

Sabine Pass Tidal Inlet Protection Strategy

Extracts from surveys done By The National Spill Control School
- Texas A&M Corpus Christi

2014

19.0. Sabine Pass

Sabine Pass is a jettied tidal inlet at the mouth of the Sabine River. It is bordered by Jefferson County, Texas to the west and Cameron Parish, Louisiana to the east. The river forms the border between Texas and Louisiana. Sabine Pass allows commercial shipping traffic to enter the metropolitan area of Beaumont, Port Arthur and Orange, Texas and to the regions numerous refineries, shipping terminals, and industrial complexes. The petroleum industry has supported this region economically since the discovery of oil in 1901 near Beaumont, Texas when the area became known as the Golden Triangle.

The region surrounding Sabine Pass has many historical landmarks. The Sabine Pass Lighthouse located on the west bank in Louisiana was first lit in 1857. Sabine Pass was also an important battleground during the American Civil War. The Sabine Pass Battleground State Historic Site honors the important events that occurred in the area.

Sabine Pass provides freshwater flow to the Gulf of Mexico. Sabine Pass has long (1,750 foot) jetties that protect the inlet and aid in commercial navigation. However, these jetties are subsiding into the sediments of the Gulf of Mexico. As a result, portions of the jetties may be invisible on RADAR and may be under the surface during high tides. Radar reflectors are being installed to signal the presence of the obstructions and to aid navigation; however, these jetties are very hazardous and may represent a danger to responders who are not familiar with the inlet. Sabine Pass is an environmentally sensitive area containing a vast amount of important wildlife habitat. Wetlands and numerous small tidal creeks are present along both banks of the inlet. Located along the Gulf beach and along the west bank of the river at Sabine Pass are the Texas Point and the McFaddin National Wildlife Refuges. The Sabine National Wildlife Refuge is located in Louisiana near Sabine Lake.



19.1. Overview of the Sabine Pass Response Strategy

Figure SP-1 through Figure SP-3 illustrates the Hypothetical response strategy for Sabine Pass. Refer to Section 19.12.1-9 for detailed response strategies including boom configurations and collection points.

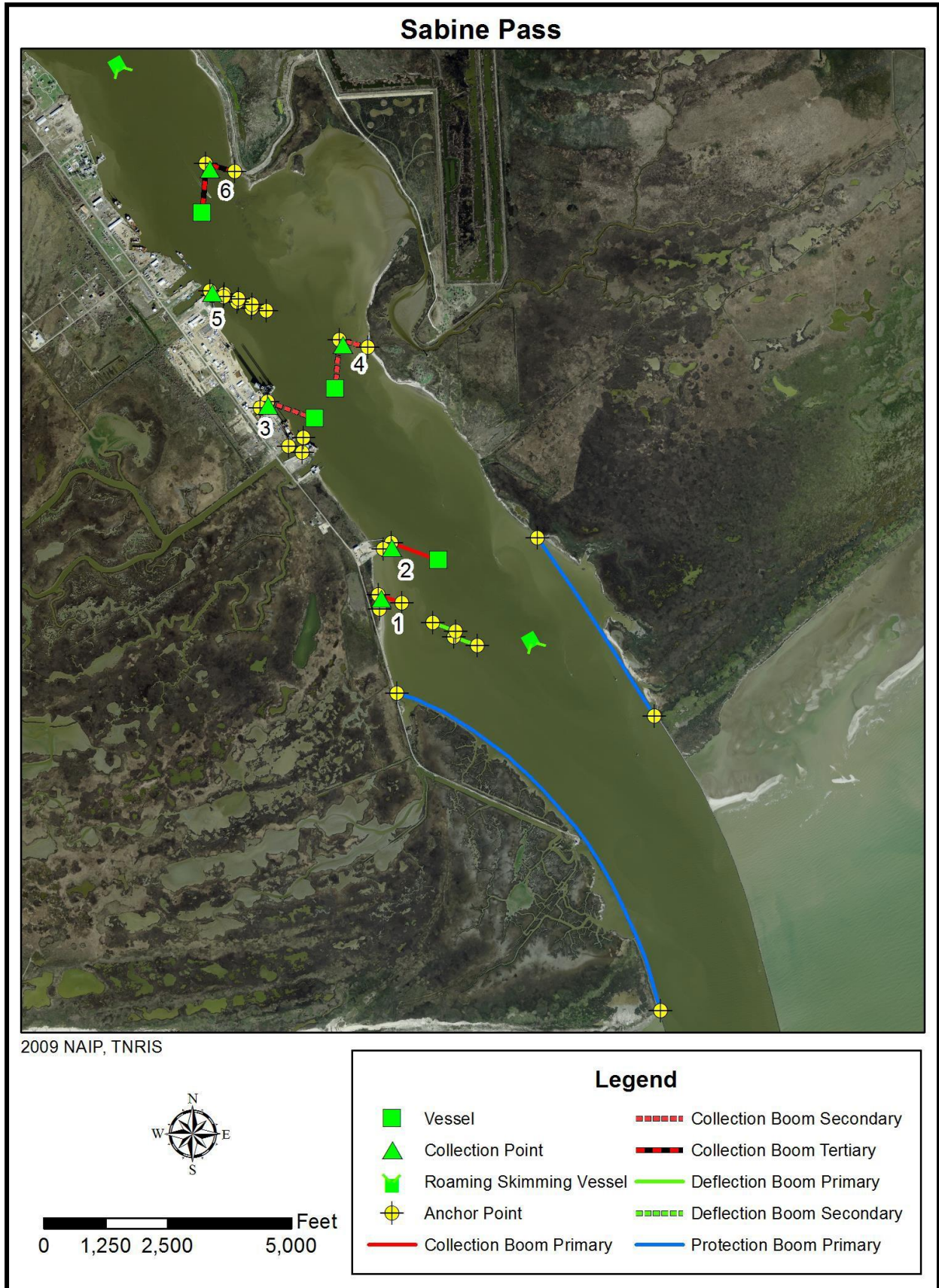
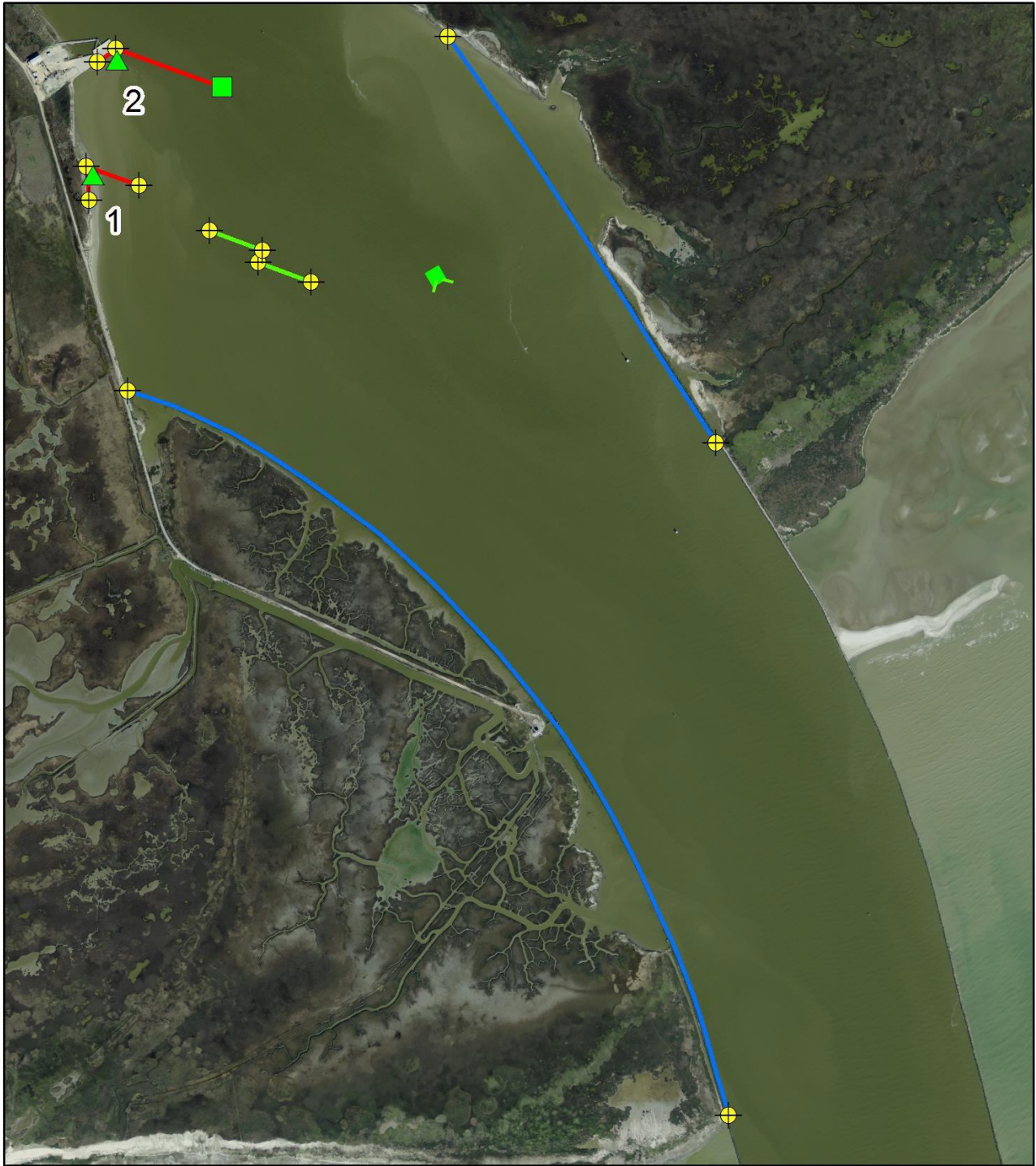


