Appendix G

Buried Oil Project Eastern States Area of Response November 2013

Prepared for

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Federal On-Scene Coordinator

Deepwater Horizon MC252

November 2013

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Executive Summary

The Buried Oil Project (BOP) was established within the Gulf Coast Incident Management Team (GCIMT) for the Deepwater Horizon MC252 Spill of National Significance (MC252 spill) to evaluate, delineate and, where practicable, recover potential buried oil deposits identified by the third Operational Science Advisory Team (OSAT-3). The OSAT-3 team integrated a number of datasets to identify areas where beach morphologies at the time of initial oiling were conducive to the formation of weathered oil deposits and where these deposits may not have been exposed or broken apart by erosion. The OSAT-3 team identified a number of areas with a higher potential to contain buried oil, or polygons, and provided them to the BOP team for field evaluation.

The Federal On-Scene Coordinator's (FOSC) original directive establishing OSAT-3, dated May 23, 2012 (see Appendix B), identified five tasks, which were to be worked in sequence:

Task 1. Evaluate the trends observed in frequency, rate, and potential for remobilization of oil on segments.

Task 2. Determine and record the locations and typical shoreline profiles and morphology for likely source(s) of residual oil or origin of the surface residual balls (SRBs).

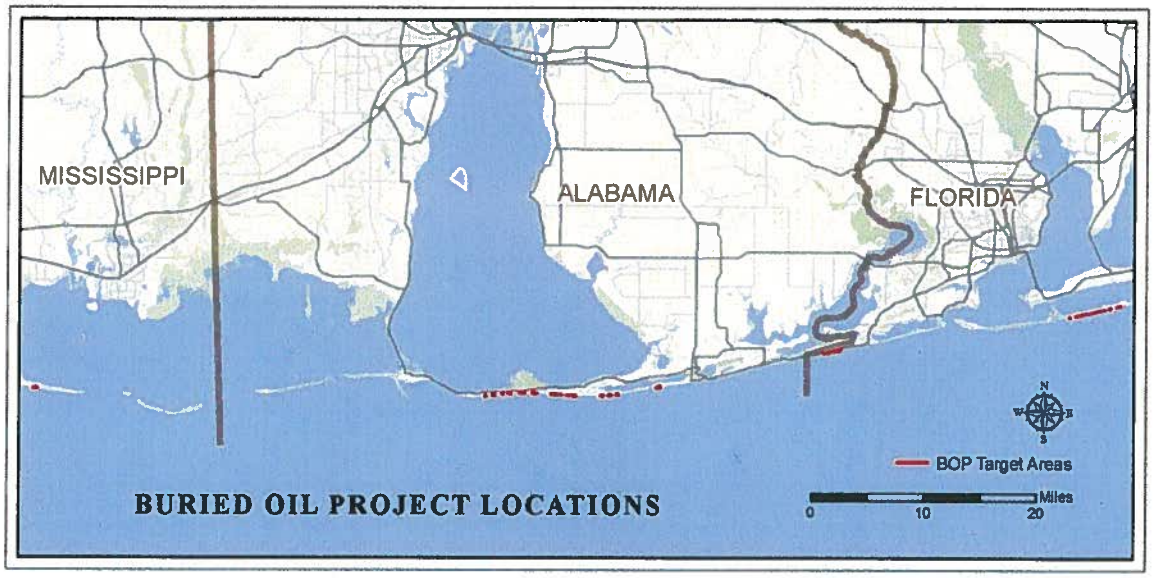
Task 3. Define or determine the mechanisms whereby re-oiling phenomena may be occurring.

Task 4. Investigate the potential for mitigating actions that may be taken to reduce these potential occurrences and, to the extent mechanisms are identified, evaluate their feasibility, and the net environmental benefit of employing such methods.

Task 5. Recommend a path forward in order to reach Shoreline Clean-up Completion Plan (SCCP) guidelines or appropriately manage identified areas through alternative methods.

As the OSAT-3 work began in earnest, it became evident that the data analysis and interpretation were of such significance that the time required would be longer than anticipated. The FOSC directed that the BOP and OSAT-3 efforts be conducted simultaneously: "The NOAA SSC and SC have also concluded that tasks 4 and 5 would be best completed if conducted concurrently outside of the OSAT-3 process through the Buried Oil Project." (See the FOSC directive in Appendix B). The OSAT-3 effort focused on Tasks 1-3, and the BOP effort focused on Tasks 4-5.

Utilizing this approach, as the OSAT-3 team conducted its analyses, the team provided information on potential buried oil targets to the BOP team for field investigations. In addition, the BOP team provided the OSAT-3 team with information on field observations and material collections. The BOP was launched on January 17, 2013. The first field investigation began on April 5, 2013, following substantial review and discussion with the OSAT-3 team and other key stakeholders.



Eastern States Polygon Area Locations

Within the Eastern States portion of the Deepwater Horizon Response Area of Response (AOR), the OSAT-3 team identified 114 polygons on 61 shoreline segments:

Florida: 39 polygons on 21 segments

Alabama: 72 polygons on 39 segments

Mississippi: 3 polygons on 1 segment

Of the 114 polygons identified, field operations were conducted on 14 polygons:

Florida: 10

Alabama: 4

Mississippi: 0

Of the polygons surveyed, buried oil deposits were found in two areas: on Pensacola Beach, Florida on April 5, 2013, where approximately 450 pounds of oiled material was recovered; and on Fort Morgan Amenity/Bureau of Land Management (BLM) property on

April 15, 2013, where approximately 4 pounds of oiled material was recovered. Additionally, some SRBs were collected in these polygons. In both cases, this material was consistent with material recovered during prior operations and consisted principally of sand/sediment, organic material, and residual weathered oil.

After wildlife restrictions and other constraints precluded investigation of the remaining polygons, the FOSC consulted with stakeholders for the Eastern States AOR (the States of Florida, Alabama, and Mississippi, as well as the U.S. Department of the Interior [DOI]). Based on consultation with the stakeholders, the FOSC issued a series of directives that ended further BOP work in the Eastern States AOR. The FOSC concluded active Response activities in the Eastern States AOR on the following dates:

DOI:	May 1, 2013
Mississippi:	April 30, 2013
Florida:	June 1, 2013
Alabama:	June 10, 2013

Under the National Contingency Plan, once the active cleanup phase is concluded, areas are returned to the NRC process. Under the NRC process, reports of possible oil-based material are made to the NRC and are investigated by the USCG. If actionable material that is visually consistent with MC252 oil is found in the former Deepwater Horizon AOR, USCG investigators will mitigate it if the volume is small, or will issue BP a directive to recover the material. BP will then dispatch a team to complete the removal. (See the FOSC directive, dated May 15, 2013, in Appendix B).

The remaining polygons identified as having the *potential* for buried oil are documented to provide information, should it become necessary to conduct operational activity in these areas in the future. All data are preserved and provided in the BOP Polygon Legacy Package (Appendix A).

1.0 Introduction and Background

Shoreline cleanup activities were conducted across the Deepwater Horizon Response AOR after heavily weathered oil began making landfall in May 2010. Multi-party Shoreline Cleanup Assessment Technique (SCAT) teams – comprised of federal and industry experts, as well as representatives from the Gulf states – continuously and systematically surveyed the shoreline to assess oiling conditions and develop shoreline treatment recommendations (STRs). The STRs were implemented at the direction of the FOSC. A wide range of shoreline treatments were undertaken to remove the weathered material and ensure that the various shoreline segments met the endpoint criteria defined in the Deepwater Horizon SCCP, which was approved by the FOSC in November 2011. As noted in the OSAT-3 report, following the initial oiling, the majority of shoreline and nearshore areas experienced sufficient erosion (vertically and laterally) that resulted in the breakup and/or redistribution (and natural cleanup) of the initial sand/oil deposits. In a number of instances, Response teams excavated buried oil deposits after they were revealed by erosion or delineated during field activities.

The OSAT-3 report further notes that there were discrete areas of shoreline that continued to experience periodic remobilization of weathered oil, which prevented or delayed some segments from reaching endpoint criteria defined in the SCCP. The priority of OSAT-3, and therefore the focus of the BOP, was on shoreline segments remaining within the active Deepwater Horizon AOR.

Before the launch of OSAT-3, prior operational and SCAT work had strongly indicated or confirmed the presence of buried oil deposits in certain shoreline areas. The BOP team focused its work in these areas first. The areas included: Pensacola Beach, Eden Condo (Perdido Key), and Johnson Beach (Perdido Key Gulf Island National Seashore [GUIS] in Florida; and Bon Secour National Wildlife Refuge (BSNWR) in Alabama.

2.0 Materials and Methods

After receiving information from the OSAT-3 team on the general areas where buried oil may have been deposited during initial oiling and may not have been exposed or broken up by erosion or removed by Response activities, the BOP team implemented an adaptive plan for field evaluations.

2.1 High-Potential Areas (Polygons)

Areas with higher potential to contain buried oil deposits were identified by the OSAT-3 team based on operational and SCAT data, aerial imagery, and data and insights gained from hydrodynamic modelling. For each of the identified areas, a pre-plot (polygon) was provided to the BOP team to assist field operations with sampling, delineation of potential buried oil deposits, and material removal. Figure 2.1 is an example map of polygons provided by the OSAT-3 team to the BOP team.

Figure 2.1: Polygon Example – Polygons FLES1-005_001, 006_001, 007_001, 008_001 and _002

Each polygon was given a unique number, which associated it with a specific shoreline segment. For example, the first polygon located in the Pensacola Beach, Florida area in Segment FLES2-018 was identified as FLES2-018_001. The second polygon in that segment was identified as FLES2-018_002, and the others followed in sequence. As with segments, the sequential polygon numbering began at the western boundary of each segment and proceeded eastward. In circumstances where a polygon crossed a segment boundary, the polygon number was associated with the segment that was first encountered in sequence (typically west to east).

2.2 Location of Polygons

To develop an operational work plan for each polygon, the physical relationship of the polygon to the current shoreline had to be determined. Using pre-plot coordinates of the polygon outline provided by the OSAT-3 team, a SCAT team established waypoints with GPS locations for each polygon. In addition, the SCAT team photographed the area and provided notes on each photograph, including view direction and a unique identification number. An example of a SCAT field survey report is provided in Table 2.1 and includes the polygon ID, waypoint number with location comments, photograph, and polygon location summary.

