

COLL  
GC  
1552  
P79  
E993  
RP93038  
G52d  
V.3

**1993 SHORELINE ASSESSMENT  
DATA REPORT: VOLUME 3  
(Ground Surveys KN209A through LA015D)**

**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**



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**SEGMENT:** KN 209 A

**LOCATION:** Knight Island Outer Group, east shore of Knight Island outside of Louis Bay.

**OTHER STUDIES**

ADEC transect station #56.

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

This is a pocket beach with exposed cliffs and areas of large boulders on the limbs. The pocket is partitioned by shallow and low outcrops that divide the southern third of the beach from the northern two thirds. In the southern third, the beach is composed of large, subrounded to rounded boulders and scattered low-lying bedrock. The mid intertidal of the northern two thirds consist of rounded large cobbles and small boulders on the surface showing reverse grading to large pebbles and small cobbles with depth. The subsurface has a large cobble and small boulder framework with a sandy, pebbly, granular matrix. High-tide pebble and drift log berms are present and the surface grain size increases toward the lower intertidal. Several very subtle berms are present in the mid intertidal. These berms are slightly finer grained on top than on the seaward berm face. These berms may have been caused by extensive tilling and berm relocation activity in 1990. The drift log storm berm in the northern two thirds of the pocket is also in a jumbled, unnatural state caused by the 1990 treatment. Along the northern limb of the beach, a relatively protected boulder field is present at the base of the cliff.

**Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 7; gravel beach.

**Fetches and Directions (kilometers)**

NE= 55; E= 55; SE= 31

**Energy Level**

Overall high with some moderate areas protected by bedrock and very large boulders.

**GENERAL BIOLOGICAL SETTING**

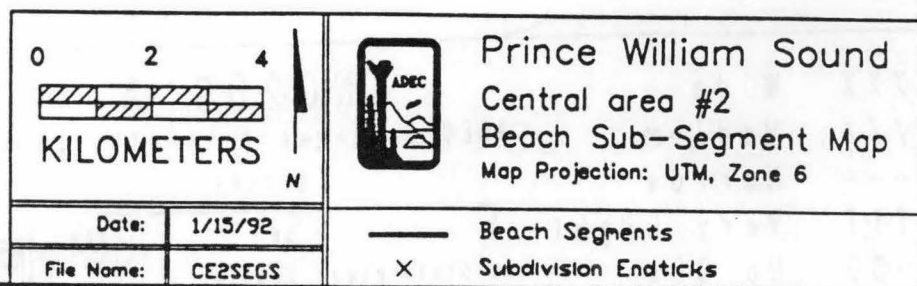
Eagle nest.

**OILING SUMMARY**

The only appreciable surface oil occurs as CT on logs along the storm berm in the northern part of the beach. This oiling was also present in 1991. In 1991 along the cliff on the northern limb and in the boulder field at the base of the cliff, AP and CV was reported that was not present in 1991.

Subsurface oil in 1993 occurs in two distinct areas one along the northern limb near the base of the cliff and the other spanning the southern part of the beach. Both sites contain

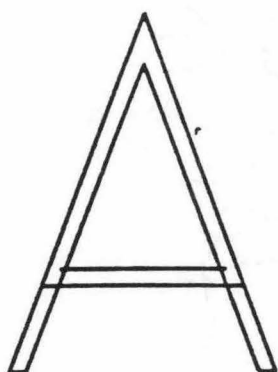
substantial amounts of OP oil in a distinct layer below clean sediments. The southern site, which lies in boulders and among low-lying bedrock, did not improve since 1991 despite manual treatment. Aggressive mechanical treatment of the northern site in 1991, however, reduced the amount of subsurface oil by about 50%. The subsurface oil in the northern site formerly extended across the beach and away from the cliff.





+

+



1/2 by 1/2 inch  
2 meters very light

AREA of 1993  
SURVEY SAME  
AS FINSAP

1 meter narrow  
Note: {Expands to 8 meters moderate}  
after Finsap. Treatment.