Figure SP-1: Sabine Pass Response Strategy

Field Survey Date: December 13, 2014

Sabine Pass



2009 NAIP, TNRS



0 625 1,250 2,500 Feet

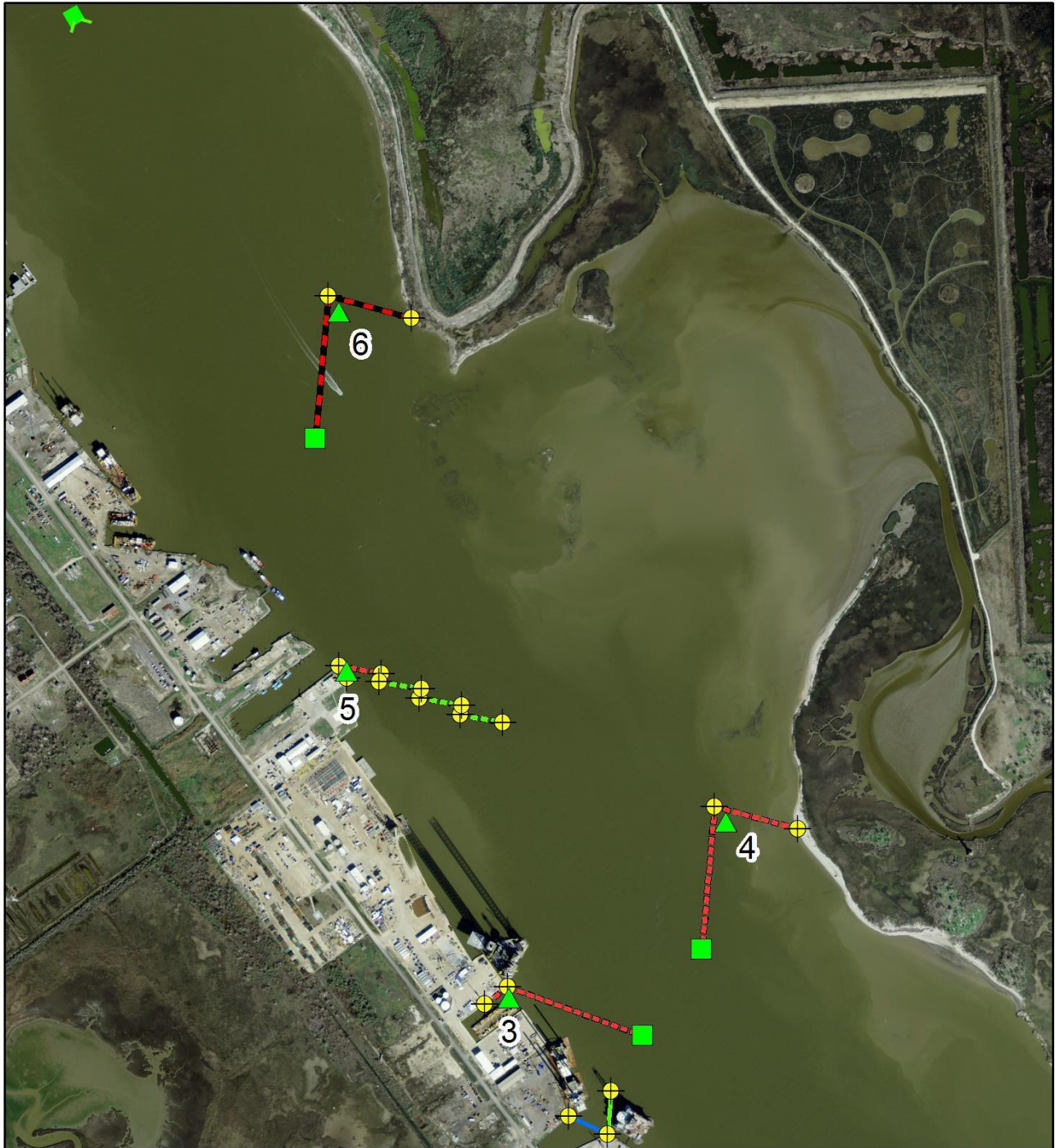
Legend

- Vessel
- Collection Point
- Roaming Skimming Vessel
- Anchor Point
- Collection Boom Primary
- Deflection Boom Primary
- Protection Boom Primary

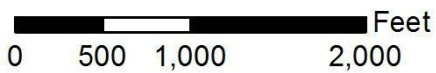
Figure SP-2: Close up of the Southern Half of the Sabine Pass Response Strategy

Field Survey Date: December 13, 2014

Sabine Pass



2009 NAIP, TNRIS



Legend










- | | | | |
|---|---------------------------|---|---------------------------|
|  | Vessel |  | Collection Boom Tertiary |
|  | Collection Point |  | Deflection Boom Primary |
|  | Roaming Skimming Vessel |  | Deflection Boom Secondary |
|  | Anchor Point |  | Protection Boom Primary |
|  | Collection Boom Secondary | | |

Figure SP-3: Close up of the Northern Half of the Sabine Pass Response Strategy

Field Survey Date: December 13, 2014

19.2. Preliminary Protection Strategy

The primary strategy for all offshore spills is to collect free oil in the offshore waters of the Gulf of Mexico. Oil that cannot be collected offshore should be diverted away from the tidal inlets and onto the adjoining Gulf beaches. If oil enters the tidal inlets, a series of collection, protection, and deflection boom configurations should be established in logical locations to maximize oil capture. Roaming skimmer vessels may be used to optimize oil collection in areas where boom placement is not practical, such as the center of the navigation channel.

At Sabine Pass, oil must be captured in the inlet before it has a chance to spread into the sensitive areas in and around Sabine Lake, the ICW, the numerous small tidal streams, and the surrounding wetlands. Areas of reduced current flows, eddies, relatively calm and protected waters, and logical collection points all exist within the confines of Sabine Pass. Several natural collection points within the inlet were identified by the accumulation of debris, seaweed, and trash. The specific location of these natural collection points may vary over time, but they should generally be incorporated into the booming strategies for Sabine Pass.

The order in which boom configurations & equipment are deployed is vital to the effectiveness of a response strategy. Primary configurations are the backbone of the response strategy and should be deployed first. Secondary configurations should be deployed once all of the primary configurations are established. Tertiary configurations are the final configurations that should be deployed. Table SP-1 lists the Site Names in Section 19.12.1-9 and their deployment ranking.

Site Names	Deployment Ranking
Collection Point #1 & #2	Primary Collection
Primary Deflection & Roaming Skimmer Vessel	Primary Deflection & Roaming Skimmer Vessel
East Bank Protection	Primary Protection
Texas Point Protection	Primary Protection
Texas Point Sediment Dike	Primary Sediment Dike
East Bank Protection & Deflection	Primary Protection & Primary Deflection
Collection Points #3 & #4	Secondary Collection
Collection Point #5	Secondary Collection & Secondary Deflection
Collection Point #6 & Roaming Skimmer Vessel	Tertiary Collection & Roaming Skimmer Vessel

Table SP-1: Sabine Pass Sites and Their Deployment Ranking.

19.3. Inlet Characteristics

Inlet Classification: Artificial Inlet/River Mouth	Degree of Difficulty Ranking: (A) Extreme Difficulty <i>(see Section 6.3 for complete details)</i>
--	---

Inlet Width: Sabine Pass has a large variation of observed widths. The inlet’s narrowest width measures 1,750 feet at the tips of the jetties. The widest portion of the inlet is located where Sabine Pass splits into Sabine Lake and the Port Arthur Ship Canal, south of TX- 82 Bridge. The width at this split is approximately 7,050 feet.

Inlet Length: Sabine Pass does not have an easily definable length. This inlet is part of a river system that empties into the Gulf of Mexico. Measuring from the seaward ends of the jetties to the TX-82 Bridge, Sabine Pass is approximately 9.9 miles in length.

Inlet Depth: Sabine Pass is generally maintained to a depth of 55 to 60 feet in the main channel. The deepest area is located near the end of Jetty Road on the west bank, with a depth of 63 feet. Additional and detailed depth information is available in Section 19.4 Inlet Transects.

Current Speed and Direction: Strong currents at Sabine Pass are present in the center of the channel and dissipate towards the banks. Currents become much slower in areas where the channel widens further inland and currents become negligible upon entering Sabine Lake. The numerous small tidal channels leading to wetlands generally have weaker currents.

Tidal Information: Sabine Pass experiences normal diurnal tides with wind and storm driven fluctuations.

Eddy Locations: Significant eddies occur throughout Sabine Pass. Several small, but significant cuts into the west bank were observed to contain eddies. The east bank contained several large eddies but access is restricted due to shallow water obstructions. See Figure SP-4 for a detailed map of eddy locations.