Polygon #	SCAT Team 4 WP #	WP loc comment	Photo #	Photo comment
FLES1-024_001	053	Wet, at plunge line	0423	Looking west
	054	UITZ, side of berm		
	055	Wet, at plunge line		
Summary: For polygon FLES1-024_001, midpoint is in UITZ on berm, and the ends are wet at the plunge line.				
FLES1-023_002	056	Wet, ~1m further offshore than plunge line, WD ~2-3'		
	057	Wet, ~1m further offshore than plunge line, WD ~2-3'		
	058	UITZ		
	059	SUTZ, about 2m landward of berm		
Summary: Eastern end of Polygon FLES1-023_002 is wet beyond plunge line, and western end is in the UITZ ad SUTZ.				
FLES1-022_003	060	In ITZ/Swash		
	061	In ITZ/Swash		
	062	In ITZ/Swash		
Summary: Polygon FLES1-022_003 is entirely in the ITZ/Swash				
FLES1-021_001	063	Wet, at or near plunge line		
	064	UITZ, just seaward of berm		
	065	UITZ, 2m seaward of berm		
Summary: East end of Polygon-021_001 is wet and at the plunge line, and the western end is in the UITZ				
FLES1-020_002	066	Swash zone seaward of berm		
	067	SUTZ, 2m landward of berm	0424	Looking west
	068	SUTZ, 2m landward of berm		
Summary: Polygon Eastern end of polygon FLES1-020_002 is in the swash zone, and the western end is in the SUTZ.				

Table 2.1: Example SCAT Polygon Survey Report for FLES1-020 – 024

2.3 Transects

To conduct subsurface investigations of polygons, the BOP team used a statistically-based approach to identify specific points and/or transects for trenching. Transects were laid out perpendicular to the shoreline and parallel to one another. Until the Real-Time Kinematics (RTK) system was set up and functional at the Pensacola Beach site (see Section 2.5), SCAT personnel used hand-held GPS units to locate boundary, transect, and transect endpoint coordinates. As with the polygons, each transect was assigned a unique number for identification. This number was affixed to the polygon identification number. For example, the first transect in Polygon FLES2-018_001 was FLES2-018_001.001.

Before excavation began, the transects were laid out in a grid on a map (Figure 2.2). To simplify these transect layouts, each polygon was bounded by a rectangular box configuration. Using these maps, the BOP team excavated the first transect at the edge of the polygon "box," and subsequent transects were excavated in 10-meter spacings. (See Section 2.4 for more information on the methodology used to determine the transect spacing).

In Florida, metal T-posts were placed to locate the endpoint where the transect line terminated in the water, whereas weighted buoys were used for transects in Alabama. These posts and buoys were placed at a distance far enough beyond the actual GPS point to allow sufficient space for the backhoe bucket operation, and to ensure the transects were properly excavated from endpoint to endpoint. Transect endpoints onshore were identified using wooden stakes. During the trenching operation, the operator aligned the excavator such that the wooden stake was located on the centerline between the excavator tracks, and the bucket was directed toward the opposite endpoint post (located in the water) to establish a straight line for the trench. To ensure a complete investigation of each polygon, a final transect was excavated at the end of the polygons, even in instances when the last spacing was less than 10 meters.

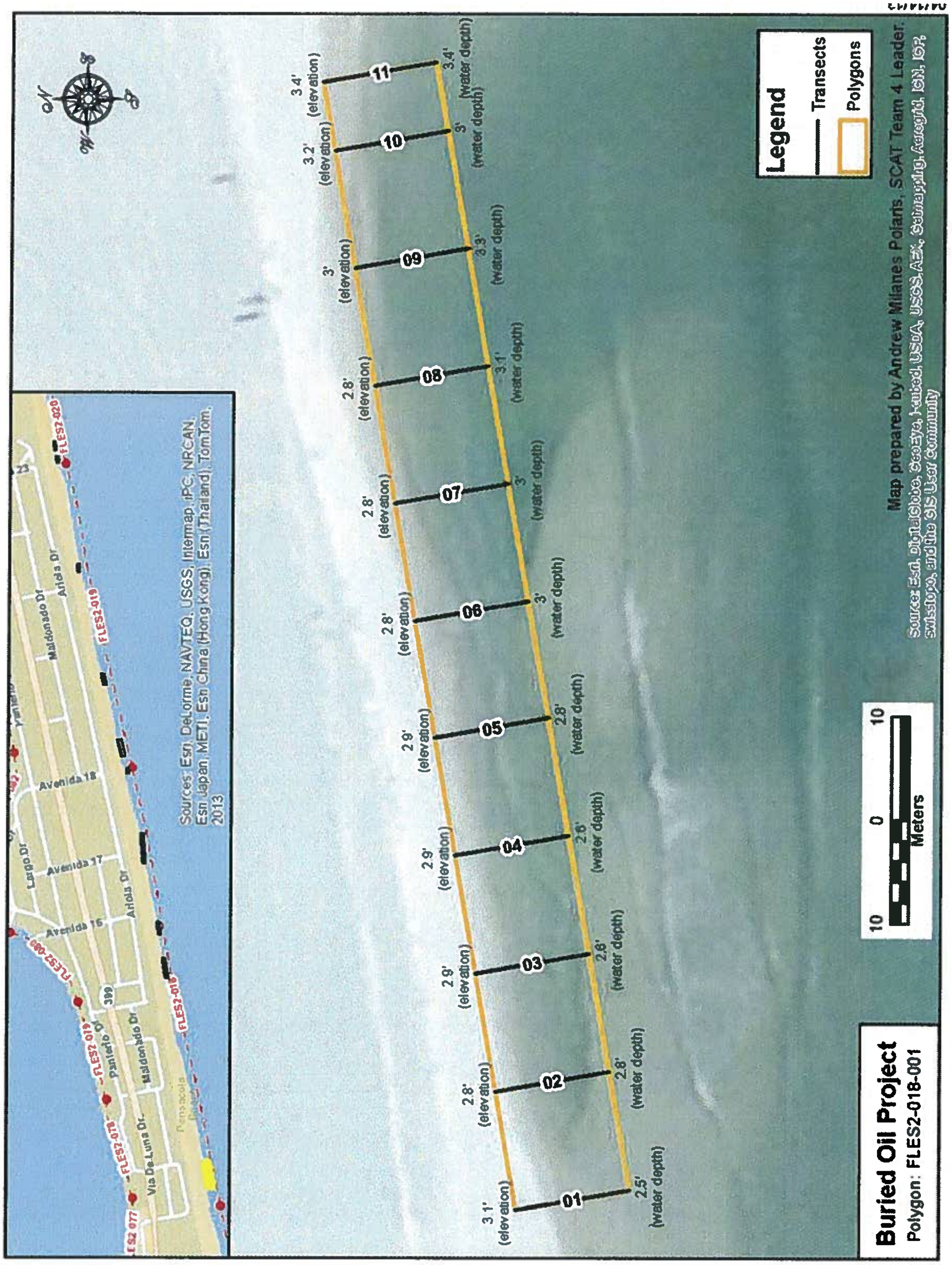


Figure 2.2: SCAT Transect Diagram Example – Transects within Polygon FLES2-018_001

2.4 Transect Spacing Methodology

A key objective when determining the optimal number and spacing of transects was to ensure that the data used by the BOP were statistically significant and would provide a high level of confidence that the areas investigated were appropriately cleared of potential buried oil. To achieve this objective, the BOP team engaged a biostatistician (see the reports in Appendix C) to develop probability-based sampling plans for detecting buried oil deposits; work with the BOP team to implement these plans; and document the plans' theoretical and practical basis. This probability-based sampling was the foundation for optimizing field efforts to detect buried oil deposits. It produced defendable, accurate, and precise detection of buried oil deposits by applying theoretical principles to the shoreline conditions that were conducive to the initial deposition of weathered oil, to practical consideration on sampling designs (e.g., grids), and to the number of samples required.

The trenching design was based on standard statistical parameters: a 95 percent confidence level (that there are no residual oil deposits in the population), with a 5 percent risk that there are weathered oil deposits in the population. (See Appendix C, *Probability of Detecting Oiled Mats Using 42-Inch Trenches*, dated July 29, 2013).

To assist with the statistical calculations to determine the required transect sample size for detecting buried oil deposits with the aforementioned confidence and risk levels, SCAT data for the tentative polygon transect spacing in Alabama was evaluated. The SCAT data suggest that buried oil deposits tend to be longer parallel to shore by a factor of four. According to the biostatistician, "Mats tend to be rectangular, rather than square (based on data from Snorkel SCAT). The oil in a 10-feet by 10-feet mat is more likely distributed in a 5-feet (onshore) by 20-feet (alongshore) dimension." Note that 10-feet by 10-feet is the equivalent of 3-meters by 3-meters, and 5-feet by 20-feet is the equivalent of 1.5-meters by 6.1-meters. (See Appendix C, *Probability of Detecting Oiled Mats Using 42-inch Trenches*, dated June 20, 2013).

Because Alabama beaches are similar to those in Florida and Mississippi, the same conclusions about buried oil deposit dimensions in these two states were inferred based on the similarity of size distribution data, Snorkel SCAT data, and Operations field knowledge. This analysis indicates that the probability of detecting buried oil deposits by trench excavation spaced 10 meters apart approaches certainty for an alongshore buried oil deposit dimension of 15 feet (4.6 meters). This alongshore dimension equates to a buried oil deposit size of 100 square feet (9.3 square meters). Additional separate statistical reports were developed for required transect numbers, augering, and Snorkel SCAT. (See Appendix C).