7/21/93

+

+

XXXX

Wide

/////

Medium

----

Narrow

TTTT

Very Light

0000

No Oil

KN0209 A

ADEC Subsegment Length: 266m

METERS

AK State Plane Zone 4

KN0209



Subdivision Field Map

Map Key: KN1KN0209A

Name: ReimerDate: 05/16/92

Date Entered:



1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

LOCATION KNIGHT ISLAND SEGMENT KN0209 SUBDIVISION A DATE 7/21/93

AFFILIATION  
NAME ME Mauro VSCG SIGNATURE [Signature]  
Concern w/ Shoreline Oiling Summary as written. Shoreline  
activities conducted, during this survey not expected to  
result in oil-water release.

AFFILIATION  
NAME Vic Baer U.S.F.S. SIGNATURE Vic Baer  
- Wind rowed logs stacked above high tide should have  
- been pulled down by heavy equip. for tide action effect.  
- IF heavy equip. is every in area this could be done, but  
- do not recommend equip. be brought out specifically  
for this work.

AFFILIATION  
NAME KATIE FARLEY ADNR/DOL SIGNATURE Kathleen M Farley  
- There is a section of heavily-oiled tidelands however;  
- the beach is of high energy, so gradually the oil  
- may become diluted. The only "environmental  
- sensitivity" listed is an eagle nest in the vicinity.  
- If the ~~nest~~ are not found to be directly affected by  
- the presence of the oil, then no further restoration will be  
- necessary.

AFFILIATION  
NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

# 1993 ADEC RESTORATION PROJECT # 930380 SHORELINE OILING SUMMARY

PAGE 1 OF 3

SEGMENT KN0209

SUBDIVISION A

DATE 7/21/93

TEAM MEMBERS: DIANNE MUMFORD, CHARA CASBY, JIM GIOFANT  
TONI MATTHEWS (ADEC)  
VIC BAER (USFS), KATIE FARLEY (ADEC)  
PHIL MEANS (USFS)  
ED OWENS, SAM STOKER (EXXON)

TIME 06:20 to 09:30 TIDE LEVEL +3.0 ft. to -3.0 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

EST. OIL CATEGORY LENGTH: H \_\_\_\_\_ m M \_\_\_\_\_ m L \_\_\_\_\_ m VL \_\_\_\_\_ m N \_\_\_\_\_ m NS \_\_\_\_\_ m

| L<br>O<br>C | SURFACE OIL CHARACTER |    |    |    |    |    |    |    |    |    | SURFACE<br>SEDIMENT | SHORE<br>SLOPE | AREA  |        | ZONE |    |    |    | NOTES                  |
|-------------|-----------------------|----|----|----|----|----|----|----|----|----|---------------------|----------------|-------|--------|------|----|----|----|------------------------|
|             | AP                    | MS | TB | SO | CV | CT | ST | FL | DB | NO | TYPE                | VHML           | WIDTH | LENGTH | S    | UI | MI | LI |                        |
|             |                       |    |    |    |    |    |    |    |    |    |                     |                | m     | m      |      |    |    |    |                        |
| A           |                       |    |    |    |    | S  |    |    |    |    | R,B                 | V              | 2     | 11     |      |    |    |    | PROTECTED SIDES        |
| B           |                       | C  |    |    | C  |    |    |    |    |    | R,B,C,P             | M              | 1     | 1      |      |    |    |    | COZING FROM UNDER BLD. |
| C           |                       |    |    |    |    |    | S  |    |    |    | B,C,P               | M              | 15    | 70     |      |    |    |    |                        |
| D           |                       |    |    |    |    | P  | P  |    |    |    | B,C,P,D             | H              | 1     | 40     |      |    |    |    | DRED DEBRIS IN A...    |
| E           |                       |    |    |    |    | P  | P  |    |    |    | R,B,C,P             | H              | 1     | 2      |      |    |    |    |                        |
| F           |                       |    |    |    |    | S  | S  |    |    |    | R                   | V              | 1.5   | 15     |      |    |    |    |                        |
|             |                       |    |    |    |    |    |    |    |    |    |                     |                |       |        |      |    |    |    |                        |
|             |                       |    |    |    |    |    |    |    |    |    |                     |                |       |        |      |    |    |    |                        |
|             |                       |    |    |    |    |    |    |    |    |    |                     |                |       |        |      |    |    |    |                        |
|             |                       |    |    |    |    |    |    |    |    |    |                     |                |       |        |      |    |    |    |                        |

