transition Plans and includes 100 sites in Louisiana, 25 in Mississippi, ten in Alabama, and 12 in Florida. These sites include both non-randomly selected set of historically sampled 200 meter x 200 meter grid cells from the Phase I Plan as well as from the randomly selected sample of the 600 meter x 600 meter grid cells (sites) from the Transition Plan. Finally, it includes a small set of Transition Plan grid cells in Louisiana characterized by higher frequencies of observed surface oiling in the months following the MC252 spill. Figures 1 through 10 display the sites included in the 2014 Abundance Monitoring Plan.

Table 2. Summary of oyster sampling procedures, maximum number of sites and replicates

Method	Potential # of sites				Est. Samples per event	Freq. of sampling	Total # of samples (estimate)
	LA	***MS***	***FL***	***AL***			
Quadrat	100	25	12	10	4 quadrats	1	588

Figure 1: 2014 Oyster Quadrat Abundance Monitoring Locations (Overview)

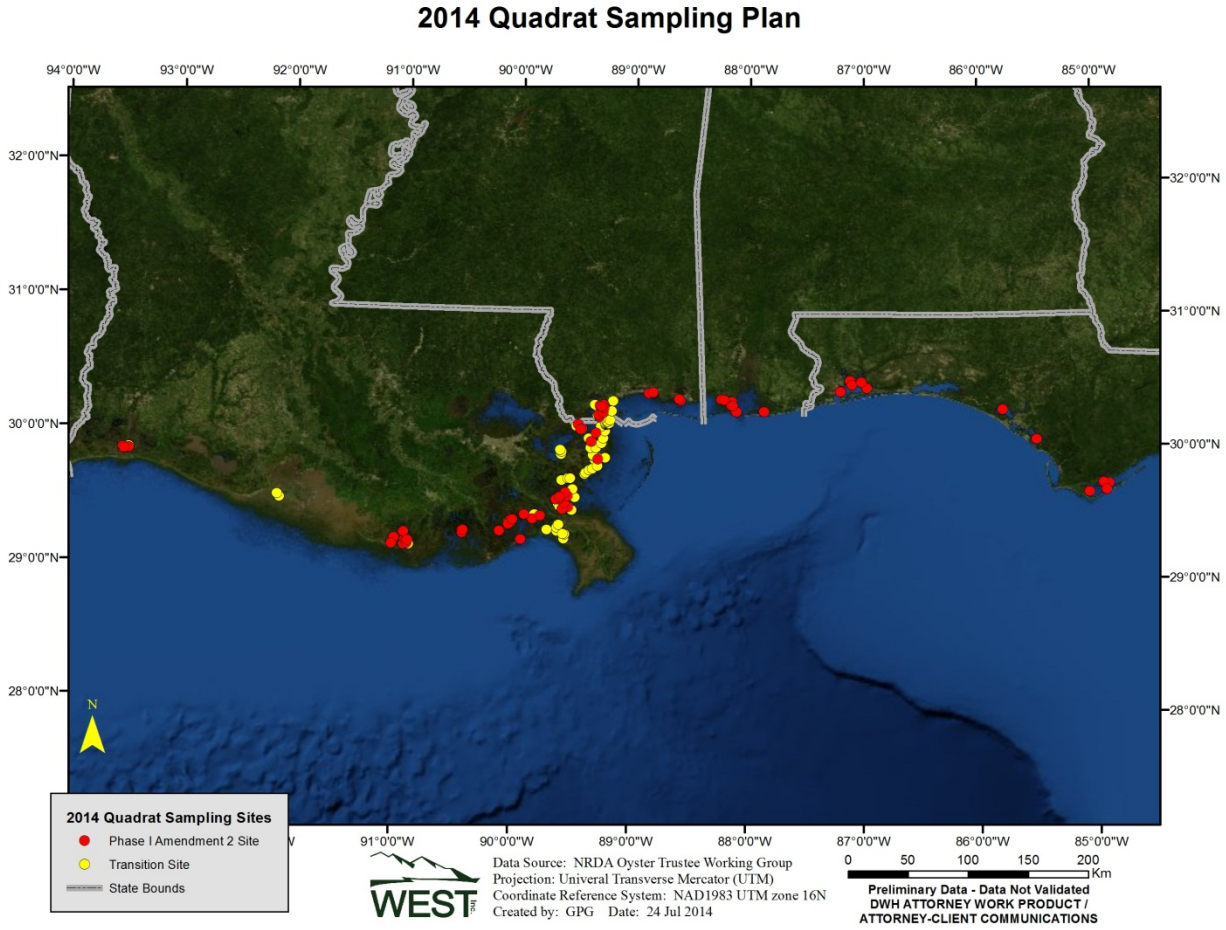


Figure 2: 2014 Oyster Quadrat Abundance Monitoring Locations in Louisiana (CSA 1N)