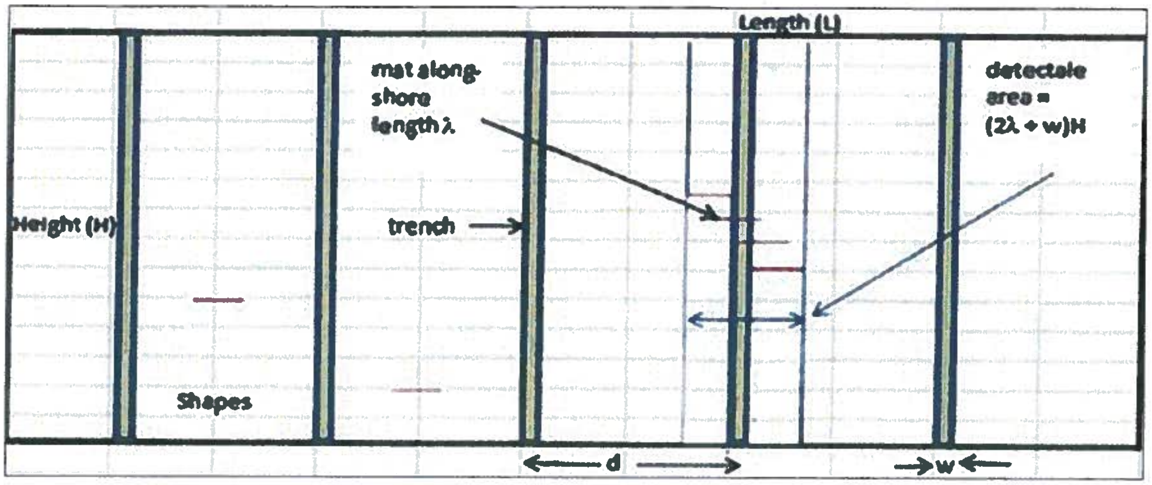


Figure 2.3: Example Trench Spacing Diagram

For the example transect in Figure 2.3, the probability of buried oil deposit detection when using equally wide trenches spaced by a fixed distance apart is as follows:

1. The probability is calculated as the detectable area searched divided by the total area.
2. Total area is the length (L) of the polygon multiplied by the height (H). Total Area = L x H.
    a. The length can be approximated by knowing the total number of trenches (ɳ) and multiplying this by the distance between trenches (d).
    b. The distance between trenches is measured from the midpoint of the trench, so it is a close and convenient approximation of length.
    c. When using the approximated length L = ɳd, the total area becomes Total Area = ɳdH.
3. The detectable area is the area in which a buried oil deposit of length (λ)* will be detected in a given trench, where λ is the alongshore length of a buried oil deposit.
    a. The detectable area is the detectable length multiplied by the height (H) of the polygon.
    b. The detectable length is displayed in Figure 2.3 between the two blue lines along the second trench from the right.

c. The detectable length covers buried oil deposits that are entirely on either side of a trench as long as they touch a trench, as well as those that cross into a trench.

d. The detectable length for a single trench is twice the length of a buried oil deposit (2λ) plus the width (w) of the trench.

e. The detectable length for an entire polygon is detectable length for a single trench multiplied by the total number of trenches.

f. That is, detectable length = $\eta(2\lambda + w)$.

g. The detectable area = $\eta(2\lambda + w)H$.

4. The probability of a buried oil deposit is p(buried oil deposit) = detectable area/total area = $\eta(2\lambda + w)H/\eta dH = (2\lambda + w)/d$.

For example, using this approach with 10-meter trench spacing and an assumed 4.3-meter (~14 feet) alongshore buried oil deposit dimension, the probability of finding a buried oil deposit is 96 percent.

That is:

1. Assumptions:

   a. λ = 4.3 meters (estimated buried oil deposit alongshore dimension).

   b. d = 10 meters (distance between trenches).

   c. w = 1.07 meters (~42 inch width of trench).

2. p(buried oil deposit = 4.3 meters) = (2(4.3) + 1.07)/10 = 0.96.

Result: There is a 96 percent chance that a buried oil deposit with a minimum alongshore length of 4.3 meters will be detected using trenches that have a 42-inch width and are spaced 10 meters apart at the midpoint of the trench. To determine the number of required trenches, total length of the polygon is divided by 10 meters to maintain the same probability given the assumed buried oil deposit length.

* Note that "λ" used here is represented by "/" in the findings in Appendix C.

2.5 Target Depths for Excavation

To effectively locate buried oil deposits that may have formed at the time of initial oiling, the BOP team had to know not only where to excavate, but also the depth to which they should excavate. Using SCAT and Operations records for documented primary deposits, aerial imagery collected nearest in time to initial oiling, tide gauge records, and output from the hydrodynamic models developed for OSAT-3, the OSAT-3 team established a maximum vertical depth of investigation of 3 feet (0.91 meters) below mean sea level (MSL).

To ensure accurate excavation of the target zone on land, SCAT personnel used RTK surveying equipment (Figure 2.4) to achieve the baseline depth of investigation of -3 feet (-0.91 meters) MSL. In water, excavation was at least 4 feet (1.2 meters) below the existing water level. This compensated for possible excavation at mean higher high water (MHHW). For instance, MHHW at Pensacola, Florida is 0.72 feet (0.21 meters) (NOAA Station 8729210), and MHHW at Dauphin Island, Alabama is 0.64 feet (0.19 meters) (NOAA Station 8735180).

Figure 2.4: Real-Time Kinematics
Left: RTK Set-up, Pensacola Beach, Florida, April 8, 2013
Right: Stake with Total Depth and Transect Number, Pensacola Beach, Florida, April 8, 2013

The SCAT team used the RTK system based on its ability to accurately determine MSL and document overburden for points along the transect lines. The RTK GPS is stable, fast, accurate, and able to provide true elevation, determining depth to MSL at any point on the beach. Using the RTK system, the team was able to obtain three-dimensional data (latitude, longitude, and elevation) that was more accurate than hand-held GPS units at locating the precise depths for trenching. For instance, RTK accuracy in the horizontal component was approximately 1 centimeter, and approximately 2 centimeters in the vertical component. Once the overburden was determined, the location was staked and the target depth (overburden plus 3 feet [0.91 meters], below MSL) was inscribed on the wooden stake (Figure 2.4).

2.6 Trenching

Once the target location and depth of excavation were known, the BOP team needed to determine the most appropriate excavation technique. Previous operations during the MC252 spill Response had used augering as an inspection tool. However, trenching was determined to be more advantageous for the BOP for two primary reasons:

1. Trenching resulted in a higher probability of buried oil deposit detection because it excavated more beach area and provided a complete cut across the entire width of the polygon boundary.
2. During trenching operations, only minor modifications – essentially a bucket change – were required to transition from delineation activities to recovery activities. The width of the excavator bucket used onshore was 42 inches (Figure 2.5), and the width of the special screener bucket used with the long-reach excavator (LRE) offshore was 60 inches (Figure 2.6).

Figure 2.5: Excavation Images from Fort Morgan Amenity/BLM
Left: Bucket Measurement, April 20, 2013
Middle: Excavator Arm Hash Marks, April 20, 2013
Right: Onshore and Offshore Excavation, April 21, 2013

To achieve the target excavation depth described in Section 2.5, the BOP team verified the depth measurement of the trench by observing hash marks placed on the excavator arms at 1-foot (0.3 meter) intervals (Figures 2.5 and 2.7). This approach to measuring the depth of the bucket supported safety by removing the need for personnel to stand close or enter the trench.

Figure 2.6: LRE Screener Bucket

While trench excavation onshore was performed with a medium-reach excavator using a solid bucket, an LRE with a special modified bucket that allowed for drainage was used for sub-tidal areas (Figures 2.6 and 2.8).

Figure 2.7: Trenching – ALBA1-029_001, April 25, 2013

SCAT personnel were present during BOP excavations to verify trenching depths and to assess/document any delineation and removal of material. SCAT data can be found in the BOP Polygon Legacy Package in Appendix A. After excavation and examination, each onshore trench was backfilled and raked to restore the beach profile to its original condition.

Figure 2.8: Example of Subtidal Excavation in Alabama (ALBA1-027_002), April 22, 2013

2.7 Recovery Techniques Vetted for Use

During the course of the MC252 spill Response, the GCIMT gained significant experience in removing oiled material from the shoreline. This experience demonstrated that three main material recovery techniques were appropriate for the BOP work, with site-specific determinations to be made based on the amount and location of the material, and the judgment of the field team. The BOP team carefully considered the applications, benefits, and limitations of these proven techniques, which included:

Manual Recovery: Field technicians use shovels to remove and bag the recovered material. This method is labor-intensive and slow. It is recommended for small and environmentally sensitive areas near or on the surface only.

Mechanical Recovery: Amphibious mini-excavators are used to remove the material. The recovered material is dumped into aluminium drip pans (approximately 6-feet by 6-feet [1.8-meters by 1.8-meters]) or placed on Geotextile fabric to eliminate or minimize the contamination of clean shoreline, after which technicians use shovels to sort, remove, and bag the oiled material. The mini-excavator greatly increases efficiency with removal of overburden, but bagging the product is labor-intensive. This method is recommended for areas that have substantial overburden.

Water Recovery: Recovery in nearshore waters must be conducted mechanically by an amphibious LRE (fitted with a screened bucket) from shore or in a gently sloping area close to shore. Using an amphibious LRE, a field team performs the excavation and places the recovered material in a front-end loader that is positioned nearby. The material is unloaded into the drip pans for recovery crews to bag.

The team engaged an Operations consultant to explore available waterborne technologies for the delineation and recovery of buried oil deposits in the nearshore (up to 20 feet [6.1 meters] of water). Through this work, the team concluded that none of the existing technologies investigated were appropriate for use in the shallow, high-energy nearshore area due to safety, environmental, or process issues. Safety concerns included the risk to divers, vessels not being sea-worthy in high-energy nearshore waters, and unacceptable ingress/egress times to the work site. Environmental concerns included potential damage to the benthic zone. Process capability shortcomings included sand/oil mat separation and limited capacity resulting in lengthy operations. (See the findings in the *Near Shore Water-Based Recovery Methodology Report*, dated October 23, 2013, in Appendix D for more information.) In the end, it was determined that no waterborne options were needed.

See Section 3.0 for information on the methods that were used in the locations where BOP recovery operations occurred.

2.8 Operational Work Plans

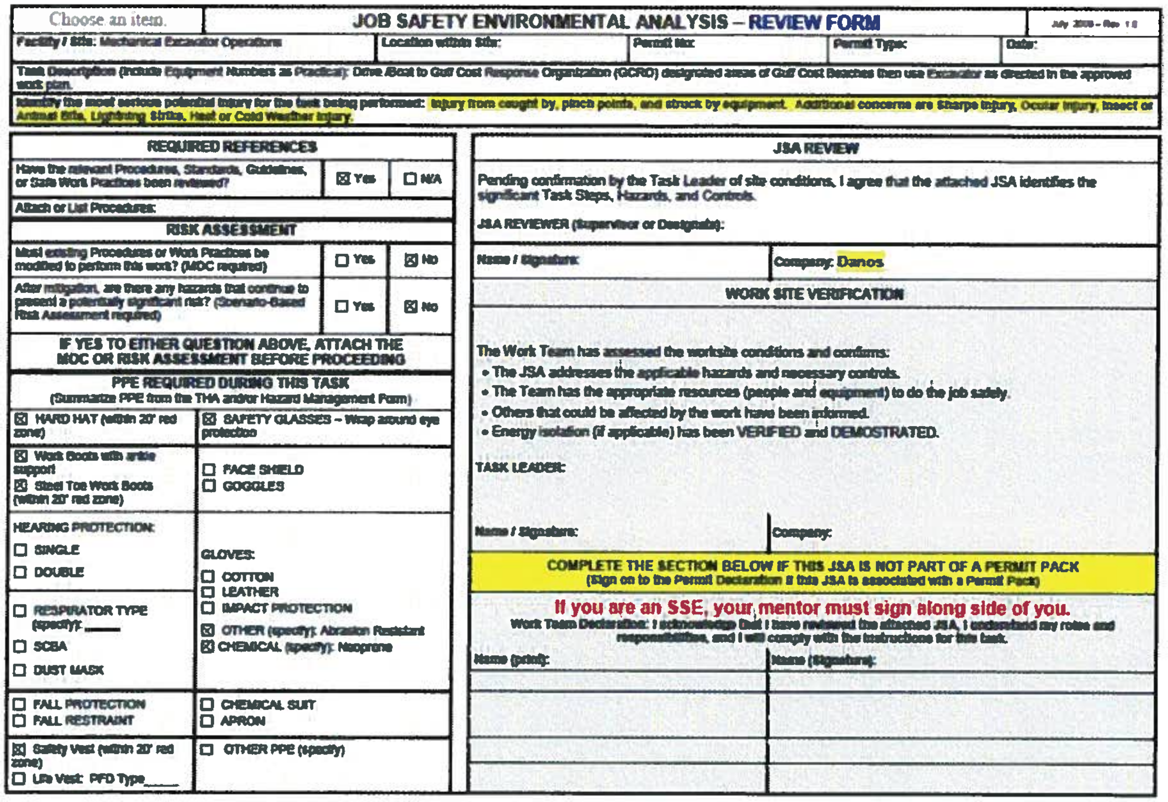
Once operations to evaluate, identify and, if appropriate, recover a potential buried oil deposit were ready to commence, local Field Operations assumed day-to-day management of these activities, which it executed with Danos, the BOP Operations contractor. The New Orleans (NOLA) BOP team, including the USCG, oversaw the development of contractor work plans and the work conducted for each BOP activity.