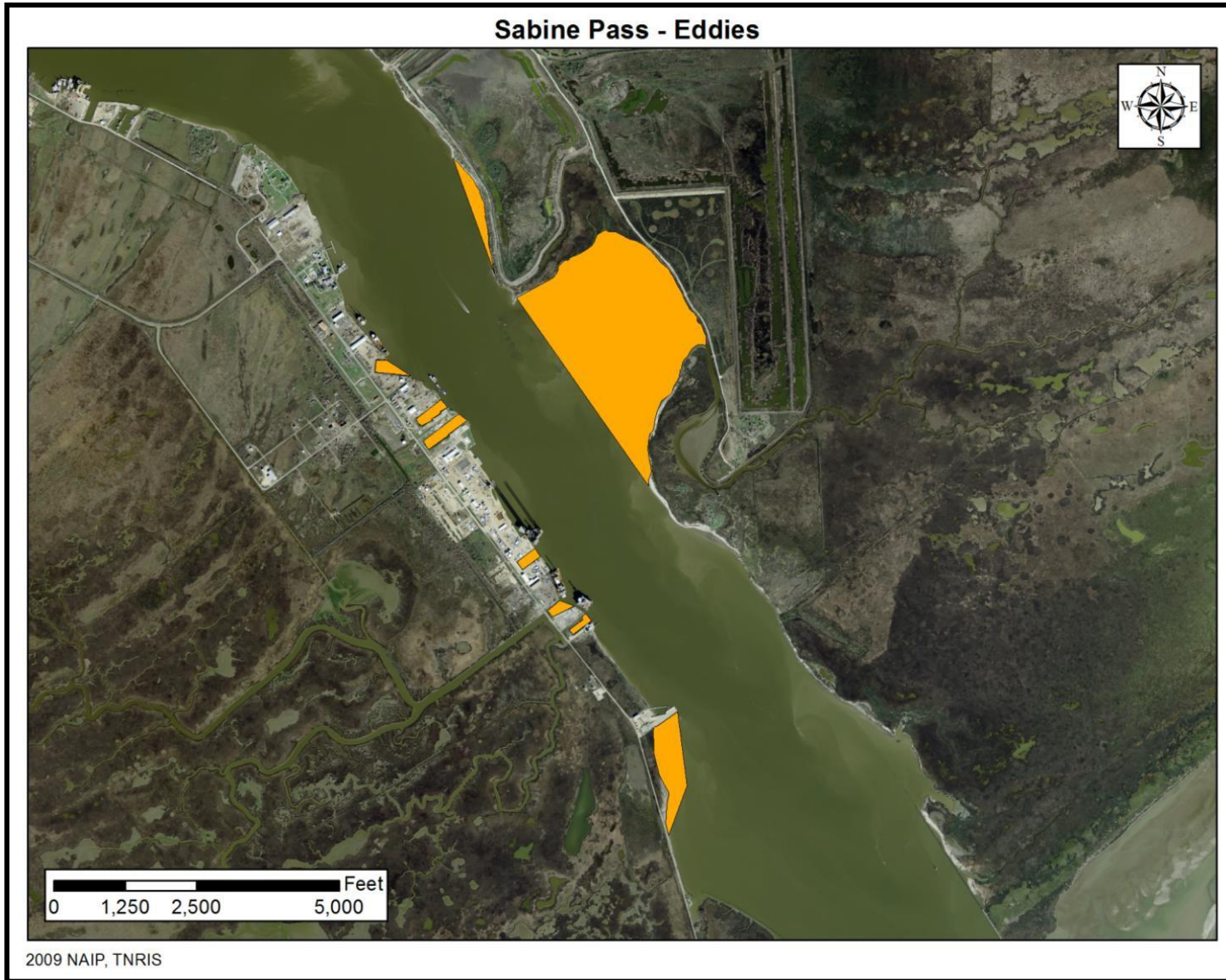


Figure SP-4: Eddy Locations at Sabine Pass

Field Survey Date: December 13, 2014

Longshore Flow Direction: Sabine Pass exhibits a longshore current heading west throughout most of the year. Prevailing southeast trade winds and Texas' concave curvature are the driving force behind the typical longshore currents. Winter months may intensify longshore currents when northerly winds occur. Longshore currents should be monitored during seasonal changes due to unpredictable patterns of movement.

Sediment Type: Sabine Pass consists of a soft sandy bottom near the mouth of the inlet. A sandy mud bottom becomes prevalent on the edge of the channel and the sediments of the nearshore wetlands are characteristically muddy clay further inland. Natural erosion in the upriver regions, coupled with strong currents, provides new silt and mud sediments that are constantly being transported and dispersed through Sabine Pass.

Points of Interest: The Sabine River and Sabine Pass form the border between Texas and Louisiana. A United States Coast Guard (USCG) Station is located on the west bank of Sabine Pass at the intersection of Dowling Road and 1st Avenue in Port Arthur, Texas. The USCG is equipped with various vessels. Sabine Pass Battleground State Historical Park is located on the west bank of the river in Texas, just north of the USCG station. The park has well protected launch ramps and a small pavilion with restrooms. Numerous industries are located along both sides of Sabine Pass and further inland.

Shoreline Type: Sabine Pass has a complex shoreline. The large riprap jetties protrude far out into the Gulf of Mexico but portions are submerged during high tides. These large riprap jetties transition to a low retaining wall and small riprap structures as the jetties enter Sabine Pass on both the Texas and Louisiana borders. During low tide these low structures are typically exposed but during high tide they may be completely submerged leaving the vast amount of marsh and vegetation unprotected from the water and waves of the inlet. The marsh vegetation slowly transitions to small sandy shell beaches on the Louisiana side and back to marsh vegetation by the Sabine Pass light house. The vegetation north of the lighthouse transitions to manmade, industrial structures intermittently dispersed. The Texas side shifts from marsh vegetation to a small section of small riprap and then to a small section of sandy beach. The majority of the rest of the inlet contains manmade, industrial structures.

19.4. Inlet Transects

Any inlet has the potential to undergo significant changes in the bottom profile due to sediment erosion and deposition. Tides, storms, and longshore currents can cause bottom shifting and reconfiguration. Jetties may limit or slow such shifts. The depth of Sabine Pass was measured in 2014. Figure SP-5 illustrates the locations of these depth transects. Figure SP-6 through Figure SP-12 show a detailed graph of each of the recorded depth transects.