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

| SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE |                      |                             |     |     |     |    |    |    |                        | PHOTO ROLL #          |                      | FRAMES                    |             |    |    |    |                                     |             |             |
|----------------------------------------------------------------------|----------------------|-----------------------------|-----|-----|-----|----|----|----|------------------------|-----------------------|----------------------|---------------------------|-------------|----|----|----|-------------------------------------|-------------|-------------|
| PIT<br>NO.                                                           | PIT<br>DEPTH<br>(cm) | SUBSURFACE<br>OIL CHARACTER |     |     |     |    |    |    | OILED<br>ZONE<br>cm-cm | CLEAN<br>BELOW<br>Y/N | H2O<br>LEVEL<br>(cm) | SHEEN<br>COLOR<br>B R S N | PIT<br>ZONE |    |    |    | SURFACE-<br>SUBSURFACE<br>SEDIMENTS | NOTES       |             |
|                                                                      |                      | OP                          | HOR | MOR | LOR | OF | TR | NO |                        |                       |                      |                           | S           | UI | MI | LI |                                     |             |             |
| 1                                                                    | 21                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 2                                                                    | 29                   |                             |     |     |     |    |    |    | -                      |                       | 18-29                | N                         |             |    |    |    |                                     | R,C,P/P,G   |             |
| 3                                                                    | 21                   |                             |     |     |     |    |    |    | 8-17                   | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 4                                                                    | 22                   |                             |     |     |     |    |    |    | 9-12                   | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 5                                                                    | 17                   |                             |     |     |     |    |    |    | 3-7                    | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 6                                                                    | 23                   |                             |     |     |     |    |    |    | 2-19                   | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 7                                                                    | 18                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 8                                                                    | 23                   |                             |     |     |     |    |    |    | 11-15                  | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 9                                                                    | 19                   |                             |     |     |     |    |    |    | 5-11                   | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 10                                                                   | 25                   |                             |     |     |     |    |    |    | 12-19                  | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 11                                                                   | 28                   |                             |     |     |     |    |    |    | 25-28                  | N                     |                      |                           |             |    |    |    |                                     | R,C,P/P     | Rock Under  |
| 12                                                                   | 33                   |                             |     |     |     |    |    |    | 14-21                  | Y                     |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 13                                                                   | 22                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 14                                                                   | 21                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 15                                                                   | 19                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 16                                                                   | 26                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 17                                                                   | 17                   |                             |     |     |     |    |    |    | 13-9                   |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 18                                                                   | 28                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G   |             |
| 19                                                                   | 32                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 20                                                                   | 29                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G,S |             |
| 21                                                                   | 49                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P     | ON TRANSECT |
| 22                                                                   | 41                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C,P/P,G   | ON TRANSECT |
| 23                                                                   | 21                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    |                                     | R,C/P       | ON TRANSECT |

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

PAGE 2 OF 2

TEAM NO. \_\_\_\_\_

SEGMENT KN0209

SUBDIVISION A

DATE 7 / 21 / 1988

[illegible]