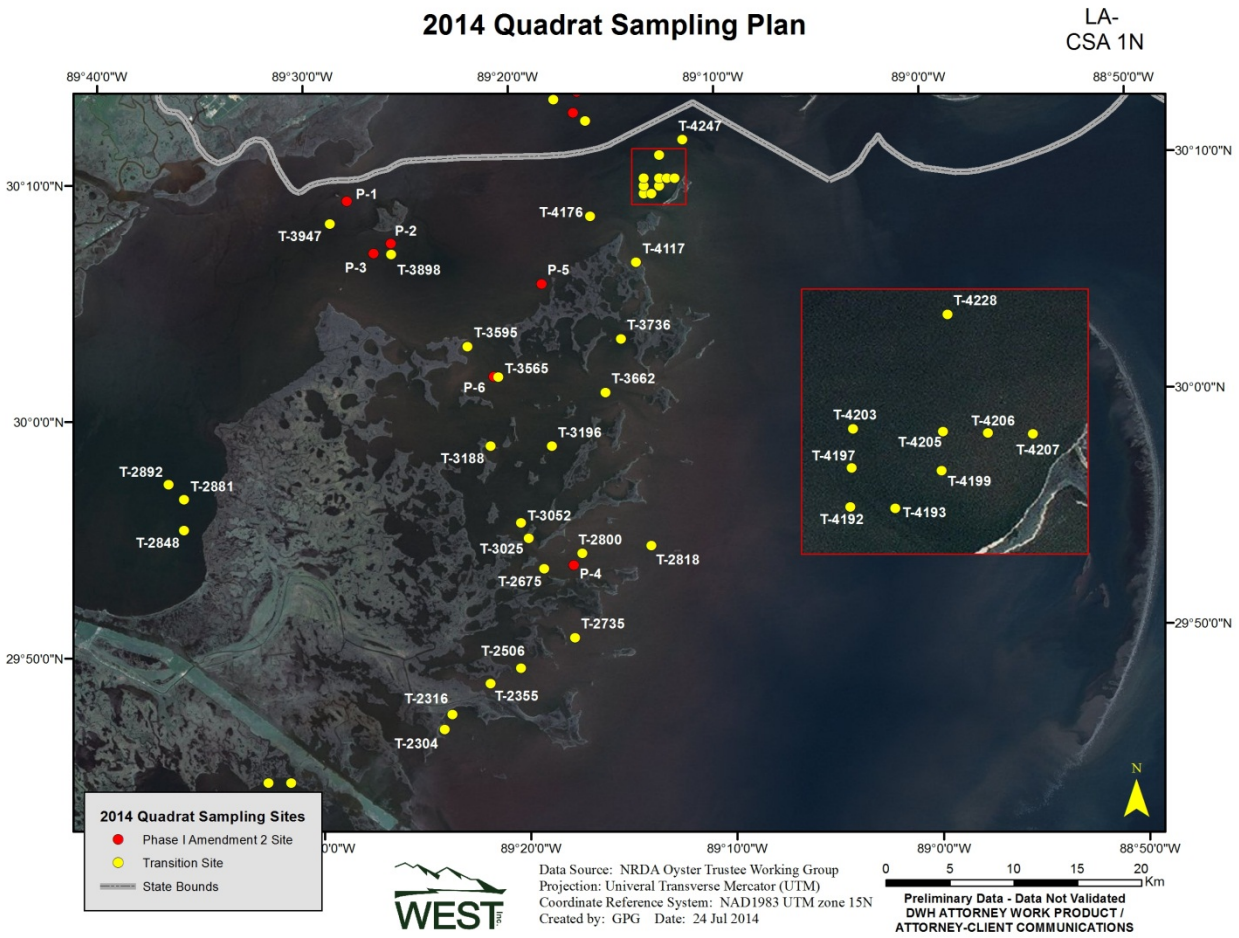


Figure 3: 2014 Oyster Quadrat Abundance Monitoring Locations in Louisiana (CSA 1S)

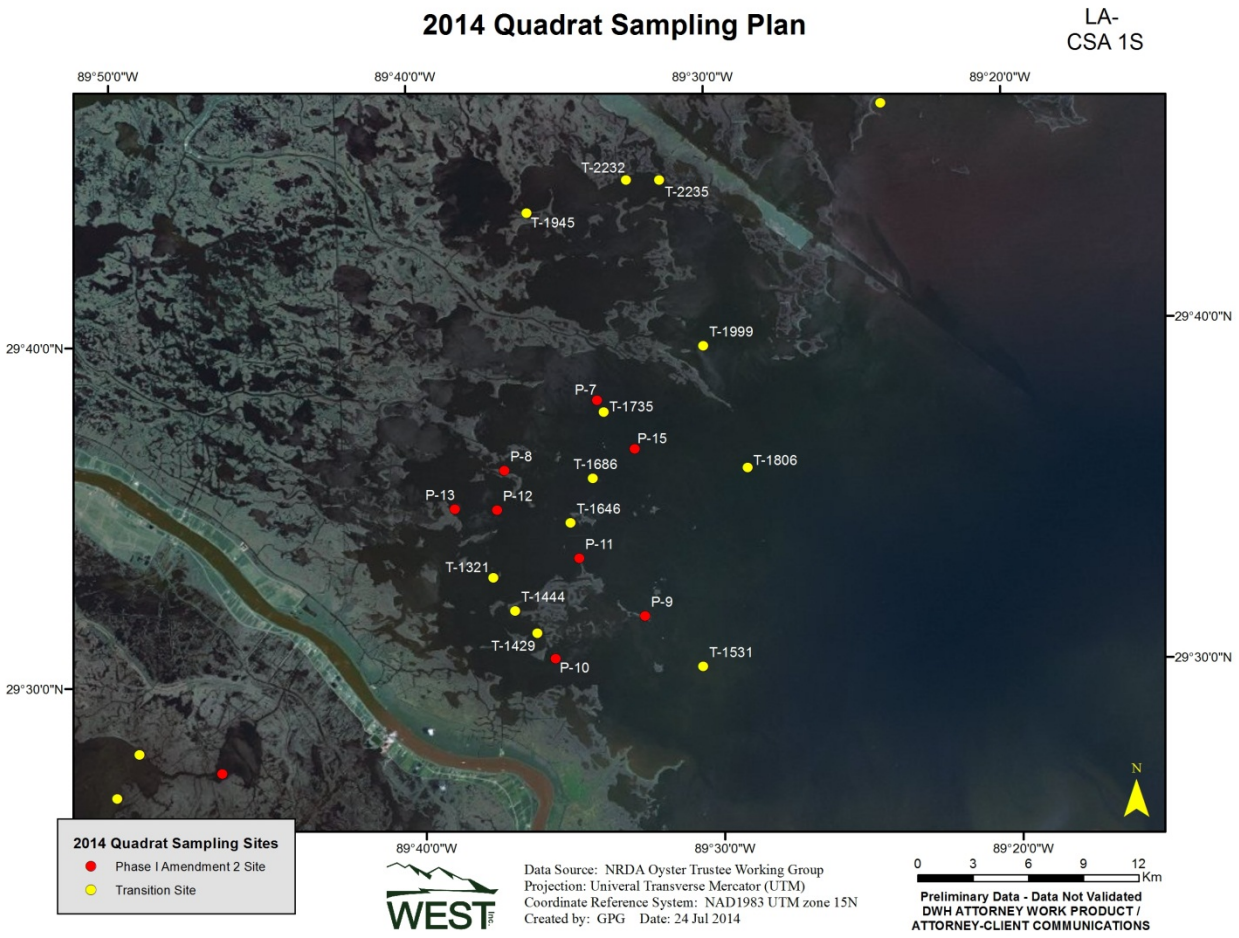


Figure 4: 2014 Oyster Quadrat Abundance Monitoring Locations in Louisiana (CSA 3)