The collaboratively developed work plans helped maintain compliance with pre-existing Best Management Practices (BMP) and ensured the scope of work for each area was communicated to all stakeholders. In developing the plans, the Field Offices consulted data from polygon surveys conducted by the SCAT team to inform the critical equipment, personnel, and logistical decisions that would need to be made for each polygon. The plans ensured all applicable considerations (safety, environmental, legal, wildlife, operational concerns, etc.) were identified and addressed, including the necessary approvals, permits, and team composition (including natural resource advisors, archaeologists, and safety representatives).

Section members within the GCIMT (Planning, Environmental, Logistics, Safety, Operations, and SCAT teams), representatives from the DOI, and State On-Scene Coordinators (SOSCs) were consulted during this planning phase, in conjunction with USCG oversight. Members of the various work groups and agencies participated in daily conference calls to review progress, to discuss any concerns and opportunities, and to maintain communication among the parties involved. Additionally, these stakeholders participated in the review process for STRs, which provided guidelines and restrictions for Field Operations. Ultimately, to accommodate the inspection requirements needed to locate potential buried oil deposits, a new STR was approved for Pensacola Beach (STR FL-4-018), and an existing STR was amended with a Mechanical Variance for Fort Morgan Amenity/BLM (STR AL-4-008b).

Danos established a management team for the BOP field investigations of each targeted polygon. Each Danos work plan included the following topics:

- Scope
- Action List
- Equipment List
- Personnel List
- Safety (including a Job Safety Environmental Analysis Form, or JSEA, for each project [Figure 2.9])
- Equipment Staging
- Operations
- Decontamination (Decon)
- Limitations/Constraints
- Schedule
- Reporting



Choose an item.

JOB SAFETY ENVIRONMENTAL ANALYSIS – REVIEW FORM

Facility / Site: Mechanical Excavator Operations | Location within Site: | Permit No: | Permit Type: | Date:

Task Description (include Equipment Numbers as Practical): Drive Bobcat to Gulf Cost Response Organization (GCRO) designated areas of Gulf Cost Beaches then use Excavator as directed in the approved work plan.

Identify the most serious potential injury for the task being performed: Injury from caught by, pinch points, and struck by equipment. Additional concerns are Sharps injury, Ocular injury, Insect or Animal Bite, Lightning Strike, Heat or Cold Weather injury.

REQUIRED REFERENCES

Have the relevant Procedures, Standards, Guidelines, or Safe Work Practices been reviewed? ☒ Yes ☐ N/A

Attach or List Procedures:

RISK ASSESSMENT

Must existing Procedures or Work Practices be modified to perform this work? (MOC required) ☐ Yes ☒ No

After mitigation, are there any hazards that continue to present a potentially significant risk? (Scenario-Based Risk Assessment required) ☐ Yes ☒ No

IF YES TO EITHER QUESTION ABOVE, ATTACH THE MOC OR RISK ASSESSMENT BEFORE PROCEEDING

PPE REQUIRED DURING THIS TASK
(Summarize PPE from the THA and/or Hazard Management Form)

☒ HARD HAT (within 20' red zone)
☒ SAFETY GLASSES – Wrap around eye protection
☒ Work Boots with ankle support
☒ Steel Toe Work Boots (within 20' red zone)
☐ FACE SHIELD
☐ GOGGLES
HEARING PROTECTION:
☐ SINGLE
☐ DOUBLE
GLOVES:
☐ COTTON
☐ LEATHER
☐ IMPACT PROTECTION
☒ OTHER (specify): Abrasion Resistant
☒ CHEMICAL (specify): Neoprene
☐ RESPIRATOR TYPE (specify): ____
☐ SCBA
☐ DUST MASK
☐ FALL PROTECTION
☐ FALL RESTRAINT
☐ CHEMICAL SUIT
☐ APRON
☒ Safety Vest (within 20' red zone)
☐ Life Vest: PFD Type____
☐ OTHER PPE (specify)

JSA REVIEW

Pending confirmation by the Task Leader of site conditions, I agree that the attached JSA identifies the significant Task Steps, Hazards, and Controls.

JSA REVIEWER (Supervisor or Designate):

Name / Signature: | Company: Danos

WORK SITE VERIFICATION

The Work Team has assessed the worksite conditions and confirms:
- The JSA addresses the applicable hazards and necessary controls.
- The Team has the appropriate resources (people and equipment) to do the job safely.
- Others that could be affected by the work have been informed.
- Energy isolation (if applicable) has been VERIFIED and DEMOSTRATED.

TASK LEADER:

Name / Signature: | Company:

COMPLETE THE SECTION BELOW IF THIS JSA IS NOT PART OF A PERMIT PACK
(Sign on to the Permit Declaration if this JSA is associated with a Permit Pack)

If you are an SSE, your mentor must sign along side of you.

Work Team Declaration: I acknowledge that I have reviewed the attached JSA, I understand my roles and responsibilities, and I will comply with the instructions for this task.

Name (print):	Name (Signature):

Figure 2.9: Sample Contractor JSEA Review Form

Once activities were ready to commence, Field Operations mobilized the necessary personnel and equipment for the work and identified access points for entry to the work sites (with state/county approval). Daily activities at the work sites included JSEA reviews, safety talks, and contractor work plan reviews. Onsite personnel and visitors were required to review and sign the applicable JSEA requirements each day. Oil disposal was handled according to existing disposal procedures. All findings, delineations, and material recoveries were forwarded to the Planning Section to ensure that the data were complete and accurate. Findings also were forwarded to the OSAT-3 team to verify/optimize the data analysis process.

Contractor work plans for Pensacola Beach and Fort Morgan Amenity/BLM, where removal operations occurred, can be found in their respective Operations Overviews in Section 3.0.

3.0 Results

Based on the OSAT-3 review, a total of 61 segments (Table 3.1) containing 114 polygons were defined as sites where beach morphologies at the time of initial oiling were conducive to the formation of weathered oil deposits and where these deposits may not have been exposed or broken apart by erosion:

Alabama: 72 polygons on 39 segments

Florida: 39 polygons on 21 segments

Mississippi: 3 polygons on 1 segment

Eastern States AOR Segments Identified by OSAT-3 for Evaluation by the BOP			
ALBA1-001 (BSNWR)	ALBA1-021	ALBA1-038 (BSNWR)	FLES1-024 (GUIS)
ALBA1-002* (BSNWR)	ALBA1-022	ALBA1-039 (BSNWR)	FLES1-025 (GUIS)
ALBA1-005	ALBA1-023	ALBA1-040 (BSNWR)	FLES1-026* (GUIS)
ALBA1-006	ALBA1-024	ALBA1-041 (BSNWR)	FLES2-018
ALBA1-007	ALBA1-025	ALBA1-043	FLES2-019
ALBA1-008	ALBA1-026	ALBA2-011	FLES2-020
ALBA1-010	ALBA1-027	ALBA2-012	FLES2-021
ALBA1-011	ALBA1-028	FLES1-005	FLES2-022
ALBA1-012	ALBA1-029	FLES1-006	FLES2-023
ALBA1-013	ALBA1-030 (BLM)	FLES1-007	FLES2-024
ALBA1-015	ALBA1-031 (BSNWR)	FLES1-008	FLES2-025
ALBA1-016 (BLM)	ALBA1-033 (BSNWR)	FLES1-009*	FLES3-001*
ALBA1-017*	ALBA1-034 (BSNWR)	FLES1-020 (GUIS)	MSJK1-017 (GUIS)
ALBA1-018	ALBA1-035 (BSNWR)	FLES1-021 (GUIS)	MSHR5-019** (GUIS)
ALBA1-019	ALBA1-036 (BSNWR)	FLES1-022 (GUIS)	
ALBA1-020	ALBA1-037 (BSNWR)	FLES1-023 (GUIS)	

Table 3.1 List of Segments in the Eastern States AOR Identified by OSAT-3 for Evaluation by the BOP

BSNWR, BLM and GUIS denote federal property.

Blue text denotes Alabama, green denotes Florida, and brown denotes Mississippi segments.

****A feature starts in the adjoining segment to the west and carries that ID, but overlaps into the segment flagged.***

*****No polygons were identified by OSAT-3 on East Ship Island, but this was an area of interest due to prior Operations field collection data.***

Of the 114 polygons identified by the OSAT-3 Science team, 14 were investigated in the field by the BOP. These 14 polygons comprised a priority list due to prior operational and

SCAT work that had strongly indicated or confirmed the presence of buried oil deposits that either had not been recovered or had been partially recovered at these locations:

Alabama:	4
Florida:	10
Mississippi:	0

Of these 14 polygons, buried oil deposits were found in two areas: Pensacola Beach, Florida on April 5, 2013, where approximately 450 pounds of oiled material was recovered; and Fort Morgan Amenity/BLM property on April 15, 2013, where approximately 4 pounds of oiled material was recovered. Additionally, some SRBs were collected in these polygons. In both cases, this material was consistent with recovered material from prior operations and consisted principally of sand/sediment, organic material, and residual weathered oil.