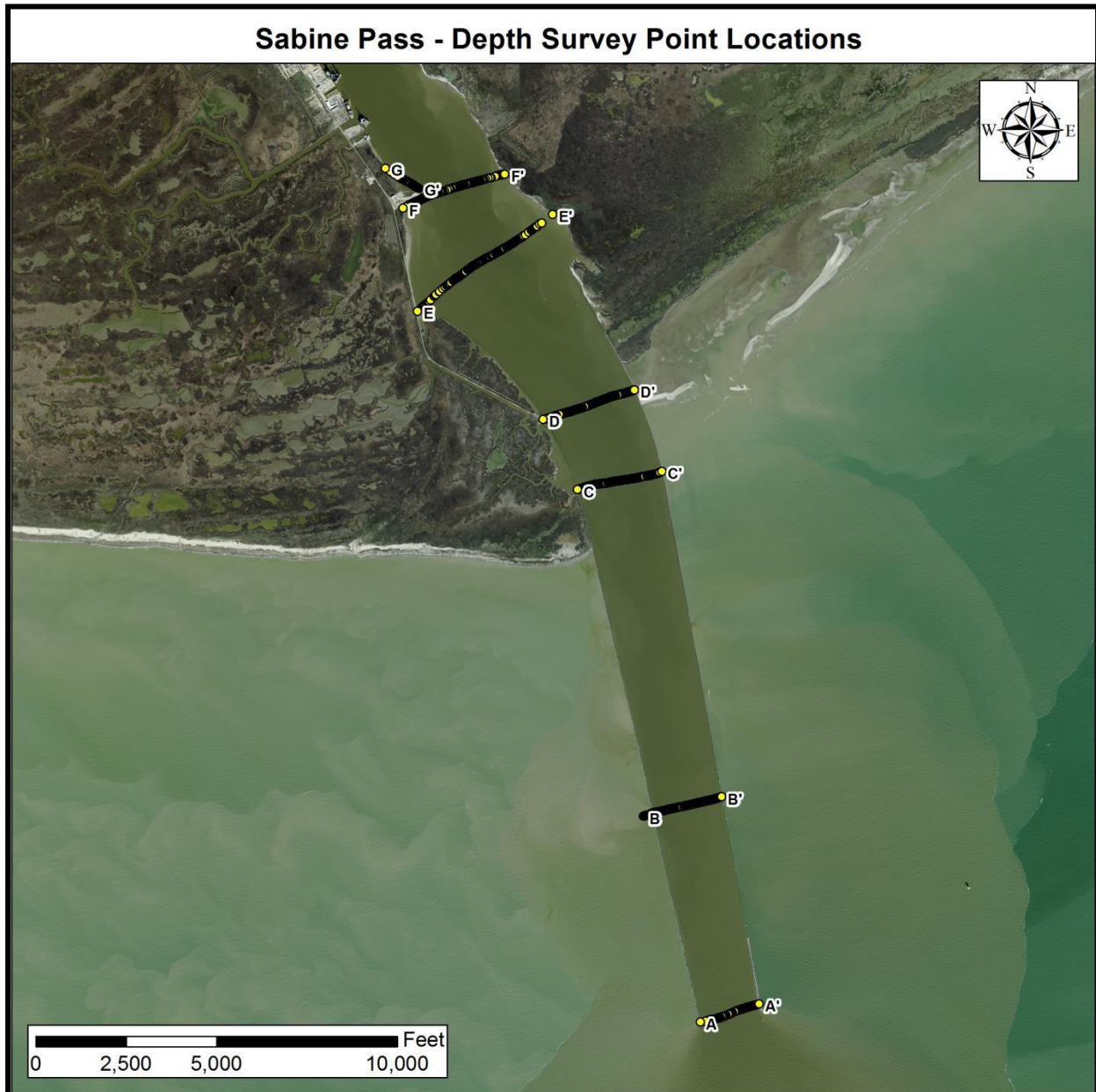


Figure SP-5: Sabine Pass Depth Transect Location Map

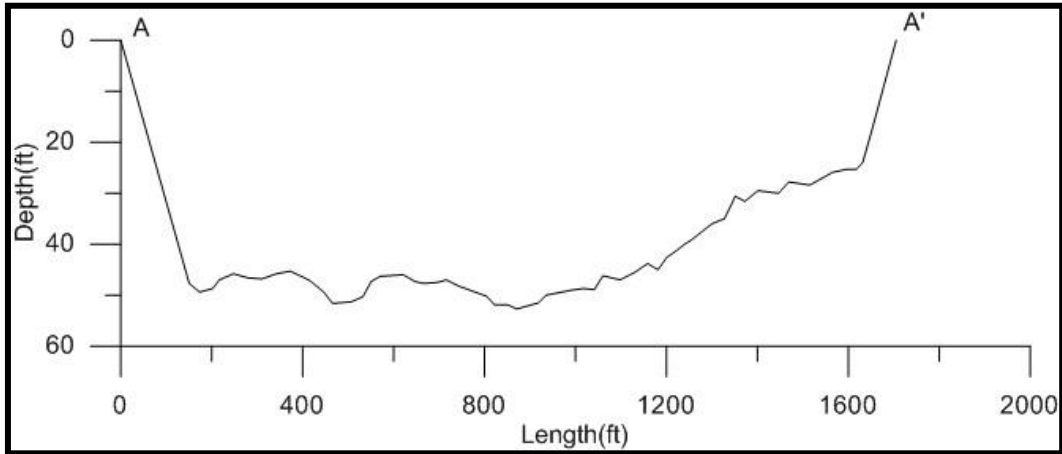


Figure SP-6: Depth Transect from the West Bank to the East Bank

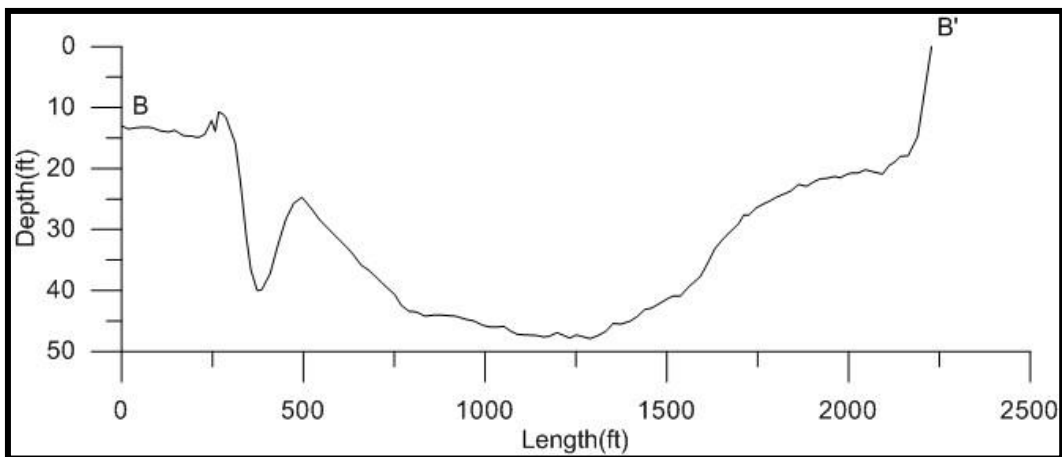


Figure SP-7: Depth Transect from the West Bank to the East Bank

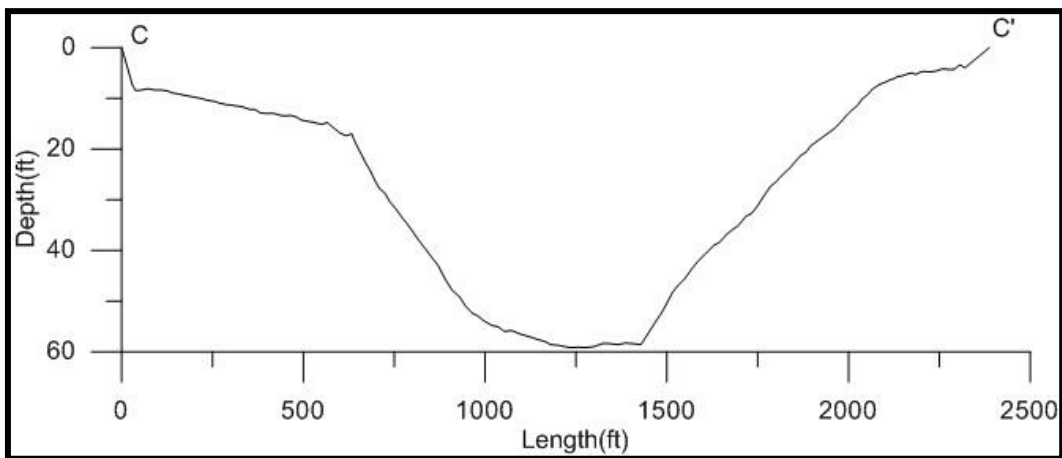


Figure SP-8: Depth Transect from the West Bank to the East Bank

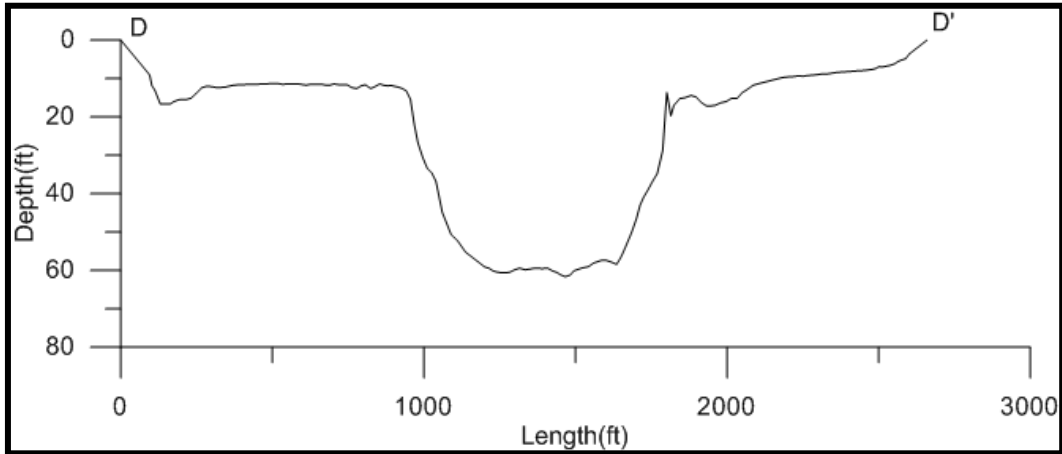


Figure SP-9: Depth Transect from the West Bank to the East Bank

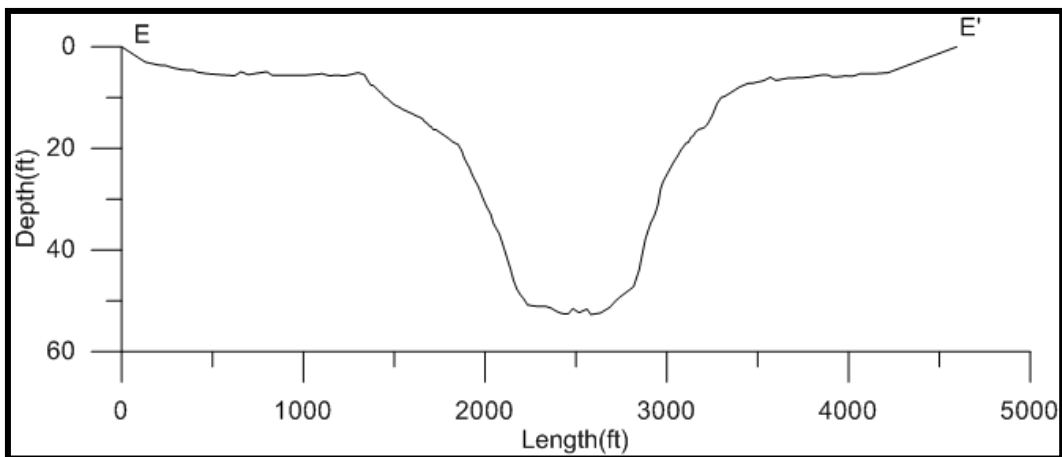


Figure SP-10: Depth Transect from the West Bank to the East Bank

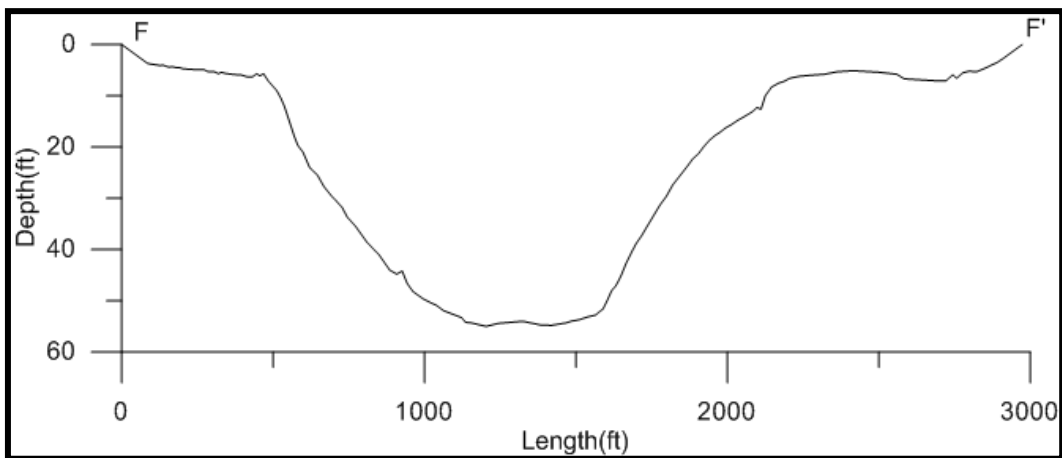


Figure SP-11: Depth Transect from the West Bank to the East Bank

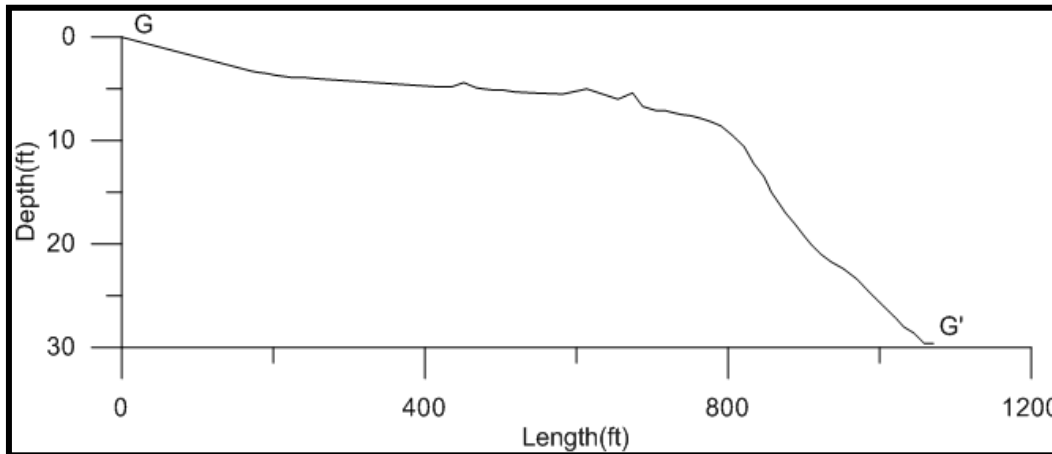


Figure SP-12: Depth Transect on the West Bank

19.5. Principle Resources at Risk

The primary features of this inlet include the Texas Point, McFaddin, and Sabine National Wildlife Refuges, the USCG Station, Sabine Pass Battleground State Historical Park, Port Arthur, Texas, Sabine Lighthouse and the numerous industrial complexes found on both banks. Landward of Sabine Pass are the ICW and the more sensitive habitats of Sabine Lake.