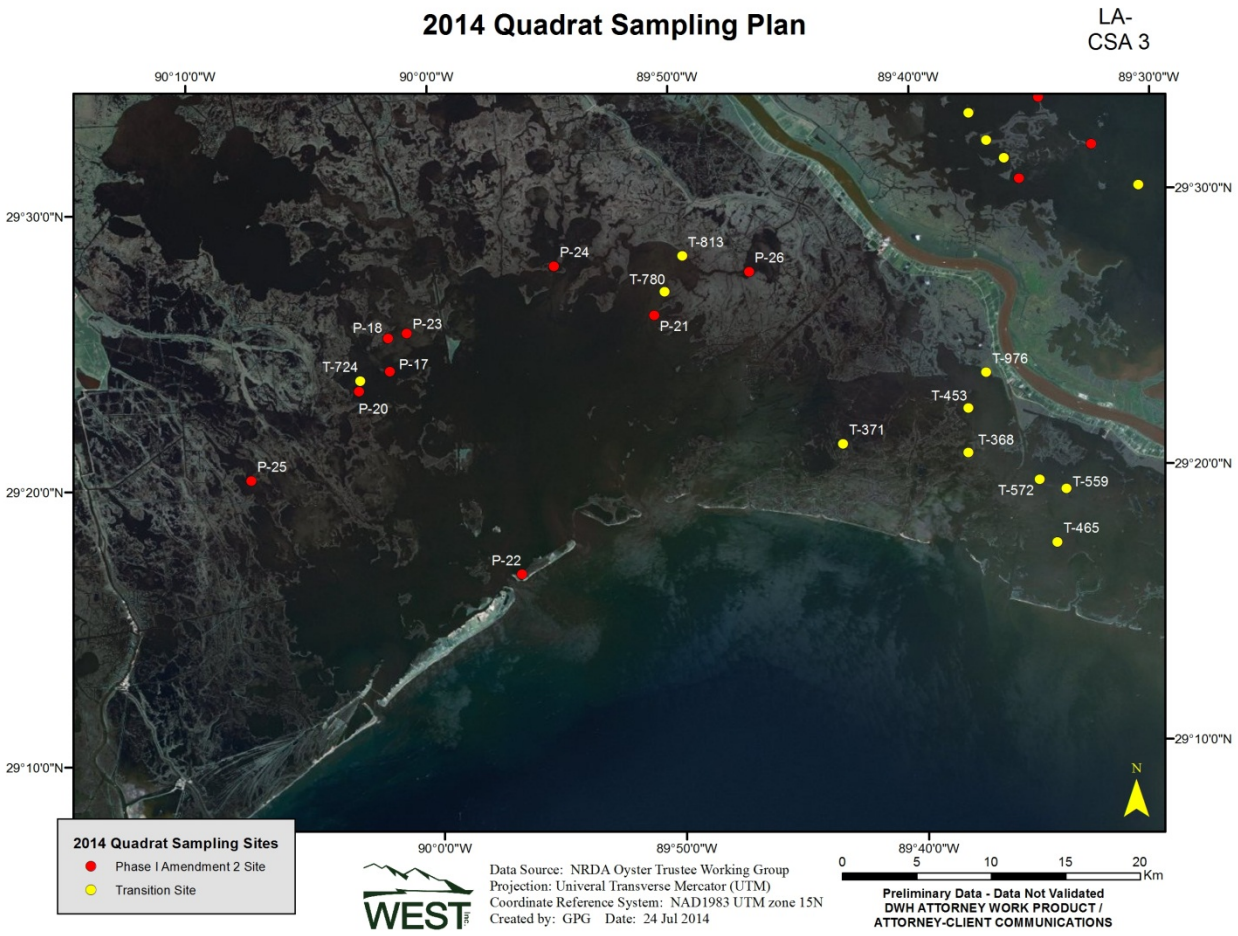


Figure 5: 2014 Oyster Quadrat Abundance Monitoring Locations in Louisiana (CSA 4 and 5)

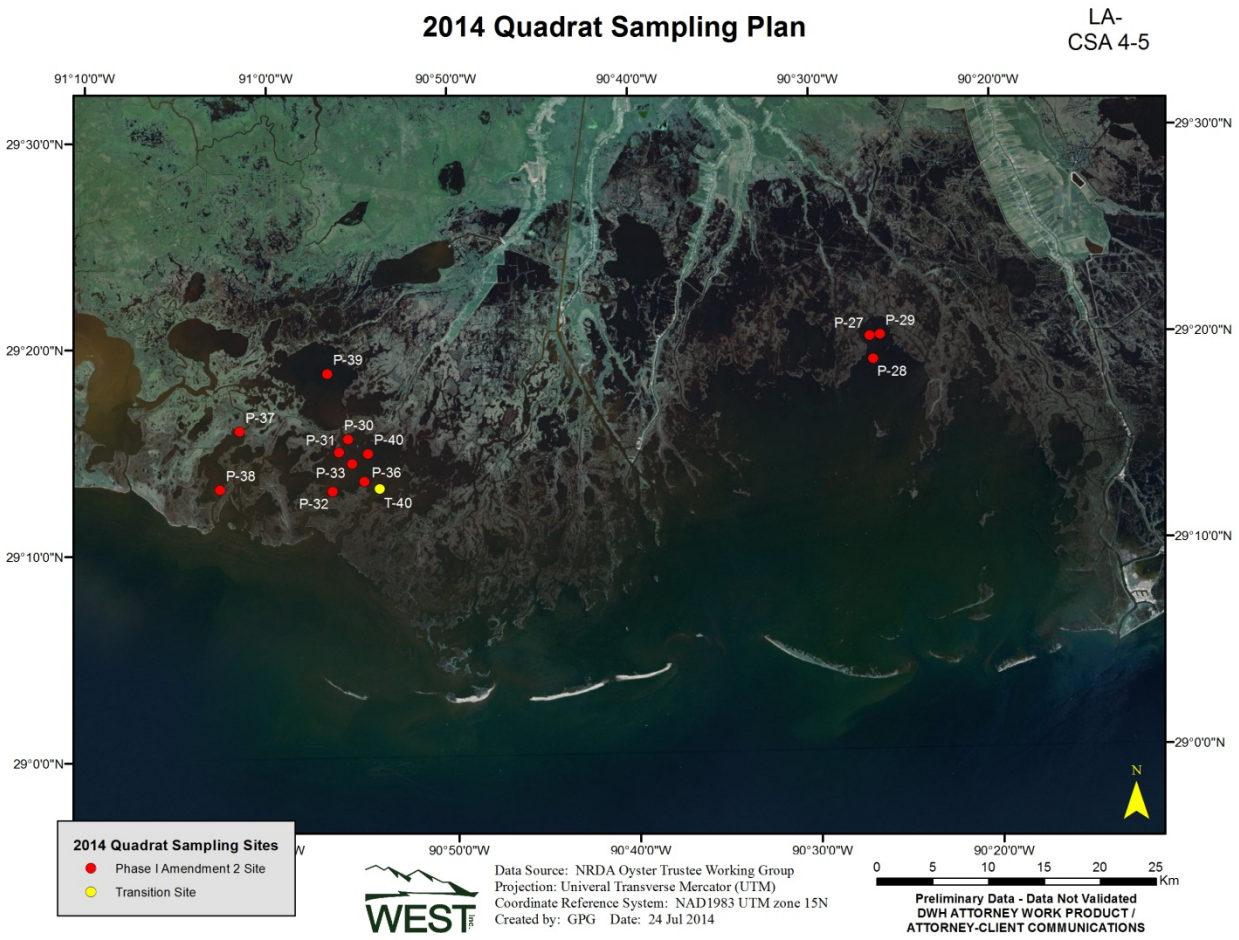


Figure 6: 2014 Oyster Quadrat Abundance Monitoring Locations in Louisiana (CSA 6 and 7)