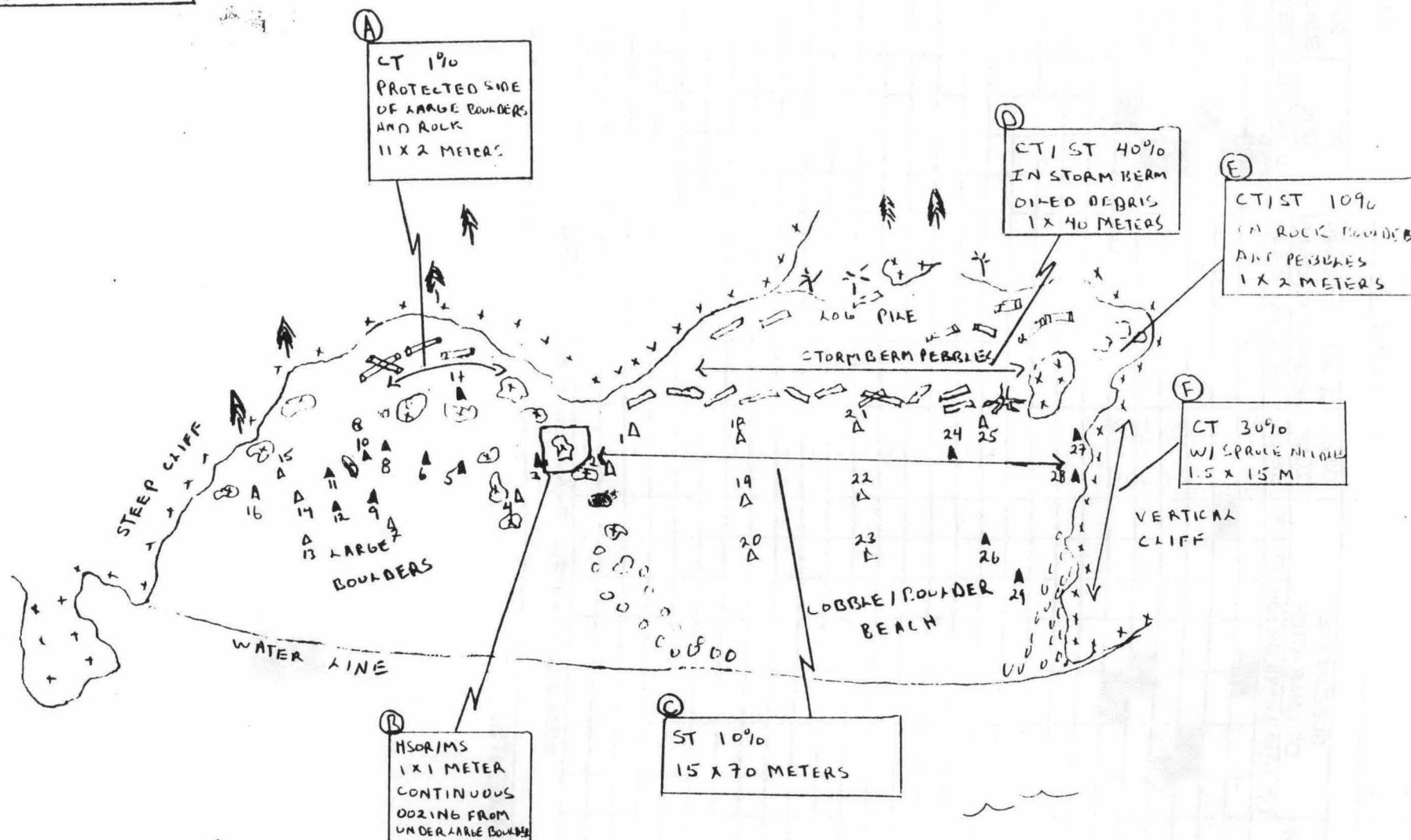
SHEEN COLOR: B = BROWN; R = RAINBOW; S = SILVER; N = NONE

**OG COMMENTS:**

KN209 A  
07-21-93

D. MUNSON

# KNIGHT ISLAND



1993 Surface Oil Summary  
Segment KN209                      Subdivision A

| Location | Area of Oiling Type in Square Meters |      |      |    |       |
|----------|--------------------------------------|------|------|----|-------|
|          | AP                                   | MS   | SOR  | CV | CT    |
| A        | 0.                                   | 0.   | 0.   | 0. | 1.32  |
| B        | 0.                                   | 0.95 | 0.95 | 0. | 0.    |
| C        | 0.                                   | 0.   | 0.   | 0. | 0.    |
| D        | 0.                                   | 0.   | 0.   | 0. | 12.   |
| E        | 0.                                   | 0.   | 0.   | 0. | 0.6   |
| F        | 0.                                   | 0.   | 0.   | 0. | 1.35  |
| TOTALS=  | 0.                                   | 0.95 | 0.95 | 0. | 15.27 |

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 KN209A**

| Loc.    | 1993 PIT # | Gr. Sz.  | Zn. | En. | Note | TREATMENT |        | 1993 OILED SED. VOL. (m3) |     |      |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |     |     |      |       | WT.'ed OIL VOL. |      |       | % CHANGE WT.'ed VOL. |          |          |
|---------|------------|----------|-----|-----|------|-----------|--------|---------------------------|-----|------|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|------|-------|-----------------|------|-------|----------------------|----------|----------|
|         |            |          |     |     |      | 1992      | 1991   | OP                        | HOR | MOR  | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR  | OF/TR | 1993            | 1992 | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA      | 3-12       | BCP-GPCB | U   | H   |      | Rs,MR     | Rs,MR  | 8.2                       | 0.0 | 1.7  | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 7.9                       | 1.0 | 0.0 | 0.7  | 0.0   | 46.3            | ?    | 45.0  | ?                    | ?        | 2.9      |
| ZB      | 24,26-29   | PC-GPC   | SU  | H   |      | NO        | ET, Rs | 7.4                       | 4.5 | 12.5 | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 23.7                      | 7.5 | 0.0 | 19.4 | 4.9   | 92.2            | ?    | 187.6 | ?                    | ?        | -50.9    |
| TOTALS= |            |          |     |     |      |           |        | 15.6                      | 4.5 | 14.2 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 31.6                      | 8.6 | 0.0 | 20.1 | 4.9   | 138.5           | 0.0  | 232.6 | Inf                  | -100.0   | -40.5    |

