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Request for Conditional Closure  
Salt Lagoon Diesel Seep, NOAA Sites 34 and 35/TPA Sites 13a and 13b  
St. Paul Island, Alaska

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Request for Conditional Closure

DEPT. OF ENVIRONMENTAL  
CONSERVATION

**Site:** Salt Lagoon Diesel Seep, also known as National Oceanic and Atmospheric Administration (NOAA) Sites 34 and 35/Two-Party Agreement (TPA) Sites 13a and 13b). NOAA designated the Salt Lagoon Diesel Seep as Site 34/TPA Site 13a (the uplands portion) and Site 35/TPA Site 13b (the channel portion). The site will be referred to herein as the Salt Lagoon Diesel Seep.

**Location:** St. Paul Island, Alaska is approximately 800 miles southwest of Anchorage in the Bering Sea (Figure 1). The Salt Lagoon Diesel Seep is situated within and adjacent to the eastern portion of the Salt Lagoon Channel north of the NOAA administrative complex at Tract 50 (Figure 2).

**Legal Property Description:** The Salt Lagoon Diesel Seep is located in Township 35 South, Range 132 West, Section 25, of the Seward Meridian, Alaska as shown on the plat of rectangular survey officially filed May 14, 1986 (Figure 2). Tanadgusix Corporation (TDX) owns the surface estate and The Aleut Corporation owns the subsurface estate.

**Type of Release:** Petroleum products had been used at a seal carcass by-products plant that once occupied the Salt Lagoon Diesel Seep site. An oil sheen emanated along the former by-products plant Salt Lagoon Channel shoreline for several years. This sheen constituted a violation of the federal Clean Water Act (U.S. Code 2002) and State of Alaska surface water quality standards (ADEC 2003).

**History and Background:**

The Salt Lagoon Diesel Seep is along the east bank of the Salt Lagoon Channel, which is tidally connected to the Salt Lagoon, St. Paul Harbor, and the Bering Sea. Presently, the site is undeveloped and no aboveground structures are present. The site was formerly the location of a seal by-products processing plant that dates to 1918. The plant rendered fur seal carcasses to oil, and animal feed or meal. In 1977, the Tanadgusix (TDX) corporation reached an agreement to take control of the plant, though the actual transfer of ownership did not take place at that time [US Army Corps of Engineers (USACE) 1990]. When government management of commercial fur seal harvests ended in the early 1980s, the by-products plant ceased operation, and the building was demolished in 1988 (NOAA undated).

During its period of operation, the by-products plant relied on 55-gallon drums to transfer diesel fuel to steel pipelines and aboveground and underground storage tanks for heating purposes. Historic releases of diesel fuel from the drums, tanks, and piping are suspected as the original source of contamination to the uplands portion of the site. Purportedly, a release of 10,000 gallons of diesel fuel occurred in 1957 as a result of a cracked valve with only 2,000 gallons recovered. In 1983, an asphalt substance was reported leaking from 197 drums stored on their sides within 100 feet of the Salt Lagoon Channel (IT 2002a).

While sheen may have been occurring as early as the early 1970s (NOAA undated), petroleum sheen was first reported emanating from the east bank of the Salt Lagoon Channel adjacent to the former by-products plant in early June 1989 (USACE 1990). This sheen constituted a violation

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of the federal Clean Water Act (U.S. Code 2002) and State of Alaska surface water quality standards (ADEC 2003c). On June 8, 1989, NOAA was issued a Notice of Violation/Request for Corrective Action by ADEC (ADEC 1989). NOAA responded to the *Notice of Violation/Request for Corrective Action* and implemented corrective action in 1994. ADEC issued NOAA a *No Further Action* determination for the Salt Lagoon Diesel Seep on November 2, 1995. Subsequently, ADEC reopened the Salt Lagoon Diesel Seep Site (ADEC 1999) amid concerns expressed by the St. Paul community over the continuation of sheening and its potential threat to human health and welfare.

#### **Summary of Previous Site Investigations and Removal Actions:**

NOAA Preliminary Investigation – 1989: In response to the June 1989 *Notice of Violation/Request for Corrective Action*, NOAA engineer X. A. Chavez, P.E. visited the site on June 20, 1989, and subsequently issued a report (NOAA undated). NOAA observed that the City of St. Paul had already dug an intercept trench parallel to the shore along the Salt Lagoon Channel that smelled of diesel and contained sheen on top of the groundwater. Additional digging by the City in the area of the former by-products plant in search of a tank failed to find one. Still believing there was a leaking UST, NOAA directed the City to dig 5 more test pits, each of which revealed sheen on the groundwater and other evidence of petroleum contamination. NOAA concluded that the site conditions (likely meaning the shallow groundwater at 3 feet below ground surface (bgs) precluded the installation of USTs, and suggested that the petroleum contamination was instead the result of surface spills and leaks from the fueling operations of the former by-products plant. NOAA recommended further soil sampling and analysis to determine the extent of contamination, and to evaluate cleanup alternatives.

USACE Site Investigation – 1989: The USACE performed a preliminary assessment of petroleum contamination on NOAA's behalf in response to the aforementioned *Notice of Violation* (USACE 1990). USACE used equipment and labor from the City of St. Paul and dug 18 more test pits in and around the site of the former by-products plant. From these they concluded that soil was contaminated from the surface down to groundwater. They recommended placing sorbant boom along a 150-foot length of the Salt Lagoon Channel, and lengthening the intercept trench dug by the City, along with the installation of a perforated drainage line in the trench. They also recommended excavation of the contaminated soils down to groundwater, suggesting the soil could be used as landfill cover material.

Oil Spill Consultants Removal Action – 1994: Oil Spill Consultants (OSC) performed a PCS removal from the uplands portion of the Site in 1994 (OSC 1995). They removed approximately 9,000 yd<sup>3</sup> of PCS from the vadose zone and upper saturated zone (Figure 3). OSC stockpiled PCS at the Blubber Dump Site where it was treated using NOAA's enhanced thermal conduction system during 2000, 2001, and 2002. Excavation did not extend significantly deeper than the top of the water table. The shoreline along the Salt Lagoon Channel was not removed during the 1994 work to allow for a 5 to 15 foot wide soil barrier to prevent tidal channel water intrusion to the upland excavations. OSC encountered floating oil (diesel fuel and suspected animal fat) atop the groundwater that seeped into the excavations. OSC used a skimming system to remove the floating oil, and an oil-water separation process to collect approximately 150 gallons of oil. The

site was backfilled with clean soil and large chunks of concrete from earlier demolition of the by-products plant.