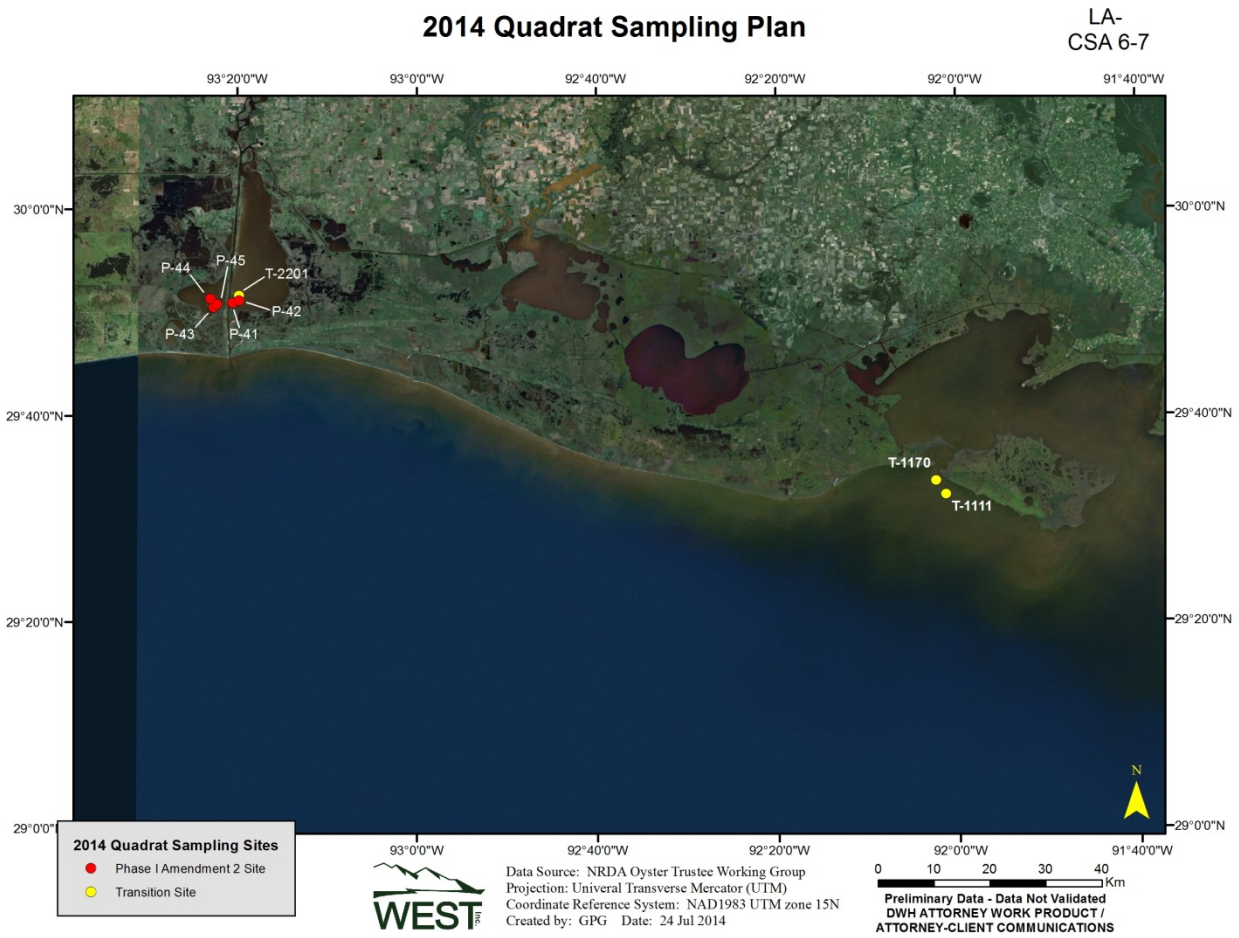


Figure 7: 2014 Oyster Quadrat Abundance Monitoring Locations in Mississippi

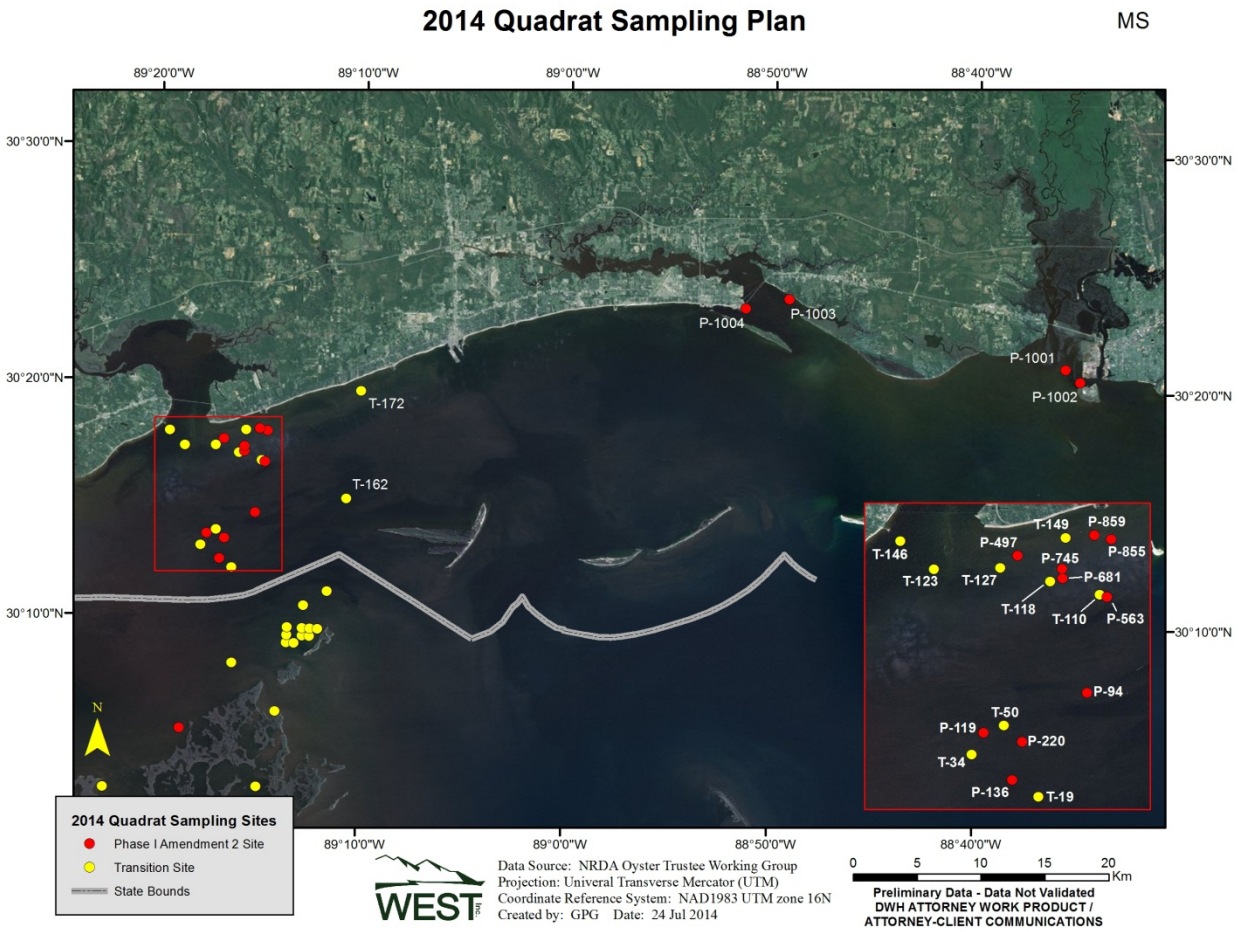