**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 VOL.**= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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: 07/21/93 TIME: -0-

SEGMENT#: KN0209 STATION#: -0-  
LOCATION: NE KNIGHT ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: WIDE ANGLE PHOTO OF SURFACE MOUSSE  
AMONG BOULDERS AND UNDER COBBLES IN AREA B ON SKETCH  
MAP.

TAKEN BY: DIANNE MUNSON INITIALS: DRM  
ROLL #: 93DRM001 FRAME #: 26 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209 STATION#: -0-  
LOCATION: NE KNIGHT ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: PHOTO IN AREA B. ROLLING BACK B/C TOP  
LAYER REVEALS MOUSSE AT PEBBLE LAYER BUT DOES NOT  
EXTEND INTO SUBSURFACE SEDIMENTS LIKE SURROUNDING  
PITS.

TAKEN BY: DIANNE MUNSON INITIALS: DRM  
ROLL #: 93DRM001 FRAME #: 28 EVIDENCE ID#:

TAKEN BY: DIANNE MUNSON INITIALS: DRM  
ROLL #: 93DRM001 FRAME #: 25 EVIDENCE ID#:

REASON FOR TAKING PHOTO: CLOSEUP PHOTO OF SURFACE MS AMONG  
BOULDERS AND UNDER COBBLES IN AREA B ON SKETCH MAP.  
KEYWORDS: -0-  
LOCATION: NE KNIGHT ISLAND  
SEGMENT#: KN0209 STATION#: -0-

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

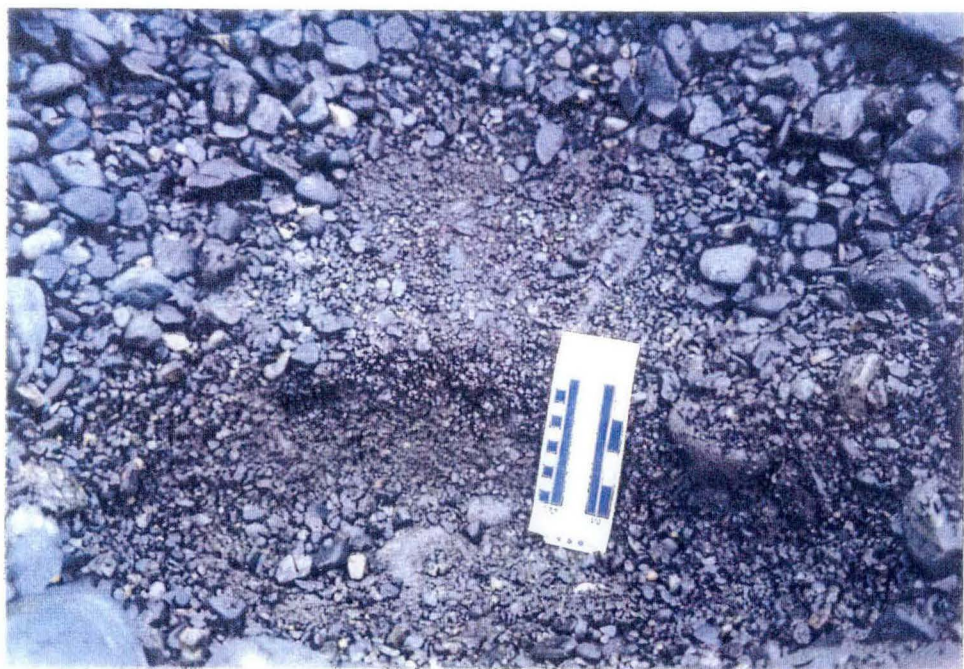
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209 STATION#: -0-  
LOCATION: NE KNIGHT ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: BEACH OVERVIEW OF KN0209 LOOKING SOUTH  
FROM MIDDLE OF BEACH IN AREA B ON SKETCH MAP.  
SURVEY TEAM DOCUMENTING OIL.