The BOP team had intended to investigate the remaining 100 polygons on a prioritized basis at the earliest possible date. However, after a review of wildlife restrictions and other constraints (including trenching depth, beach access restrictions, and cultural sensitivities) that precluded investigation of the remaining polygons, and after consultation with key stakeholders, the FOSC issued a series of directives to cease further BOP work in the Eastern States AOR. (See the Eastern States Polygon Summary in Appendix E for more information on these polygons). Within the Eastern States AOR, the FOSC concluded active Response activities on the following dates:

DOI:	May 1, 2013
Mississippi:	April 30, 2013
Florida:	June 1, 2013
Alabama:	June 10, 2013

Note: Throughout the following sections, the term "actioned" appears. This term and its variations refer to the process of taking operational steps to investigate and/or delineate, and/or remove potential oiled material. At a minimum, "actioning" included investigation (excavation), but not necessarily delineation or removal operations, depending on the results of each investigation. Not all polygons referenced in this report were actioned due to wildlife restrictions and other constraints. The BOP Legacy Polygon Package in Appendix A describes a suggested process to delineate and recover oil if discovered in the future and if directed to do so by the FOSC via the legacy NRC process.

3.1 Florida

In Florida, 21 segments (Figure 3.1) containing 39 polygons were identified by the OSAT-3 team as sites where beach morphologies at the time of initial oiling were conducive to the formation of weathered oil deposits and where these deposits may not have been exposed or broken apart by erosion.

Locations of the 39 polygons identified for investigation (Table 3.3) included Pensacola Beach, Eden Condo (Perdido Key), and Johnson Beach (Perdido Key GUIS). The BOP team executed field investigations on 10 of these polygons, all in the Pensacola Beach area. As noted previously, the FOSC ceased further BOP field activities before the other polygons could be investigated.

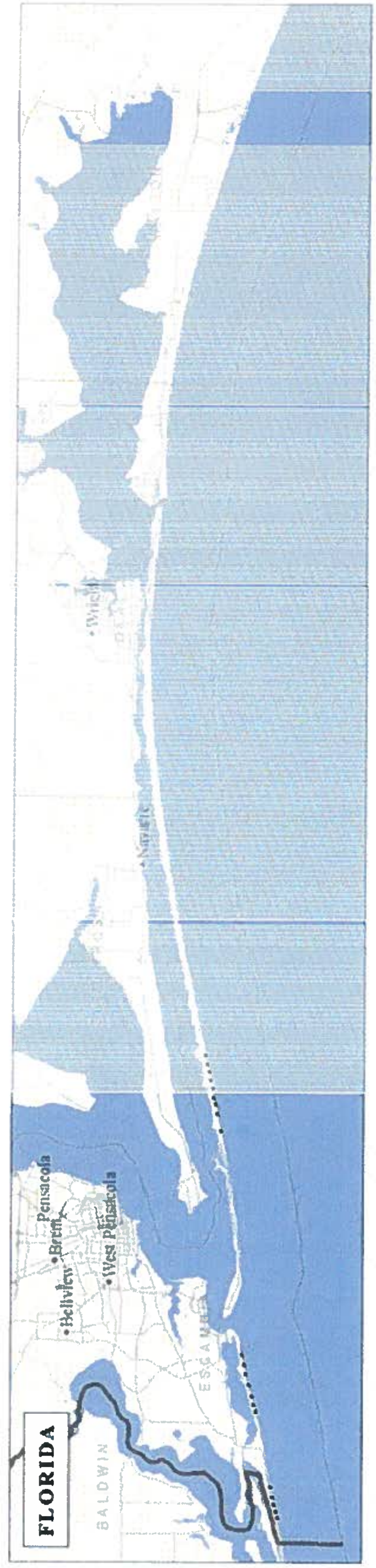


Figure 3.1: Florida Polygon Area Location

Pensacola Beach

The first area investigated by the BOP team was Pensacola Beach (Figure 3.2), where operations began on April 5, 2013. The specific Pensacola Beach segments were chosen for several reasons: they persistently experienced higher material recovery rates than surrounding segments; the Snorkel SCAT team confirmed the existence of a residual buried oil deposit; or parts of what may have been a larger buried oil deposit had been recovered previously. Of the 20 polygons identified by the OSAT-3 team in the Pensacola Beach segments, 10 targets with higher potential for containing buried oil deposits were prioritized based on SCAT data and field collection data. These polygons ranged in size from 20 meters to 125 meters in length, and 7 meters to 9 meters in width.

The BOP team recovered approximately 450 pounds of oiled material from the subtidal zone in Transects 013 and 014 in FLES2-018_005 (Table 3.2). Additionally, some SRBs were collected in these polygons. This material was consistent with recovered material from prior operations and consisted principally of sand/sediment, organic material, and residual weathered oil. The team also excavated areas between, and on either side of, Transects 013 and 014, and no additional oiled material was recovered.

Three excavation teams worked the Pensacola Beach site onshore and in the subtidal zone. The team working the subtidal zone used an LRE with a special screened bucket to allow for water drainage and to facilitate material inspection (the team attempted to use a solid bucket, which ultimately required too much operator time to decant). The team "rinsed" the screened bucket and inspected it for oily residue. The rinsing process involved shaking buckets of material at the waterline to allow the fine sand to escape while retaining any larger sediment. The team deposited any collected material on Geotextile fabric and disposed of it according to established waste management practices.

In Transect FLES2-019_003.002, tidal conditions caused a high rate of backfill into the trench and prevented excavation to the target depth. The affected portion was 5–7 feet (1.5 to 2.1 meters) of the northernmost end of the transect, which fell 2 feet (0.6 meters) short of the desired excavation depth. After discovering only 12 SRBs in Polygon FLES2-020_001, the team excavated three additional transects in that area to attempt to find any additional potential buried oil deposits. No additional oily material was found. These results produced insufficient justification to continue additional investigation in the remaining polygons. The Pensacola Beach area project was completed on April 14, 2013. (See the Operations Overview in Table 3.2 for the compiled data.)

Figure 3.2: Pensacola Beach Polygon Locations (Actioned Areas Appear in Bottom Panel)

OPERATIONS OVERVIEW – PENSACOLA BEACH

1) Segment Results

	Total (est.)	Actioned
No. of Segments	9	3
No. of Polygons	20	10
No. of Transects	65	72

Start Date	April 5, 2013	STR
Stop Date	April 14, 2013	STR-FL-4-018

2) Product Discovery/Recovery

Segment	_Polygon.Transect	Amount
FLES2-018	_005.005	2 SRBs
FLES2-018	_005.013 & .014	~450 lbs. of oiled material
FLES2-019	_001.002	6 SRBs
FLES2-020	_001.004	12 SRBs
FLES2-020	_002.005	3 SRBs

3) Data/Reports/Info

Document	Description	Data Location	
Pensacola DSP	Project approval document	Link	
MOU	Memorandum of Understanding	Link	
Job Scope	Project scope	Link	
Polygon Data	Science team polygon data	Link	
Polygon Criteria	Polygon prioritization and selection	Link	
Polygon Maps	Maps of selected polygons	Link	
Work Plans	Contractor work plans	Link	
Danos Data	Contractor transect data sheets	Link	
Branch Reports	Daily operational reports	Link	
Trench Data Sheets	Branch daily trenching documentation	Link	
Data Matrix	Branch operations documentation	Link	
SCAT Field Survey	Polygon reconnaissance/ground truthing	018-020	021-025
SCAT Transect Maps	As-excavated transect locations	Link	
SCAT Final Report	SCAT findings and results	Link	
Pictures	Various project pictures	Link	

Table 3.2: Operations Overview – Pensacola Beach

Eden Condo (Perdido Key)

In the Eden Condo area (Figure 3.3), five polygons were identified for investigation. Two of the polygons were within Perdido Key State Park, which has established buffers and travel corridors that precluded the use of heavy equipment. Wildlife and access restrictions from the U.S. Fish & Wildlife Service (USFWS) prevented the team from obtaining approval to investigate any polygons in the Eden Condo area. (See the FOSC directive, dated May 13, 2013, in Appendix B and the BOP Polygon Legacy Package in Appendix A for the compiled data.)

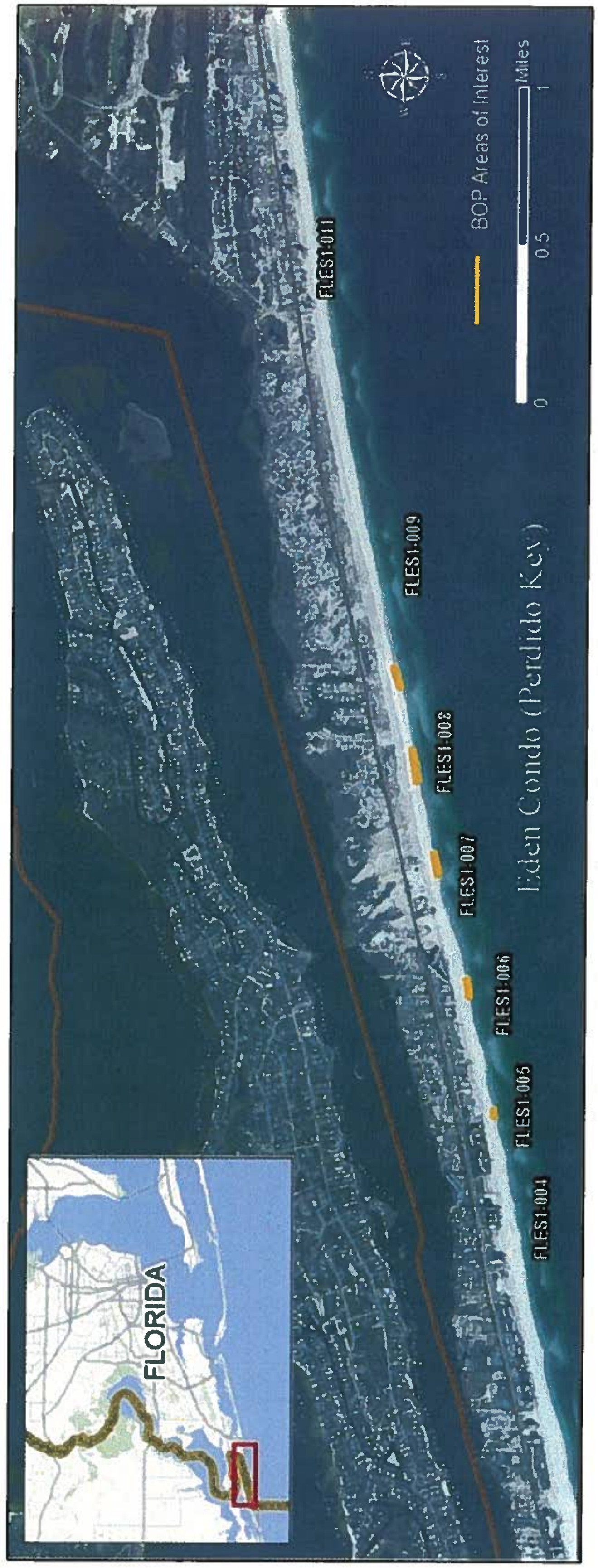


Figure 3.3: Eden Condo Area Polygon Locations

Johnson Beach (Perdido Key Gulf Island National Seashore)

The OSAT-3 team identified 14 polygons in the Johnson Beach area (Figure 3.4), five of which were determined to have higher potential for containing buried oil deposits, based on SCAT data and field collection data. This area, Segments FLES1-016 to 025, is part of the GUIS. The BOP team intended to first investigate these polygons with higher potential for containing buried oil deposits and then proceed with the remaining polygons in the segments if buried oil deposits were found in the first segments.