Figure 8: 2014 Oyster Quadrat Abundance Monitoring Locations in Alabama

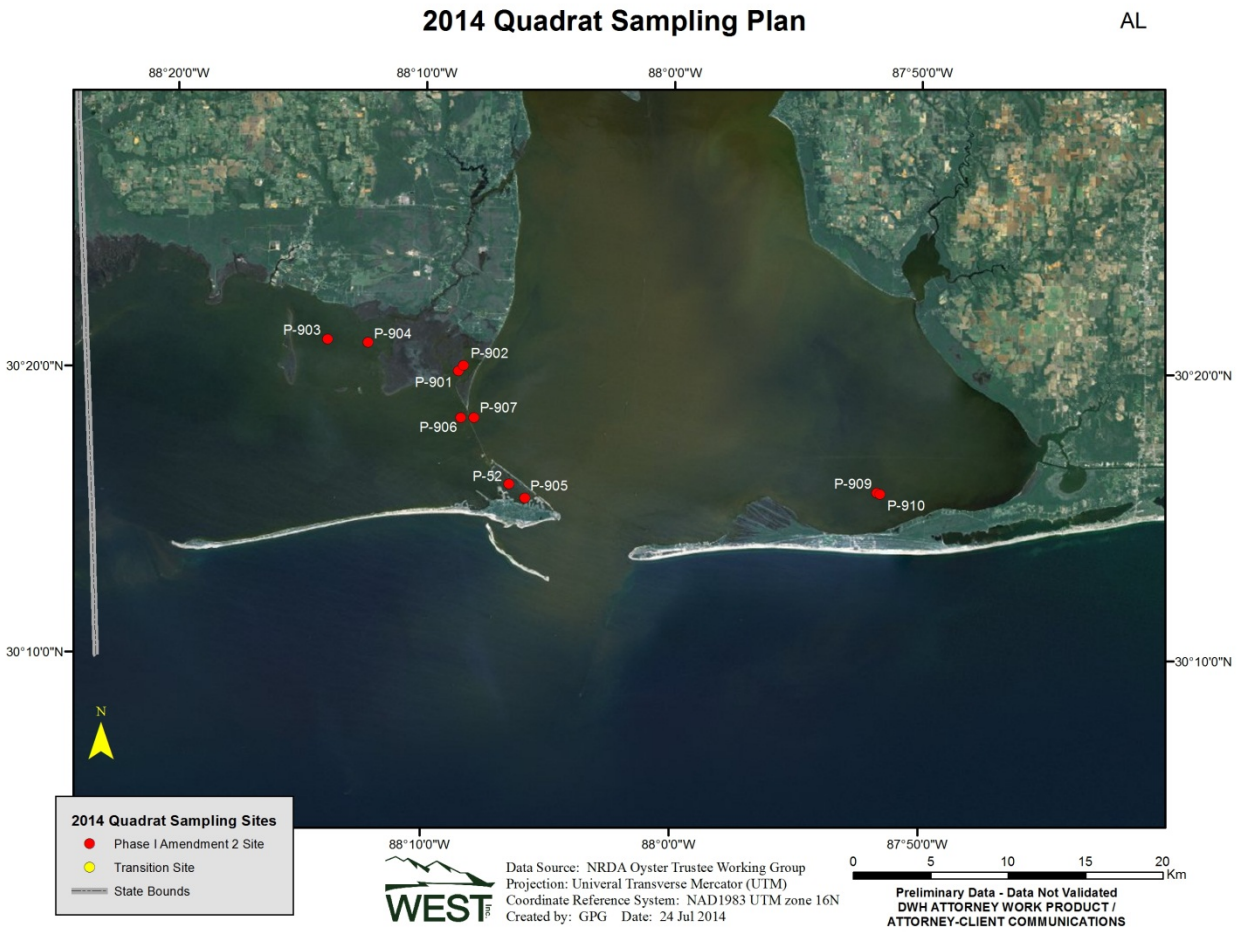


Figure 9: 2014 Oyster Quadrat Abundance Monitoring Locations in Florida (East)