TAKEN BY: DIANNE MUNSON INITIALS: DRM  
ROLL #: 93DRM001 FRAME #: 27 EVIDENCE ID#:







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: WIDE ANGLE PHOTO OF PIT 4 SHOWING  
SUBSURFACE OIL IN AREA B.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 30

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP PHOTO OF 21 CM PIT 3 SHOWING  
OP LENS 9 CM IN DEPTH IN AREA B.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 29

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP PHOTO OF PIT 10 SHOWING OP/MS  
LENS 6 CM IN DEPTH.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 32

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP PHOTO OF PIT 8 SHOWING OP LENS  
4 CM IN DEPTH.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 31

EVIDENCE ID#: \_\_\_\_\_





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/21/93 TIME: -0-

SEGMENT#: KN0209

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: WIDE ANGLE PHOTO OF PIT 10 SHOWING  
OP/MS LENS 6 CM IN DEPTH.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 33

EVIDENCE ID#: \_\_\_\_\_

**KN 211 B**

**SEGMENT:** KN 211 B

**LOCATION:** Knight Island Outer Group, northeast coast of Knight Island.

**OTHER STUDIES**

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

Deeply embayed pocket beach at the head of a broad bay. The pocket is approximately 100 m across. The limbs of the pocket are steep bedrock and subrounded boulders. Boulder beaches are in each corner of the pocket and grade along shore to a well rounded cobble and pebble beach with berms at the head of the pocket beach. Reverse grading is evident in the cobble and pebble sediments with cobbles and large pebbles grading with depth to small pebbles and then to a pebble gravel with a sandy, granular matrix at about 30 cm depth. Several bedrock outcrops occur along the head of the beach.

**Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 7; gravel beach.

**Fetches and Directions (kilometers)**

E= 55.5; NE= 65; SE= 33

**Energy Level**

High.

**GENERAL BIOLOGICAL SETTING**

Anadromous stream.