TTEMI Preliminary Site Investigation – 1999: Tetra Tech Environmental Management, Inc. (TTEMI) conducted a preliminary site investigation in 1999 (TTEMI 2000) following ADEC's demand to reopen the site. Results of this investigation documented that significant diesel-range organics (DRO) contamination existed in soil to depths of at least 5 feet bgs, if not more (Figure 3). TTEMI did not determine the overall vertical and horizontal extent of DRO contamination in soil. The nature and extent of contamination in groundwater was also not determined for the site.

CESI Historical Review – 1999: In 1999, Columbia Environmental Sciences, Inc. (CESI) conducted a historical review of the operational history of the by-products plant and potential sources at the adjacent National Marine Fisheries Service compound at Tract 50, as well as, the Salt Lagoon Diesel Seep. The Historical Review is discussed in a later CESI site characterization report (CESI 2001). CESI indicated that features of interest included fuel transfer piping, USTs, above ground storage tanks (ASTs), and a saltwater well that may have been installed for a facility that was never completed.

CESI Site Characterization – 2000: In 2000, CESI conducted a site investigation of the Salt Lagoon Diesel Seep. NOAA found much of the data generated from PetroFlag<sup>®</sup> analysis of suspect quality and potentially unreliable. The draft report was not submitted to ADEC (CESI 2001). CESI also installed five groundwater monitoring wells at the Diesel Seep Site (Figure 4). In well MWDS-2\* they found DRO contamination at 9,000 micrograms per liter ( $\mu\text{g/L}$ ). In the other four wells, DRO varied from 82 to 400  $\mu\text{g/L}$ . The only other analyte detected was GRO in MWDS-2\* at 190  $\mu\text{g/L}$ .

IT Site Characterization– 2001: In 2001, IT Alaska Corporation (IT) performed a comprehensive site characterization on behalf of NOAA (IT 2002a). IT collected 231 soil samples from 57 sampling locations, and 65 sediment samples from 14 locations using a direct-push exploration rig (Figure 3). IT collected samples at each location in 2-foot depth intervals and sent samples for analysis to an off site laboratory for DRO, gasoline-range organics (GRO), residual-range organics (RRO), benzene, toluene, ethylbenzene, total xylenes (BTEX), and semi-volatile organic compounds (SVOCs), including select polynuclear aromatic hydrocarbons (PAHs). Of the 65 sediment samples taken from in the Salt Lagoon Channel only six detected DRO; concentrations varied from 19 to 470 milligrams per kilogram ( $\text{mg/kg}$ ). In addition, IT collected three surface water and five groundwater samples. The surface water samples did not reveal detectable levels of DRO, GRO, BTEX, or SVOCs. Only monitoring well MWDS-2\* had an exceedance above the ADEC Table C cleanup levels with DRO at 2,500  $\mu\text{g/L}$ . No other analytes tested exceeded Table C levels.

NOAA Sediment Characterization– 2002: In 2002, NOAA collected sediment samples from within the Salt Lagoon Channel to supplement the characterization work performed previously by IT (Figure 3). Sediment sampling results indicated that concentrations of DRO varied from <13  $\text{mg/kg}$  to 80  $\text{mg/kg}$  (NOAA 2002).

TTEMI Groundwater Monitoring – 2004/2005 In April and July 2004, Tetra Tech collected groundwater samples from the five Salt Lagoon Diesel Seep Site monitoring wells. Analytical data for groundwater samples indicated the presence of DRO at a maximum concentration of 2,900 µg/L in monitoring well MWDS-2\*, exceeding the ADEC Table C cleanup level; no other groundwater samples contained analytes at concentrations above the cleanup levels (Tetra Tech 2005).

**Summary of Applied Cleanup Levels:**

The presence of a petroleum sheen observed emanating from the east bank of the Salt Lagoon Channel constituted a violation of the federal Clean Water Act (U.S. Code 2002), as well as, State of Alaska surface water quality standards (ADEC 2003). As a result, the primary objective of the corrective action was to eliminate the petroleum sheen and mitigate risk to potential receptors.

NOAA employed ADEC Method Two cleanup criteria, discussed at 18 AAC 75.341(c) (ADEC 2000). ADEC uses 15 feet below ground surface (bgs) to define subsurface soil to which residents will have a reasonable potential to be exposed through the inhalation or ingestion pathways (ADEC 2000; 18 Alaska Administrative Code 75.340 (j)(2)). However, excavating to this depth is difficult because the groundwater at the Salt Lagoon Diesel Seep is very shallow, ranging from 2 to 5 feet below ground surface. Excavation into the groundwater is generally not required, in part because free petroleum product contamination usually does not penetrate significantly deeper than the surface of the water table, floating on the surface instead, and because building foundations do not normally extend below the water table. Further, excavation into the groundwater is difficult because groundwater entering the excavation causes the side slopes to slough into the site making further excavation difficult. Also, excavations below the water table can become filled with contaminated groundwater and the water that leaches from the excavated soil is difficult to manage. However, NOAA determined the water table is under tidal influence, thereby contributing to high levels of DRO contamination at depths several feet below and above the mean water table elevation. Consequently, the removal of 9,000 yd<sup>3</sup> of PCS from above the water table in 1994 was insufficient to abate contaminant leachate (OSC 1995). Sufficient diesel remained at the site to continue to cause petroleum sheen in the Salt Lagoon Channel. Therefore, NOAA decided to excavate below the water table at the Salt Lagoon Diesel Seep in order to eliminate as much of the source of the diesel contamination as practical.

**Summary of 2004 Cleanup Actions:**

TTEMI Corrective Action – 2004: In 2004, NOAA returned to the Salt Lagoon Diesel Seep to excavate additional PCS. (NOAA 2005). The area excavated covered much of the same area excavated by OSC in 1994, except that the 2004 excavation extended up to 5 feet below the water table. Also, more excavation extended to the north, and removal included the shoreline bank and a zone of sediments within the Salt Lagoon Channel (Figure 5). NOAA received authorization from USACE to conduct work under Nationwide Permits 13 (Bank Stabilization) and 38 (Cleanup of Hazardous and Toxic Waste).

TTEMI removed approximately 9,234 cubic yards of PCS and sediments from the Salt Lagoon Diesel Seep Areas 1, 2, 3A, 3B, 3C, and 3D, (Figure 6) according to the corrective action report, (NOAA 2005). They removed PCS down to elevations that varied from -1 ft mean lower low

water (MLLW) to -4 ft MLLW. They removed sediments extending approximately 15 feet out into the channel along the east shoreline of the Salt Lagoon Channel (Figure 6). Excavation efforts continued in these areas until either no petroleum sheen was observed, or until further excavation was impracticable because of groundwater and sloughing of excavation sidewalls. NOAA attempted to investigate potential contamination in Area 4 by excavating two test pits. Subsurface debris prevented NOAA from completing this investigation and no soil was removed from Area 4. Past site characterization data (CESI 2001, IT 2002) indicate Area 4 soil is contaminated at depths ranging approximately +4.5 ft MLLW to +0.0 ft MLLW (*i.e.*, approximately 3.5 ft bgs to 8.0 ft bgs), which includes both the vadose and saturated zones. Concentrations of DRO were found during the past site characterizations of Area 4 as high as 17,000 mg/kg.