Sabine Pass and the adjoining beaches are not easily accessible and are located next to sensitive wetlands. These sensitive wetlands dominate a majority of the surrounding land towards the mouth of the Sabine Pass. The wetlands gradually transition to industrial complexes further inland. This area is known primarily for recreational, industrial, and commercial activities such as boating, fishing, petroleum refining, and commercial shipping. Sabine Pass is a migratory pass used by numerous species of marine life and birds. Responders should be especially aware that certain species are common in the pass and could be adversely affected by spilled oils or response actions. These include numerous bird species, various species of marine turtles, and marine mammals like dolphin. Some of these species are endangered, threatened, or otherwise protected. Vegetative cover and immobile species exist in all of the adjoining coastal habitats. Responders should use appropriate caution in any areas that are not paved. Avoid travelling in vegetated areas to minimize the chances for wildfires initiated by vehicle exhaust or damage to stabilizing root structures.

For further information, including a list of sensitive species found within the vicinity of Sabine Pass, refer to the Environmental Sensitivity Index (ESI) maps identified below:

ESI located at Texas General Land Office TOOLKIT:

<http://www.glo.texas.gov/ost/sabine-lake-area/texaspoi/index.html>

<http://www.glo.texas.gov/ost/sabine-lake-area/sabinepa/index.html>

<http://www.glo.texas.gov/ost/sabine-lake-area/portarts/index.html>

19.6. Safety Hazards

General safety concerns related to response activities at all coastal inlets are listed in Section 4.0. Special safety precautions associated with Sabine Pass include surface hazards, submerged hazards, commercial shipping traffic, and animal interactions. Both large riprap jetties lack walkable surfaces and have large gaps in their structure; responders should not traverse the jetties as they have the potential to be submerged and have poor walking surfaces. In late 2014, radar guiding beacons were being installed on the jetties to aid vessel navigation. There are no planned efforts to fix the jetty structures. The jetties may be submerged during high tide, storms, or high wave action, and may not be visible at night or during certain times of the day. Vessel operators should exercise extreme caution near the inlet banks. Any portion of the jetties may become slippery when wet and may form extremely slippery algal growth due constant splash. Caution should be used when traversing all parts of the jetties, riprap, or shorelines. Caution should be taken to avoid interaction with stingrays, mosquitos, and rattlesnakes. Fishing gear and fish carcasses may also represent hazards. Expect significant recreational and commercial vessel traffic.

19.7. Response Times

Sabine Pass is readily accessible from the towns of Sabine Pass and Port Arthur, Texas. Paved road access is available to all four of the vessel launch ramps within this inlet. Paved road access is not available to the mouth of Sabine Pass. However, Jetty Road is an unmaintained 4WD road that runs parallel to the inlet on the west bank in Texas. Travel times to the Broadway Street launch ramp in Sabine Pass, Texas are listed below in Table SP-2.

Start Point	Distance	Time
TGLO Region 1 Office via TX-82 & TX-87	21 miles	25 minutes
Houston, Texas via I-10, TX-73, & TX-87	99 miles	1 hour & 30 minutes
George Bush Intercontinental Airport via TX-8, I-10, TX-73, & TX-87	109 miles	1 hour & 40 minutes
USCG Sector Port Arthur via US-287 & TX-87	20 miles	30 minutes
Jack Brooks Regional Airport via US-287 & TX-87	22 miles	30 minutes
TGLO Region 2 Office via I-10, TX-73, & TX-87	86 miles	1 hour & 20 minutes
Houston Hobby via TX-8, I-10, TX-73 & TX-87	104 miles	1 hour & 40 minutes
Chennault International Airport via I-10, TX-62, TX-87, & TX-82	81 miles	1 hour & 25 minutes

Table SP2: Travel Times to the Broadway Street Launch Ramp.

19.8. Possible Staging Areas

The most readily available staging area, within the immediate vicinity of Sabine Pass, is the public vessel launch ramp at Broadway Street and South 1st Avenue. This primary staging area is a pre-identified staging area in the Southeast Texas and Southwest Louisiana Area Contingency Plan. It has paved & compacted dirt parking lots, and offers a vantage point of Sabine Pass.

An additional staging area is located at the Sabine Pass Battleground State Historical Park. This potential staging area contains a small shaded pavilion area, a large parking lot, and restrooms. This area is well maintained and provides another good vantage point of the inlet. The large paved parking lot is adjacent to four well maintained launch ramps. These launch ramps provide easy access to the Sabine River and Sabine Pass. This area may provide a small secondary staging area for equipment and vessels.

19.9. Inlet Accessibility

Vehicle Access: 2WD vehicles can easily access the paved roads on both the Texas and Louisiana side of Sabine Pass. The majority of the Louisiana coast in this area is undeveloped wetlands that are not accessible by vehicle. The Texas coast is more developed and offers some paved areas around the inlet. 1st Avenue on the Texas side merges into Jetty Road; which can only be accessed by 4WD vehicles. Jetty Road runs parallel with Sabine Pass and is the closest road to the mouth of the inlet.

4WD vehicles are necessary to access any of the trails or beaches along either the Texas or Louisiana shoreline. Texas Point National Wildlife Refuge beach access can only be accessed by 4WD UTVs. Off road trails and beach access may provide access to the base of the jetties. However, entrance points to the beaches on both coastlines are far from the inlets and may provide minimum benefit. See Figure SP-13 for a detailed map of 4WD accessible roads.

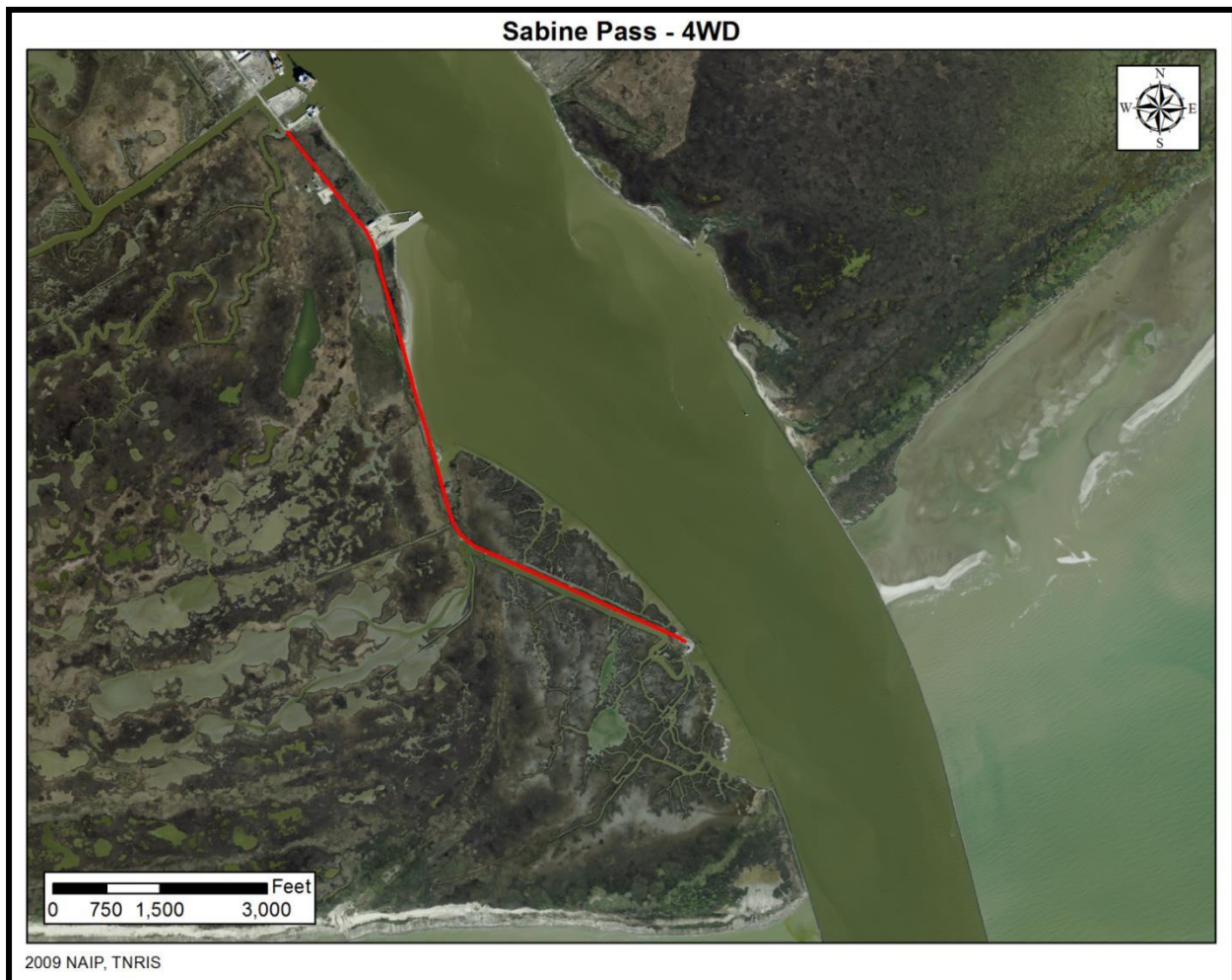


Figure SP-13: 4WD Accessible Roads at Sabine Pass

Vessel Access: The shortest access to Sabine Pass by trailerable vessel is by the use of one of the well maintained launch ramps located at Sabine Pass Battleground State Historical Park (Latitude: 29°44'02.35"N, Longitude: 93°52'31.15"W). The launch ramps are capable of launching or recovering four trailerable vessels simultaneously.

Another launch ramp is located near the intersection of Broadway Street and South 1st Avenue (Latitude: 29°44'22.23"N, Longitude: 93°53'24.39"W). The launch ramp is capable of launching or recovering three trailerable vessels simultaneously. This launch ramp is highly used but is not well maintained like the Sabine Pass Battleground State Historical Park.

Additional launch ramps are found at the Sabine Lake Causeway Bridge; one set of ramps are on the Texas side and the other launch ramp is located on the Louisiana side. These vessel launch ramps are located underneath the TX-82 Bridge. The launch ramps located on the Texas side are capable of launching or recovering three trailerable vessels simultaneously (Latitude: 29°45'53.66"N, Longitude: 93°53'53.03"W). The other launch ramp, located on the Louisiana side, is capable of launching or recovering two vessels simultaneously (Latitude: 29°46'04.48"N, Longitude: 93°53'33.17"W).

