Exxon Valdez Oil Spill
Restoration Project Final Report

Restoration Project Data Report
Volume IV: Ground Surveys LA015E thru TB004A

1993 Shoreline Oiling Assessment of the Exxon Valdez Oil Spill
Restoration Project 93038

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and

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Joni Matthews, Principal Surveyor, Alaska Department of Environmental Conservation
Marianne Profita, Principal Surveyor, Alaska Department of Environmental Conservation
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Alaska Department of Environmental Conservation
Office of Restoration and Damage Assessment
410 Willoughby Avenue, Suite 105
Juneau, Alaska 99801-1795

September 1998
1993 SHORELINE ASSESSMENT DATA REPORT: VOLUME 4
(Ground Surveys LA015E through TB004A)

Prepared by the
Alaska Department of Environmental Conservation (ADEC)
Exxon Valdez Oil Spill Restoration
410 Willoughby Avenue
Juneau, Alaska 99801

for the
Exxon Valdez Oil Spill Trustee Council
645 "G" Street
Anchorage, Alaska 99501

Project #930380

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Compilation and Analysis by James C. Gibeaut, Ph.D., Consulting Geologist

January, 1994
SEGMENT: LA 015 E

LOCATION: Chenega Area Group, northeastern shore of Latouche Island

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Irregular headland, wave-cut platform, and gravel beach shoreline. Rounded pebble and large cobble beach in the northern part of the site is protected by prominent seaward outcrops. Subsurface matrix sediment is sandy granules. Large angular boulders occur near outcrops and in the high intertidal of the southern part of the site.

Environmental Sensitivity Index (ESI)
Type 1; rocky coast.
Type 2; exposed wave-cut platform.
Type 7; gravel beach.

Fetches and Directions (kilometers)
NE = 110

Energy Level
High with some moderate locations behind seaward outcrops.

GENERAL BIOLOGICAL SETTING
Oiled mussel bed.
Eagle nest.
Fish harvest area.

OILING SUMMARY
Several large and concentrated areas of AP and SOR persist at this site. All the sites are in areas where large boulders or outcrops provide protection from waves. The worst is location 'G', which is a 29 by 11 m area amongst large boulders. MS was oozing out from beneath the boulders during the survey, and there has been no discernible improvement since 1991.

Subsurface location ZB, which includes pits #6 through 10 and 12 through 19, has a large amount of MOR, HOR, and OP. ZB is located in the pebble and large cobble beach behind a prominent seaward outcrop. Even though this site still retains considerable oil, it has improved greatly since 1991, when it was mechanically tilled, and since 1992, when manual removal occurred. The amount and level of oiled sediment reduced by about 75% from 1991 to 1993.

Locations ZD and ZE had no or little subsurface oil in 1993, but had large amounts in 1991. ZD is down slope of surface area 'G', and ZE extends to the south of location 'H'. Workers manually removed oiled-sediment in 1991 at both sites, but the large amounts indicate that natural removal was also important.

Overall, there has been a large reduction in subsurface oil at this site since 1991.
Danger Island

Prince William Sound
Southwest area #1
Beach Sub-Segment Map
Map Projection: UTM, Zone 6

Date: 1/15/92

File Name: SWISSCS

- Beach Segments
- Subdivision Features
FILIALION

NAME: U. DEC - Bob Tindall

SIGNATURE: [Signature]

1993 ADEC RESTORATION PROJECT #930380
SHORELINE SURVEY COMMENT SHEET

SEGMENT 435  SUBDIVISION E  DATE 1-1-93

FILIALION

NAME: DNR Div. of Land

SIGNATURE: Kathleen M. Farley

The presence of oil in the mussel beds disrupts subsistence use and gathering within the intertidal area for an indefinite time. Eagle nests and commercial gathering are not directly affected by the site's current condition.

FFILIALION

NAME: AE

SIGNATURE:

NAME: AE

SIGNATURE:
# 1993 ADEC Restoration Project # 930380
## Shoreline Oiling Summary

**Team Members:**
- J. Mynard
- C. Geczy
- L. K. Nace
- E. Pifer (ADEC)
- C. Carley (ADEC)
- T. K. Hobbs (ADEC)
- C. Eglet (EPA)
- C. Travis

**Time:** 9:30 to 10:30
**Tide Level:** 3.0 ft. to -1.0 ft.
**Energy Level:**
- H: High
- M: Medium
- L: Low

**Surveyed From:**
- Foot
- Boat
- Helo

**Weather:**
- Sun
- Clouds
- Fog
- Rain
- Snow

**Total Length Shoreline Surveyed:**

**Estimated Oil Category Length:**
- H: High
- M: Medium
- L: Low
- V: Very
- N: None

### Surface Oil Character

<table>
<thead>
<tr>
<th>Loc</th>
<th>AP</th>
<th>MS</th>
<th>BT</th>
<th>SB</th>
<th>CV</th>
<th>CT</th>
<th>ST</th>
<th>FL</th>
<th>DB</th>
<th>NO</th>
<th>Type</th>
<th>Slope</th>
<th>Width</th>
<th>Length</th>
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<td>B/C</td>
<td>M</td>
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<td>S</td>
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<tr>
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<td>C</td>
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<td>B/C</td>
<td>M</td>
<td>10</td>
<td>30</td>
<td>S</td>
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<tr>
<td>C</td>
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### Distribution:
- C: 01-100%
- B: 61-80%
- M: 41-60%
- L: 21-40%
- T: <1%

### Subsurface Oil Character

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<th>Depth (cm)</th>
<th>Surface Oil Character</th>
<th>Oiled Zone</th>
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<th>HEO Level</th>
<th>Sheen Color</th>
<th>Pit Zone</th>
<th>Subsurface Sediments</th>
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<td>12-14</td>
<td>R</td>
<td></td>
<td>B/C PG</td>
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</tr>
</tbody>
</table>

**Surface-Subsurface Sediments:**
- B/C PG: Black/Coyote Petroleum Gas
- M: Muskeg
- S: Snow

**Notes:**
- Oil coming from B/C PG
- Muskeg on land
- Muskeg on shelf
- Muskeg on shelf

**Sheen Color:**
- B: Brown
- R: Rainbow
- S: Silver
- N: None
### 1993 Surface Oil Summary

#### Segment LA118 Subdivision E

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SCR</th>
<th>CV</th>
<th>CT</th>
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<td>A</td>
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<td>0.4</td>
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<td>B</td>
<td></td>
<td>21.6</td>
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<td>C</td>
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<tr>
<td>D</td>
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<tr>
<td>E</td>
<td>45.</td>
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<tr>
<td>F</td>
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<td>0.</td>
<td>28.</td>
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<td>G</td>
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<td>TOTALS</td>
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</table>

AP = asphalt; MS = moss; SCR = surface oil residue; CV = cover; CT = coat

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous = 95+
- broken = 70+
- patchy = 30+
- sporadic = 6+
- trace = 1.5+
### SUBSURFACE OIL SUMMARY FOR SEGMENT LA015E

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<tr>
<td><strong>TOTAL</strong></td>
<td>1995 OILED SED. VOL.</td>
<td>60.9</td>
<td>86.9</td>
<td>80.9</td>
<td>42.0</td>
<td>41.0</td>
<td>171.5</td>
<td>290.0</td>
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</table>

**Loc.** = location name of specific oiling area (subsite).

**1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.

**Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat.

**Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mid inter tidal, L= low inter tidal.

**En.** = wave-energy level, H= high, M= moderate, L= low, VL= very low.

**TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, RB= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO = no treatment.

**OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type, OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR= medium oil residue, heavily coated sediments, pore spaces are not filled with oil - pore spaces may be filled with water, LOR= light oil residue, sediments lightly coated with oil - oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR= trace, discontinuous film; spots of oil on sediments; an odor or tackiness with no visible evidence of oil, ?= area of subsite not visited or adequately surveyed.

**WT.'d OIL VOL.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2

**% CHANGE WT.'d OIL VOL.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100. positive values indicate increases in the amount of oil, negative values indicate decreases. "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 07:30
SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: OVERVIEW PAN PHOTO FROM SOUTH TO NORTH OF THE NORTH END OF THE SEGMENT. GOES WITH 93RTK005 #01-04. THE MUSSEL BED IS IN 01-03.
TAKEN BY: RUSSELL KUNIBE  INITIALS: ___________-
ROLL #: 93RTK005  FRAME #: 2  EVIDENCE ID#: ___________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 07:30
SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: OVERVIEW PAN PHOTO FROM SOUTH TO NORTH OF THE NORTH END OF THE SEGMENT. GOES WITH 93RTK005 #01-04. THE MUSSEL BED IS IN 01-03.
TAKEN BY: RUSSELL KUNIBE  INITIALS: ___________
ROLL #: 93RTK005  FRAME #: 1  EVIDENCE ID#: ___________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 07:30
SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: OVERVIEW PAN PHOTO FROM SOUTH TO NORTH OF THE NORTH END OF THE SEGMENT. GOES WITH 93RTK005 #01-04. THE MUSSEL BED IS IN 01-03.
TAKEN BY: RUSSELL KUNIBE  INITIALS: ___________
ROLL #: 93RTK005  FRAME #: 4  EVIDENCE ID#: ___________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 07:30
SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: OVERVIEW PAN PHOTO FROM SOUTH TO NORTH OF THE NORTH END OF THE SEGMENT. GOES WITH 93RTK005 #01-04. THE MUSSEL BED IS IN 01-03.
TAKEN BY: RUSSELL KUNIBE  INITIALS: ___________
ROLL #: 93RTK005  FRAME #: 3  EVIDENCE ID#: ___________
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 07:30

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVR
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF TOM KELLEY, EXXON AND C. CROSBY WITH THE TAPE MEASURING THE SURFACE AP AREA. D. MUNSON HAS CLIP BOARD. NOTE THE GRASS LINE.

TAKEN BY: RUSSELL KUNIBE INITIALS: _K_T_
ROLL #: 93RTK005 FRAME #: 6 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 07:30

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVR
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF AP ON DEAD GRASS IN HITZ. THE PHOTO #07 IS AN OVERVIEW OF THIS AREA WHERE THE AP APPEARS.

TAKEN BY: RUSSELL KUNIBE INITIALS: _K_T_
ROLL #: 93RTK005 FRAME #: 5 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVR
REASON FOR TAKING PHOTO: CLOSE UP PHOTO OF AP IN MUSSLE BED. (SHOWN IN PHOTO 1-4)

TAKEN BY: RUSSELL KUNIBE INITIALS: _K_T_
ROLL #: 93RTK005 FRAME #: 8 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 07:45

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVR
REASON FOR TAKING PHOTO: CLOSE UP OF STAIN AND COAT WITH SPRUCE NEEDLES ON A BEDROCK SURFACE IN THE HITZ.

TAKEN BY: RUSSELL KUNIBE INITIALS: _K_T_
ROLL #: 93RTK005 FRAME #: 7 EVIDENCE ID#:
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00
SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP OF A PIT IN THE MUSSEL BED
HOR OILING WHICH IS BELOW THE SURFACE. PHOTO #12 HAS AN OVERVIEW OF THE PIT IN PHOTO #10 AND #11.
TAKEN BY: RUSSELL KUNIBE INITIALS: R+K
ROLL #: 93R1K005 FRAME #: 10 EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00
SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP OF A PIT IN THE MUSSEL BED
HOR OILING WHICH IS BELOW THE SURFACE BY APROX 14 CM.
TAKEN BY: RUSSELL KUNIBE INITIALS: R+K
ROLL #: 93R1K005 FRAME #: 11 EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00
SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF THE MUSSEL BED AND
OF THE PITS IN PHOT #10 AND #11. NOTICE THE HEAVY
CONCENTRATION OF MUSSELS IN THIS AREA.
TAKEN BY: RUSSELL KUNIBE INITIALS: R+K
ROLL #: 93R1K005 FRAME #: 12 EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00
SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP OF A PIT IN THE MUSSEL BED
HOR OILING WHICH IS BELOW THE SURFACE. PHOTO #12 HAS AN OVERVIEW OF THE PIT IN PHOTO #10 AND #11.
TAKEN BY: RUSSELL KUNIBE INITIALS: R+K
ROLL #: 93R1K005 FRAME #: 12 EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00
SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF THE MUSSEL BED
OF THE PITS IN PHOT #10 AND #11. NOTICE THE HEAVY
CONCENTRATION OF MUSSELS IN THIS AREA.
TAKEN BY: RUSSELL KUNIBE INITIALS: R+K
ROLL #: 93R1K005 FRAME #: 12 EVIDENCE ID#: 
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:30

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF THE BEACH FROM N. TO S. LOOKING BACK AT THE BEACH FROM THE LARGE ROCKS IN FRONT OF THE MUSSEL BED. GOES WITH 93RTK005 #14-#18
TAKEN BY: RUSSELL KUNIBE INITIALS: T
ROLL #: 93RTK005 FRAME #: 16 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 08:00

SEGMENT#: LA015 STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF THE BEACH FROM N. TO S. LOOKING BACK AT THE BEACH FROM THE LARGE ROCKS IN FRONT OF THE MUSSEL BED. GOES WITH 93RTK005 #14-#18
TAKEN BY: RUSSELL KUNIBE INITIALS: T
ROLL #: 93RTK005 FRAME #: 13 EVIDENCE ID#:___
OFFICIAL PHOTOGRAPH ADEC  EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 08:30

SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF THE BEACH FROM N. TO S. LOOKING BACK AT THE BEACH FROM THE LARGE ROCKS IN FRONT OF THE MUSSEL BED. GOES WITH 93RTK005 #14-#18

TAKEN BY: RUSSELL KUNIBE  INITIALS: __________
ROLL #: 93RTK005  FRAME #: 18  EVIDENCE ID#: __________

OFFICIAL PHOTOGRAPH ADEC  EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE  DATE: 08/04/93  TIME: 08:45

SEGMENT#: LA015  STATION#: -0-
LOCATION: NE SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP OF PIT #15 WITH OIL FILM FROM 8 TO 16 CM. BELOW THE SURFACE. NOTICE THE BROWN SHEEN ON THE WATER IN THE PIT.