TTEMI restored the Salt Lagoon Channel bank using a combination of rock, sand, and filter fabric (Figure 7). The restored bank was designed to resist erosion of the backfill material that could not be consolidated or held by vegetation as with the original shoreline. The top of the shoreline was restored using topsoil, which was seeded, fertilized, and wrapped with erosion control matting.

Because excavation activities involved the removal of sediments with elevated levels of DRO from the Salt Lagoon Channel and PCS from the saturated zone, TTEMI constructed a dewatering cell for the temporary stockpiling and drainage of water (Figures 5 And 6). When dewatering was complete, PCS was transported to the designated disposal site. Initially, dewatered PCS was transported to the lined stockpile located at Tract 42. Upon receiving ADEC approval for a draft landspreading work plan (NOAA 2004b), NOAA directed excavated PCS to the National Weather Service landspreading area. The PCS was leveled to a maximum thickness of 18 inches  $\pm$ 0.5 ft and later tilled by a tractor and rotary disc attachment to enhance volatilization of the DRO.

Two underground granular activated carbon (GAC) barriers were installed at the Diesel Seep Site to provide treatment of potentially contaminated groundwater flowing toward the Salt Lagoon Channel (Figure 6). The GAC trench was designed to allow the groundwater to flow through sandbags filled with GAC, which are expected to absorb petroleum migrating along with the groundwater.

Flow of groundwater is from east to west across the site. The trenches were oriented from north to south across the site. The sandbags containing GAC were stacked between elevations of -1 feet MLLW and +5 ft MLLW (Figure 7). The surface of the groundwater is at approximately +3 feet MLLW.

**Recommended Action:**

In accordance with paragraph 59 of the TPA (NOAA 1996), NOAA requests ADEC to grant a conditional closure confirming that NOAA completed all appropriate corrective action, to the maximum extent practicable, at the Salt Lagoon Diesel Seep, NOAA Sites 34 and 35/TPA Sites 13a and 13b, St. Paul Island, Alaska. The conditional closure will relieve NOAA from further remedial action. NOAA understands ADEC will/may require additional containment, investigation, or cleanup if subsequent information indicates that the level of contamination that remains does not protect human health, safety, or welfare, or the environment.

**\*FOOTNOTE:**

Three consulting firms investigated groundwater at the Diesel Seep Site since the installation of five monitoring wells in 2000. The consultants included Columbia Environmental Services, Inc. (CESI 2001) IT Alaska, Inc. (IT 2002), and Tetra Tech (Tetra Tech 2005). IT's and Tetra Tech's investigation reports conflict with the CESI report regarding well identification of monitoring wells 1 and 2. Also, IT's analytical results for monitoring wells 2 and 3 are inconsistent with results from the CESI and Tetra Tech investigations for these wells. The following table and discussion summarizes the history of groundwater monitoring at the Diesel Seep Site, and proposes explanations for noted report discrepancies.

SAMPLING EVENT		CURRENT WELL ID				
		Well 1	Well 2	Well 3	Well 4	Well 5
CESI 2000	Reported Well ID	MWDS-2	MWDS-1	MWDS-3	MWDS-4	MWDS-5
	GRO (µg/L)	ND	190	ND	ND	ND
	DRO (µg/L)	83	<b>9000</b>	400	130	150
IT 2001	Reported Well ID	MWDS-1	MWDS-2	MWDS-3	MWDS-4	MWDS-5
	GRO (µg/L)	ND	ND	ND	ND	ND
	DRO (µg/L)	ND	320	<b>2500</b>	130	ND
Tetra Tech April 2004	Reported Well ID	MWDS-1	MWDS-2	MWDS-3	MWDS-4	MWDS-5
	GRO (µg/L)	ND	85	ND	ND	ND
	DRO (µg/L)	ND	<b>2900</b>	370	110	75
Tetra Tech July 2004	Reported Well ID	MWDS-1	MWDS-2	MWDS-3	MWDS-4	MWDS-5
	GRO (µg/L)	ND	76	ND	ND	ND
	DRO (µg/L)	ND	<b>2700</b>	240	100	ND

**Bold Result**– Above ADEC Table C criteria.

ND – Not detected above Practical Quantitation Limit.

CESI installed five monitoring wells at the Diesel Seep Site in 2000 (CESI 2001). As shown in the table above, Figure No. 5 in the CESI 2001 report identified the well now known as "Well 1" as "MWDS-2" and the well now known as "Well 2" as "MWDS-1". As indicated in the above table, Figure No. 3 in the IT 2002 report reversed the identification of these two wells. All reports generated subsequent to the IT 2002 report used IT's identification, which has become NOAA's accepted designation for these 5 wells.

A possible error also exists with IT's assignment of the IT 2001 analytical results relative to "Well 2" and "Well 3". The IT MWDS-2 result of 320 µg/L DRO differs significantly from the CESI and Tetra Tech DRO results for that well. Similarly, the IT MWDS-3 DRO result of 2,500 µg/L differs significantly from CESI's and Tetra Tech's DRO results for that well. As indicated by the table above, if IT's DRO results for MWDS-2 and MWDS-3 results were reversed, then they would closely match the corresponding levels found at those wells by CESI and Tetra Tech. IT's report does not provide clues that the wells were misidentified during sampling, or sample labels/results were inadvertently switched in the field or the lab. However, DRO results shown in the above table suggest that IT inadvertently misidentified the two wells.

**References:**

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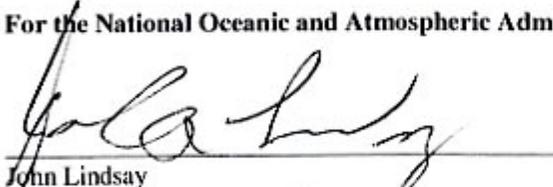
TTEMI. 2005. *Draft Field Investigation Report St. Paul Island, Alaska*. May 2.