Access to the mouth of the Sabine Pass, from all launch ramps, can be reached by heading southeast following the well-marked ship channel. Sabine Pass has frequent vessel traffic, including commercial vessels.

Aerial Access: The closest regional airport is the Jack Brooks Regional Airport located near Port Arthur. The closest international airport is the Chennault International Airport in Lake Charles, Louisiana. Other large airports include, George Bush Intercontinental Airport and Hobby Airport located in Houston, Texas.

19.10. Nearby Waste Disposal Facilities

Various Treatment, Storage, and Disposal Facilities (TSD) are located within the upper Texas coastal zone. The Southeast Texas and Southwest Louisiana Area Contingency Plan lists the following waste disposal facilities that may accept spilled oil and residues. Table SP-3 lists TSD Facilities, the type of TSD, and their contact information. Prior arrangements should be made before transporting any oil and/or residues to these locations.

Type of TSD Facility	Name & Location	Contact Information
Class I Hazardous Waste Fuel Recycling	Dura Therm, Inc. P.O. Box 58466 Houston, TX 77258 Galveston County	Phone: (281) 339-1352 Fax: (281) 339-1351
Class I Hazardous Waste/Disposal Well - Storage & Processing	Texas Molecular Box 1914 2525 Battleground Deer Park, TX 77536 Harris County	Phone: (281) 930-2525 Fax: (281) 930-2511
	Vopak 2000 W. Loop S., Suite 1550 Houston, TX 77027 phone Harris County	Phone: (713) 561 7200 Fax: (713) 561 7323
Class I Hazardous/Class I Non-Hazardous Municipal Solid Waste/Storage	Clean Harbors 500 Battleground Road La Porte, TX 77571 Harris County	Phone: (281) 476-0645 Fax: (281) 727-7693
Class I Hazardous Waste Mixed Hazardous and Radioactive Waste Storage	NSSI/Recovery Services, Inc. P. O. Box 34042 Houston, TX 77234 Harris County	Phone: (713) 641-0391 Fax: (713) 641-6153
Class I Hazardous Waste Storage and Processing	SCT Environmental In Houston 5738 Cheswood Houston, TX 77087 Harris County	Phone: (713) 645-8710 Fax: (713) 649-6022
Class I Hazardous Waste/Storage and Processing Incineration	Rhodia Inc. 8615 Manchester St. Houston, TX 77262 Harris County	Phone: (713) 928-3411 Fax: (713) 928-3431

Table SP-3: TSD Facilities in the Upper Texas Coastal Zone

19.11. Minimum Resources Required

Response strategies require a variety and a minimum quantity of resources to be effective. The recommended response strategy for Sabine Pass is broken down in section 19.12.1-9. Each site includes a table that lists necessary resources and their minimum quantities to fulfill the response action. Different environmental conditions may alter the type and quantity of resources required. Table SP-4 shows a summary of the types of resources and their respective total amounts to successfully carry out the response strategy.

Resource Type	Recommended Minimum Amount for Sabine Pass
Anchors <i>(This number is calculated using double anchor systems)</i>	34
Anchor System Line (Anchor, Trip, Mooring)	2,484 Feet
Posts	27
Inshore Boom	22,300 Feet
Skimmers	6
Anchor Point Vessels	4
People	34-40+
Vessels	10+
Roaming Skimmer Vessels	2
Earthmovers / Front End Loaders (Section 19.12.5)	Minimum of 2
Backhoes (Section 19.12.5)	Minimum of 2
Mobile Crane (Section 19.12.5)	Minimum of 1
FIBC (Section 19.12.5)	Number of Fiber Bags = Width (ft.) of the Inlet X Depth (ft.) of the Inlet X 0.5

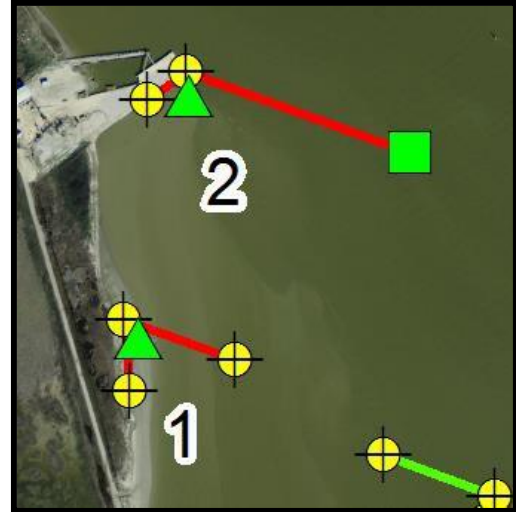
Table SP-4: Resource Types & Amounts for the Sabine Pass Response Strategy

19.12.1. Boom Configuration and Collection Areas

Site Name: Collection Points #1 & #2

Relative Location: Collection Points #1 & #2 are located on the east bank. Collection Point #1 is south of Collection Point #2.

Site Name:	Latitude:	Longitude:
Collection Point #1	29°42'11.3660"N	93°51'14.1440"W
Collection Point #2	29°42'21.3597"N	93°51'11.0642"W



Currents: Strong currents are present in the center of the channel. Current velocities dissipate towards the banks of the channel. The wider profile of the inlet along this shoreline and the dock/bulkhead structure tend to slow currents and form an eddy in these locations.

Shoreline Description: The shoreline at Collection Point #1 consists of sandy beach with intermittent sections of vegetation. The shoreline at Collection Point #2 consists of concrete bulkhead.

Access to Collection Points: 2WD vehicles can easily access the paved portions leading up to Jetty Road. 4WD or high clearance vehicles may be necessary to access Jetty Road or any of the trails or beaches surrounding Collection Points #1 & #2. Collection Point #2 is a popular fishing destination for local residents and is more accessible. Trail improvement may be necessary if conditions do not allow for vacuum truck access. Temporary roads can be constructed by installing planks or mobile grates to improve surface traction. Temporary storage devices can be utilized until appropriate methods allow for land or water access to the collection points.

Depth: The depth at Collection Point #1 ranges from 0 to 3 feet deep. The depth of the leg of boom anchored in the channel ranges from 2 to 4 feet. The depth at Collection Point #2 ranges from 4 to 6 feet deep. The depth of the leg of boom anchored in the channel ranges from 20 to 25 feet.

Anchoring: Posts driven into the substrate are required to hold the boom at Collection Point #1 and create the appropriate collection point. Posts need to be securely placed to withstand strong environmental forces that are exerted onto the boom and to minimize boom movement. One leg of the configuration is attached to the shoreline. The other leg of the boom is placed into the channel to increase the oil capture rate.

At Collection Point #2, posts are unable to be driven into the ground because of the concrete bulkhead and the steep drop off. A shoreline anchor system with a larger anchor can be attached to the bank and placed over the boom to create the necessary apex of the collection point. The shoreline anchor system holds the boom near the bank. Due to the high volume of commercial vessel traffic of this area, traditional anchoring systems are impractical in the main channel. Vessels are required to hold the leg of boom at Collection Point #2 in the main channel. The utilization of vessels as anchor points in the main channel is important, as they may alter the shape of the collection point to allow for commercial vessel traffic.

Anchor systems within the main channel have to resist strong currents. A large single anchor or double anchor system may be required to minimize boom movement. Collection Point #1 requires 2 anchor system, 3 posts, and 79 feet of anchor system line. Collection Point #2 requires 2 anchor systems, 1 post, 1 vessel, and 150 feet of anchor system line.

Boom Classification: Collection Points #1 & #2 are comprised of inshore boom.

Description: Collection Point #1 is established on the west bank. The apex of the collection point is formed by a shoreline anchor system. One leg of the configuration is moored to the bank. The other leg of the collection point is placed into the channel to increase the oil capture rate. Collection Point #1 requires 800 feet of boom.

Collection Point #2 is established on the west bank. The apex of the collection point is formed by a skimming system, skimming vessel, or skimming barge. One leg of the configuration is held to the shoreline by a shoreline anchor system. The other leg of the configuration is moored to a vessel that acts as an anchor system to hold the boom in the channel. Collection Point #2 requires 1,200 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

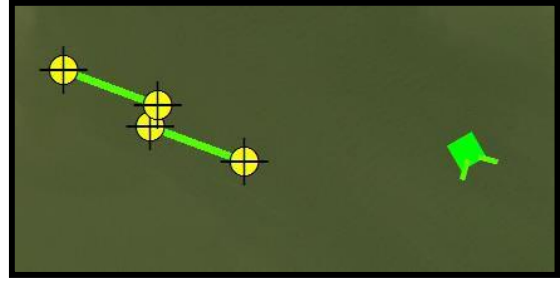
Resources Required:

Resource Type	Minimum Amount
Anchors	4
Anchor System Line (Anchor, Trip, Mooring)	229 Feet
Posts	4
Inshore Boom	2,000 Feet
Skimmers	2
Anchor Point Vessel	1

19.12.2. Boom Configuration and Collection Areas

Site Name: Primary Deflection & Roaming Skimmer Vessel

Relative Location: This boom configuration is located southeast of Collection Point #1. The roaming skimmer vessel moves within the inlet collecting oil that is present.



Currents: Strong currents and large waves are present in the center of the channel. Current velocities dissipate towards the banks of the channel.

Shoreline Description: N/A

Access to Boom Configuration: Shallow draft vessels capable of deploying boom and anchor systems may be required for this boom configuration.

Depth: The depth at this boom configuration ranges in depth from 15 to 20 feet.

Anchoring: Anchor systems within the main channel have to resist strong currents and large waves. Double anchor systems are required to minimize boom movement. This boom configuration requires 8 anchor systems and 576 feet of anchor system line.

Boom Classification: This boom configuration is comprised of inshore boom.

Description: This boom configuration is located southeast of Collection Point #1. It is designed to deflect oil towards Collection Point #1. This boom configuration requires 1,000 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

A roaming skimmer vessel may be maneuvered within Sabine Pass to collect oil carried past the other collection points by currents. A roaming skimmer vessel can maximize the ability of responders to collect oil in the throat of the channel. Its maneuverability may minimize or eliminate the disruption of vessel traffic. To maximize collection capabilities, roaming skimmer vessels may also be used at the apex of a V-boom configuration. Boom affixed to the roaming skimmer vessel may be pulled by other vessels, or anchored in the channel or along the shore.