TAKEN BY: RUSSELL KUNIBE  INITIALS: __________
ROLL #: 93RTK005  FRAME #: 20  EVIDENCE ID#: __________
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<td>KEYSWORDS: SHORELINE EVALUATION-SRVY</td>
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<td>REASON FOR TAKING PHOTO: OVERVIEW PHOTO OF AN OILED AREA IN THE SUPERTIDAL AREA OF THE BEACH. THE OILING HAS STARTED TO TURN TO AP.</td>
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<td>ROLL #: 93RTK005 FRAME #: 22 EVIDENCE ID#:</td>
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<td>KEYSWORDS: SHORELINE EVALUATION-SRVY</td>
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<tr>
<td>REASON FOR TAKING PHOTO: CLOSED UP OF PIT #17 WITH BROWN DROPLETS OF OIL ON THE WATER IN THE BOTTOM OF THE PIT.</td>
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<td>ROLL #: 93RTK005 FRAME #: 23 EVIDENCE ID#:</td>
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<td>SEGMENT#: LA015 STATION#: -0-</td>
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<td>LOCATION: NE SHORE OF LATOUCHE ISLAND</td>
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<td>KEYSWORDS: SHORELINE EVALUATION-SRVY</td>
</tr>
<tr>
<td>REASON FOR TAKING PHOTO: PHOTO TO THE NORTH ACROSS THE BOULDER COBBLE BEACH TO THE SOUTH OF THE OIL MUSSEL AREA AND THE N. OF THE NO OIL MUSSEL AREA.</td>
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<tr>
<td>TAKEN BY: RUSSELL KUNIBE INITIALS: RFK</td>
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<td>ROLL #: 93RTK005 FRAME #: 24 EVIDENCE ID#:</td>
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SEGMENT: LA 019 A

LOCATION: Chenega Area Group, Sleepy Bay, north shore of Latouche Island

OTHER STUDIES
Tesoro 1993 PES-51 test site.
ADEC transect station 43 (actually in LA 018 A)

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Boulder beach with complicated sediment and bedrock distribution. Sediments are subangular boulders and subrounded cobbles overlying pebbles and boulders and cobbles with a sandy, granular matrix. Low bedrock outcrops are important along the beach, and a large outcrop and large boulder area oriented normal to shore separates about 1/4 of the eastern end of the site from the rest of the beach. A storm berm is present.

Environmental Sensitivity Index (ESI)
Type 1; exposed rocky.
Type 7; gravel beach.

Fetches and Directions (kilometers)
N=14; NE=110

Energy Level
High with some moderate areas.

GENERAL BIOLOGICAL SETTING

OILING SUMMARY
The eastern 1/4 of the site, which is to the east of a prominent outcrop and large boulder area that separates this area form the rest of the beach, has a large and concentrated area of AP and MS amongst boulders and cobbles. The concentration in this area, which is designated as location 'G', is between 11 and 50% and occurs in the mid and upper intertidal zones. No detectable improvement has occurred here since 1991, and only manual pickup of AP was performed in 1991 with no treatment occurring in 1992.

Several other areas have relatively concentrated amounts of surface oil amongst boulders but cover smaller areas at the west end of the site and the east end, west of the eastern dividing bedrock. The area covered by locations 'C', 'E', and 'F' in 1993 greatly improved since 1991. The storm berm area also greatly improved. Sites in very large boulders near bedrock on the western end (location 'A') and the eastern end (west side of dividing bedrock and large boulders, location 'H') did not noticeably improve.

Most of the oil at this site has been recorded as surface oil and thus has been minor relative to reported surface oil amounts. Because of the complicated distribution of sediments both across the beach and with depth, it is difficult to map the subsurface oil. The recorded subsurface oil amounts and levels of concentration (OP, HOR etc.), however, were about the same in 1991 and 1993. The greatest amount occurred in the upper and mid-intertidal zone across the central part of the boulder beach in 1993 (location ZA, pits 1-3, 5,7,8, and 10-14).
AFFILIATION  
NAME: DNR, Div of Land  
SIGNATURE: Kathleen M. Assley

It is being determined to be conducive for restoration and the application methodology is improved. This would probably be a worthwhile use for further treatment because it was one of the most heavily hit areas, its proximity to the Village of Chehoga, and because of its "notoriety" among the public.
## 1993 ADEC RESTORATION PROJECT # 930380
### SHORELINE OILING SUMMARY

**MEMBERS:**

- [Name 1]
- [Name 2]
- [Name 3]

**DATE:** 27/1/93

**TIME:** 12:35

**TIDE LEVEL:** 4.6 ft to 3.4 ft

**ENERGY LEVEL:**
- [ ] H
- [ ] M
- [ ] L

**WEATHER:**
- [ ] SUN
- [ ] CLOUDS
- [ ] FOG
- [ ] RAIN
- [ ] SNOW

**SURVEYED FROM:**
- [ ] FOOT
- [ ] BOAT
- [ ] HELO

**TOTAL LENGTH SHORELINE SURVEYED:** ____ m

**NEAR SHORE SHEEN:**
- [ ] BR
- [ ] RB
- [ ] SL
- [ ] NONE

## SURFACE OIL CHARACTER

<table>
<thead>
<tr>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE SEDIMENT SLOPE TYPE</th>
<th>WIDTH</th>
<th>LENGTH</th>
<th>ZONE</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>m</td>
<td>m</td>
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</tr>
</tbody>
</table>

**DISTRIBUTION:**
- C = 61-100%
- B = 61-80%
- P = 11-60%
- S = 1-10%
- T = <1%

**NOTES:**
- Underwater

## DISTRIBUTION:

**SLOPE:**
- V = VERTICAL
- H = HIGH ANGLE
- M = MEDIUM ANGLE
- L = LOW ANGLE

**PHOTO ROLL:** LJE_001

**FRAMES:** 11-13

## SURFACE-OILED ZONE

<table>
<thead>
<tr>
<th>OILED ZONE</th>
<th>CLEAN BENEATH</th>
<th>H20 LEVEL</th>
<th>SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>SURFACE-SUBSURFACE SEDIMENTS</th>
<th>NOTES</th>
</tr>
</thead>
</table>

**SHEEN COLOR:**
- B = BROWN
- R = RAINBOW
- S = SILVER
- N = NONE
### RESTORATION SHORELINE OILING SUMMARY (cont.)

**TEAM NO.**

**DATE** 07/17/1993

**PIT NO.**

**PIT DEPTH** (cm)

**SUBSURFACE OIL CHARACTER**

**OILED ZONE**

**CLEAN ZONE**

**HRO LEVEL**

**SHEEN COLOR**

**PIT DEPTH** (cm)

**SURFACE-SUBSURFACE SEDIMENTS**

**NOTES**

**SHEEN COLOR:** B = BROWN; R = RAINBOW; S = SILVER; N = NONE

### OG COMMENTS:

- * Pits 1 - 7 fell between Tesoro test markers at 4T + 5T in Utzi
- * Pit 10 - HGOR intermixed among BC
- * Tesoro test of PES-51 performed on July 1-6th - DEC rep Leslie Pearson (video footage) present
- * Strong odor of PES-51 in pits - orange solv odor.
- * Pits were on border of Utzi/MITZ along beach
**SHORELINE OILING SUMMARY**

*PRE-TREATMENT ASSESSMENT*

**SEGMENT** LA 21G

**SUBDIVISION** A

**DATE** 2/3/93

**AM MEMBERS:**
- ERNIE PIPER
- DIANE MINSON
- MARIANNE PROCTA

**TIME:** 5:20 10:20 11:20

**TIDE LEVEL:** 10 ft. to 10 ft.

**ENERGY LEVEL:** H L M

**SURVEYED FROM:** FOOT BOAT HELO

**WEATHER:** SUN CLOUDS FOG RAIN SNOW

**TOTAL LENGTH SHORELINE SURVEYED:** m

**NEAR SHORE SHEEN:** BR RB SL NONE

**EST. OIL CATEGORY LENGTH:** H m M m L m V m N m NS m

<table>
<thead>
<tr>
<th>LOC</th>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE SEDIMENT</th>
<th>SLOPE</th>
<th>WIDTH</th>
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<tbody>
<tr>
<td>A</td>
<td>P</td>
<td>B H</td>
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<td>C</td>
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**NOTES:**
- DISTRIBUTION: C = 01-100%; S = 81-90%; P = 11-60%; S = 1-10%; T = <1%

**PIT NO. DEPTH**

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<tr>
<th>TR NO.</th>
<th>OILED ZONE</th>
<th>CLEAN H2O LEVEL</th>
<th>OILED SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>OILED SUBSURFACE SEDIMENTS</th>
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<td>C B P G</td>
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1993 Surface Oil Summary
Segment LAC13 Subdivision A

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<tr>
<th>Location</th>
<th>Area of Oiling Type in Square Meters</th>
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<td>D</td>
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<td>G</td>
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<td>H</td>
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<tr>
<td><strong>TOTALS</strong></td>
<td><strong>167.9</strong></td>
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</table>

AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; CT = coat
Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:
continuous = 95%; broken = 70%; patchy = 30%; sporadic = 6%; trace = 0.5%
## Subsurface Oil Summary for Segment LA019A

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<td>ZC</td>
<td>19-21</td>
<td>CB PS</td>
<td>M</td>
<td>H</td>
<td>Rb</td>
<td>0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td>0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td>0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
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<td></td>
<td>19.9 78.1 7.2 15.1 7.2 0.8 0.0 0.0 0.0 0.0 5.0 6.0 19.9 0.7 0.0</td>
<td>19.9 78.1 7.2 15.1 7.2 0.8 0.0 0.0 0.0 0.0 5.0 6.0 19.9 0.7 0.0</td>
<td>11.7 77.6 15.4 15.1 7.1 7 7 7 7 5.0 6.0 19.9 0.7 0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Loc.** = location name of specific oiling area (subsite).

**1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.

**Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat

**Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mid inter tidal, L= low inter tidal.

**En.** = wave-energy level, H= high, M= moderate, L= low, VL= very low.

**TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO= no treatment.

**OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type, OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR= medium oil residue, heavily coated sediments; pore spaces are not filled with oil - pore spaces may be filled with water, LOR= light oil residue, sediments lightly coated with oil. Oil film, continuous layer of sheen or film on sediments - water may bead on sediments. TR= trace, discontinuous film, spots of oil on sediments; an odor or tackiness with no visible evidence of oil, ?= area of subsite not visited or adequately surveyed.

**WT. 'ed OIL VOL.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2

**% CHANGE WT. 'ed VOL.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100, positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH

ADEC

Date: 7/17/93  Time: 17:30 (5:30 pm)
Location (segment #): LA 19A
Latouche Island, Sleepy Bay
Reason for taking photo: Mousse & OP underneath large overturned boulder, just outside (to the East) of FES treatment area
Taken by: L.J. Evans
Roll #: LJE 001  Frame #: 12

OFFICIAL PHOTOGRAPH

ADEC

Date: 7/17/93  Time: 17:26 (5:26 pm)
Location (segment #): LA 19A
Latouche Island, Sleepy Bay
Reason for taking photo: Pit #2
Taken by: L.J. Evans
Roll #: LJE 001  Frame #: 11

OFFICIAL PHOTOGRAPH

ADEC

Date: 7/17/93  Time: 17:35 (5:35 pm)
Location (segment #: LA 19A
Latouche Island, Sleepy Bay
Reason for taking photo: Pit #4
Taken by: L.J. Evans
Roll #: LJE 001  Frame #: 11
SEGMENT: LA 020 C

LOCATION: Chenega Island Area Group, north end of Latouche Island, west shoreline of Sleepy Bay

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Linear boulder and cobble beach about 900 m long. The beach is gently sloping with bedrock near the surface and exposed in places. The entire beach contains boulders but in some areas very large boulders are present. A cobble and drift log storm berm is present along the shoreline. Sediments are subangular to subrounded and at depth a granular matrix occurs. In some areas a clayey sediment is present at depth (pits #17-22). A low rocky promontory projects from the beach at one location behind which bedrock outcrop occurs.