During preparations for this work, extensive discussion and review took place between the BOP Project team and the DOI GCIMT representative regarding trenching, augering, and the excavation depths needed to locate any potential buried oil deposits in the segments. The team submitted two proposals to GUIS, but neither was accepted. Approval for field investigation was not obtained and the FOSC directed that no further BOP recovery activities were to be planned or executed in the Johnson Beach area. (See FOSC directives, dated April 24 and 30, 2013, in Appendix B and the BOP Polygon Legacy Package in Appendix A for the compiled data).

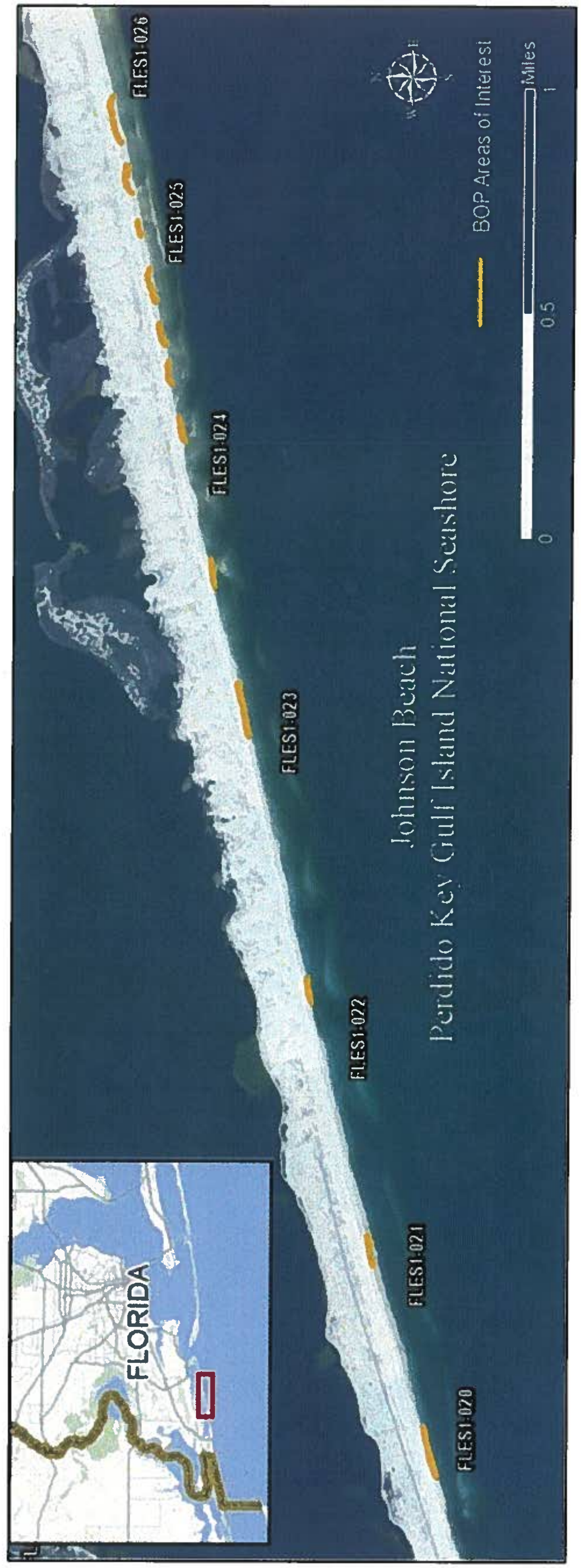


Figure 3.4: Johnson Beach Area Polygon Locations

The overall summary of polygons and resulting BOP work in Florida is shown in Table 3.3.

FLORIDA PLOYGON LIST AND ACTIVITY				Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.	
	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning/Notes
Eden Condo (Perdido Key)					
FLES1-003 – 008	005-001	5	5	N	BOP activities ceased due to USFWS' wildlife & access restrictions
	006-001			N	BOP activities ceased due to USFWS' wildlife & access restrictions
	007-001			N	BOP activities ceased due to USFWS' wildlife & access restrictions
	008-001			N	BOP activities ceased due to USFWS' wildlife & access restrictions
	008-002		*	N	BOP activities ceased due to USFWS' wildlife & access restrictions
Johnson Beach (Perdido Key GUIS)					
FLES1-016 – 025	020-002	14	7	N	BOP activities ceased due to GUIS trench depth limitation
	021-001			N	BOP activities ceased due to GUIS trench depth limitation
	022-003			N	BOP activities ceased due to GUIS trench depth limitation
	023-002			N	BOP activities ceased due to GUIS trench depth limitation
	024-001			N	BOP activities ceased due to GUIS trench depth limitation
	024-002			N	BOP activities ceased due to GUIS trench depth limitation
	024-003			N	BOP activities ceased due to GUIS trench depth limitation
	025-001			N	BOP activities ceased due to GUIS trench depth limitation
	025-003			N	BOP activities ceased due to GUIS trench depth limitation
	025-004			N	BOP activities ceased due to GUIS trench depth limitation
	025-007			N	BOP activities ceased due to GUIS trench depth limitation
	025-009			N	BOP activities ceased due to GUIS trench depth limitation
	025-010			N	BOP activities ceased due to GUIS trench depth limitation
	025-013		*	N	BOP activities ceased due to GUIS trench depth limitation

FLORIDA PLOYGON LIST AND ACTIVITY					Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.
	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning/Notes
Pensacola Beach					
FLES2-012 – 025	018-001	20	9	Y	Material recovery data, possible residual buried oil deposit
	018-003			Y	Material recovery data, possible residual buried oil deposit
	018-004			Y	Material recovery data, possible residual buried oil deposit
	018-005			Y	Material recovery data, possible residual buried oil deposit
	018-006			Y	Material recovery data, possible residual buried oil deposit
	019-001			Y	Material recovery data, possible residual buried oil deposit
	019-002			Y	Material recovery data, possible residual buried oil deposit
	019-003			Y	Material recovery data, possible residual buried oil deposit
	020-001			Y	Material recovery data, possible residual buried oil deposit
	020-002			Y	Material recovery data, possible residual buried oil deposit
	020-003			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	021-002			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	021-004			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	022-001			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	022-002			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	022-003			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	023-003			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	024-001			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	025-001			N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
	025-002		*	N	Insufficient findings in actioned, higher-potential Pensacola Beach polygons did not justify further investigation of this polygon
Totals		39	21		

* This polygon crosses into an adjacent segment and increases the total number of affected segments.

Table 3.3: Florida Polygon List and Activity

3.2 Alabama

In Alabama, 39 segments containing 72 polygons (Figure 3.5) were identified by the OSAT-3 team as potential sites for buried oil deposits.

Locations of the 72 polygons identified for investigation include: Bon Secour National Wildlife Refuge (BSNWR), Gulf Shores, and Fort Morgan Amenity/BLM. The BOP team executed field investigations on four of these polygons, all in the Fort Morgan/BLM area.

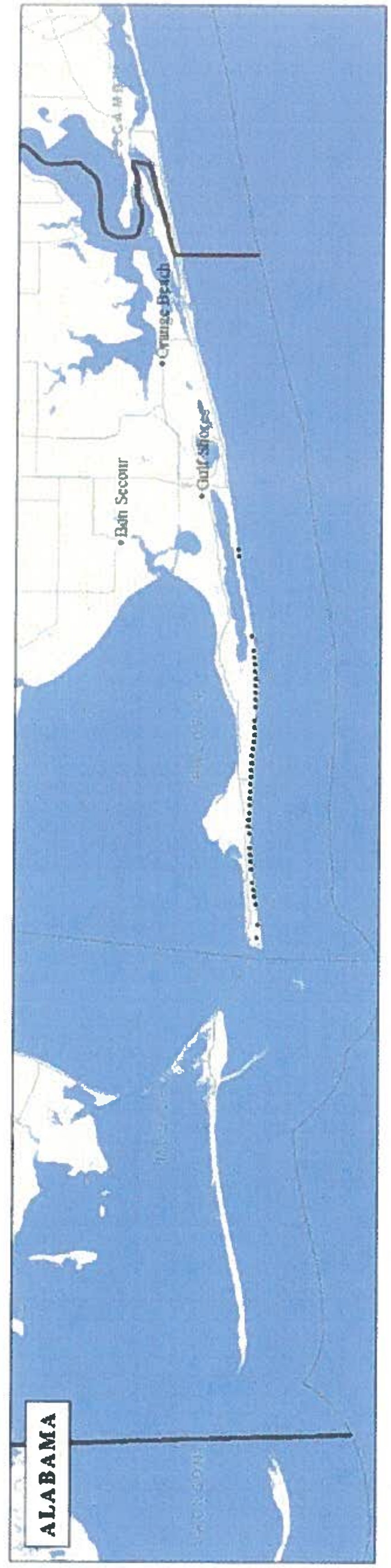


Figure 3.5: Alabama Polygon Area Locations

Bon Secour National Wildlife Refuge

Eighteen polygons were identified in BSNWR for investigation on Segments ALBA1-031 through 042 (Figure 3.6), and ALBA1-001 in Fort Morgan Unit (Figure 3.7). Most of the polygons were located in the subtidal zone, and many were within reach of an LRE. Coordinates from multiple prior Snorkel SCAT investigations indicated that a buried oil deposit possibly was located in the subtidal zone, but because the buried oil deposit was not visible at the time of the recommended BOP work, the BSNWR Manager would not grant permission for operational activity. As a result, in a June 5, 2013 email, the FOSC directed that "no further operations should be undertaken at this time," and that this area had been designated RADC and transitioned back to the legacy NRC reporting system. (See the FOSC directives, dated April 18 and 30, 2013, in Appendix B.)