Resources Required:

Resource Type	Minimum Amount
Anchors	8
Anchor System Line (Anchor, Trip, Mooring)	576 Feet
Inshore Boom	1,000 Feet
Roaming Skimmer Vessel	1

19.12.3. Boom Configuration and Collection Areas

Site Name: East Bank Protection

Relative Location: This boom configuration is located on the east bank.

Currents: Strong currents are present in the center of the channel. Tidal fluctuations between the inlet and the marshes on the east bank may generate strong current flow. Current velocities dissipate towards the banks of the channel.

Shoreline Description: The shoreline at this boom configuration consists of vegetated sandy beach at the anchor points, and submerged riprap between the anchor points.

Access to Boom Configuration: Shallow draft vessels capable of deploying boom and anchor systems may be required for this boom configuration.

Depth: The depth at this boom configuration ranges in depth from 2 to 4 feet.

Anchoring: Posts driven into the substrate are required to hold this boom configuration to the shoreline. Posts need to be securely placed to withstand strong environmental forces that are exerted onto the boom and to minimize boom movement. Additional posts or anchor systems may be required to hold the boom in place against the submerged riprap. This boom configuration requires a minimum of 4 posts and 100 feet of anchor system line.

Boom Classification: This boom configuration is comprised of inshore boom.

Description: This boom configuration is located on the east bank. Posts driven into the substrate hold the boom to the shoreline. This boom configuration is designed to protect the sensitive salt marshes on the east bank. This boom configuration requires 4,300 feet of boom. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

Site Specific Hazard: This boom configuration follows a submerged riprap along the east bank. This submerged riprap may be difficult to see, especially in low light situations and during high tide and poses a substantial threat to responders and vessel operators. Marking the submerged riprap with temporary buoys or other identifiers is recommended to mitigate the hazard of the submerged riprap.



Resources Required:

Resource Type	Minimum Amount
Anchor System Line (Anchor, Trip, Mooring)	100 feet
Posts	Minimum of 4
Inshore Boom	4,300 Feet

19.12.4. Boom Configuration and Collection Areas

Site Name: Texas Point Protection

Relative Location: This boom configuration is located on the west bank, at Texas Point.

Currents: Strong currents are present in the center of the channel. Tidal fluctuations between the inlet and the marshes in Texas Point bank may generate strong current flow. Current velocities dissipate along the banks of the channel.

Shoreline Description: The shoreline at this boom configuration consists of vegetated sandy beach at the anchor points, and submerged riprap and a concert wall between the anchor points. It should be noted that the concert wall is submerged on at high tide.



Access to Boom Configuration: Jetty Road offers 4WD access to the north anchor point. Shallow draft vessels capable of deploying boom and anchor systems may be required for this boom configuration.

Depth: The depth at this collection Point ranges from 2 to 4 feet.

Anchoring: Posts driven into the substrate are required to hold this boom configuration to the shoreline. Posts need to be securely placed to withstand strong environmental forces that are exerted onto the boom and to minimize boom movement. Additional posts or anchor systems will be required to hold the boom in place off the submerged riprap. This boom configuration requires a minimum of 6 posts and 100 feet of anchor system line.

Boom Classification: This boom configuration is comprised of inshore boom.

Description: This boom configuration is located on the west bank. Posts driven into the substrate hold the boom to the shoreline. This boom configuration is designed to protect the sensitive salt marshes in Texas Point. This boom configuration requires 8,700 feet of boom. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

Resource Type	Minimum Amount
Anchor System Line (Anchor, Trip, Mooring)	100 feet
Posts	Minimum of 6
Inshore Boom	8,700 Feet

19.12.5. Boom Configuration and Collection Areas

Site Name: Texas Point Sediment Dike

Relative Location: This site is located at the base of the west bank jetty. The site is the mouth of the small channel that runs parallel to the large riprap shoreline.

Currents: When this small channel is open, strong, tidally-influenced currents are present. If the small channel is silted in, there will be no current.



Shoreline Description: The shoreline at this site consists of large riprap near the jetty and a vegetated muddy shoreline on the Texas Point. If the channel is silted in, it may have a sandy beach shoreline.

Access to Area: Shallow draft work vessels and deep draft work vessels, such as barges are required to access this site and deploy the recommended response strategy.

Depth: The depth at this site varies. Storm events and natural processes frequently close and open this small channel. A measurement prior to field operations is encouraged for proper execution of response strategies.

Strategy: If an offshore oil spill threatens to impact this site, a sediment dike should be established. Flexible Intermediate Bulk Containers (FIBC) filled with sand is recommended for construction of the sediment dike at Texas Point. FIBC's hold position under strong currents and are easier to remove than sandy materials. A barge may be anchored near the site with a mobile crane on the deck. This crane should be able to set and remove the FIBCs. The constructed sediment dike at this site should be removed once the offshore oil spill is no longer a threat to the inlet. The Responsible Party should work closely with TGLO and TPWD to ensure the sediment dike is satisfactorily removed and flow is reestablished between Texas Point and the Gulf of Mexico.

If this site is silted in during an off shore oil spill, ensure the integrity of the naturally occurring sediment dike is satisfactory. FIBCs may still be added to the natural sediment dike if it is not structurally sound, or if it is submerged under high tide.

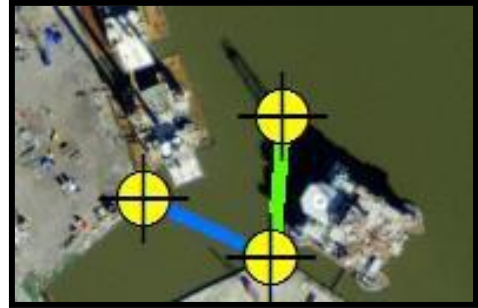
Resources Required:

Resource Type	Minimum Amount
People	12-14
Earthmovers / Front End Loaders	Minimum of 2
Backhoes	Minimum of 2
Mobile Crane	Minimum of 1
FIBC	Number of Fiber Bags = Width (ft.) of the Inlet X Depth (ft.) of the Inlet X 0.5

19.12.6. Boom Configuration and Collection Areas

Site Name: East Bank Protection & Deflection

Relative Location: This boom configuration is located on the west bank, north of Collection Point #2 and south of Collection Point #3.



Currents: Exceptionally strong currents are present in the center of the channel leading into Texas Point. Current velocities dissipate towards the banks of the channel.

Shoreline Description: The shoreline at this boom configuration consists of concrete bulkhead at the land based anchor points.

Access to Boom Configuration: 2WD vehicles may access the paved portions surrounding the land based anchor points. Shallow draft vessels capable of deploying boom and anchor systems may be required for this boom configuration.

Depth: The depth at the land based anchor points ranges from 2 to 4 feet. The depth of the anchor point in the main channel ranges from 8 to 10 feet.

Anchoring: Posts are unable to be driven into the substrate at this boom configuration due to the bulkhead shoreline and the steep drop off. A shoreline anchor system with a larger anchor can be attached to the bank and placed over the boom to create the necessary apex of the boom configuration. The shoreline anchor system holds the boom near the bank. This boom configuration requires 4 anchor systems and 172 feet of anchor system line.

Boom Classification: This boom configuration is comprised of inshore boom.

Description: This boom configuration is located on the west bank, in front of the channel leading into Texas Point. Posts are unable to be driven into the ground at this location; shoreline anchor systems hold the boom to the shoreline. This boom configuration has two functions; protect the channel leading into Texas Point and divert oil into Collection Point #3. This boom configuration requires 600 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

Site Specific Hazard: This boom configuration utilizes local industrial complexes. Barges, oil rigs, and commercial vessels may be parked near the entrance to the channel leading to Texas Point. The presence of industrial equipment may alter this boom configuration. Vessel operators and responders should exercise extreme caution when traveling or working near industrial equipment.

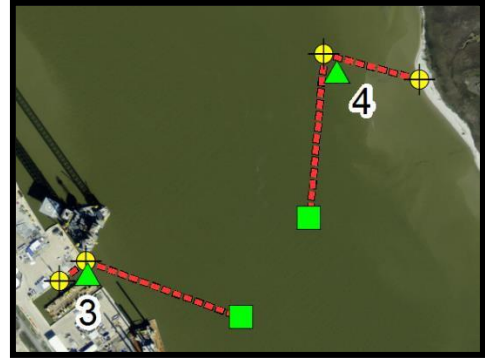
Resources Required:

Resource Type	Minimum Amount
Anchors	4
Anchor System Line (Anchor, Trip, Mooring)	172 Feet
Inshore Boom	600 Feet

19.12.7. Boom Configuration and Collection Areas

Site Name: Collection Points #3 & #4

Relative Location: Collection Point #3 is located on the west bank. Collection Point #4 is located on the east bank.



Site Name:	Latitude:	Longitude:
Collection Point #3	29°42'51.1997"N	93°51'37.6157"W
Collection Point #4	29°43'02.5265"N	93°51'19.6829"W

Currents: Strong currents are present in the center of the channel. Current velocities dissipate towards the banks of the channel.

Shoreline Description: The shoreline at Collection Point #3 consists of concrete bulkhead at the land based anchor points. The shoreline at Collection Point #4 consists of sandy beach with deposits of shells.

Access to Collection Points: 2WD vehicles may access the land based anchor points at Collection Point #3. Shallow draft vessels capable of deploying boom and anchor systems may be required for Collection Point #4.

Depth: The depth of the land based anchor points at Collection Point #3 range from 2 to 4 feet. The depth at the leg of boom anchored in the water for Collection Point #3 ranges from 12 to 14 feet. The depth of the land based anchor point for Collection Point #4 ranges from 0 to 2 feet. The depth at the apex of Collection Point #4 ranges from 10 to 12 feet. The depth at the leg of boom anchored into the main channel for Collection Point #4 ranges from 18 to 20 feet.

Anchoring: Posts are unable to be driven into the substrate at Collection Point #3 because of the concrete bulkhead and the steep drop off. A shoreline anchor system with a larger anchor can be attached to the bank and placed over the boom to create the necessary apex of the collection point. The shoreline anchor system holds the boom near the bank. A vessel is required to hold the leg of boom at Collection Point #3 in the main channel.