Environmental Sensitivity Index (ESI)
Type 2; exposed wave-cut rock platform.
Type 7; gravel beach.
Fetches and Directions (kilometers)
N= 14; NE= 110

Energy Level
High with some moderate areas.

GENERAL BIOLOGICAL SETTING
Eagle nest.
Deer harvesting.

OILING SUMMARY
Four large areas of significant surface oiling occur at this site. Location 'C' contains a relatively high concentration of AP behind the promontory described above. At the north end of the site, location 'D' also contains a high concentration of AP and SOR. Locations 'C' and 'D' are both in the upper intertidal zone.

Locations 'A' and 'B' are two very large areas with moderate concentrations of AP and SOR in the mid and upper intertidal zones.

Based strictly on office interpretations of the data collected by the oiling geomorphologists in 1991 and 1993, it appears that significant improvement has occurred at locations 'A' and 'C', and 'D'. These areas had coverage of more than 11% in 1991, but generally less than 11% in 1993. The storm berm also appears to have improved since 1991 all along this beach. The area between location 'C' to the south and location 'D' to the north also appears to have significantly improved since 1991. Much manual removal occurred at these locations in 1991 and 1992.
Three significant areas of LOR to OP oil remains at this site. The largest location is ZB, which is coincident with surface location 'B'. Location ZA is amongst the very large boulders of surface location 'A'. Both these locations are in the mid-intertidal zone and ZA extends to the lower intertidal zone while ZB extends to the upper intertidal zone.

Location ZC is a continuous lens of HOR and OP in pebble, cobble gravel at the base of the storm berm of surface location 'B'.

The 1991 and 1992 surveys did not provide adequate information for comparisons through time of subsurface oil.
1993 ADEC RESTORATION PROJECT #930380
SHORELINE SURVEY COMMENT SHEET

10 Latache Is SEGMENT LA 020 SUBDIVISION 1 DATE 8-3-93

AFFILIATION ADNR - DIV. OF LAND
NAME KATIE FARLEY SIGNATURE Kathleen M. Farley

Ernie Piper (ADEC); Katie Herrick (USFS); and I completed this survey on 8/3/93. I concur with the observations as recorded. Some discussion should be made as to the benefits of leaving the pits uncovered versus covered for aesthetic reasons especially in non-recreation areas.
## Shoreline Oiling Summary

### Segment: __________
### Subdivision: __________
### Date: 2/3/93
### Time: __2:52__ to __6:29__
### Tide Level: __3.0__ to __4.0__ m
### Energy Level: __H__
### Surveyed From: __Foot__ __Boat__ __Helo__
### Weather: __Sun__ __Clouds__ __Fog__ __Rain__ __Snow__
### Total Length Shoreline Surveyed: __________ m
### Near Shore Sheen: __BR__ __RB__ __SL__ __None__
### 1st Oil Category Length:

<table>
<thead>
<tr>
<th>Pit</th>
<th>Pit No.</th>
<th>Subsurface Oil Character</th>
<th>Oil Zone</th>
<th>Clean Below</th>
<th>H2O Level</th>
<th>Sheen Color</th>
<th>Pit Zone</th>
<th>Surface Subsurface Sediments</th>
<th>Notes</th>
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</tr>
</tbody>
</table>

### Distribution:
- __C__ = 61-100%
- __B__ = 51-60%
- __P__ = 11-60%
- __S__ = 1-10%
- __T__ = <1%

### Notes:
- AP = Above Personnel
- B = Bacterial
- C = Chlorophyll
- D =大师
- E = Ecosystem
- H = Harbor
- R = Remote
<table>
<thead>
<tr>
<th>Pit No.</th>
<th>Depth (cm)</th>
<th>Subsurface Oil Character</th>
<th>Oiled Zone</th>
<th>Clean H2O Below Level</th>
<th>Sheen Color</th>
<th>Pit Zone</th>
<th>Surface Subsurface Sediments</th>
<th>Notes</th>
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</tr>
</tbody>
</table>

Sheen Color: B = Brown; R = Rainbow; S = Silver; N = None

OG Comments:
LA020C
4 JUNE 93
0730 - 1200
D. MUNSON

LATOUCHE ISLAND

130 m x 1.3 m band - P
of hard AP, Tanat, TAR
amphibolite, large cobbles
and tilted sedimentary rocks
behind promontory, just below
storm berm

75 METERS
AP SOF from LITZ thru HITZ
occurs interstitially
in and around boulders
and cobblestones. Not necessarily
compact surfaces. OIL is
occurs interstitially in
crevices and is difficult to
access. This area contains
very large boulders and

LA020C
LA020C

SLEEPY BAY
### 1993 Surface Oil Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SOP</th>
<th>CV</th>
<th>VT</th>
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<tbody>
<tr>
<td>A</td>
<td>37.3</td>
<td>5.0</td>
<td>37.3</td>
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<td>B</td>
<td>143.4</td>
<td>3.0</td>
<td>24.6</td>
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<tr>
<td>C</td>
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<td><strong>TOTALS</strong></td>
<td>414.3</td>
<td>0.0</td>
<td>336.3</td>
<td>5.5</td>
<td>15.5</td>
</tr>
</tbody>
</table>

AP = asphalt; MS = mousse; SOP = surface oil residue; CV = cover; VT = total.

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous = 95+
- broken = 70+
- patchy = 30+
- sporadic = 6+
- trace = 0.5+
### SUBSURFACE OIL SUMMARY FOR SEGMENT LA020C

<table>
<thead>
<tr>
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<tr>
<td>2A</td>
<td>1</td>
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<td>U.P.-C.Y.</td>
<td>ML</td>
<td>L.V. LARGE BOULDERS</td>
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<td>9.0</td>
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<td>2B</td>
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<td>h.C-P</td>
<td>EM</td>
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<td>BASE OF STORM BERN</td>
<td>16.2</td>
<td>14.0</td>
<td>20.0</td>
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<td>H</td>
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<td>SUN</td>
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<td>TOTALS</td>
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</table>

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**% CHANGE WT.'ed OIL VOL.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1)) * 100 positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/04/93 TIME: 0800
SEGMENT#: LA020 STATION#: -0-
LOCATION: LATOUCHE ISLAND
KEYWORDS: -0-
REASON FOR TAKING PHOTO: field section B - AP/SOR underlying MS/OP in UITZ.

TAKEN BY: Marianne Profita INITIALS: _______ EVIDENCE ID#: _______
ROLL #: 93MSP001 FRAME #: 1

Taken by: _______
Roll #: _______ Frame #: _______

TAKEN BY: Marianne Profita INITIALS: _______ EVIDENCE ID#: _______
ROLL #: 93MSP001 FRAME #: 2

Taken by: _______
Roll #: _______ Frame #: _______

TAKEN BY: Marianne Profita INITIALS: _______ EVIDENCE ID#: _______
ROLL #: 93MSP001 FRAME #: 3

Taken by: _______
Roll #: _______ Frame #: _______
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/04/93 TIME: 0800
SEGMENT: LA020 STATION: -0-
LOCATION: LATOUCHE ISLAND KEYWORD: -0-
REASON FOR TAKING PHOTO:HOR/MOR lens extending north along berm in HIRZ.

TAKEN BY: Marianne Profita INITIALS: ___________
ROLL #: 93HSP001 FRAME #: 6 EVIDENCE ID#: __________

Taken by: 
Roll #: 93HSP001 Frame #: 6

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/04/93 TIME: 0800
SEGMENT: LA020 STATION: -0-
LOCATION: LATOUCHE ISLAND KEYWORD: -0-
REASON FOR TAKING PHOTO: Supra-tidal -- from grass down 5m below into boulder/cobble/pebble.

TAKEN BY: Marianne Profita INITIALS: ___________
ROLL #: 93HSP001 FRAME #: 5 EVIDENCE ID#: __________

Roll #: 93HSP001 Frame #: 5

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/04/93 TIME: 0800
SEGMENT: LA020 STATION: -0-
LOCATION: LATOUCHE ISLAND KEYWORD: -0-
REASON FOR TAKING PHOTO: Continuation of subsurface lens from grass down into B/C/P.

TAKEN BY: Marianne Profita INITIALS: ___________
ROLL #: 93HSP001 FRAME #: 7 EVIDENCE ID#: __________

Taken by: 
Roll #: 93HSP001 Frame #: 7

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/04/93 TIME: 0800
SEGMENT: LA020 STATION: -0-
LOCATION: LATOUCHE ISLAND KEYWORD: -0-
REASON FOR TAKING PHOTO: Continuation of subsurface lens from grass down into B/C/P.

TAKEN BY: Marianne Profita INITIALS: ___________
ROLL #: 93HSP001 FRAME #: 8 EVIDENCE ID#: __________

Taken by: 
Roll #: 93HSP001 Frame #: 8
Date: 8-3-93
Site: LA-20C Site Photo (looking east to Montague Is)
Roll# 8 Frame# 3

OFFICIAL PHOTOGRAPH
ADEC
Date: 8-3-93 Time: 1930
Location (segment #): LA-20C
Reason for taking photo: Site photo looking north
Taken by: Katie Farley - DNR/DNR/DNR/DNR
Roll # 8 Frame #: 4
SEGMENT: LA 021 A

LOCATION: Chenega Island Area Group, northwestern shore of Latouche Island

OTHER STUDIES

PHYSICAL SETTING

**Coastal Morphology and Sedimentology**

This is a 200 m long gently sloping boulder cobble beach overlying a shallow bedrock platform. A few prominent outcrops occur. Sediments are subangular to subrounded boulders and large cobbles on the surface with pebbles in the interstices and a granular matrix in the subsurface. A gravel and drift log storm berm is present.

**Environmental Sensitivity Index (ESI)**

Type 2; exposed wave-cut rock platform
Type 7; gravel beach.

**Fetches and Directions (kilometers)**

N = 16; NW = 23; W = 4

**Energy Level**

Moderate.

GENERAL BIOLOGICAL SETTING

Eagle nest.
Deer harvesting.

OILING SUMMARY

Location 'B' is a large area 5 by 200 m long extending along the entire site and occurring in the mid to upper intertidal zones. AP and SOR occur at a coverage of about 10%. Location 'A' is a smaller area (50 by 10 m) on the southwest end of the site with only about a 1% coverage of AP and SOR. No measurable improvement has occurred at these sites, but it is emphasized that the survey methods can only detect rather large changes and reductions have probably occurred. Manual removal occurred in site 'B' in 1991 and manual breakup in 1992.

Twenty pits defined a subsurface oil area that is coincident with surface location 'B' and contains minor amounts of LOR to HOR oil. The subsurface oil is discontinuous and often resides on bedrock. It is estimated that only about 5% of the area covered by pits 1-20 (subsurface location ZA) contains subsurface oil. This site has improved since 1991 when OP oil was present. In 1991, workers manually removed oiled subsurface sediment.
1993 ADEC RESTORATION PROJECT #930380
SHORELINE SURVEY COMMENT SHEET

AFFILIATION
NAME: USCG - Bob Travis
SIGNATURE: [Signature]

Oil in mid to upper 58'; large areas of bleedoff on or near surface. AP/NOR/HOR from surface or sediments under bubble down to the bleedoff coat on some boulders. HOR in cavities of shale ends. Oil in VITZ (per gravel) is intermittent. Some pits show M/L/HOR 4.5" down. Generally concave w/conditions indicated on maps.

NAME: Kate Farley
DIV/OF: DNR
SIGNATURE: [Signature]

I also attended the survey of LA-20C and was unable to observe the survey on LA-21A.
1993 ADEC RESTORATION PROJECT # 930380
SHORELINE OILING SUMMARY

A MEMBERS: Z. WU, R. KUNIBA, J. HELBER, C. MC

DATE: 1/3/93
TIDE LEVEL: 7 ft. to 11 ft. ENERGY LEVEL: H M L
WEATHER: SUN CLOUDS FOG RAIN SNOW

SURVEYED FROM: FOOT BOAT HELO NEAR SHORE SHEEN: BR RB SL NONE

TOTAL LENGTH SHORELINE SURVEYED: 200 m
ST. OIL CATEGORY LENGTH: H M M L M VL M N M NS

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<tr>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE SEDIMENT</th>
<th>SHORE SLOPE</th>
<th>AREA</th>
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| DISTRIBUTION: C = 81-100%; B = 61-80%; P = 41-60%; S = 1-40%; T = <1% |  |

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<thead>
<tr>
<th>SURFACE-</th>
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<tr>
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<td>NOTES</td>
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| SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE | PHOTO ROLL |

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<td>NOTES</td>
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| SHEEN COLOR: B = BROWN; R = RAINBOW; S = SILVER; N = NONE |  |

<table>
<thead>
<tr>
<th>SEDIMENT TYPE</th>
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| NOTES |  |
|-------|  |
SUBDIVISION COMPOSED PRESENTLY OF SHALLOW MARSH AND BIBIAL SED.
DATING WITHIN SUBDIVISION OCCURS CA. THROUGHOUT AN OMPASSABLE APalach/ST/LI
IN THE UPPER 6-7 FEET LITTORAL

LATROUCHE ISLAND

LATROUCHE PASSAGE

WATERLINE

STORM BEACH

RAISED BEACH

TREE LINE

STORM BEACH

VALENTINE

TREE LINE


50M Approx.
<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SCR</th>
<th>CV</th>
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<td>TOTALS</td>
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<td>90</td>
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AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; DT = DT.