Gulf Shores

In Gulf Shores, four polygons were identified. Early in the BOP effort, the team determined that it would be beneficial to identify an offshore polygon to test waterborne delineation and recovery techniques. As a result, three targets were identified in segments (043 and 044) in the Gulf Shores area, outside of the BSNWR (Figure 3.6). All polygons were located completely or partially in the subtidal zone. These polygons, however, would not have ranked as higher-potential areas for further evaluation relative to the other polygons in Alabama, had they been located onshore. Consequently, it later was determined that current waterborne techniques could not be utilized safely, and no action was taken.

Additionally, an area of interest (treated as a polygon) was identified in ALBA2-011 and 012 (Little Lagoon) because buried oil deposits had been recovered there previously. As with the other three polygons in Gulf Shores, it was determined that current waterborne techniques could not be utilized safely, and no action was taken. (See the related FOSC directives, dated March 8 and April 5, 2013, in Appendix B and the BOP Polygon Legacy Package in Appendix A for the compiled data.)

Figure 3.6: BSNWR and Gulf Shores Area Polygon Locations

Fort Morgan Amenity/Bureau of Land Management

The OSAT-3 team identified 50 polygons in the Fort Morgan Amenity/BLM area. Prior to the OSAT-3 team finalizing the polygons for Alabama, on April 15, 2013, a Snorkel SCAT team located a buried oil deposit (approximately 200 pounds) about 10 meters offshore in ALBA1-027, and it subsequently was recovered by Field Operations.

Following the aforementioned Snorkel SCAT and Field Operations activities in the Fort Morgan Amenity/BLM area, the OSAT-3 team reviewed the area and identified two additional polygons to the west of the buried oil deposit in ALBA1-027, and two polygons to the east in ALBA1-029 (Figure 3.7). These two segments contained four polygons with 36 transects. Work on Segments ALBA1-027 and 029 began on April 20, 2013.

Three teams worked onshore and in the subtidal zone in the Fort Morgan Amenity/BLM area. The team working the subtidal zone used an LRE with a special screened bucket to allow for water drainage and to facilitate material inspection. The team "rinsed" the screened bucket and inspected it for oily residue. The rinsing process entailed shaking buckets of material at the waterline to allow the fine sand to escape while retaining any larger sediment. The team deposited any collected material on Geotextile fabric and disposed of it according to established waste management practices. Other than a few SRBs, no significant buried oil deposit was found and approximately 4 pounds of material was recovered in total. As a result, mechanical recovery operations were not required. Work on Segments ALBA1-027 and 029 was completed on April 27, 2013. (See the Operations Overview in Table 3.4 for the compiled data.)

Upon completion of Segments ALBA1-027 and 029, the BOP team attempted to obtain approvals to continue work on the remainder of Fort Morgan Amenity/BLM. However approvals could not be obtained from USFWS, due to the onset of turtle nesting season, and the FOSC terminated the work on May 1, 2013. (See the FOSC directive, dated June 10, 2013, in Appendix B).

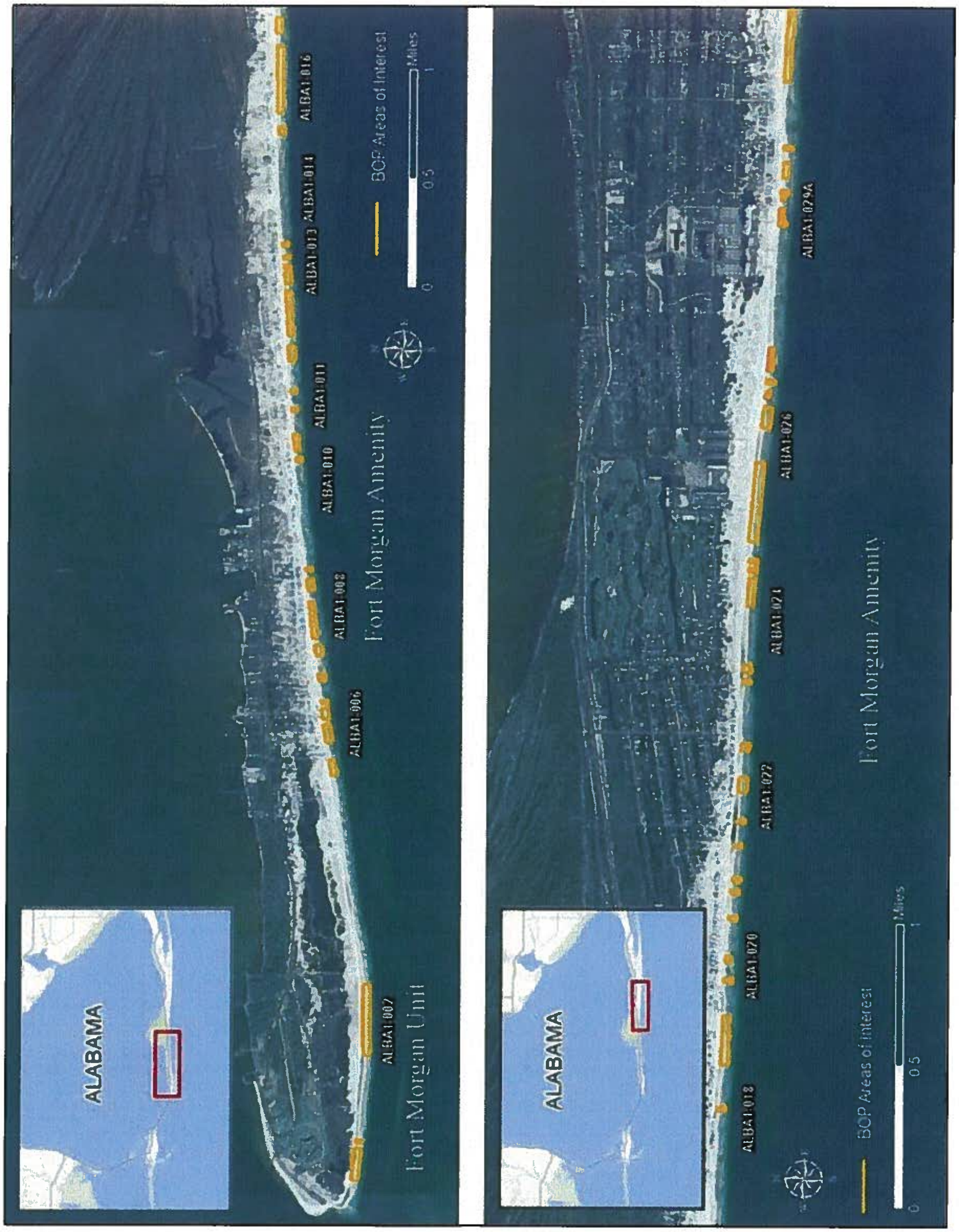


Figure 3.7: Fort Morgan Amenity/BLM Area Polygon Locations

OPERATIONS OVERVIEW - FORT MORGAN AMENITY/BLM

1) Segment Results

		Total (est.)	Actioned
No. of Segments		24	2
No. of Polygons		50	4
No. of Transects		426	36

Start Date	April 20, 2013	STR
Stop Date	April 27, 2013	AL-S4-008b r.1

2) Product Discovery/Recovery

Segment	_Polygon.Transect	Amount
ALBA1-027	_002.001	1 SRB
ALBA1-027	_002.003	Several SRBs
ALBA1-027	_002.004	Several SRBs
ALBA1-029	_001.005	Several SRBs
ALBA1-029	_001.006	~4 lbs.

3) Data/Reports/Info

Document	Description	Data Location
Work Plans	Contractor work plans	Link
Polygon Maps	Maps of selected polygons	Link
Polygon Data	Science team polygon data	Link
Danos Data	Contractor transect data sheets	Link
Branch Reports	Daily operational reports	Link
Trench Data Sheets	Branch daily trenching documentation	Link
Field Survey	Polygon reconnaissance/ground truthing	Link
SCAT Transect Maps	As-excavated transect locations	027 Link 029 Link
Pictures	Various project pictures	Link

Table 3.4: Fort Morgan Amenity/BLM Operations Overview

The overall summary of polygons and resulting BOP work in Alabama is shown in Table 3.5.

ALABAMA POLYGON LIST AND ACTIVITY	Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.				
	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning
BSNWR (Fort Morgan Unit)					
ALBA1-001 – 004	001-001	3	2	N	BOP activities ceased due to USFWS' wildlife constraints
	001-002			N	BOP activities ceased due to USFWS' wildlife constraints
	001-003		*	N	BOP activities ceased due to USFWS' wildlife constraints
Fort Morgan Amenity/BLM					
ALBA1-005 – 030	005-001	50	24	N	BOP activities ceased due to USFWS' wildlife constraints
	006-001			N	BOP activities ceased due to USFWS' wildlife constraints
	006-002			N	BOP activities ceased due to USFWS' wildlife constraints
	006-003			N	BOP activities ceased due to USFWS' wildlife constraints
	007-001			N	BOP activities ceased due to USFWS' wildlife constraints
	007-002			N	BOP activities ceased due to USFWS' wildlife constraints
	007-003			N	BOP activities ceased due to USFWS' wildlife constraints
	008-001			N	BOP activities ceased due to USFWS' wildlife constraints
	008-002			N	BOP activities ceased due to USFWS' wildlife constraints
	010-001			N	BOP activities ceased due to USFWS' wildlife constraints
	010-002			N	BOP activities ceased due to USFWS' wildlife constraints
	011-001			N	BOP activities ceased due to USFWS' wildlife constraints
	011-002			N	BOP activities ceased due to USFWS' wildlife constraints
	012-001			N	BOP activities ceased due to USFWS' wildlife constraints
	012-002			N	BOP activities ceased due to USFWS' wildlife constraints
	013-001			N	BOP activities ceased due to USFWS' wildlife constraints
	013-002			N	BOP activities ceased due to USFWS' wildlife constraints

ALABAMA POLYGON LIST AND ACTIVITY	Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.				
	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning
	013-003			N	BOP activities ceased due to USFWS' wildlife constraints
	013-004			N	BOP activities ceased due to USFWS' wildlife constraints
	015-001			N	BOP activities ceased due to USFWS' wildlife constraints
	015-002			N	BOP activities ceased due to USFWS' wildlife constraints
	016-001		*	N	BOP activities ceased due to USFWS' wildlife constraints
	018-001			N	BOP activities ceased due to USFWS' wildlife constraints
	019-001			N	BOP activities ceased due to USFWS' wildlife constraints
	020-001			N	BOP activities ceased due to USFWS' wildlife constraints
	020-002			N	BOP activities ceased due to USFWS' wildlife constraints
	021-001			N	BOP activities ceased due to USFWS' wildlife constraints
	021-002			N	BOP activities ceased due to USFWS' wildlife constraints
	021-003			N	BOP activities ceased due to USFWS' wildlife constraints
	021-004			N	BOP activities ceased due to USFWS' wildlife constraints
	022-001			N	BOP activities ceased due to USFWS' wildlife constraints
	022-002			N	BOP activities ceased due to USFWS' wildlife constraints
	022-003			N	BOP activities ceased due to USFWS' wildlife constraints
	023-001			N	BOP activities ceased due to USFWS' wildlife constraints
	023-002			N	BOP activities ceased due to USFWS' wildlife constraints
	024-001			N	BOP activities ceased due to USFWS' wildlife constraints
	024-002			N	BOP activities ceased due to USFWS' wildlife constraints
	025-001			N	BOP activities ceased due to USFWS' wildlife constraints
	025-002			N	BOP activities ceased due to USFWS' wildlife constraints
	026-001			N	BOP activities ceased due to USFWS'