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St. Paul Island, Alaska

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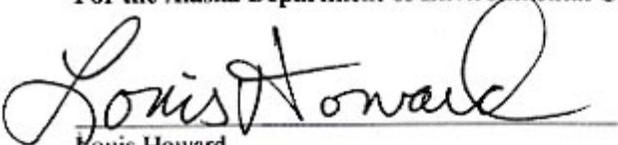
For the National Oceanic and Atmospheric Administration

  
John Lindsay  
NOAA, Pribilof Project Office

January 30, 2006  
Date

**Approvals:** In accordance with Paragraph 59 of the Two Party Agreement, this is to confirm that all corrective action has been completed to the maximum extent practicable at the Salt Lagoon Diesel Seep, NOAA Sites 34 and 35/TPA Sites 13a and 13b, St. Paul Island, Alaska, in accordance with the Agreement and that no further remedial action is required as a part of this conditional closure granted by ADEC.

For the Alaska Department of Environmental Conservation

  
Louis Howard  
Alaska Department of Environmental Conservation  
Remedial Project Manager

Feb 13, 2006  
Date

## Figures



Bering Sea

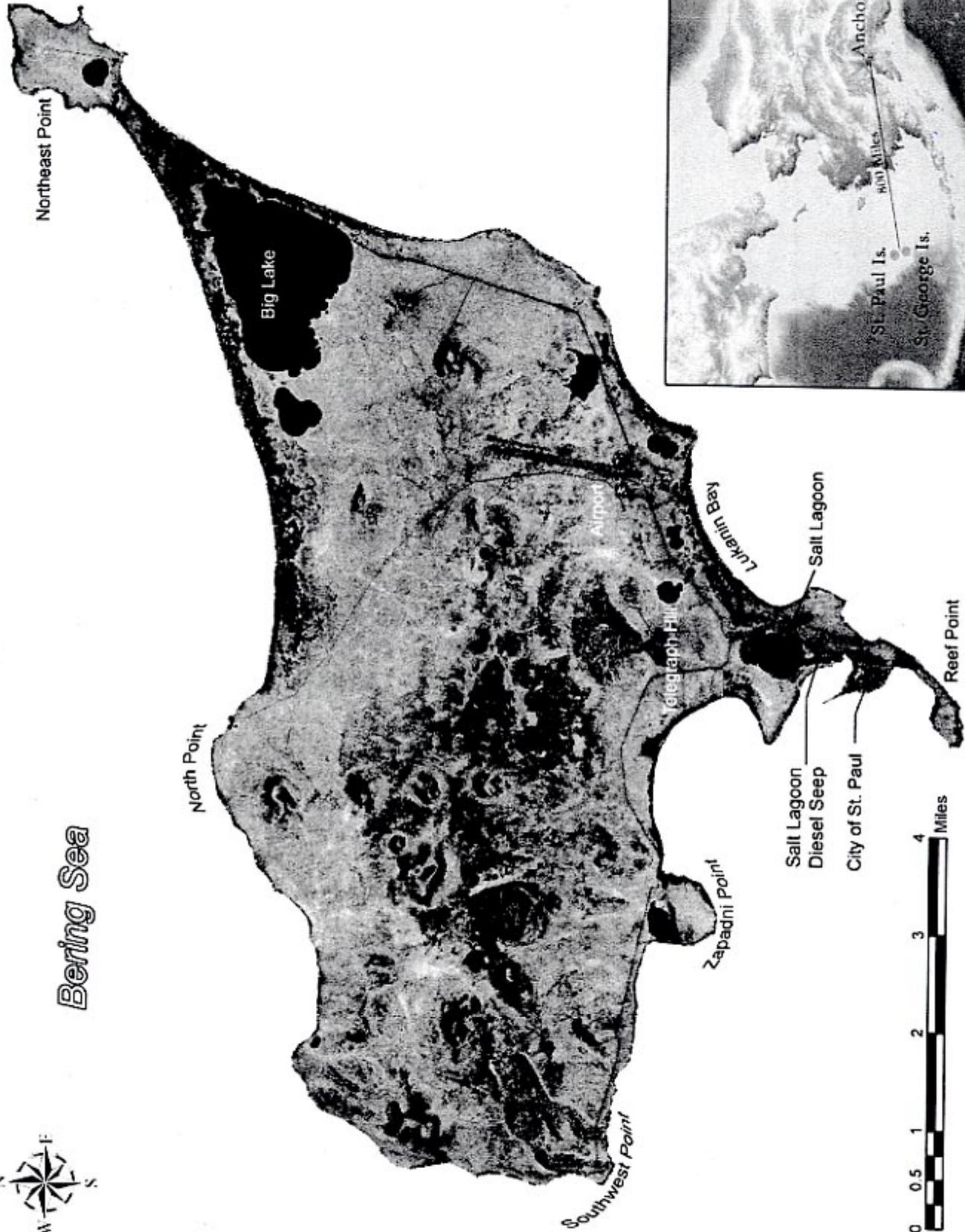
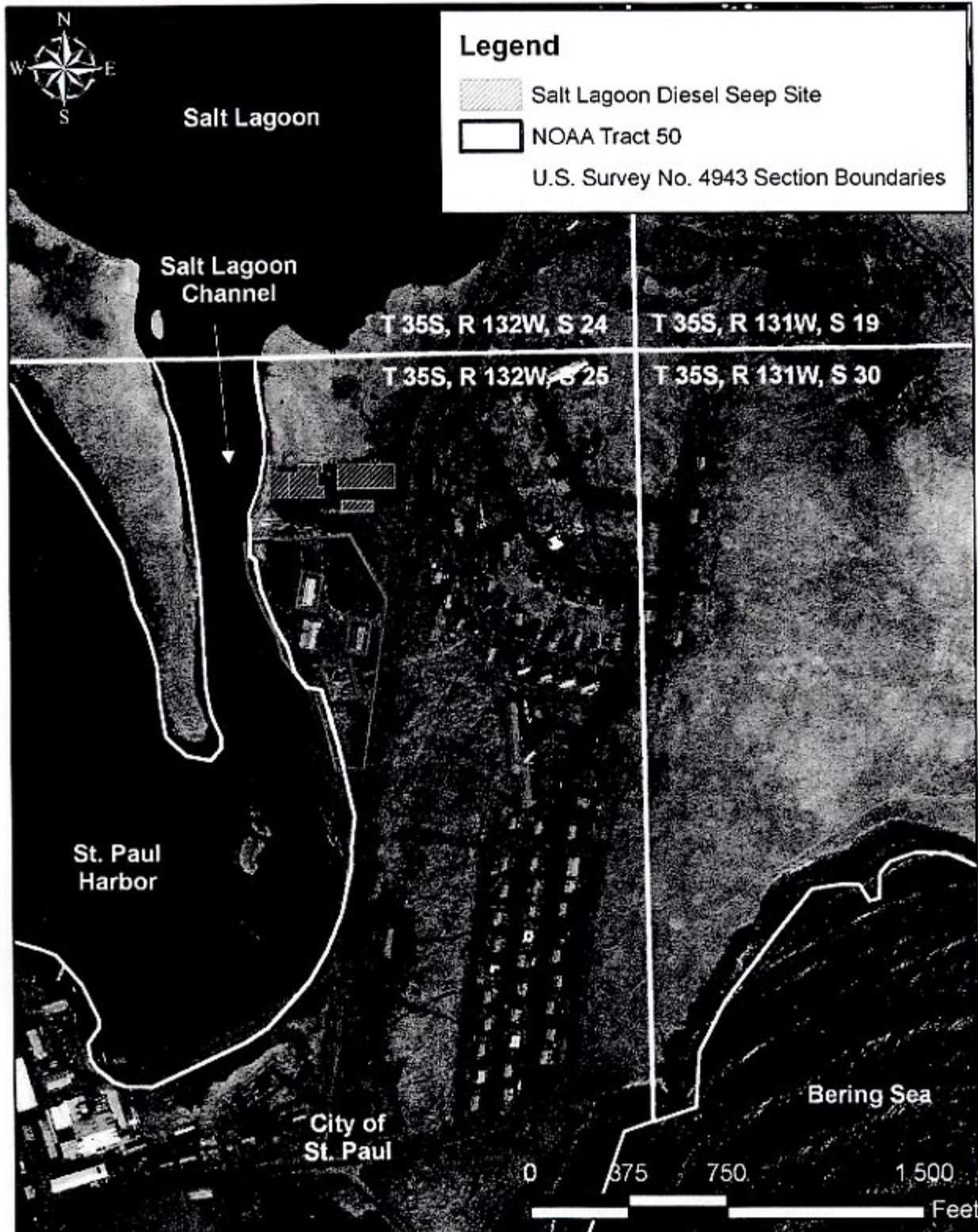