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

continuous = 95%; broken = 70%; patchy = 30%; sporadic = 6%; trace = 0.5%.
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**Loc.** = location name of specific oiling area (subsite).

**1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.

**Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat

**Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mud inter tidal, L= low inter tidal.

**En.** = wave-energy level, H= high, M= moderate, L= low, VL= very low

**TREATMENT** = cleanup treatment occurring at the subsite for the given year. ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO= no treatment

**OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type. OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone. HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments. MOR= medium oil residue, heavily coated sediments; pore spaces not filled with oil - pore spaces may be filled with water. LOR= light oil residue, sediments lightly coated with oil - oil film, continuous layer of sheen or film on sediments - water may bead on sediments. TR= trace, discontinuous film, spots of oil on sediments, an odor or tackiness with no visible evidence of oil. ?= area of subsite not visited or adequately surveyed

**WT. Oiled VOL.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2

**% CHANGE WT. Oiled VOL.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100. Positive values indicate increases in the amount of oil, negative values indicate decreases. "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/03/93 TIME: 18:45
SEGMENT#: LA021 STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: OVERVIEW PHOTO LOOKING TO THE SOUTH.
D. MUNSON HAS THE ORANG BACKPACK AND IS OVER PIT #3.
TAKEN BY: RUSSELL KUNIBE
ROLL #: 93RTK004 FRAME #: 30 EVIDENCE ID#: __________
INITIALS: KTK

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/03/93 TIME: 18:45
SEGMENT#: LA021 STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: CLOSE UP OF PIT #3 MOR FROM 1CM TO 6 CM BELOW THE SURFACE.
TAKEN BY: RUSSELL KUNIBE
ROLL #: 93RTK004 FRAME #: 31 EVIDENCE ID#: __________
INITIALS: KTK

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 08/03/93 TIME: 18:45
SEGMENT#: LA021 STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVT
REASON FOR TAKING PHOTO: CLOSE UP PHOTO OF PIT #1 MOR 20 TO 44 CM BELOW THE SURFACE.
TAKEN BY: RUSSELL KUNIBE
ROLL #: 93RTK004 FRAME #: 29 EVIDENCE ID#: __________
INITIALS: KTK
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/03/93  TIME: 18:55
SEGMENT#: LA021  STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP PHOTO OF SEDIMENTS FROM A PIT DUG BY BM1 BOB TRAVIS. THE WATER FROM THE SEDIMENTS IS CREATING A RAINBOW SHEEN ON THE BOULDER.

TAKEN BY: RUSSELL KUNIBE  INITIALS: ___
ROLL #: 93RTK004  FRAME #: 34  EVIDENCE ID#: ________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/03/93  TIME: 19:15
SEGMENT#: LA021  STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: CLOSE UP PHOTO OF PIT #10 HOR FROM 6 TO 16 CM BELOW THE SURFACE.

TAKEN BY: RUSSELL KUNIBE  INITIALS: ___
ROLL #: 93RTK004  FRAME #: 35  EVIDENCE ID#: ________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 08/03/93  TIME: 18:55
SEGMENT#: LA021  STATION#: -0-
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRVY
REASON FOR TAKING PHOTO: OVERVIEW PHOTO LOOKING TO THE NORTH FROM THE SAME SPOT THAT PHOTO # 32 WAS TAKEN. NOTICE THE LOW TO MID INTRERTIDAL SHELF.

TAKEN BY: RUSSELL KUNIBE  INITIALS: ___
ROLL #: 93RTK004  FRAME #: 33  EVIDENCE ID#: ________
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/03/93 TIME: 19:15

SEGMENT#: LA021 STATION#: 0
LOCATION: NW SHORE OF LATOUCHE ISLAND
KEYWORDS: SHORELINE EVALUATION-SRvy
REASON FOR TAKING PHOTO: OVERVIEW OF THE LOCATION OF PIT #12 IN THE HITZ. B. TRAVIS, USCG; D. MUNSON & C. CROSBY, ADEC.

TAKEN BY: RUSSELL KUNIBE INITIALS: T
ROLL #: 93R1K004 FRAME #: 37 EVIDENCE ID#: __________
SEGMENT: LA 031 A

LOCATION: Chenega Area Group, northeastern shore of Latouche Island

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

Very large boulders as a veneer on an irregular wave-cut platform with a small storm berm. Stream enters just to the north and supplies pebble and cobble sediments.

Environmental Sensitivity Index (ESI)

Type 2, exposed wave-cut rock platform.

Fetches and Directions (kilometers)

NE = 46, E = 11, SE = 11, S = 17

Energy Level

High

GENERAL BIOLOGICAL SETTING

Anadromous stream.

Eagle nest.

Deer harvesting.

Finfish harvesting.

OILING SUMMARY

Surveyors in 1993 recorded two small upper intertidal locations of four square meters each on the southern most portion of LA 031 A. The SOR, MS, CV, and CT occur among very large boulders on a wave-cut platform. Percent coverage within these areas is on the order of 5%. There appears to have been little change since 1992, and the area was apparently not surveyed in 1991. In 1992 the southern most location, location 'A' was recorded as 10 square meters with the same coverage, therefore, this may indicate a slight improvement. Accessible MS was removed at these locations in 1992. It should be noted that in 1992, surveyors reported numerous "non-EVOS" tar balls in the lower intertidal zone at this site.

Surveyors recorded no subsurface oil in 1993, and in 1992, only a small amount was recorded in the area coincident with surface location 'B' (subsurface location ZA). Thus a small improvement may have occurred.
1972 survey location was located on the border of LA-31A and LA-31B as shown. See 1992 sketch for more detail.
1993 ADEC RESTORATION PROJECT # 930380
SHORELINE OILING SUMMARY

MEMBERS: ADEC - ERVIN PAPER
          ERVIN A. PAPER

NAME 29: 00 to 3: 40 TIDE LEVEL 7: 0 ft. to 0 ft. ENERGY LEVEL: H M L

SURVEYED FROM: FOOT BOAT HELO WEATHER: SUN CLOUDS FOG RAIN SNOW

TOTAL LENGTH SHORELINE SURVEYED: _____ m NEAR SHORE SHEEN: BR RB SL NONE

T. OIL CATEGORY LENGTH: H _____ m M _____ m L _____ m VL _____ m N _____ m NS _____ m

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<tr>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE AREA</th>
<th>ZONE</th>
<th>NOTES</th>
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DISTRIBUTION: C = 81-100%; B = 81-60%; P = 11-50%; S = 1-10%; T = <1%

LOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE

PHOTO ROLL #: FRAMES

<table>
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<tr>
<th>PIT</th>
<th>PIT NO.</th>
<th>DEPTH (cm)</th>
<th>OIL ZONE</th>
<th>OILED ZONE</th>
<th>CLEAN Zone</th>
<th>H2O LEVEL</th>
<th>SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>SUBSURFACE OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEAN Zone</th>
<th>H2O LEVEL</th>
<th>SHEEN COLOR</th>
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</table>

SHEEN COLOR: B = BROWN; R = RAINBOW; S = SILVER; N = NONE
Survey conducted in NA 31 B due to little oiling in 1980 MAYSAP and 1992 PINCAP survey. Survey conducted on border of NA 31 B and NA 31 A only.

LA 31 A
September 17, 1993
0900 - 0940
-1.0' to .5'
D. Munson

Latouche Island

Montague Strait

CT 2090
CV 590
SOR 590
2 x 2 meters amongst large boulders

CV/CT 590
H5R 590
MS 590
2 x 2 meters amongst large boulders
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AP = asphalt; MS = mouse; SOR = surface oil residue; CV = cover; IT = coat

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous = 95+
- broken = 70+
- patchy = 30+
- sporadic = 6+
- trace = 1.5+
### Subsurface Oil Summary for Segment LA031A

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</tbody>
</table>

#### Loc. = Location name of specific oiling area (subsite).
1993 PIT # = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.
Gr. Sz. = grain size, a dash separates surface from subsurface sediments, B = boulders, C = cobbles, P = pebbles, G = granules, S = sand, M = mud, Pt = peat.
Zn. = inter tidal zone, S = supra tidal, H = high inter tidal, M = mid inter tidal, L = low inter tidal.
En. = wave-energy level, H = high, M = moderate, L = low, VL = very low.
Oiled Sed. Vol. = oiled-sediment volume in cubic meters by year and oil type, OP = oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR = heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR = medium oil residue, heavily coated sediments, pore spaces are not filled with oil - pore spaces may be filled with water, LOR = light oil residue, sediments lightly coated with oil - OP film, continuous layer of sheen or film on sediments - water may bead on sediments, TR = trace, discontinuous film, spots of oil on sediments, an odor or tackiness with no visible evidence of oil, ? = area of subsite not visited or adequately surveyed.
% CHANGE WT. Oiled Vol. = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/year 1)*100 positive values indicate increases in the amount of oil, negative values indicate decreases. "Inf" (infinite percent increase) indicates newly discovered oil.
SEGMENT: LN 001 A

LOCATION: Northern Islands Group, north end of Lone Island

OTHER STUDIES

PHYSICAL SETTING

*Coastal Morphology and Sedimentology*

*Environmental Sensitivity Index (ESI)*
Type 1; exposed rocky
Type 2; exposed wave-cut platform.
Type 7; gravel beach.

*Fetches and Directions (kilometers)*
N= 15, NE= 24

*Energy Level*
High with some moderate bedrock-protected areas.

GENERAL BIOLOGICAL SETTING

Eagle nest

OILING SUMMARY

Only one small area of AP and one of MS was present in 1993. In 1992, workers relocated MS in location 'A4'. In 1992, the MS covered an area 5 by 6 m in size and was 2 to 11 cm thick. In 1993, there was only a trace of MS in an area 0.5 by 0.5 m. The AP in location 'A1' was reported in 1992 as about three times the size as it was in 1993. Thus significant improvement has occurred at this site since 1992, largely due to treatment. Significant improvement also occurred at location 'A5' since 1991 when surveyors reported a 2 by 8 m area with 20% coverage of MS. In 1993, this area had less than 11% coverage of tarballs. It should be noted that in 1991, the oiling geomorphologist indicated that "non-ANS" (sp?) tar occurred along this site. It is not know what is meant by his note, but he may have been indicating that tar other than that from the Exxon Valdez was present.

The only subsurface oil recorded in 1993 was a small pocket of HOR. A 200 m² area of OF/Tr to MOR was discovered in 1991 in the area coincident with the 1993 surface location 'A2'. This oil was not present in 1993. In 1992, subsurface oil associated with the surface MS in surface location 'A4' was not present in 1993. Therefore, significant improvement in the amounts of subsurface oil occurred.
AFFILIATION: DNR
NAME: John A., Thompson
SIGNATURE: John A., Thompson

Agreed with the survey results.
Note: Large parts of walls surrounding Fish Hatchery's mixing tank are on the beach by the pond. 30' x 2' ABS pipe lining 1/2' removed by Phys. C.

AFFILIATION: ADEC
NAME: Donna M., Illig
SIGNATURE: Donna M., Illig

The most significant observation was the improvement in oiling condition from 1992. The State survey crew observed and exposed oil in 1992 and believe that this treatment greatly enhanced the recovery of this subdivision. Oil remains but in small isolated amounts.

AFFILIATION: U.S. Forest Service
NAME: Vic Bann
SIGNATURE: Vic Bann

Only a minimal amount of surface asphalt and tar, not obvious to recreationists. Recommend no additional treatment needed.

AFFILIATION: IVAN NANCE
NAME: IVAN NANCE
SIGNATURE: IVAN NANCE

Concur with above.
## 1993 ADEC RESTORATION PROJECT # 950330

### SHORELINE OILING SUMMARY

#### TIME 07:00 to 09:30

- **TIDE LEVEL**: 2.0 ft to 2.5 ft
- **ENERGY LEVEL**: M
- **SURVEYED FROM**: FOOT
- **WEATHER**: SUN, CLOUDS, FOG, RAIN, SNOW
- **TOTAL LENGTH SHORELINE SURVEYED**: __________ m
- **NEAR SHORE SHEEN**: BR, RB, SL, NONE

#### SURFACE OIL CHARACTER

<table>
<thead>
<tr>
<th>C</th>
<th>AP</th>
<th>MS</th>
<th>TB</th>
<th>SOR</th>
<th>CV</th>
<th>CT</th>
<th>ST</th>
<th>FL</th>
<th>DB</th>
<th>NO</th>
<th>SEDIMENT TYPE</th>
<th>SLOPE</th>
<th>WIDTH</th>
<th>LENGTH</th>
<th>ZONE</th>
<th>NOTES</th>
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<tbody>
<tr>
<td>A1</td>
<td>O</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>P</td>
<td>L</td>
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<tr>
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<td>S</td>
<td>S</td>
<td>P</td>
<td>L</td>
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<tr>
<td>A4</td>
<td>S</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>P</td>
<td>L</td>
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<tr>
<td>A5</td>
<td>S</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>P</td>
<td>L</td>
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<tr>
<td>A6</td>
<td>S</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>P</td>
<td>L</td>
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</tr>
</tbody>
</table>

#### DISTRIBUTION:
- C = 91-100%
- B = 61-90%
- P = 11-50%
- S = 1-10%
- T = <1%

#### SHEEN COLOR:
- B = BROWN
- R = RAINBOW
- S = SILVER
- N = NONE
Sporadic CT, ST, TB. Relocated mousse from 1992 ice-plant structure weathered well, only CT, ST, TB were observed. No subsurface oil observed.