Posts driven into the substrate are necessary to hold the boom to the bank at Collection Point #4. Posts need to be securely placed to withstand strong environmental forces that are exerted onto the boom and to minimize boom movement. Skimming systems, skimming vessels, or skimming barges are required to create the appropriate collection point. A vessel is required to hold the leg of boom at Collection Point #4 in the main channel.

Due to the high volume of commercial vessel traffic of this area, traditional anchoring systems are impractical in the main channel. The utilization of vessels as anchor points in the main channel is important, as they may alter the shape of the collection point to allow for commercial vessel traffic. Collection Point #3 requires 3 anchor systems, and 201 feet of anchor system line. Collection Point #4 requires 3 anchor systems, 2 post, 1 vessel, and 100 feet of anchor system line.

Boom Classification: Collection Points #3 & #4 are comprised of inshore boom.

Description: Collection Point #3 is established on the west bank. The apex of the collection point is formed by a shoreline anchor system. One leg of the configuration is moored to the bank. The other leg of the configuration is moored to a vessel that acts as an anchor system to hold the boom in the channel. Collection Point #3 requires 1,200 feet of boom.

Collection Point #4 is established on the east bank. The apex of the collection point is formed by a skimming system, skimming vessel, or skimming barge. One leg of the configuration is moored to the bank by a post driven into the substrate. The other leg of the configuration is moored to a vessel that acts as an anchor system to hold the boom in the channel. Collection Point #4 requires 1,600 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

Resources Required:

Resource Type	Minimum Amount
Anchors	6
Anchor System Line (Anchor, Trip, Mooring)	301 Feet
Post	2
Inshore Boom	2,800 Feet
Skimmers	2
Anchor Point Vessels	2

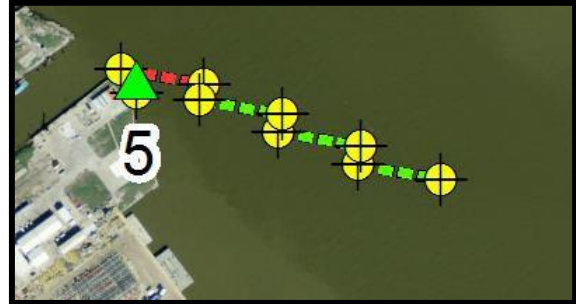
19.12.8. Boom Configuration and Collection Areas

Site Name: Collection Point #5

Relative Location: This Collection Point is located northwest of Collection Point #3.

Latitude: 29°43'14.3902"N

Longitude: 93°51'48.9705"W



Currents: Strong currents are present in the center of the channel. Current velocities dissipate towards the banks of the channel.

Shoreline Description: The shoreline at Collection Point #5 consists of concrete bulkhead.

Access to Collection Point: 2WD vehicles may access the land based anchor points at Collection Point #5. Shallow draft vessels capable of deploying boom and anchor systems may be required for the cascade system east of Collection Point #5.

Depth: The depth of the land based anchor points at Collection Point #3 range from 2 to 4 feet. The depth at the leg of boom anchored in the water for Collection Point #5 and the cascade series ranges from 14 to 16 feet.

Anchoring: Posts are unable to be driven into the substrate at Collection Point #5 because of the concrete bulkhead and the steep drop off. A shoreline anchor system with a larger anchor can be attached to the bank and placed over the boom to create the necessary apex of the collection point. The shoreline anchor system holds the boom near the bank. Anchor systems within the main channel have to resist strong currents. Double anchor systems are required to minimize boom movement. This collection point requires 13 anchor systems and 906 feet of anchor system line.

Boom Classification: This boom configuration is comprised of inshore boom.

Description: Collection Point #5 is established on the west bank. The apex of the collection point is formed by a shoreline anchor system. One leg of the configuration is moored to the bank. The other leg is anchored in the channel to increase the oil capture rate. A cascade system is established east of this collection point to further enhance the oil capture rate. This collection point requires 1,300 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

Resources Required:

Resource Type	Minimum Amount
Anchors	13
Anchor System Line (Anchor, Trip, Mooring)	906 Feet
Inshore Boom	1,300 Feet
Skimmer	1
Roaming Skimmer Vessel	1

19.12.9. Boom Configuration and Collection Areas

Site Name: Collection Point #6 & Roaming Skimmer Vessel

Relative Location: This Collection Point is located on the east bank, northwest of Collection Point #4. The roaming skimming vessel moves within the inlet collecting oil that is present.

Latitude: 29°43'39.1611"N

Longitude: 93°51'48.0290"W

Currents: Strong currents are present in the center of the channel. Current velocities dissipate towards the banks of the channel.

Shoreline Description: The shoreline at Collection Point #6 consists of vegetated sandy beach.

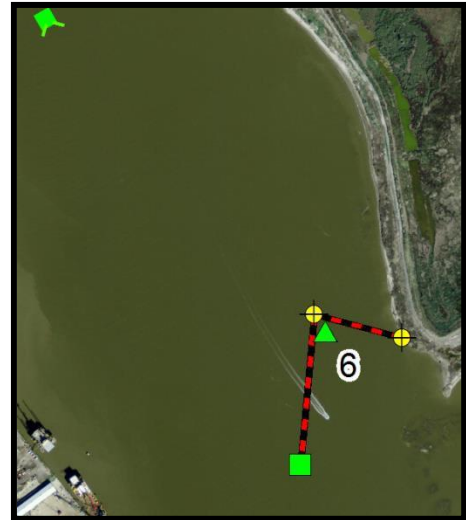
Access to Collection Point: Shallow draft vessels capable of deploying boom and anchor systems may be required for this boom configuration.

Depth: The depth of the land based anchor points at Collection Point #6 range from 0 to 2 feet. The depth at the apex of Collection Point #6 ranges from 25 to 30 feet. The depth at the leg of boom anchored in the main channel ranges from 35 to 40 feet.

Anchoring: Posts driven into the substrate are necessary to hold the boom to the bank at Collection Point #6. Posts need to be securely placed to withstand strong environmental forces that are exerted onto the boom and to minimize boom movement. Skimming systems, skimming vessels, or skimming barges are required to create the appropriate collection point. A vessel is required to hold the leg of boom at Collection Point #6 in the main channel.

Due to the high volume of commercial vessel traffic of this area, traditional anchoring systems are impractical in the main channel. The utilization of vessels as anchor points in the main channel is important, as they may alter the shape of the collection point to allow for commercial vessel traffic. Collection Point #6 requires 2 post, 1 vessel, and 100 feet of anchor system line.

Boom Classification: This Collection Point #6 is comprised of inshore boom.



Description: Collection Point #6 is established on the east bank. The apex of the collection point is formed by a skimming system, skimming vessel, or skimming barge. One leg of the configuration is moored to the bank by a post driven into the substrate. The other leg of the configuration is moored to a vessel that acts as an anchor system to hold the boom in the channel. Collection Point #6 requires 1,600 feet of boom. Boom is positioned at an angle to handle a 3 knot current that is generally associated with Sabine Pass. Boom should be monitored constantly to confirm the alignment and position of this boom configuration.

A roaming skimmer vessel may be maneuvered within Sabine Pass to collect oil carried past the other collection points by currents. A roaming skimmer vessel can maximize the ability of responders to collect oil in the throat of the channel. Its maneuverability may minimize or eliminate the disruption of vessel traffic. To maximize collection capabilities, roaming skimmer vessels may also be used at the apex of a V-boom configuration. Boom affixed to the roaming skimmer vessel may be pulled by other vessels, or anchored in the channel or along the shore.

Resources Required:

Resource Type	Minimum Amount
Anchor System Line (Anchor, Trip, Mooring)	100 Feet
Post	2
Inshore Boom	1,600 Feet
Skimmer	1
Anchor Point Vessel	1
Roaming Skimmer Vessel	1

19.13. Imagery



Louisiana Shoreline with Underwater Obstructions
(Facing North)



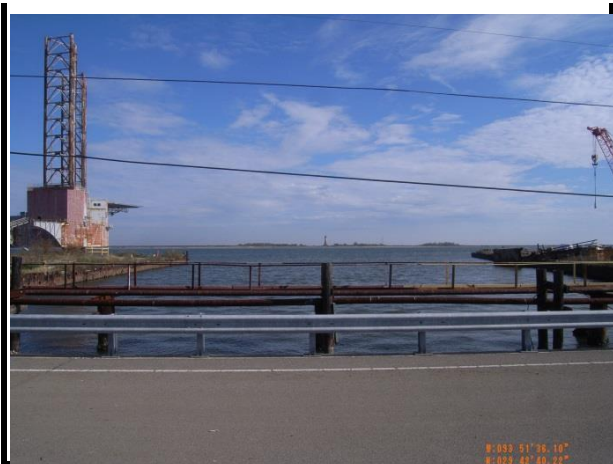
Texas Shoreline, Large Riprap Transitions to
Submerged Small Riprap (Facing North)



Texas Shoreline with Submerged Small Riprap
(Facing West)



Texas Shoreline, Culvert Leading to Marshes
(Facing West)



Small Side Channel Leading to Marshes
(Facing East)



Small Navigable Gap in Texas Jetty
(Facing East)



Louisiana Jetties with Brown Pelicans
(Facing South)



Texas Shoreline with Large Riprap and
Marshes (Facing North)



Salt Marshes on Texas Shoreline
(Facing West)



Texas Shoreline, Beach, & Jetty
(Facing South)



Louisiana Beach Near Jetties
(Facing West)



Dock on Texas Shoreline
(Facing East)



USCG Station Near Battleground State Park in Texas (Facing North)



Helicopter Landing Pads West of Sabine Pass (Facing South)



County Launch Ramp in Texas, Intersection of South 1st Ave & Broadway St. (Facing East)



Public Launch Ramp in Louisiana, North of TX-82 (Facing West)



Public Launch Ramp in Texas, North & South of TX-82 (Facing West)



Launch Ramp at Battleground State Park in Texas (Facing East)

19.14. Special Stakeholder Concerns

Sabine Pass experiences high volumes of ocean-going commercial vessel traffic traversing its waters. The regions of Port Arthur, Beaumont, and Orange, Texas are dependent on Sabine Pass for their industrial operations. The Texas Point, McFaddin, and Sabine National Wildlife Refuges are located within the vicinity of the Sabine River or Sabine Pass. Coordination with these refuges is recommended.