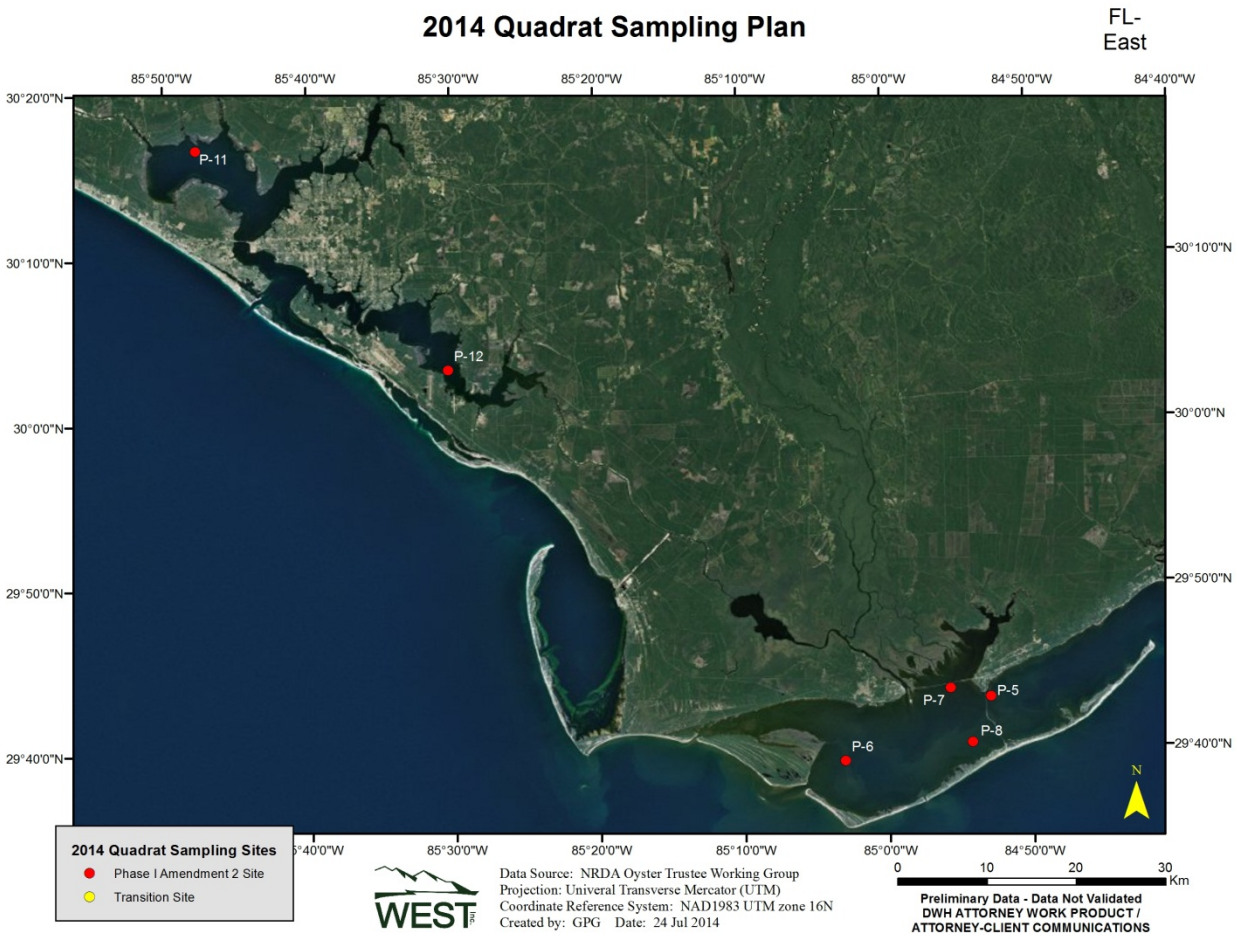
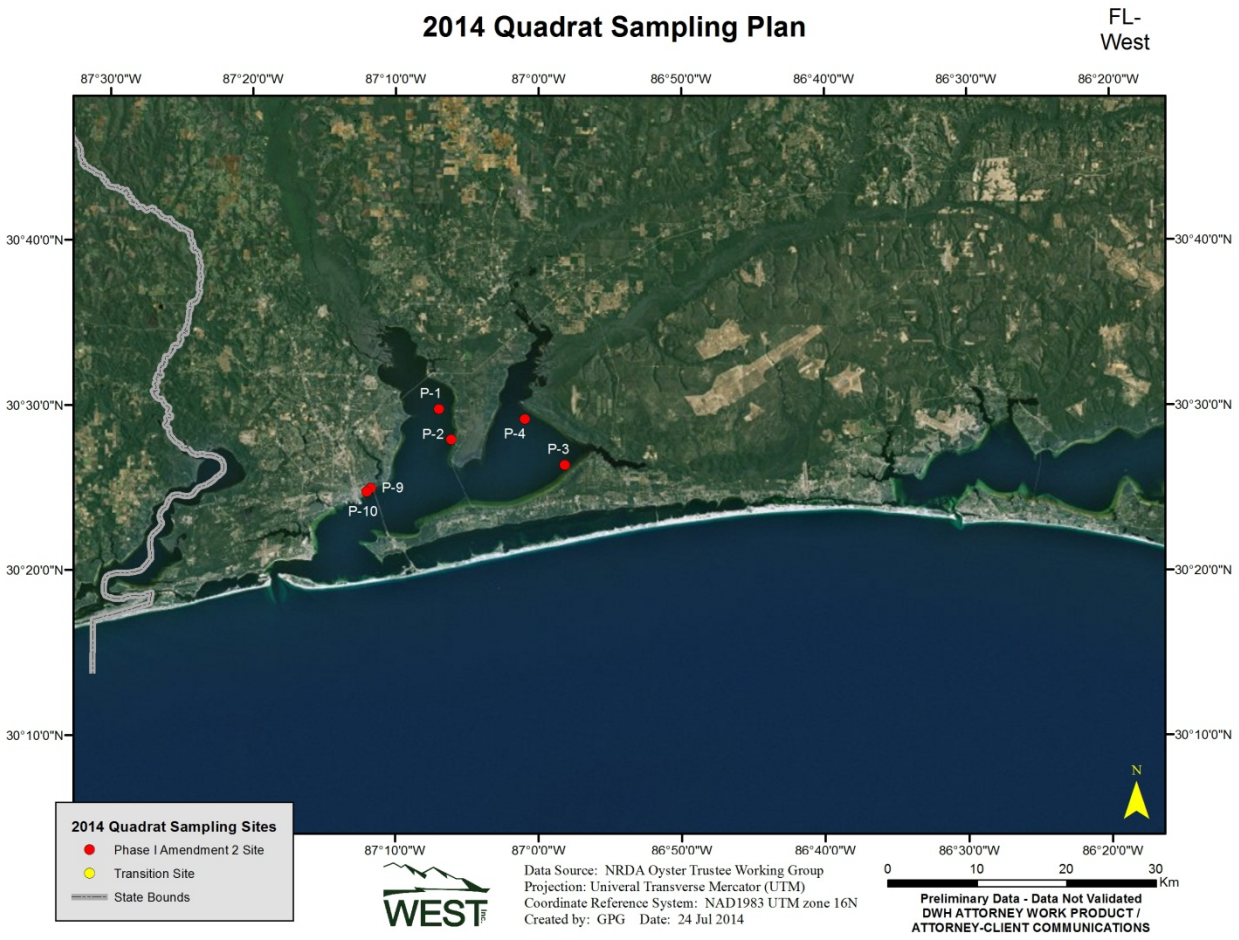


Figure 10: 2014 Oyster Quadrat Abundance Monitoring Locations in Florida (West)



Cost Estimate

The estimated cost for this plan is $3,290,424. The subtotal for the field costs including oyster resource mapping, quadrat sampling, and data intake (Dade Moeller), is $2,795,165 and the subtotal for the costs of quadrat processing is $61,574. The cost estimates presented in the plan account for federal samplers, equipment and personnel only. Additional State costs contributing to this plan are not reflected in this cost estimate. For details concerning cost estimates, refer to Table 3.

Table 3. Cost estimate for 2014 Oyster Quadrat Abundance Monitoring Plan

	Budget
Plan Development and Sampler Trainings	$146,536
Field Work - Samplers and Vessels	$1,996,906
Field Work - Dade Moeller	$651,723
Quadrat Processing and Analysis	$61,574
Data Management and Visualization	$433,685
Total	**$3,290,424**

Appendix A: Detailed Standard Operating Procedures (SOPs)

A. Juvenile and Adult Oysters (Settled Life Stages)

Field Sampling

Samplers should complete the **2014 Oyster Quadrat Abundance Monitoring Plan – Site Visit Form,** the **2014 Oyster Quadrat Abundance Monitoring Plan – Quadrat Form,** and the **2014 Oyster Quadrat Abundance Monitoring Plan – Site Summary/Signature Form.** A unique sample ID should be given to each sample and prominently marked on the form according to the Oyster Sample Naming Convention (Appendix B). Sample codes should be recorded in the **2014 Oyster Quadrat Abundance Monitoring Plan – Quadrat Form** datasheets and also in the **NRDA Sample Collection Form – Tissue/Wrack** (available on www.noaanrda.org)**.**

1. *Site Description*

- Measure / Record:
    - Site name (e.g., OYS-T-LA-A-465)
    - Cell number (GCID, e.g., 0020)
    - Time of day and date.
    - Tidal depth (intertidal or subtidal)
        - If subtidal, estimate the depth in meters (record units) at the time of sampling.
        - Describe reef conditions – recent harvest, oiling, covered in mud, fouled, etc.

2. *Physical/Chemical Parameters*

- Measure and record:
    - Bottom and surface salinity
    - Bottom and surface water temperature
    - Bottom and surface dissolved oxygen (at subtidal sites only)
    - Ambient air temperature
    - Weather conditions
    - Oiled condition (None, Sheen, Scattered Deposits, Surface substantially covered, Surface completely covered or Deep Deposits).

After completing the above steps, move on to oyster sampling within the gridcell in accordance with the sampling methods below.

4. *Oyster Quadrat Sampling*

- Collect four individual quadrat samples per grid cell. Field teams will be provided with up to eight randomly generated contact points per grid cell. These contact points will be generated as a random sample of points from oyster reef transect segments identified in the mapping exercise.
- Determine coordinates via GPS. Ensure that you are within 5 meters of the contact point provided by NOAA NRDA Field Ops.