CB POCKET

A3
Sporadic TB, CT, ST in Boulder cobble field at base of Bedrock cliff.

BR
RAISED WAVE-CUT PLATFORM

A5
Sporadic Tarballs in Boulder/cobble Trace CT, ST.

A6
Tarballs, some very large scattered throughout boulder field. CT, ST occurring sporadically. Some tarballs were broke.

Note
Site A, observed a large lterine concentration.
### 1993 Surface Oil Summary
#### Segment LN001

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SOR</th>
<th>CV</th>
<th>CT</th>
<th>CT</th>
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<td>A2</td>
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<td>A6</td>
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<td>0.</td>
<td>0.</td>
<td>0.</td>
<td>2.6</td>
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</tbody>
</table>

AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; CT = coat
Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:
- continuous = 95%; broken = 70%; patchy = 30%; sporadic = 6%; trace = 0.5%
## Subsurface Oil Summary for Segment LNO01A

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<td>U</td>
<td>M</td>
<td>SB</td>
<td>OP</td>
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<td>0.0</td>
<td>0.0</td>
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</tbody>
</table>

### Notes:
- **Loc.** = location name of specific oiling area (subsite).
- **1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.
- **Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat.
- **Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mid inter tidal, L= low inter tidal.
- **En.** = wave-energy level, H= high, M= moderate, L= low, VL= very low.
- **Treatment** = cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO= no treatment.
- **Oiled Sed. Vol.** = oiled-sediment volume in cubic meters by year and oil type, OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR= medium oil residue, heavily coated sediments; pore spaces are not filled with oil - pore spaces may be filled with water, LOR= light oil residue, sediments lightly coated with oil, OF= oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR= trace, discontinuous film; spots of oil on sediments, an odor or tackiness with no visible evidence of oil, ?= area of subsite not visited or adequately surveyed.
- **WT ed Oiled Vol.** = weighted oiled-sediment volume = (OP Vol.)*5 + (HOR Vol.)*4 + (MOR Vol.)*3 + (LOR Vol.)*2
- **% Change WT ed Vol.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100, positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil.
SEGMENT: LN 002 A

LOCATION: Northern Island Group, northeast shore of Lone Island

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Wave-cut rock platform with boulder veneers. Pebble high-tide berms present.

Environmental Sensitivity Index (ESI)
Type 2; exposed wave-cut rock platform.

Fetches and Directions (kilometers)
NE = 24; E = 14; SE = 26

Energy Level
Moderate to high.

GENERAL BIOLOGICAL SETTING

Eagle nest.

OILING SUMMARY

Two small areas of MS and SOR remain in 1993. These areas occur in the upper to supra intertidal zone amongst boulders in the northern part of the segment. Both areas are in a narrow protected cove and were relocated by the 1993 survey team. In 1993 these areas were only 1.5 and 4 m² in size, but in 1992 they had a total area of 36 m², and a much higher concentration. Workers relocated these sediments in 1992, which resulted in the significant improvement in this area. No detectable improvement occurred from 1991 to 1992. The state vessel performed manual removal (15 geobags) at this segment in 1991, but it is not clear exactly where the sediment was removed.

A small amount of OP and HOR oil was discovered at one location in 1993. The location includes and extends beyond surface location 'B' by a few 10's of meters. Four pits of OP and HOR oil were recorded in 1992, but the pit locations were not indicated on the map. Essentially no subsurface oil was reported in 1991.
### 1993 ADEC RESTORATION PROJECT #930380
**SHORELINE SURVEY COMMENT SHEET**

**SECTION bne Is SEGMENT NV 002 SUBDIVISION A DATE 6/20/93**

<table>
<thead>
<tr>
<th>AFFILIATION</th>
<th>NAME</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNR</td>
<td>Wyn Menafee</td>
<td>Wyn Menafee</td>
</tr>
</tbody>
</table>

- Observation: Oil is not visible on the surface, except in areas where the waves are strong. Seems to be some oil extending into a lagoon. No visible oil sheen on the water.
- Impression: There appears to be no areas that are affected by remaining oil.

<table>
<thead>
<tr>
<th>AFFILIATION</th>
<th>NAME</th>
<th>SIGNATURE</th>
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<tbody>
<tr>
<td>USFS</td>
<td>Ivan Nance</td>
<td>Ivan Nance</td>
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</tbody>
</table>

- Impression: I would not characterize any of the oiling I saw as "oil off the shore." The highest oiling which remains is in protected areas which minimize the effect of weathering.

<table>
<thead>
<tr>
<th>AFFILIATION</th>
<th>NAME</th>
<th>SIGNATURE</th>
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</thead>
<tbody>
<tr>
<td>ADEC</td>
<td>Diane M. Nelson</td>
<td>Diane M. Nelson</td>
</tr>
</tbody>
</table>

- Impression: Heavy surfacing oil was isolated to areas shown on sketch. This oiling was exposed and relocated.

<table>
<thead>
<tr>
<th>AFFILIATION</th>
<th>NAME</th>
<th>SIGNATURE</th>
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</thead>
<tbody>
<tr>
<td>U.S. Forest Service</td>
<td>Vic Bann</td>
<td>Vic Bann</td>
</tr>
</tbody>
</table>

- Impression: Very little to no visible surface oil. Recommend no additional treatment needed.
# 1993 ADEC RESTORATION PROJECT # 930380
## SHORELINE OILING SUMMARY

**M MEMBERS:**
- Marianne Pauita ADEC
- Tim Pauila ADEC
- Jean Meshnik ADEC
- Mike Mengel ADEC

**DATE:** 6/20/93

**TIME:** 07:00 to 09:30
**TIDE LEVEL:** 5 ft. to 20 ft.
**ENERGY LEVEL:** □ H □ M □ L

**SURVEYED FROM:** □ FOOT □ BOAT □ HELO
**WEATHER:** □ SUN □ CLOUDS □ FOG □ RAIN □ SNOW

**TOTAL LENGTH SHORELINE SURVEYED:** _____ m
**NEAR SHORE SHEEN:** □ BR □ RB □ SL □ NONE

**EST. OIL CATEGORY LENGTH:**
- H _____ m
- M _____ m
- L _____ m
- VL _____ m
- N _____ m
- NS _____ m

## SURFACE OIL CHARACTER

<table>
<thead>
<tr>
<th>NO</th>
<th>AP</th>
<th>MS</th>
<th>TB</th>
<th>BOR</th>
<th>CV</th>
<th>CT</th>
<th>ST</th>
<th>FL</th>
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</table>

**DISTRIBUTION:** C = 81-100%; B = 61-80%; P = 41-60%; S = 1-40%; T = <1%

**SLOPE:** V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE

## SUBSURFACE OIL CHARACTER

<table>
<thead>
<tr>
<th>NO</th>
<th>PIT</th>
<th>DEPTH (cm)</th>
<th>SUBSURFACE OIL CHARACTER</th>
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<tr>
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</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**OILED ZONE:**
- S - 10
- S - 10
- 10 - 9

**CLEAN WELL:**
- Y
- Y
- Y

**H2O COLOR:**
- B R S N
- B R S N
- B R S N

**SHEEN ZONE:**
- S
- S
- S

**PIT ZONE:**
- M
- M
- M

**SURFACE-ZONE SUBSURFACE SEDIMENTS:**
- □
- □
- □

**SHORE SEDIMENTS**
- □
- □
- □

**NOTES:**
- Large B - Trenton Shingles
- Sporadic across CP US

**SHEEN COLOR:** B = BROWN; R = RAINBOW; S = SILVER; N = NONE

---

**SEGMENT:** V CO

**SUBDIVISION:** A
LN OC2A
0120193
PROFIT-A

Steep pillow
Lava Shore

B/R

BC/R

D000

massive Boulders

1.5 X m - Exposed ms under Boulders Relocated.

B A I OP Relocated.

-Sporadic Tea splatters,
Coast, Stain from Site B South in WITE MITE
### 1993 Surface Oil Summary

**Segment LN012**  
**Subdivision A**

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SOR</th>
<th>CV</th>
<th>CT</th>
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<tbody>
<tr>
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<td>B</td>
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<td>3.9</td>
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<tr>
<td>C</td>
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</tbody>
</table>

**TOTALS=**  
0. 1.425 3.9 0. 0.

AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; CT = tar.

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:
- continuous = 95%; broken = 70%; patchy = 30%; sporadic = 5%; trace = 1.5%.
<table>
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<td>TOTALS</td>
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<td>-10%</td>
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**Loc.** = location name of specific oiling area (subsite).

**1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.

**Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C'= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat.

**Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mid inter tidal, L= low inter tidal.

**En.** = wave-energy level, H= high, M= moderate, L= low, VL= very low.

**TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO= no treatment.

**OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type, OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR= medium oil residue, heavily coated sediments, pore spaces are not filled with oil - pore spaces may be filled with water, LOR= light oil residue, sediments lightly coated with oil, OF= oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR= trace, discontinuous film, spots of oil on sediments, an odor or tackiness with no visible evidence of oil, ?= area of subsite not visited or adequately surveyed.

**WT. Oiled Vol.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2

**% CHANGE WT. Oiled Vol.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100. Positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/02/93 TIME: 10:15

SEGMENT#: LW002 STATION#: -0-
LOCATION: Lone Island; location A1.
KEYWORDS: -0-
REASON FOR TAKING PHOTO: Exposed MS/OP under boulder.

TAKEN BY: Marianne Profita INITIALS: 
ROLL #: 93MSP002 FRAME #: 4 EVIDENCE ID#: 

Roll #: _______ Frame #: _______

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 06/02/93 TIME: 10:15

SEGMENT#: LW002 STATION#: -0-
LOCATION: Lone Island; location A1.
KEYWORDS: -0-
REASON FOR TAKING PHOTO: Exposed MS/OP under boulder.

TAKEN BY: Marianne Profita INITIALS: 
ROLL #: 93MSP002 FRAME #: 3 EVIDENCE ID#: 

Taken by: 
Roll #: 93MSP002 Frame #: 3
SEGMENT: MA 002 A

LOCATION: Northern Islands Group, two small islands just north of the mouth of Main Bay in Foul Bay

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Two low, rocky islands. Wave-cut rock platforms with pockets of boulders, cobbles, and pebbles. Bedrock is splintery

Environmental Sensitivity Index (ESI)
Type 2, exposed wave-cut rock platform.
Type 7, gravel beach.

Fetches and Directions (kilometers)
N = 22, NE = 46, E = 28, in addition for site 2 SE = 19

Energy Level
High with moderate areas.

GENERAL BIOLOGICAL SETTING

Oiled mussel bed.
Eagle nest.
Fry release.
Fish harvest area.

OILING SUMMARY

Only trace amounts of CT was surveyed in one location in 1993. This location, location 'D', contained a greater than 50% cover in a 2 by 5 m area of AP. Several other areas on site #1 contained high concentrations of AP and SOR in 1991 but had no surface oil in 1993. Thus improvement occurred.

Oil in a mussel bed and tide pool on site #1 and in the vicinity of pit #8 was recorded as surface oil in 1991. In 1993, this same area was recorded has having substantial amounts of LOR, MOR, and HOR oil in the mussel bed and above a peat layer. Sheening was observed without disturbance of the sediment. Apparently this location (location ZC) has not improved since 1991 even though it was manually treated in 1991 and 1992.

Another subsurface oil area is location ZA also on site #1. This location occurs in the lower and mid-intertidal zones and was sheening in 1993 (see photo 93MSP003-11). No subsurface oil was recorded here in 1991, but "surface" oil was removed in 1991 and 1992.
Subdivision Field Map
Map Key: PWSMA002ab
Name: Reimer
Date: 5/18/92
Date Entered:

XXXX Wide
///// Medium
---- Narrow
TTTT Very Light
0000 No Oil

MA002 A

ADEC Subsegment Length: 1551m

100
200

EXON

AK State Plane Zone 4
pm0002ab
### 1993 ADEC RESTORATION PROJECT #930380
#### SHORELINE SURVEY COMMENT SHEET

<table>
<thead>
<tr>
<th>TION</th>
<th>SEGMENT</th>
<th>SUBDIVISION</th>
<th>DATE</th>
</tr>
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<tbody>
<tr>
<td>744</td>
<td>MA202</td>
<td>A</td>
<td>1/2/93</td>
</tr>
</tbody>
</table>

#### AFFILIATION: DNAC
**NAME:** W. H. Marler  
**SIGNATURE:** [Signature]

- Nests for release, fishhauling, and not set net sites, eagle nest,
  and oil present in mussel bed at site 9 on South Island.  
- Two, who have worked sites before, 
  and grays/whites are present on site.
- Seabirds are present on the north side of South Island.
- Active set nets site 20 with
  oiled site on South Island.
- Middle Tilikum has active eagle nest w/ 2 eggs present.