Figure 1

St. Paul Island Vicinity Map  
Salt Lagoon Diesel Seep Site Location  
NOAA Sites 34 and 35/TPA Sites 13a and 13b  
St. Paul Island, Alaska

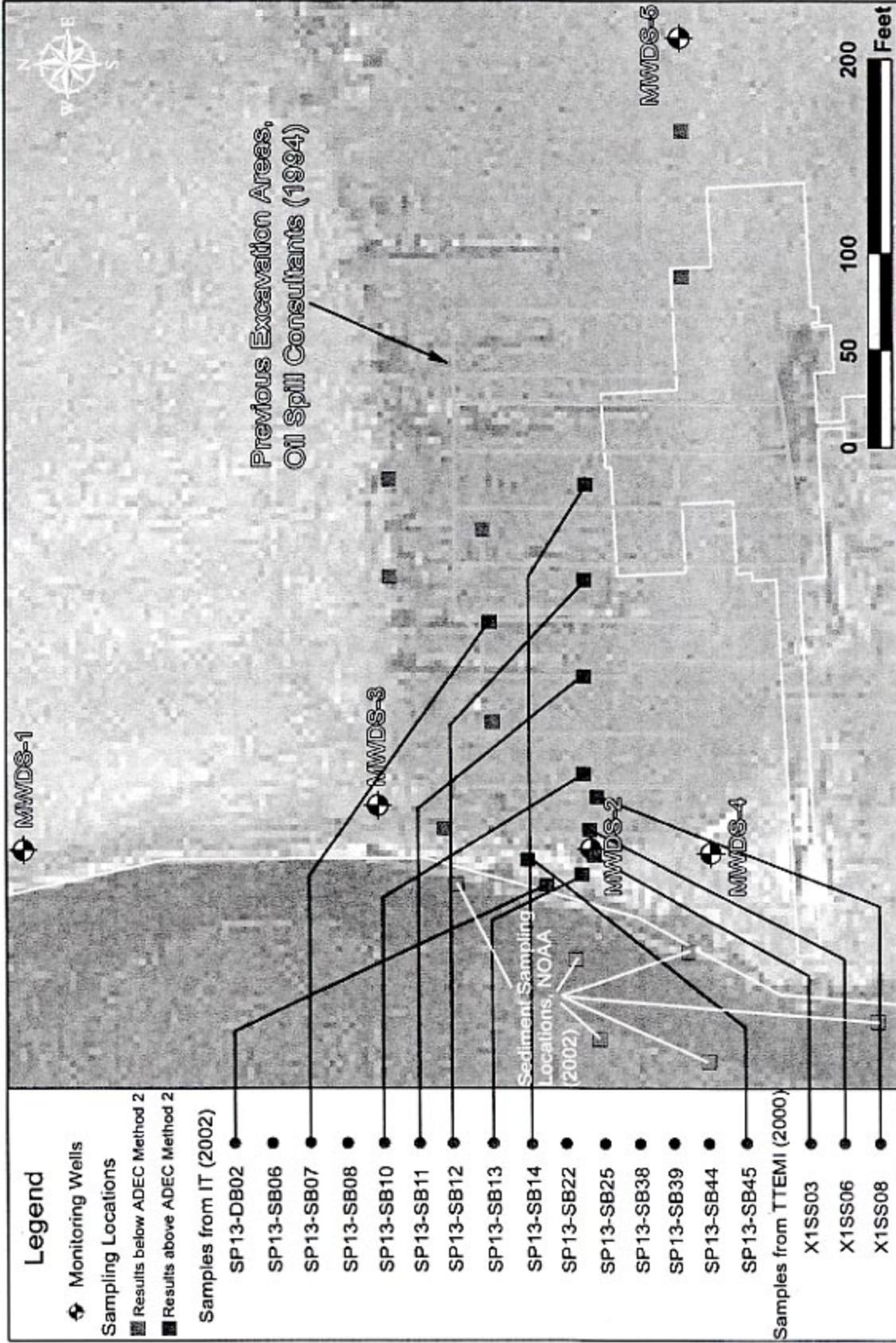
Source: Ikonos Satellite Imagery, 2001





<p>Figure 2</p>	<p>Legal and Property Description Salt Lagoon Diesel Seep NOAA Sites 34 and 35/TPA Sites 13a and 13b St. Paul Island, Alaska</p>	<p>Sources: Public Land Survey Sections (BLM 1983), Diesel Seep Site (NOAA 2004), Satellite Imagery (Ikonos 2001).</p>
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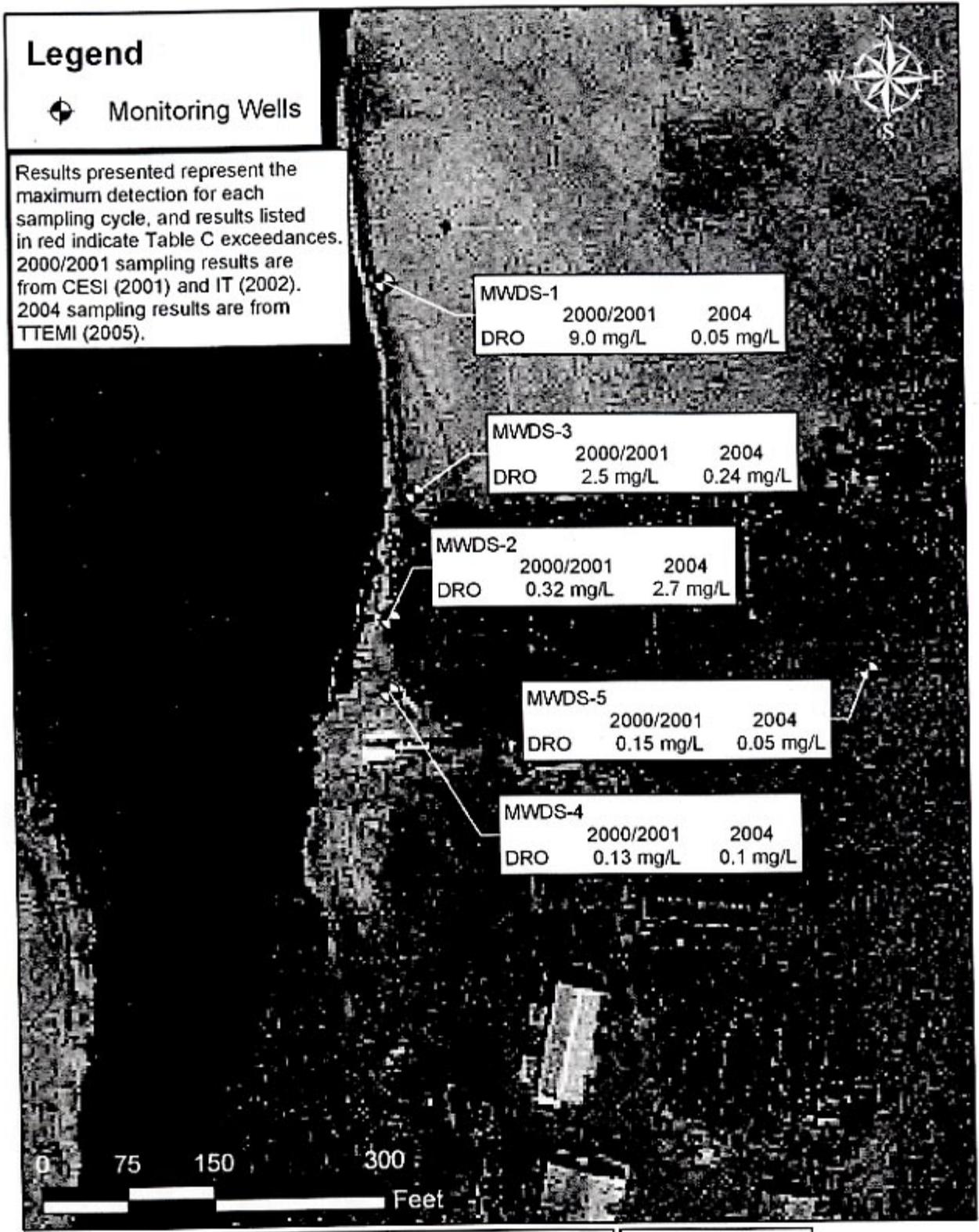




Sources: Soil Sampling Locations (NOAA Pribilof Project Database 2005), OSC Excavation Areas (NOAA GIS 2000), Satellite Imagery (Ikonos 2001).

**Historical Soil Sampling Locations**  
 Salt Lagoon Diesel Seep  
 NOAA Sites 34 and 35/TPA Sites 13a and 13b  
 St. Paul Island, Alaska