**OILING SUMMARY**

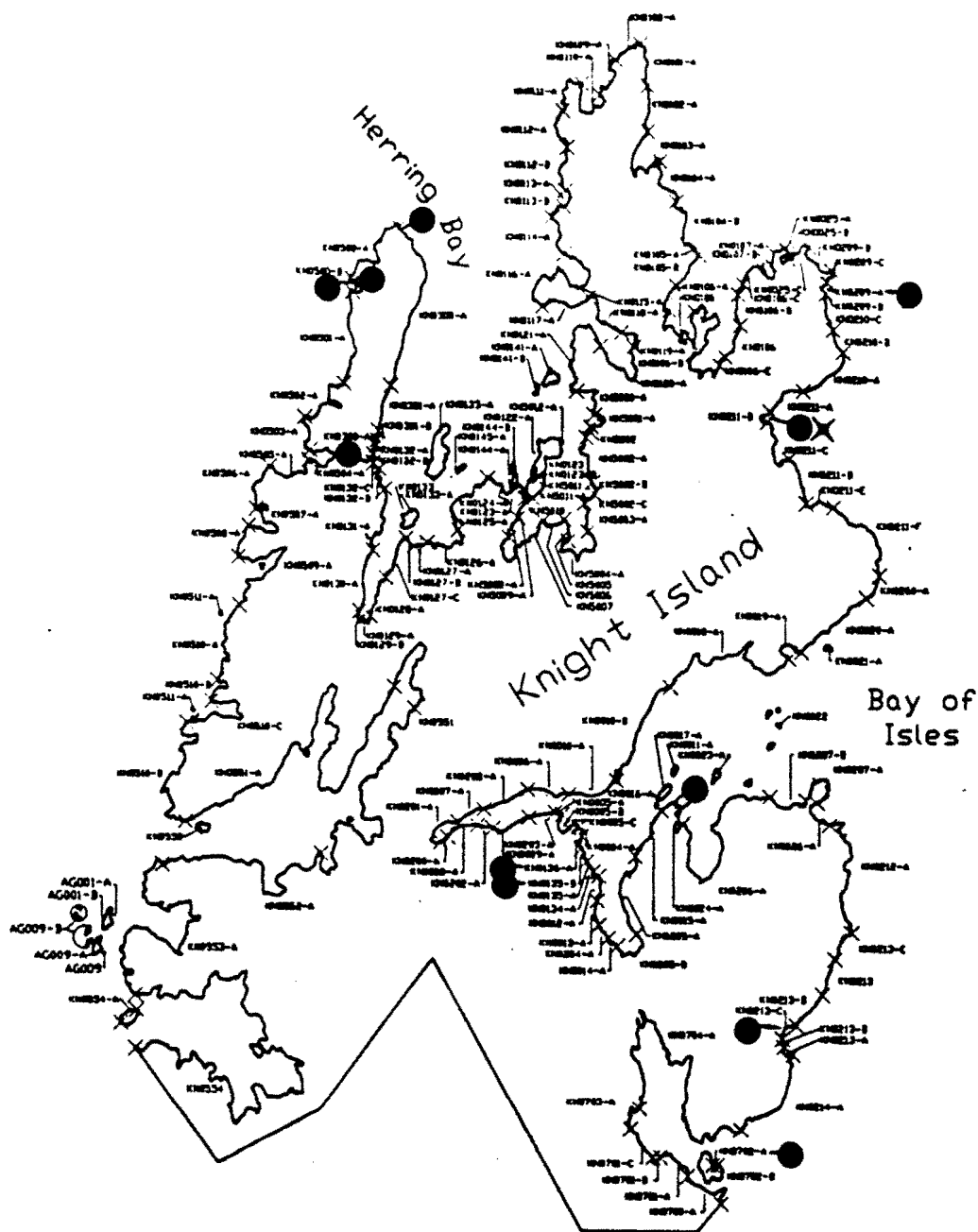
Three significant areas of soft (MS and SOR) surface oil remain at this site. All three areas contain oil in the interstices of boulder and cobble sediments in the corners of the pocket beach. The 1991 and 1992 surveys recorded about the same amounts of SOR and MS in the area of location 'B' in the south corner of the pocket, and no improvement is detectable from the 1993 survey. Some AP recorded in this same general area in 1991, however, was not discovered in 1993. In addition, a location of SOR was recorded in 1991 along the southern limb, but only a much smaller area of CV and CT (1993 location 'A') was discovered here in 1993. In 1993, surveyors found about the same amounts of surface oil in locations 'D' and 'F' in the north corner that were recorded in 1991. An area of MS patties discovered around the northern stream was not present in 1993. Finally, one large and concentrated area of CV and CT occurs on the north limb (location 'G').

One area of significant subsurface oil remains. A brown, emulsified OP lens occurs at about 20 cm below the surface in the upper intertidal zone in cobble, pebble gravel near the southern corner of the site. This subsurface oil was not discovered in 1991 or 1993. While the survey team prepared to leave the beach MS was found just below the surface in



the mid-intertidal zone in the center of the beach. There was not enough time to investigate the extent of this oil.

Two other areas of significant subsurface oil occurred in 1991 that greatly improved by 1993. In the southern corner, manual removal in 1991 caused a significant decrease in a HOR area that was associated with heavy SOR conditions. This area is approximately coincident with surface location 'B' in the 1993 survey. Extensive manual removal and tilling in 1991 around the northern stream eliminated HOR from the upper and mid intertidal zone, although discovery of the subsurface MS in the mid intertidal zone, as mentioned above, may be a remnant.



|                                   |         |
|-----------------------------------|---------|
| 0      2      4<br><br>KILOMETERS |         |
| Date:                             | 1/15/92 |
| File Name:                        | CE2SEGS |