#### AFFILIATION: LT. USCG
**NAME:** Ivan Nance  
**SIGNATURE:** [Signature]

- Area treated w/finsap is improved but oil persists in low energy
  areas.

#### AFFILIATION: J.B. Forest Service
**NAME:** Vic Care  
**SIGNATURE:** [Signature]

- Significant amounts of tar/asphalt on surface, and
  tensile. Site 1B P1 +8 (oiled mussel bed) had recovered
  significantly from last year's treatment. No surface oil
  present, and no need for future treatment.
## 1993 ADEC Restoration Project # 930380
### Shoreline Oiling Summary

**Segment:** MAQQ2  
**Subdivision:** G  
**Date:** 6-21-93

**AM Members:**  
- E. Piper - ADEC  
- D. Munson - ADEC  
- H. Forthi - ADEC  
- T. Nance - USCG  
- W. Menefee - AENR

**Time:** 18:50 to 20:30  
**Tide Level:** 4.8 ft. to 7.8 ft.  
**Energy Level:** H  
**Surveyed From:** Foot  
**Weather:** Sun, Clouds  
**Total Length Shoreline Surveyed:** ______ m  
**Near Shore Sheen:** ______

**Est. Oil Category Length:** H ______ m  M ______ m  L ______ m  VL ______ m  N ______ m  NS ______ m

<table>
<thead>
<tr>
<th>Location</th>
<th>Surface Oil Character</th>
<th>Surface Shore Type</th>
<th>Area Width (m)</th>
<th>Area Length (m)</th>
<th>Zone</th>
<th>Notes</th>
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<tr>
<td>L O C D</td>
<td>AP MS</td>
<td>TB</td>
<td>SOR CV</td>
<td>CT ST FL</td>
<td>DB NO</td>
<td>V H M L</td>
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<tr>
<td></td>
<td>C P</td>
<td>S T</td>
<td>Y E M</td>
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</table>

**Distribution:**  
- C = 01-100%  
- B = 01-50%  
- P = 1-10%  
- S = <1%

**Slope:**  
- V = Vertical  
- H = High Angle  
- M = Medium Angle  
- L = Low Angle

**Pit Pit NO. Depth**  
<table>
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<tr>
<th>Oil Character</th>
<th>Oiled Zone</th>
<th>Clean Below</th>
<th>HBD Level</th>
<th>Sheen Color</th>
<th>Pit Zone</th>
<th>Surface-Subsurface Sediments</th>
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</tbody>
</table>

**Sheen Color:**  
- B = Brown  
- R = Rainbow  
- S = Silver  
- N = None
TEAM NO. __

PIT SUBSURFACES OILED CLEAN SHEEN SURFACE:

OP HORIZON OR I.R. TR NO. (cm) OILED ZONE CLEAN H2O SHEEN PIT ZONE SURFACE-SUBSURFACE SEDIMENTS NOTES

TOTAL _____

SHEEN COLOR: B = BROWN; R = RAINBOW; S = SILVER; N = NONE

LOG COMMENTS:

SITE 2 - LOC B MUSSEL BED OILING SIMILAR THROUGHOUT AT SHALLOW DEPTH. HORIZ./OR.

- HEAVY RAINBOW SHEEN PRESENT WITHOUT DISTURBANCE - ACTIVELY SHEENING

- OILING EXTENDS FROM SITE TO MITE -
  ALSO PRESENT UNDER FOCUS

- PIT # 8 HORIZ./OR. OILING

- 2 OYSTER CATCHERS AT LOC. # 8 OILED MUSSEL BED

SITE 2 - LIMITED SURVEY DUE TO EAGLE NEST

OYSTER CATCHERS PRESENT.
### 1983 Surface Oil Summary

**Segment MA3/12  Subdivision A**

<table>
<thead>
<tr>
<th>Location</th>
<th>Area of Oiling Type in Square Meters</th>
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<th></th>
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<td>D</td>
<td>AP</td>
<td>MS</td>
<td>SOR</td>
<td>CV</td>
<td>ST</td>
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<td>Totals</td>
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</table>

AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; ST = trace

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous = 95+%
- broken = 70%
- patchy = 30%
- sporadic = 6%
- trace = .5%
### SUBSURFACE OIL SUMMARY FOR SEGMENT MA002A

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<td>0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
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</tbody>
</table>

**Loc.** = location name of specific oiling area (subsite)

1993 PIT # = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite

Gr. Sz. = grain size, a dash separates surface from subsurface sediments, B = boulders, C = cobbles, P = pebbles, G = granules, S = sand, M = mud, Pt = peat

Zn. = inter tidal zone, S = supra tidal, H = high inter tidal, M = mid inter tidal, L = low inter tidal

En. = wave-energy level, H = high, M = moderate, L = low, VL = very low

**TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET = equipment tilling (heavy equipment), MT = manual tilling, BR = berm relocation, SR = sediment relocation, RB = oiled-sediment removal from subsurface, RS = oiled-sediment removal from the surface, MB = manual breakup, MR = manual raking, ? = unknown, NO = no treatment

**Oiled Sed. Vol.** = oiled-sediment volume in cubic meters by year and oil type, OP = oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR = heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR = medium oil residue, heavily coated sediments, pore spaces not filled with oil - pore spaces may be filled with water, LOR = light oil residue, sediments lightly coated with oil. Oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR = trace, discontinuous film, spots of oil on sediments, an odor or tackiness with no visible evidence of oil, ? = area of subsite not visited or adequately surveyed

**WT. Ed Oil Vol.** = weighted oiled-sediment volume = (OP VOL.)^*5 + (HOR VOL.)^*4 + (MOR VOL.)^*3 + (LOR VOL.)^*2

**% CHANGE WT. Ed OIL VOL.** = % change in weighted oiled-sediment volume between the given years = (year 2 - year 1)/(year 1)*100 positive values indicate increases in the amount of oil. Negative values indicate decreases. "Inf" (infinite percent increase) indicates newly discovered oil
SEGMENT: PR 016 A

LOCATION: Northern Islands Group, Meares Point on south tip of Perry Island

OTHER STUDIES
NOAA transect station =N-17.

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Pebble and cobble pocket beach. Sediments are well rounded. Grain size grades from pebbles to boulders in the lower intertidal. Multiple high-tide berms are commonly present as well as a storm berm. A small gravel tombolo is present in the center of the pocket, and grain size abruptly increases toward each limb. A freshwater lake lies behind the beach causing abundant outflow of freshwater through the beachface at least in the southern half of the pocket.

Environmental Sensitivity Index (ESI)
Type 7, gravel beach.

Fetches and Directions (kilometers)
E= 24, SE= 24

Energy Level
High.

GENERAL BIOLOGICAL SETTING
Eagle nest.
Fish harvest area.

OILING SUMMARY
One area of AP and SOR remains in the boulder field at the base of the bedrock on the north limb. It was estimated that less than 11% coverage occurs at this location, but in 1991 more than 11% was present. Manual pickup occurred at this location in 1991.

Two areas of significant subsurface oil remain at this site. Both areas (ZA and ZB) are in the southern half of the site. Location ZA is in the upper and mid intertidal zones amongst boulders along the south limb. MOR and HOR oil occurs here, and there has been no improvement since 1991. Location ZB is in the mid intertidal zone just south of the tombolo. MOR and LOR occurs below clean surface boulders and cobbles in this exposed portion of the site. Much improvement occurred here with less than half of the oil remaining in 1993 than was present in 1991.

Several other small areas of subsurface oil completely cleaned up since 1991, despite only minor treatment in 1991 and no treatment in 1992. Overall, the amount of subsurface oil has decreased by 50% since 1991. The berm was relocated in 1990.
1993 ADEC RESTORATION PROJECT #930.380
SHORELINE SURVEY COMMENT SHEET

DATE 1/22/93

AFFILIATION
NAME IAN NANCE LT, USCG SIGNATURE

SUBSURFACE OIL PRESENT IN BOULDER AREAS AND MITZ. STORM BEAM RELOCATION IN 1990 WAS EFFECTIVE BUT OIL OBSERVED ABOVE HAS BEEN PERSISTENT. NO SHEEN INV FROM UNDISTURBED AREAS NOTED.

AFFILIATION U.S. Forest Service
NAME /S/ J. D. S. M. SIGNATURE

Small amounts of tar and needles observed on surfaces of bedrock. Subsurface oil in rocky area on south end of beach that could be treated with PESSI, but is not necessary (area A) During clean-up of beach the old beach logs were windrowed above the high tide line and are still there in unnatural state. These logs should have been relocated after the clean-up was completed with heavy equipment. It is now going to be very difficult if not impossible to improve appearance.

AFFILIATION DNR
NAME WYN MENEFEE SIGNATURE

Recording of oil on DEC sheet is correct. Human use is prevalent. Gillnet and net site. Two hiking trails (well used) emerge from beach to other side of marsh Point. Sub surface oil persisting. The beach logs were all pushed up to the top berm above extreme tides. Looks unnatural. Maintains potential camping area.

Marc cult habit in same bay. Note additional report on 5. Perry to present. Oil not shearing until disturbed.

AFFILIATION
NAME SIGNATURE
## 1993 ADEC RESTORATION PROJECT # 930380
### SHORELINE OILING SUMMARY

**AM MEMBERS:**
- E. Pope - ADEC
- D. Murak - ADEC
- C. Brooks - ADEC
- J. Caffey - USFS
- V. MenaaS - DNS

**SUBDIVISION:**
- 6

**DATE:**
- 10/10/93

**TIME:** 1730 to 2015
**TIDE LEVEL:**
- 6 ft. to 3 ft.
**ENERGY LEVEL:**
- H

**SURVEYED FROM:**
- Foot
- Boat
- Helo

**WEATHER:**
- Sun
- Clouds
- FOG
- Rain
- Snow

**TOTAL LENGTH SHORELINE SURVEYED:**
- ______ m

**NEAR SHORE SHEEN:**
- BR
- RB
- SL
- None

**EST. OIL CATEGORY LENGTH:**
- H ______ m
- M ______ m
- L ______ m
- VL ______ m
- N ______ m
- NS ______ m

### SURFACE OIL CHARACTER

<table>
<thead>
<tr>
<th>L</th>
<th>O</th>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE SEDIMENT</th>
<th>SHORE SLOPE</th>
<th>AREA</th>
<th>ZONE</th>
<th>NOTES</th>
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</table>

**SURFACE SEDIMENT**
- VHM

**AREAS:**
- S
- U
- M
- L

**ZONE:**
- Total Length Shoreline Surveyed: ______ m

**TOTAL LENGTH NEAR SHORE SURVEYED:**
- ______ ft.

**SHEEN CATEGORY:**
- Surface Oil
- Cleaned Oil
- Brown Oil
- None

**ORIENTATION:**
- Vertical
- Horizontal
- Medium Angle
- Low Angle

**PHOTO ROLL:**
- ______ frames

**DISTRIBUTION:**
- C = 61-100%
- B = 51-60%
- P = 11-50%
- S = 1-10%
- T = <1%

**SLOPE:**
- V = Vertical
- H = High Angle
- M = Medium Angle
- L = Low Angle

**OILED ZONE:**
- Y/N

**CLEAN LEVEL:**
- Below

**HEIGHT LEVEL:**
- HBD

**SHEEN COLOR:**
- Brown
- Rainbow
- Silver
- None

**SURFACE-SUBSURFACE SEDIMENTS:**
- Notes

<table>
<thead>
<tr>
<th>PIT NO.</th>
<th>PIT DEPTH (cm)</th>
<th>SUBSURFACE OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEAN LEVEL</th>
<th>HBD LEVEL</th>
<th>SHEEN COLOR</th>
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<td>N</td>
<td>B</td>
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<td>22</td>
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<td>29-25</td>
<td>N</td>
<td>B</td>
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</tbody>
</table>

**SHEEN COLOR:**
- B = Brown
- R = Rainbow
- S = Silver
- N = None
<table>
<thead>
<tr>
<th>PIT NO.</th>
<th>DEPTH (cm)</th>
<th>OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEAN BELOW</th>
<th>H2O LEVEL</th>
<th>SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>SURFACE- SUBSURFACE SEDIMENTS</th>
<th>NOTES</th>
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Sheen color: B = Brown; R = Rainbow; S = Silver; N = None

OG COMMENTS:

- We used 'Traveled Deer trails from beach thru woods to other side of Mead point.