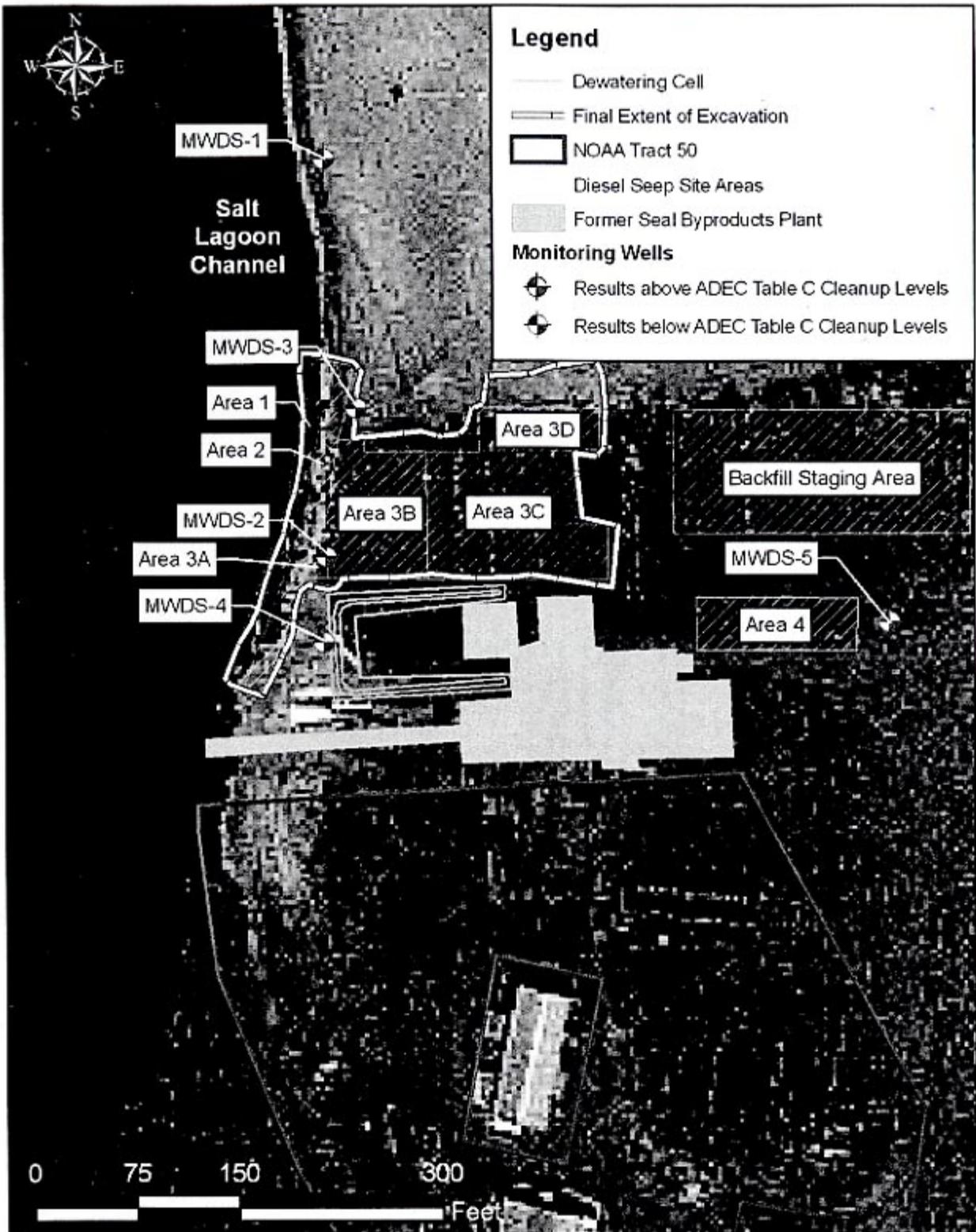
**Figure**  
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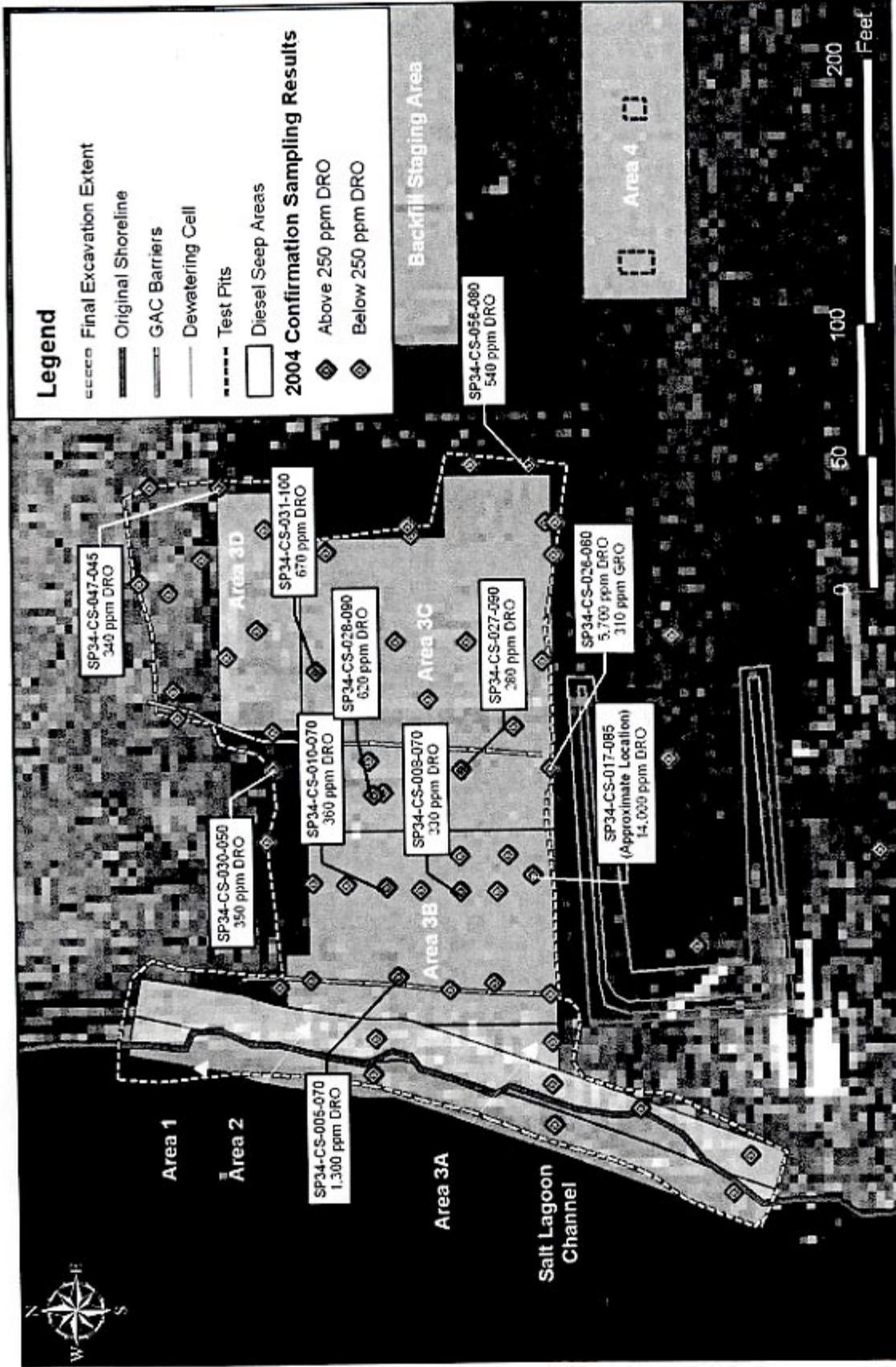


**Figure 4** Groundwater Sampling Locations and Results Salt Lagoon Diesel Seep NOAA Sites 34 and 35/TPA Sites 13a and 13b St. Paul Island, Alaska

Sources: Monitoring Well Locations and Sampling Results (NOAA 2005), Satellite Imagery (Ikonos 2001).