- Place 1 m^2 PVC quadrat frame directly at arm's length at a random spot (choose random side of boat to drop quadrat by pulling from a hat or spinning a compass) at the contact point. Do not favor abundant or sparse areas.
- Drop quadrat and have diver descend to depth (unless quadrat is in shallow water that does not require diving).
- Using tools when applicable, harvest all oysters 3-4 cm down into the reef (approximately the depth of a diver's gloved hand). You should not have to dig into the mud.[2]
- Place all material from the quadrat in burlap sack. When the quadrat collection is complete, secure sample to buoyed line.
- Divers are to signal to on-boat team that the quadrat has been collected. When divers are clear, on boat team pulls up the sample.
- Observe resource in the bag, and note the number of live oysters from the quadrat with respect to target collection goal. If necessary, dump collected material on tray to inspect.
- Return all material to burlap sack and close sack.
- Place the burlap sack in a plastic contractor bag.
- Samples should be tagged with an external (flagging tape with permanent marker) and internal tag (flagging tape with permanent marker) that prominently denotes sample code.
- The sample code should be constructed of the location ID, date, matrix, sample team leader code, grid cell id, and sample number along with information regarding sample type (for details, see the Oyster Sample ID Naming Convention, Appendix B).
- Hold animals on ice until delivered to intake team.
- Contact points should not be skipped. Retain all quadrat sample material and submit all quadrat samples to the intake lab.

5. *Photographs*

See **NRDA Field Photography Guidance** (available onwww.noaanrda.org) for camera preparation and set-up prior to going into the field. –

- Photograph the operating GPS screen showing the date and time to synchronize the photos with the GPS track.
- Photograph site to describe oiling conditions.
- Collect a close-up photo of the reef showing individual oysters
- Photograph the entire reef.
- **DO NOT DELETE ANY PHOTOS**
- Document the pictures taken on the Oyster Reef Sampling Form
- Additionally, complete the NOAA NRDA Trustees Sampler Photo Logger form

6. *Collection and Disposition*

[2] Collection of all material encompassed within the quadrat to a depth of approximately the size of a diver's gloved hand, as recommended in the SOP, will capture the preponderance of live and recently dead material present.

The individual who collected the sample should be noted on the field data form. If more than one person is involved, list the field party leader and the person who entered the data (if different).

Lab Processing

7. *Sample Processing: Abundance*

Samples will be brought to a non-field location for processing. Samples should be kept in a cooler with ice. Samples should be processed within 96 hours to ensure accurate characterization of live and dead oysters.

Regardless of sample method, both live and dead oysters should be enumerated by size category.

- Measure shell height (SH).
    - Using rulers (when oyster category is easily determined) and calipers (when fine scale separation of categories is needed to measure the distance from the umbo (small tapered end of the oyster) to the maximum limit of the shell.
    - Measure dead oysters in the same way.
        - Dead oysters are oysters that have no living tissue but are still in their articulated form (i.e., the shells are still hinged but no living oyster tissues is present also called "boxes"). These oysters will often appear opened or "gaped".
        - If the oyster is gaped and tissue appears to be undergoing decomposition, these oysters should be enumerated as a separate category
- Classify oysters by size:
    - spat (between 0.4 and 1 inch [10 - 25 mm] shell height),
    - seed or juvenile oysters (between 1 and 3 inches [25 – 75 mm]),
    - market size or "legal" oysters (> 3 inches [75 mm] shell height].

- Measure the shell height to the nearest millimeter for the first 20 haphazardly-selected oysters in each size category (spat, seed and market, as defined above).

- Identify and enumerate associated biota.
    - Identifications and counts should be entered on separate lines under the "Other Species" category on the Oyster Reef Sample Form. Associated fauna should be archived with the quadrat sample.

8. *Sample Processing: Biomass*

- Weigh living material:
    - Weighed in aggregate by size category.
    - Similarly, dead oysters should be weighed by category. Finally, associated species should be identified and weighed by taxon.
    - Dead oyster still with tissue will be classified as dead and weighed separately.

3. Sample Processing: Condition index measurements

- Objective: Determine the condition of oysters at each sampling site.

- Lab procedures (within 96 hours)

  i. From the 20 oyster subsample from each site used for shell height measurements (see *Lab Processing: Abundance*), haphazardly select 12 market or if fewer than 12 market size oysters are available, select seed-sized oysters from each site, and wash, scrap and scrub to remove mud and attached biota. When possible, select two oysters from each of four quadrats collected at a given site. If fewer than four quadrats were collected and/or if fewer than two oysters were collected in each quadrat, select oysters so that the sample consists of oysters from across the site. For example, if fewer than four quadrats were collected at a given site or if fewer than four quadrats at a given site contain resource, select three oysters from each quadrat sample.

  ii. Measure (to the nearest mm) the length (umbo-to-bill) of each oyster.

  iii. Remove and retain the right valve.

  iv. Detach the left valve from the adductor muscle, and combine with the right valve; matched valves are blotted dry and weighed.

  v. Blot and weigh (to the nearest 0.1 g) oyster meat to obtain wet weight.

  vi. CI is determined as the (blotted) wet weight of the oyster meat divided by (blotted) shell weight.

The objective of this research is to access differences between impacted and un-impacted sites in oyster condition (CI).

Equipment List

i. 8 PVC quadrats
ii. 3 sets of calipers and rulers
iii. Spring scales (0-10g, 10-100g, 100 – 1000g, and 0-10 kg)
iv. Digital camera with extra batteries
v. GPS with extra batteries
vi. Nitrile gloves (size M and L)
vii. Small shovel / tool for separating oysters
viii. Waterproof data sheets (chain-of-custody, sample tracking, photo log, oyster reef sample form)
ix. Waterproof labels or tags
x. Waterproof pens
xi. Flagging tape for external tags

xii. Burlap sacks for sample storage.
xiii. Plastic contractor-grade construction bags
xiv. YSI multimeter for DO, salinity

B. SOP for Decontamination Procedures for Sampling Equipment
Adapted from "the Standard Operating Procedure Decontamination Procedures for Sampling Equipment MC252 Fish Technical Work Group Plans," August 24, 2011

1. Scope and Applicability

This Standard Operating Procedure (SOP) describes equipment and field procedures necessary to properly decontaminate equipment utilized for the MC252 2012 Oyster Quadrat Abundance Monitoring Plan. This process is designed to minimize the potential for constituent migration and/or cross contamination. This procedure does not apply to personnel decontamination.

2. Summary of Method

The objective of this monitoring program is to determine and quantify the abundance and biomass of oysters in previous sampled locations. Decontamination procedures appropriate to the oil-related chemicals being assessed may improve the prevention of cross contamination. This SOP presents an adaptive approach to decontamination that ensures sufficiency of decontamination while minimizing the use of and personnel exposure to solvents.