- See for Area A & B comments
### 1993 Surface Oil Summary

**Segment PROJ 6, Subdivision A**

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SOR</th>
<th>CV</th>
<th>CT</th>
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<tr>
<td>A</td>
<td>4.8</td>
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<td>4.3</td>
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<td><strong>TOTALS</strong></td>
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</tbody>
</table>

AP = asphalt; MS = mousse; SOR = surface oil residue; CV = cover; CT = trace

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous = 35+
- broken = 70+
- patchy = 30+
- sporadic = 6+
- trace = 1.5+
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**SUBSURFACE OIL SUMMARY FOR SEGMENT PRO16A**

- **Loc.** = location name of specific oiling area (subsite)
- **1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.
- **Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B = boulders, C = cobbles, P = pebbles, G = granules, S = sand, M = mud, Pf = peat
- **Zn.** = inter tidal zone, S = supra tidal, H = high inter tidal, M = mid inter tidal, L = low inter tidal
- **En.** = wave-energy level, H = high, M = moderate, L = low, VL = very low
- **TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET = equipment tilling (heavy equipment), MT = manual tilling, BR = berm relocation, SR = sediment relocation, Rb = oiled-sediment removal from subsurface, Rs = oiled-sediment removal from the surface, MB = manual breakup, MR = manual raking, ? = unknown, NO = no treatment
- **OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type, OP = oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR = heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR = medium oil residue, heavily coated sediments, pore spaces are not filled with oil - pore spaces may be filled with water, LOR = light oil residue, sediments lightly coated with oil, OF = oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR = trace, discontinuous film, spots of oil on sediments, an odor or tackiness with no visible evidence of oil, ? = area of subsite not visited or adequately surveyed
- **WT.'ed OIL. VOL.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2
- **% CHANGE WT.'ed VOL.** = % change in weighted oiled-sediment volume between the given years = (year 2 - year 1)/(year 1)*100, positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil
1993 ADEC RESTORATION PROJECT #930380
SHORELINE SURVEY COMMENT SHEET

DATE 1-5-93

SEGMENT __ x ___ SUBDIVISION ___

AFFILIATION
NAME ___ SIGNATURE ___

L. G. ERNST
SIGNATURE ADE

COMMENTS: ______

AFFILIATION
NAME ___ SIGNATURE ___

AFFILIATION
NAME ___ SIGNATURE ___

AFFILIATION
NAME ___ SIGNATURE ___

AFFILIATION
NAME ___ SIGNATURE ___
**1993 ADEC RESTORATION PROJECT # 930380**

**SHORELINE OILING SUMMARY**

**DATE 09/16/93**

**SEGMENT T3032**

**SUBDIVISION A**

**MEMBERS:**
- C. C. Hunt - ADEC
- R. MacCormick - ADNR
- A. J. Simpson - ADEC

**TIDE LEVEL:** 10:30 to 1:50

**ENERGY LEVEL:**
- H: High
- M: Medium
- L: Low

**WEATHER:**
- SUN
- CLOUDS
- FOG
- RAIN
- SNOW

**TOTAL LENGTH SHORELINE SURVEYED:** _____ m

**NEAR SHORE SHEEN:**
- BR: Brown
- RB: Rainbow
- SL: Silver
- NS: None

**OIL CATEGORY LENGTH:**
- H: High
- M: Medium
- L: Low
- VL: Very Low
- N: None

### Surface Oil Character

<table>
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<tr>
<th>AP</th>
<th>MS</th>
<th>TB</th>
<th>SC</th>
<th>CV</th>
<th>CT</th>
<th>ST</th>
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**Notes:** SEE OIL NOTES

### Subsurface Oil Character

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<tr>
<th>PIT</th>
<th>OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEAN</th>
<th>H2O LEVEL</th>
<th>SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>SURFACE-SUBSURFACE SEDIMENTS</th>
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**Notes:** NO PT DATA RECORDED

**GENERAL GRND SURVEY ONLY**
### RESTORATION SHORELINE OILING SUMMARY (cont.)

**SEGMENT:** TEO03  
**SUBDIVISION:** A  
**DATE:** 09/16/91  

<table>
<thead>
<tr>
<th>PIT NO.</th>
<th>DEPTH (cm)</th>
<th>SUBSURFACE OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEAN LEVEL</th>
<th>H2O</th>
<th>SHEEN COLOR</th>
<th>PIT ZONE</th>
<th>SURFACE-SUBSURFACE SEDIMENTS</th>
<th>NOTES</th>
</tr>
</thead>
</table>

**SHEEN COLOR:** B = BROWN; R = RAINBOW; S = SILVER; N = NONE

---

**OG COMMENTS:** Surface oiling only - Pits not recorded.

**LOCATION "A":** LSOR/MSOR/FL - Located in Pact/P/1/4/5/6 - Southern end of Island. NPS performed mussel study during Spring/Summer '93 and reported oiled mussel bed - this bed was not observed during this survey due to tide height.

**LOCATION "B":** AP - (HARD) - Patchy coverage of 10 x 12m area at Uitz to Mitz.

**LOCATION "C":** LSOR/MSOR/FL - 5 15 x 5m located in the Litz behind/at the base of Bedrock Island (northern side).
Tonsina Bay TB003A
Otter Beach
Surface oiling
16 September '93

Location "A" 4 x 30m
- SOR - MSOR sheets
- Brown to silver -
quickly released when
sediment is disturbed.
(peat < 1.0 g/1)

CNDs reported heavy oiling
in musselbed (not observed
to 5m)
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 1030

SEGMENT#: TB003  STATION#: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: ASPHALT MAT PERSISTS LANDWARD SIDE OF SMALL ISLAND AT THE UTIZ OF SMALL SADDLE. LOCATION B.

TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC010  FRAME #: 1  EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 1030

SEGMENT#: TB003  STATION#: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: J. JOHNSON (ADNR) HOLDING FRIABLE AP THAT PERSISTS LANDWARD SIDE OF SMALL ISLAND AT THE UTIZ OF SMALL SADDLE. LOCATION B.

TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC010  FRAME #: 3  EVIDENCE ID#:
OFFICIAL PHOTOGRAPH
ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 1030

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
REASON FOR TAKING PHOTO: LOCATION A, AREA WAS ACTIVELY SHEENING UPON ARRIVAL. SHEEN WAS NOT THE RESULT OF AGITATION.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #:93CSC010 FRAME #: 7 EVIDENCE ID#: _

OFFICIAL PHOTOGRAPH
ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 1030

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
REASON FOR TAKING PHOTO: CLOSE-UP OF AP THAT PERSISTS LANDWARD SIDE OF SMALL ISLAND AT THE UITZ OF SMALL SADDLE. LOCATION B

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #:93CSC010 FRAME #: 4 EVIDENCE ID#: _

OFFICIAL PHOTOGRAPH
ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 1030

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: OILING IN LOCATION A, LSOR/MSOR MIXED WITH FINE SEDIMENT AT LITZ.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #:93CSC010 FRAME #: 6 EVIDENCE ID#: _

OFFICIAL PHOTOGRAPH
ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 1030

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: LOCATION A, AREA WAS ACTIVELY SHEENING UPON ARRIVAL. SHEEN WAS NOT THE RESULT OF AGITATION.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #:93CSC010 FRAME #: 5 EVIDENCE ID#: _
SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: OILING IN LOCATION A, LSOR/MSOR MIXED WITH FINE SEDIMENT AT LITZ.
ANEROBIC MUD WAS ASSOCIATED WITH THE OILING IN THE LITZ.

DATE: 09/16/93
OFFICIAL PHOTOGRAPH ADEC
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC010 FRAME #: 9 EVIDENCE ID#: 

TIME: 1030
EXXON VALDEZ OIL SPILL
INITIALS: 
EVIDENCE ID: 
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
ROLL #: 93CSC010 FRAME #: 8 EVIDENCE ID#: 

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: OILING IN LOCATION A, SHEENS WERE EASILY INDUCED FROM AGITATION OF SEDIMENT AT LITZ. SILVER TO RAINBOW SHEENS.

DATE: 09/16/93
OFFICIAL PHOTOGRAPH ADEC
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC010 FRAME #: 11 EVIDENCE ID#: 

TIME: 1030
EXXON VALDEZ OIL SPILL
INITIALS: 
EVIDENCE ID: 
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
ROLL #: 93CSC010 FRAME #: 10 EVIDENCE ID#: 

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: OILING IN LOCATION A, LSOR/MSOR MIXED WITH FINE SEDIMENT AT LITZ. ANEROBIC MUD WAS ASSOCIATED WITH THE OILING IN THE LITZ.

DATE: 09/16/93
OFFICIAL PHOTOGRAPH ADEC
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC010 FRAME #: 10 EVIDENCE ID#: 

TIME: 1030
EXXON VALDEZ OIL SPILL
INITIALS: 
EVIDENCE ID: 
OFFICE: ANCHORAGE
TAKEN BY: CLARA CROSBY
ROLL #: 93CSC010 FRAME #: 11 EVIDENCE ID#: 

SEGMENT: TB003 STATION: -0-
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO: OILING IN LOCATION A, SHEENS WERE EASILY INDUCED FROM AGITATION OF SEDIMENT AT LITZ. SILVER TO RAINBOW SHEENS.
SEGMENT: TB 004 A

LOCATION: Kenai Peninsula, south shore of Tonsina Bay

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology
Gently sloping pocket beach formed by a stream delta. Sediments are subangular pebbles and cobbles on the surface with a sand and mud matrix in the subsurface. Angular boulders occur in the upper intertidal and sediments decrease in size down the beach. Drift logs and a storm berm are present on the western portion of the beach. The stream has several distributary channels that cross the delta.

Environmental Sensitivity Index (ESI)
Type 7; gravel beach.
Type 8; sheltered rocky.

Fetches and Directions (kilometers)
N= 1; NE= 12

Energy Level
Low to moderate.

GENERAL BIOLOGICAL SETTING
Oiled mussel and fucus beds.
Eel grass and subtidal clam bed (clam bed not well developed).
Eagle nest.
Herring spawning.
Fish harvest area.

OILING SUMMARY
A 20 by 60 m area with a 1 to 11% coverage of SOR remains in the mid and lower intertidal zones. Active sheening was observed throughout this location (location 'A') which includes fucus and mussel beds in front of the stream entrance. This area has improved somewhat since 1991, although it is very difficult to estimate percent coverage of the oil.

Silver sheens were observed in location 'D'; this area, however, undoubtedly significantly improved since 1991. Location 'D' is in the mid to upper intertidal and contained more than 10% SOR in a 20 by 70 m area in 1991. In 1993, only trace amounts were observed in an area 10 by 20 m.


Small amounts of subsurface oil remain. Location ZB is a HOR and OP layer 1 by 7 m in size. Location 'C' was defined as surface oil but one could also interpret the oil as
subsurface. Photo 93CSC009-31 shows the surface and shallow subsurface layer exposed along a cut stream bank in location 'C'.

Location ZA retains a small amount of LOR below mussels and fucus in an area of 30 square meters, but this is a great improvement over 1991 conditions when MOR oil covered a 1200 square meter area.

The above mentioned subsurface areas were treated in 1991 with manual raking, tilling, and removal, and in addition, workers removed oil on the surface in location ZA in 1992.

Overall, conditions have greatly improved since 1991, but persistent sheening is evidence of continuing pollution.
1993 RESTORATION SURVEY LIMITED TO "GRIM BEACH"

Subdivision Field Map
Map Key: KENTB004Aa
Name: C SC
Date: 16 Sept '93
Date Entered:

XXX X Wide
/// Medium
---- Narrow
TTTT Very Light
0000 No Oil

ADEC Subsegment Length: 3100m
METERS

AK State Plane Zone 4
W1800406
**SHORELINE SURVEY COMMENT SHEET**

**LOCATION**: Tonsina Bay  
**SEGMENT**: TB 004  
**SUBDIVISION**: A  
**DATE**: 9/16/93

**AFFILIATION**  
**NAME**: Roger J. MacCoud  
**SIGNATURE**:

**SURVEYED**  
L - MITZ, sheens observed on surface throughout area due to light rain, particularly near streams. Some sheen observed in stream (4-5)  
Subsurface oil found in 1.5 cm deep in area B-1, mixed w/ bay water. Area A - (map) shows surface oil covers spotty throughout area.  
Does not appear to be as much as areas A & B-1. Evidences of work and pictures were still visible.

<table>
<thead>
<tr>
<th>AFFILIATION</th>
<th>NAME</th>
<th>SIGNATURE</th>
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<tbody>
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</tbody>
</table>

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**LOCATION**: Tonsina Bay  
**SEGMENT**: TB 004  
**SUBDIVISION**: A  
**DATE**: 9/16/93

**AFFILIATION**  
**NAME**: Roger J. MacCoud  
**SIGNATURE**:

**SURVEYED**  
L - MITZ, sheens observed on surface throughout area due to light rain, particularly near streams. Some sheen observed in stream (4-5)  
Subsurface oil found in 1.5 cm deep in area B-1, mixed w/ bay water. Area A - (map) shows surface oil covers spotty throughout area.  
Does not appear to be as much as areas A & B-1. Evidences of work and pictures were still visible.