ALABAMA POLYGON LIST AND ACTIVITY	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning
					wildlife constraints
	027-001			Y	Higher potential and an "area of opportunity" at the time
	027-001b			N	027-001b added after "areas of opportunity" were completed; BOP activities ceased due to USFWS' wildlife constraints
	027-002			Y	Higher potential and an "area of opportunity" at the time
	028-001			N	BOP activities ceased due to USFWS' wildlife constraints
	029-001			Y	Higher potential and an "area of opportunity" at the time
	029-002			Y	Higher potential and an "area of opportunity" at the time
	029-003			N	BOP activities ceased due to USFWS' wildlife constraints
	029-004			N	BOP activities ceased due to USFWS' wildlife constraints
	029-005			N	BOP activities ceased due to USFWS' wildlife constraints
	030-001			N	BOP activities ceased due to USFWS' wildlife constraints
BSNWR (Perdue Unit)					
ALBA1-031 – 042	031-001	15	10	N	BOP activities ceased due to USFWS' wildlife constraints
	033-001			N	BOP activities ceased due to USFWS' wildlife constraints
	034-001			N	BOP activities ceased due to USFWS' wildlife constraints
	034-002			N	BOP activities ceased due to USFWS' wildlife constraints
	035-001			N	BOP activities ceased due to USFWS' wildlife constraints
	035-002			N	BOP activities ceased due to USFWS' wildlife constraints
	036-001			N	BOP activities ceased due to USFWS' wildlife constraints
	036-002			N	BOP activities ceased due to USFWS' wildlife constraints
	036-003			N	BOP activities ceased due to USFWS' wildlife constraints
	037-001			N	BOP activities ceased due to USFWS'

Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.

ALABAMA POLYGON LIST AND ACTIVITY	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning
					wildlife constraints
	038-001			N	BOP activities ceased due to USFWS' wildlife constraints
	039-001			N	BOP activities ceased due to USFWS' wildlife constraints
	040-001			N	BOP activities ceased due to USFWS' wildlife constraints
	041-001			N	BOP activities ceased due to USFWS' wildlife constraints
	041-002			N	BOP activities ceased due to USFWS' wildlife constraints
Gulf Shores					
ALBA1-043 – ALBA2-021	043-002	3	1	N	Unable to use waterborne methods safely; no action taken
	043-003			N	Unable to use waterborne methods safely; no action taken
	043-005			N	Unable to use waterborne methods safely; no action taken
	**	1	2	N	Unable to utilize existing ALDOT lagoon dredging Operations on this gulf side of Little Lagoon inlet
Totals		72	39		

Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.

* This polygon crosses into an adjacent segment and increases the total number of affected segments.
** There is an unlabeled polygon area at the inlet to Little Lagoon (ALBA2-011 and 012) which, due to the inlet dynamics, is an area of interest for possible deposition of material.

Table 3.5: Alabama Polygon List and Activity

3.3 Mississippi

In Mississippi, three polygons within one segment (Figure 3.8) were identified by the OSAT-3 team as potential sites for buried oil deposits.

Figure 3.8: Mississippi Polygon Area Locations

The three polygons identified for investigation (Table 3.6) were located on Horn Island (Figure 3.9). However, several factors impeded access to the areas of interest. North shore access to Horn Island is not possible due to shallow water depth, and south shore access is unsafe due to water dynamics. Additionally, Hurricane Isaac (August 2012) changed the beach morphology on the east end of Horn Island; barge sets (a tug boat and at least one barge) that previously could land here could no longer access the beach due to erosion. Barge sets could be placed on the west end of Horn Island, but after March 1, 2013, GUIS would not allow access to other parts of the island via land due to the onset of bird nesting season, which meant that the BOP team would not be able to reach the areas of interest. Thus, this segment was moved to RADC by the FOSC on May 1, 2013. (See the related DOI correspondence, dated March 1, 2013, and FOSC directive, dated May 1, 2013, in Appendix B.)

In addition to these Horn Island areas recommended by OSAT-3, GCIMT operations also identified the northeastern shoreline of Segment MSHR5-019 on East Ship Island (Table 3.6) as a site for potential investigation, based on field observations of persistent and, at times, substantial intertidal SRB impacts, which were consistent with product originating from nearshore buried oil deposits. However, East Ship Island is a culturally sensitive area, and Segment 019 had undergone substantial accretion following Hurricane Isaac. As such, GUIS declined to approve these BOP activities as noted in an email message from a DOI GCIMT representative: "After reviewing the information, we do not recommend utilization of Snorkel SCAT for the BOP on East Ship Island. This is based on the cultural sensitivities of the area and probability that Snorkel SCAT would not be able to detect the material based upon the likely source. In addition, if a mat is located, the Park would not authorize removal by mechanical means in this area, so recovery methods are uncertain." Consequently, no BOP projects were implemented in Mississippi. (See the related DOI correspondence, dated April 30, 2013, in Appendix B.)

Figure 3.9: Mississippi Polygon Locations

MISSISSIPPI POLYGON LIST AND ACTIVITY					
Note: Refer to the BOP Polygon Legacy Package for additional BOP data should the FOSC direct further investigation into any of these polygons.					
	Polygon ID	No. of Polygons	No. of Segments	Actioned Y/N	Reasoning
Horn Island					
MSJK1-017	017-001	3	1	N	Unable to use transport vessels; inaccessible due to GUIS restrictions
	017-002			N	Unable to use transport vessels; inaccessible due to GUIS restrictions
	017-003			N	Unable to use transport vessels; inaccessible due to GUIS restrictions
East Ship Island					
MSHR5-019	*			N	Unable to trench or utilize SSCAT due to GUIS cultural sensitivities

*No polygons identified by OSAT-3 on East Ship, but this was an area of interest due to Operations collection data

Table 3.6: Mississippi Polygon List and Activity

4.0 Summary and Conclusions

The BOP was established within the GCIMT for the MC252 spill to evaluate, delineate and, where practicable, recover potential buried oil deposits from locations identified by the OSAT-3 team. Using integrated datasets – including operational and SCAT data, aerial imagery, and data from hydrodynamic modelling – the OSAT-3 team identified 61 segments containing 114 polygons in the Eastern States AOR where beach morphologies at the time of initial oiling were conducive to the formation of weathered oil deposits and where these deposits may not have been exposed or broken apart by erosion or removed by Response activities:

Florida:	39 polygons
Alabama:	72 polygons
Mississippi:	3 polygons

Of these, 14 high-potential areas for buried oil deposits were investigated:

Pensacola Beach, Florida:	10 polygons
Fort Morgan Amenity/BLM, Alabama:	4 polygons

With consultation from a biostatistics expert, the BOP team employed a scientifically defendable, accurate, and precise statistical method for establishing transects for detecting potential buried oil deposits. This method provided a 95 percent confidence level of detecting any buried oil deposits that may have formed at the time of initial oiling, with a 5 percent risk that potential buried oil deposits would go undetected.

Using this methodology, the BOP team investigated the 14 areas with higher potential for containing buried oil deposits. The team located a buried oil deposit in Pensacola Beach, Florida on April 5, 2013, and approximately 450 pounds of oiled material was recovered. The team found a second buried oil deposit on Fort Morgan Amenity/BLM property on April 15, 2013, where approximately 4 pounds of oiled material was recovered. Additionally, some SRBs were collected at these locations. In both cases, this material was consistent with recovered material from prior operations and consisted principally of sand/sediment, organic material, and residual weathered oil.

The BOP had intended to investigate the remaining 100 polygons. However, after a review of wildlife restrictions and other constraints that precluded investigation of the remaining polygons, the FOSC issued a series of directives to designate these segments RADC.

Based on the amount of oil recovered by the BOP in the Eastern States AOR, the expectation is that only a small percentage of the areas that were not investigated would have a buried oil deposit and contain a significant quantity of residual material.

Working together, the BOP and OSAT-3 teams have been able to narrow locations containing potential buried oil deposits in the Eastern States AOR based on their collective experience, knowledge of the shoreline, and refinement of field methodology and processes conducted as part of this work.

Since late spring 2013, in the areas that were returned to the NRC process, the quantity of residual MC252 material recovered in response to individual NRC calls has been sufficiently small to only require USCG mitigation more than 80 percent of the time. When BP has been directed by the USCG to mitigate material removal in response to an NRC call, it typically has amounted to just a few pounds of material consisting of sand/sediment, organic material and weathered residual oil.

Should the need arise to investigate any of the remaining polygons, the BOP Polygon Legacy Package describes a process to investigate, delineate, and recover oily material, if directed by the FOSC via the NRC process (Appendix A).

5.0 Acronyms

AOR	Area of Responsibility
BLM	Bureau of Land Management
BMP	Best Management Practice
BOP	Buried Oil Project
BSNWR	Bon Secour National Wildlife Refuge
DOI	United States Department of the Interior
FOSC	Federal On-Scene Coordinator
GCIMT	Gulf Coast Incident Management Team
GUIS	Gulf Island National Seashore
JSEA	Job Safety Environmental Analysis
LRE	Long-Reach Excavator
MC252 Spill	Deepwater Horizon MC252 Spill of National Significance
MHHW	Mean Higher High Water
MSL	Mean Sea Level
NOAA	National Oceanographic and Atmospheric Administration
NOLA	New Orleans, Louisiana
NRA	Natural Resource Advisor
NRC	National Response Center
OSAT-3	Third Operational Science Advisory Team
RADC	Removal Actions Deemed Complete
RTK	Real-Time Kinematics
SCAT	Shoreline Cleanup Assessment Technique
SCCP	Shoreline Clean-up Completion Plan
SOSC	State On-Scene Coordinator
SRB	Surface Residual Ball
STR	Shoreline Treatment Recommendation
USCG	United States Coast Guard
USFWS	U.S. Fish & Wildlife Service
UTV	Utility Task Vehicle