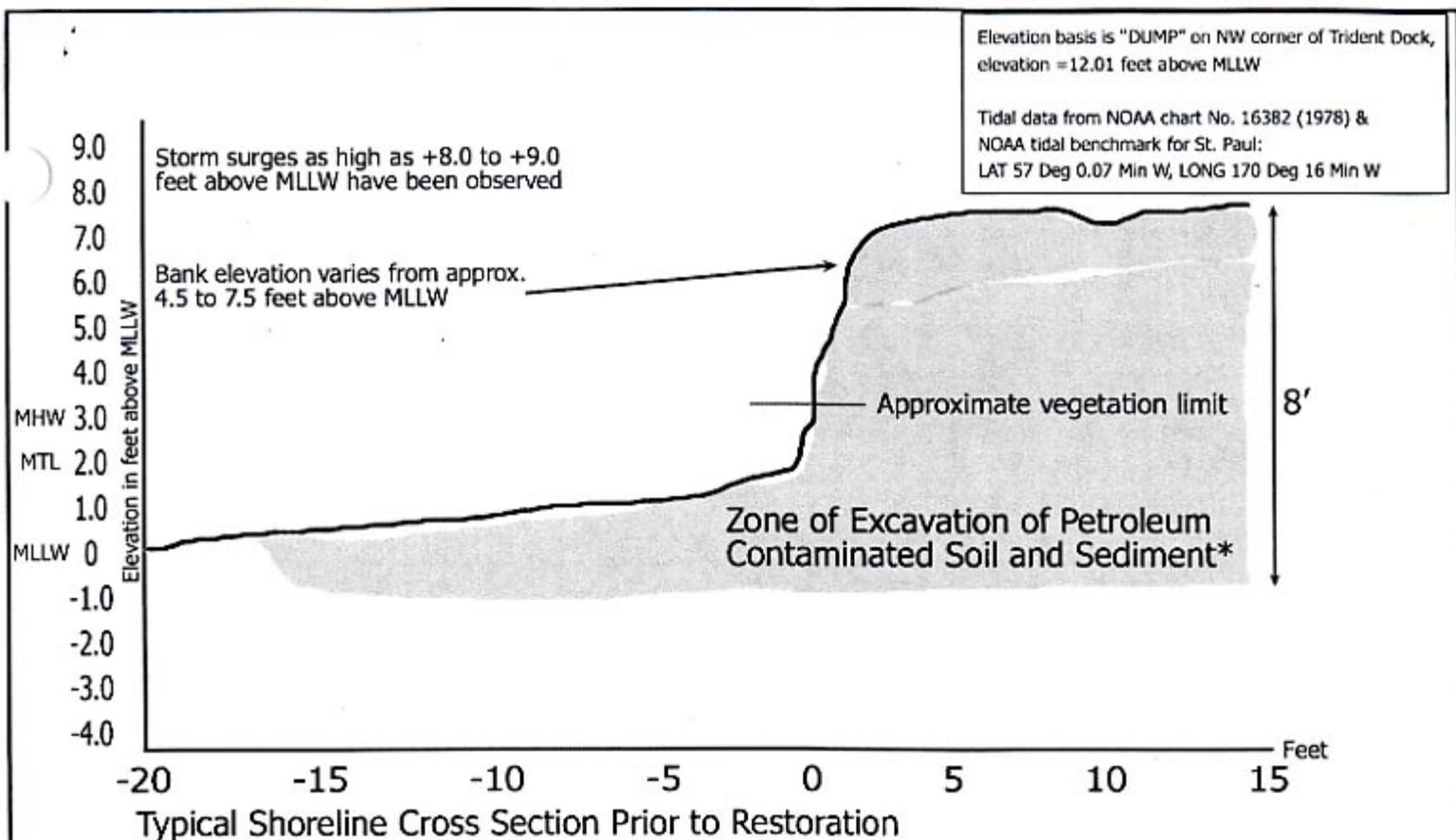




**Figure 6**

**Sampling Location Map**  
Salt Lagoon Diesel Seep  
NOAA Sites 34 & 35/TPA Sites 13a and 13b  
St. Paul Island, Alaska

Sources: NOAA GPS (2004),  
Ikonos Satellite Imagery (2001).



MHW = Mean High Water      MTL = Mean Tide Level      MLLW = Mean Lower Low Water

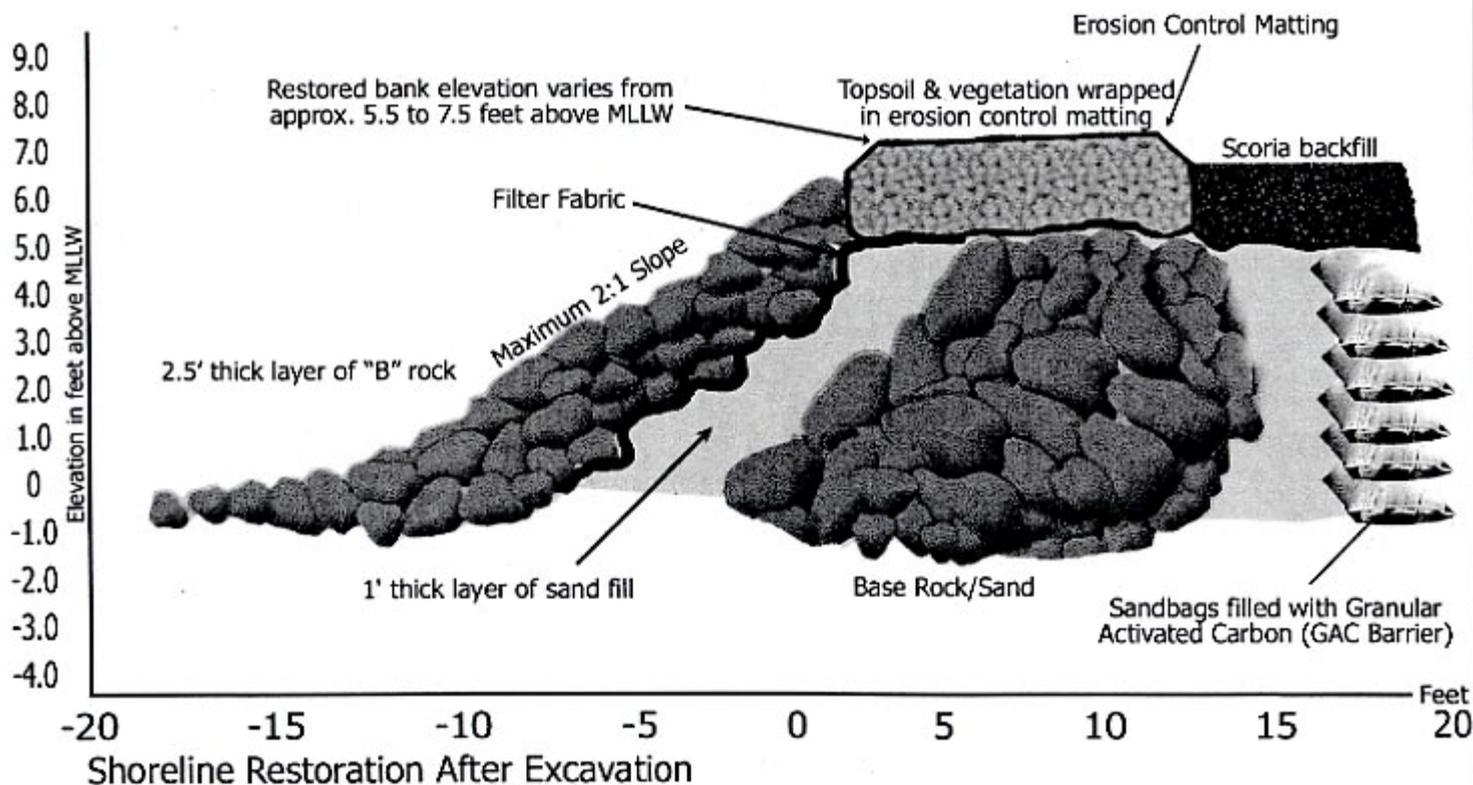


Figure  
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Cross-Section for Areas 1 and 2  
Salt Lagoon Diesel Seep  
NOAA Sites 34 and 35/TPA Sites 13a and 13b  
St. Paul Island, Alaska

Source: NOAA  
Pribilof Project  
Office, 2005.