**AFFILIATION**  
**NAME**: Roger J. MacCoud  
**SIGNATURE**:

**AFFILIATION**  
**NAME**: Roger J. MacCoud  
**SIGNATURE**:

---
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 09:00

SEGMENT: TB004 STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: SHEEN FROM LSOR AND LOR IN PIT FOUND IN MITZ, LOCATION A

TAKEN BY: CLARA CROSBY INITIALS: C.C
ROLL #: 93CSC009 FRAME #: 20 EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 09:00

SEGMENT: TB004 STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: HOR/OP AT PIT #4, LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: C.C
ROLL #: 93CSC009 FRAME #: 23 EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 09:00

SEGMENT: TB004 STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: HOR/OP AT PIT #4, LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: C.C
ROLL #: 93CSC009 FRAME #: 22 EVIDENCE ID#: ___
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 0900

SEGMENT#: TB004 STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT #5, HOR/OP, LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: CC
ROLL #: 93CSC009 FRAME #: 25 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 09:00

SEGMENT#: TB004 STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO:HOR/OP AT PIT #5, LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: CC
ROLL #: 93CSC009 FRAME #: 24 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 0930

SEGMENT#: TB004 STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT #9, HOR/OP, BROWN SHEEN ON PIT WATER. LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: CC
ROLL #: 93CSC009 FRAME #: 28 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/16/93 TIME: 0930

SEGMENT#: TB004 STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT #9, HOR/OP, BROWN SHEEN ON PIT WATER. LOCATION B

TAKEN BY: CLARA CROSBY INITIALS: CC
ROLL #: 93CSC009 FRAME #: 27 EVIDENCE ID#:
OFFICIAL PHOTOGRAPH  ADEC  EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 09:00
SEGMENT#: TB004  STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -O-
REASON FOR TAKING PHOTO:SHEEN ON STREAM, SILVER SHEENS FORMING BROWN SHEENS AND MS, LOCATION A
TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC009  FRAME #: 16  EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH  ADEC  EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 09:00
SEGMENT#: TB004  STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -O-
REASON FOR TAKING PHOTO:SURFACE OIL OBSERVED ACTIVELY SHEENING IN MITZ, LSOR-HSOR, LOCATION A
TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC009  FRAME #: 15  EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH  ADEC  EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 09:00
SEGMENT#: TB004  STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -O-
REASON FOR TAKING PHOTO:SHEEN ON STREAM, SILVER SHEENS FORMING BROWN SHEENS AND MS, EDGE OF LOCATION A
TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC009  FRAME #: 18  EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH  ADEC  EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 09:00
SEGMENT#: TB004  STATION#: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORDS: -O-
REASON FOR TAKING PHOTO:SHEEN ON STREAM, SILVER SHEENS FORMING BROWN SHEENS AND MS, EDGE OF LOCATION A
TAKEN BY: CLARA CROSBY  INITIALS: CSC
ROLL #: 93CSC009  FRAME #: 17  EVIDENCE ID#: ___
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 0930

SEGMENT: TB004  STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: OILING ALONG LOCATION C, STREAM HAS CUT A CROSS-SECTION ALONG THE OILED BANK EXPOSING MOR/HOR/HSOR. REFERENCE PHOTO #14 FOR OVERVIEW OF AREA.
TAKEN BY: CLARA CROSBY  INITIALS: CC
ROLL #:93CSC009  FRAME #: 31  EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 0930

SEGMENT: TB004  STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: OIL FLOWING FROM SEDIMENT, MOR/OP AT PIT #9, IN LOCATION B.
TAKEN BY: CLARA CROSBY  INITIALS: CC
ROLL #:93CSC009  FRAME #: 30  EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 0930

SEGMENT: TB004  STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: OILING ALONG LOC C, CLOSE-UP OF MOR/HOR IN PHOTO #11. REFERENCE PHOTO #14 FOR OVERVIEW OF AREA.
TAKEN BY: CLARA CROSBY  INITIALS: CC
ROLL #:93CSC009  FRAME #: 34  EVIDENCE ID#: 

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE  DATE: 09/16/93  TIME: 0930

SEGMENT: TB004  STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO: OILING ALONG LOC C, CLOSE-UP OF MOR/OP/HSOR IN PHOTO #31. REFERENCE PHOTO #14 FOR OVERVIEW OF AREA.
TAKEN BY: CLARA CROSBY  INITIALS: CC
ROLL #:93CSC009  FRAME #: 32  EVIDENCE ID#: 
**1993 ADEC RESTORATION PROJECT # 930380**

**SHORELINE OILING SUMMARY**

**TEAM MEMBERS:**
- Clara Clossy - ADEC
- Roger W. Campbell - ADNR
- Jeff Johnson - ADNR

**TIME:** 06:00 to 09:30

**TIDE LEVEL:** -1.3 ft. to 0 ft.

**ENERGY LEVEL:**
- [ ] H
- [ ] M
- [ ] L

**SURVEYED FROM:**
- [ ] FOOT
- [ ] BOAT
- [ ] HELO

**WEATHER:**
- [ ] SUN
- [ ] CLOUDS
- [ ] FOG
- [ ] RAIN
- [ ] SNOW

**DATE:** 09/110/93

**TOTAL LENGTH SHORELINE SURVEYED:** _______ m

**NEAR SHORE SHEEN:**
- [ ] BR
- [ ] RB
- [ ] SL
- [ ] NONE

**EST. OIL CATEGORY LENGTH:**
- H _______ m
- M _______ m
- L _______ m
- VL _______ m
- N _______ m
- NS _______ m

---

### SHORE OIL CHARACTER

<table>
<thead>
<tr>
<th>SURFACE OIL CHARACTER</th>
<th>SURFACE SEDIMENT</th>
<th>SHORE TYPE</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**DISTRIBUTION:**
- C = 91-100%
- B = 61-90%
- P = 11-60%
- S = 1-10%
- T = <1%

**SLOPE:**
- V = VERTICAL
- M = MEDIUM ANGLE
- L = LOW ANGLE

---

### SURFACE/SUBSURFACE

<table>
<thead>
<tr>
<th>OILED ZONE</th>
<th>OILED CLEAN BELOW</th>
<th>SHEEN COLOR</th>
<th>PIT</th>
<th>SUBSURFACE SEDIMENTS</th>
</tr>
</thead>
<tbody>
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**SHEEN COLOR:**
- B = BROWN
- R = RAINBOW
- S = SILVER
- N = NONE
RESTORATION SHORELINE OILING SUMMARY (cont.)

TEAM NO.

SEGMENT 3004

SUBDIVISION A

DATE 09/11/91

<table>
<thead>
<tr>
<th>PIT</th>
<th>PIT NO.</th>
<th>DEPTH</th>
<th>SUBSURFACE OIL CHARACTER</th>
<th>OILED ZONE</th>
<th>CLEANED</th>
<th>M2O LEVEL</th>
<th>SHEEN COLOR</th>
<th>PIT</th>
<th>SURFACE- SUBSURFACE SEDIMENTS</th>
<th>NOTES</th>
</tr>
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</table>

SHEEN COLOR: B = BROWN; R = RAINBOW; S = SILVER; N = NONE

OG COMMENTS: Survey limited to low - mid intertidal zone.

Light brown indicate oil sheen throughout the intertidal in locations A, B, E. Sheen is associated with surface oil residual - L-H.

Evidence of previous work (i.e. impressions from tending craft excavation pits) remain.

In locations B & C - subsurface oiling points below cobble armor - up to 13 cm deep.
TONSINA BAY
KACHEMAK BAY STATE WILDERNESS PARK
09 - 16 - 93

0800 - 0930
K. McCampbell, Jeff Johnson, ADNR
C. Crossby, ADGC

STANDING DEAD

DRIFT LOGS

STORM BERM

LOCATION "D"
10 x 20m
LSOR/MSOR/HSOR/SR

"Grim Beach" TB004A TONSINA BAY

LOCATION "A"
2x3m FL
Sor to Sor
Spreading thin
MOB: 1983001

LOCATION "B"
1x7m
Hor to OP
Subsurf fine
Trace Signal to SHV

AP
Hor to Sor
Sporadic flow

STANDARDS SURVEYED

Approximately
20m 40m 1

Loc. E
2x3
MSOR - LSOR - FL
Sheens leaching from undisturbed soils at low tide
### 1993 Surface Oil Summary

#### Segment TB004 Subdivision A

<table>
<thead>
<tr>
<th>Location</th>
<th>AP</th>
<th>MS</th>
<th>SOR</th>
<th>CV</th>
<th>CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>0</td>
<td>72</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>0</td>
<td>0.035</td>
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<tr>
<td>C</td>
<td>0</td>
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<td>0.36</td>
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<tr>
<td>D</td>
<td>0</td>
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<tr>
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<td>73.425</td>
<td>0</td>
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</tr>
</tbody>
</table>

AP= asphalt; MS= mousse; SOR= surface oil residue; CV= cover; CT= coat

Areas are computed by multiplying the affected area by the percent coverage of each oil type. Field categories of percent oil coverage are converted to the median percent value as follows:

- continuous= 95%;
- broken= 70%;
- patchy= 30%;
- sporadic= 6%;
- trace= 0.5%
**SUBSURFACE OIL SUMMARY FOR SEGMENT TB004A**

<table>
<thead>
<tr>
<th>Loc.</th>
<th>1993 PIT #</th>
<th>Gr. Sz.</th>
<th>Zn.</th>
<th>En.</th>
<th>Note</th>
<th>1993 OILED SED. VOL. (m³)</th>
<th>1992 OILED SED. VOL. (m³)</th>
<th>1991 OILED SED. VOL. (m³)</th>
<th>WT.'ed OIL VOL.</th>
<th>% CHANGE WT.'ed VOL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZA</td>
<td>1, 2</td>
<td>CPS-G-SM</td>
<td>M</td>
<td>M</td>
<td>MUSSELS, FUCUS</td>
<td>Rs</td>
<td>MT, Rs, Rb</td>
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<tr>
<td>ZB</td>
<td>3, 5, 9</td>
<td>CF-GSM</td>
<td>M</td>
<td>M</td>
<td></td>
<td>NO</td>
<td>NO</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>ZC</td>
<td>11</td>
<td>CPS-SMGP</td>
<td>M</td>
<td>M</td>
<td></td>
<td>NO</td>
<td>MT, Rs, Rb</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TOTALS</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Loc.** = location name of specific oiling area (subsite).

**1993 PIT #** = the number designations, as indicated on the 1993 survey forms, of the pits in the subsite.

**Gr. Sz.** = grain size, a dash separates surface from subsurface sediments, B= boulders, C= cobbles, P= pebbles, G= granules, S= sand, M= mud, Pt= peat.

**Zn.** = inter tidal zone, S= supra tidal, H= high inter tidal, M= mid inter tidal, L= low inter tidal.

**En.** = wave-energy level, H = high, M= moderate, L= low, VL= very low.

**TREATMENT** = cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual raking, ?= unknown, NO= no treatment.

**OILED SED. VOL.** = oiled-sediment volume in cubic meters by year and oil type, OP= oil pore, pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone, HOR= heavy oil residue, pore spaces partially filled with oil residue but not generally flowing out of sediments, MOR= medium oil residue, heavily coated sediments, pore spaces are not filled with oil - pore spaces may be filled with water, LOR= light oil residue, sediments lightly coated with oil, OF= oil film, continuous layer of sheen or film on sediments - water may bead on sediments, TR= trace, discontinuous film; spots of oil on sediments; an odor or tackiness with no visible evidence of oil, ?= area of subsite not visited or adequately surveyed.

**WT.'ed OIL VOL.** = weighted oiled-sediment volume = (OP VOL.)*5 + (HOR VOL.)*4 + (MOR VOL.)*3 + (LOR VOL.)*2

**% CHANGE WT.'ed OIL VOL.** = % change in weighted oiled-sediment volume between the given years = ((year 2 - year 1)/(year 1))*100, positive values indicate increases in the amount of oil, negative values indicate decreases, "Inf" (infinite percent increase) indicates newly discovered oil.
OFFICIAL PHOTOGRAPH
ADEC
EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE
DATE: 09/16/93
TIME: 09:00

SEGMENT: TB004
STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO:
SHEEN IN STREAM, SILVER TO BROWN.
AREA WAS ACTIVELY SHEENING UPON ARRIVAL AND NOT THE
RESULT OF SEDIMENT AGITATION.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC009
FRAME #: 13
EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH
ADEC
EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE
DATE: 09/16/93
TIME: 09:00

SEGMENT: TB004
STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO:
PAN OVERVIEW OF "GRIM BEACH", TONSINA
BAY, PHOTOS 7-11.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC009
FRAME #: 11
EVIDENCE ID#: ___

OFFICIAL PHOTOGRAPH
ADEC
EXXON VALDEZ OIL SPILL
OFFICE: ANCHORAGE
DATE: 09/16/93
TIME: 09:00

SEGMENT: TB004
STATION: 312
LOCATION: TONSINA BAY, GULF OF ALASKA
KEYWORD: -0-
REASON FOR TAKING PHOTO:
PAN OVERVIEW OF "GRIM BEACH", TONSINA
BAY, PHOTOS 7-11.

TAKEN BY: CLARA CROSBY
INITIALS: CSC
ROLL #: 93CSC009
FRAME #: 12
EVIDENCE ID#: ___