3. Equipment and Supplies

- PPE (including disposable Neoprene gloves, chemical splash goggles; see Section 4.0 below for additional information including safe work practices)
- Small dry chemical Fire Extinguisher (BC or ABC Rated - 5 lb or larger)
- Bristled Brushes compatible with the solutions being used
- Low Phosphate Detergent (Alconox or Liquinox), diluted in accordance with instructions provided with the product.
- Distilled/DI water
- Designated solvent-compatible container for collection of decon waste/rinsates
- Secondary containment vessel such as a cooler that can be closed to reduce the likelihood of spills and reduce volatilization
- Clean Ambient/Tap water source
- Wash/rinse tubs compatible with the solutions being used
- Specified area of vessel for decon away from other contaminant sources and other personnel
- If collecting a rinsate blank, small container appropriate for the collection
- Field documentation materials

4. Health and Safety

Health and safety hazards associated with this procedure can be mitigated by the following engineering, administrative, and PPE controls:

HAZARD	CONTROL(S)
Bodily injury due to pinch points or dropped equipment	• Leather gloves and steel-toe boots should be worn while equipment is being

	handled • Equipment safety features (e.g., lock pins) should be engaged while equipment is being handled
Vapor inhalation	• Perform decon only in well-ventilated areas • Remain upwind of decon work • Advise other workers in the area of the nature of your task and ask them to remain upwind
Skin irritation	• Don proper chemical-resistant gloves (disposable Neoprene 5ml or greater thickness) • Promptly wash any areas of skin which may have encountered contact with oil or rinsate and always wash after completing work with hazardous materials
Eye contact	• Do not use wash bottle near face
Fire	• 5- or 10-pound dry chemical fire extinguisher (Type BC or Type ABC) should be readily accessible during the decon process
Solvent spill	• Place equipment to be decontaminated in containers to capture rinsate
Environmental detriment	• Maintain solid used materials (e.g., paper towels, disposable gloves, etc.) in a bucket or other container to prevent litter • Promptly replace lids onto rinsate buckets and secondary containers

NOTE: The above information was determined from job hazard analysis of the work tasks

5. Decontamination Procedures

Levels of Decontamination Procedures and their Selection
All equipment and non-disposable materials that directly contact a sample medium must undergo Level 1 Decontamination (see below) or be pre-cleaned by the manufacturer, in compliance with the protocols described here.

The Level 1 Decontamination procedure shall be the default decontamination procedure for all nondisposable equipment, followed by Level 2 Decontamination when applicable. The observation of oil in the general vicinity of the sampling does not necessitate Level 2 Decontamination but Level 2 Decontamination can be used at the field crew's discretion.

If Level 1 and Level 2 Decontamination procedures are not successful (i.e. visible oil is still observed on the equipment or the equipment rinsate) or if the equipment is heavily oiled, the sampling team will discontinue use of the contaminated equipment. During data intake, the team will transfer the equipment to Dade Moeller for proper disposal.

Level 1- Default decontamination procedure

Scrub[3] all equipment and parts with a dilute detergent mixture and rinse with deionized or distilled water. Inspect the equipment and rinse water for signs of residual oil, other contaminants, or incomplete decontamination.

Level 2 – Inspection and secondary decontamination

Whenever, after the Level 1 Decontamination procedure, there remains some evidence of incomplete decontamination and residual oil (i.e. sheen in rinse water, dark spots on net, etc.) the field team shall repeat Level 1 decontamination.

After the Level 1 Decontamination procedure is repeated, the equipment and rinse shall again be inspected. If after visual inspection there remains evidence of incomplete decontamination and residual oil (i.e. sheen in rinse water, dark spots on the net, etc.) the team shall discontinue the use of contaminated equipment. Dade Moeller will collect contaminated equipment during data intake and dispose of such equipment as appropriate.

Specific Protocols

These protocols are to be followed for all sampling apparatus (e.g., quadrats etc.).

All sampling devices between sample collections

- Collect the samples following the Work Plan's sampling protocol
- Wash and scrub with a clean mixture of distilled/DI water and low phosphate detergent
- Rinse equipment with distilled/DI water
- Inspect devices and rinse water; if sheen or oil is observed, repeat the above steps; if not, decontamination is complete
- If sheen or oil is observed after a second decontamination with water and detergent, discontinue use of equipment and turn over contaminated equipment to Dade Moeller for disposal during data intake.

6. Storage and Disposal of Chemicals and Chemical Waste

Rinsates will be handled following the specific guidelines listed below:

Rinsates Containing Oil

- Collect all rinsates in the designated compatible container with the appropriate label on the side
- Place rinsate containers in a secondary containment system to reduce the likelihood of spills and prevent volatilization
- All rinsates containing oil will be transported by authorized persons to the appropriate waste disposal site
- All rinsates will be captured in the same container.[4]

[3] The full decontamination process using detergent washing procedures is described below.

Rinsates Containing Water and/or Low-phosphate Detergents

- Rinsates containing only low phosphate detergents and water will also be containerized and given to Dade Moeller during data intake for proper disposal.
- Place rinsate containers in secondary containment during transportation and storage to reduce the likelihood of spills.

[4] Diluting the rinsate from level 2 with the rinsate from level 1 is a key safety factor, reducing both concentration and volatility.

Appendix B: OYSTER SAMPLE ID NAMING CONVENTION

NOAA NRDA Sample Format:

- **LocationCode – DateCode - Matrix Leader# Sample#**
    - 6-digit Location code (from maps located on www.noaanrda.org. These should be the NRDA Grid location code rather than the SCAT location code);
    - 5-digit date: year letter and mmdd (A=2010, B=2011, C=2012, D=2013, E=2014);
    - Matrix letter (T = Tissue);
    - 2 or 3-digit leader code; and
    - 2-digit sample number.
- We will be numbering each sample sequentially *within each GCID and by sample type* (i.e., each GCID will have four quadrats numbered 01Q through 04Q). This information will go in the "Sample #" section at the end of the NOAA NRDA required tag.
- Grid Cell ID – the Grid Cell ID number (e.g., 0024, 3989) will be added to the sample ID immediately preceding the sample number so that the site can be identified. The Grid Cell number is not unique across states, but with the state abbreviation embedded in the location code the value is unique. *Use leading zeroes to ensure that the GCID is always four digits.*
- Tissue Subtype – In addition, because there are several different tissue sample types collected across oyster plans, we will add an identifier after the sample number that will indicate the sample type for tissue samples. For this plan, only quadrat samples are collected.
    - Q = quadrat sample
    - L = larval sample
    - SP = settlement plate
- All additional information describing the samples will be recorded in the "Sample Notes" field of the NOAA NRDA sample collection forms. This additional information differs by sample type.
    - Quadrat oysters
        - Site Name
        - Quadrat Number

- EXAMPLE: **LAAM24-E0802-TA10024-01Q**

Sample ID Components	*Components from Example*	*Interpretation*
Location Code	LAAM24	NRDA Gridcell LAAM24
Date	E0802	August 2, 2014
Matrix	T	Tissue
Leader Code	A1	Team leader A1
Site ID	0024	Site 24
Sample number	01	First quadrat sampled during this site visit
Sample type	Q	Quadrat sample

Lab Teams

- The labs will track the sample ID changes, splits and composites in a sample bridge template and upload to noaanrda.org site, under instruction from the data management TWG. In addition, the labs will upload result information to the www.noaanrda.org site on a frequency agreed upon by the lab and the data management team.