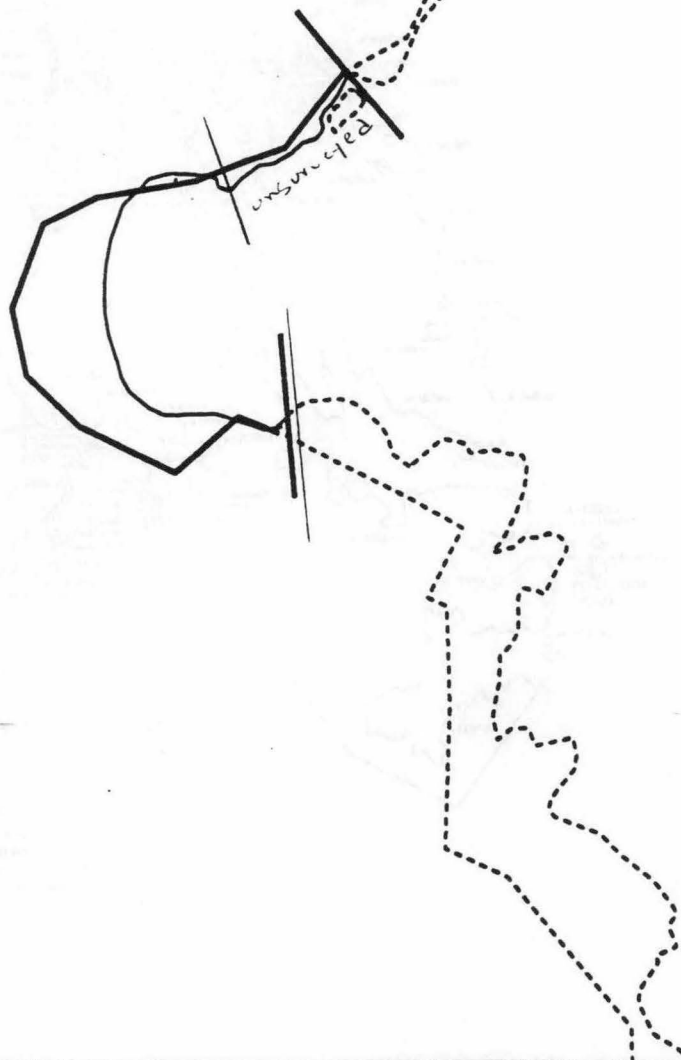
Prince William Sound  
Central area #2  
Beach Sub-Segment Map  
Map Projection: UTM, Zone 6

- Beach Segments
- Subdivision Endticks

+

+

B



+

+

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

KN0211 B  
ADEC Subsegment Length: 431m  
METERS  
0 100 200  
AK State Plane Zone 4  
ttn0211b



Subdivision Field Map  
Map Key: KNKN0211B  
Name: D.M.  
Date: 7/20/93  
Date Entered:



**1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET**

IC. IN KNIGHT IS. SEGMENT KN0211 SUBDIVISION B DATE 7/20/93

AFFILIATION DNR DIVISION of Land  
NAME W. J. Kiley SIGNATURE W. J. Kiley

A lot of oil seemed to have the highest concentration of oil. It would be important to hand tell this area of the segment and mop it up with sorbent material. After collecting the bulk of the heaviest oil, just leaving the pits open and allowing for flushing and dispersion action would help accelerate the cleansing process. A lot of logs and plastics have washed up here.

AFFILIATION USCG  
NAME Phil Means SIGNATURE Phil Means

Concur w/ Shoreline Oiling Summary as written. Shoreline activities conducted during this survey not expected not expected to result in on-water release.

AFFILIATION U.S.F.S.  
NAME Vic Bae SIGNATURE Vic Bae

Only minor amounts of surface oil and do not recommend the need for further treatment. Not used heavily by recreationists.

AFFILIATION \_\_\_\_\_  
NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

# 1993 ADEC RESTORATION PROJECT # 930380 SHORELINE OILING SUMMARY

PAGE 1 OF 3

SEGMENT KN0211

SUBDIVISION B

DATE 07/20/93

TEAM MEMBERS: J. Matthews, D. Munson, J. Gibeault ADEC  
K. Farley - ADNR, P. Means USCG  
Ed Owens Sunstaker - Exxon  
Natalie Fokes - photographer  
Clara Crosby ADEC, Vic Bauer USFS

TIME 18:10 to 19:50

TIDE LEVEL +6 ft. to +1.8 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

| L<br>O<br>C | SURFACE OIL CHARACTER |    |    |    |    |    |    |    |    |    | SURFACE<br>SEDIMENT<br>TYPE | SHORE<br>SLOPE<br>VHML | AREA  |        | ZONE |    |    |    | NOTES                          |
|-------------|-----------------------|----|----|----|----|----|----|----|----|----|-----------------------------|------------------------|-------|--------|------|----|----|----|--------------------------------|
|             | AP                    | MS | TB | BO | CV | CT | ST | FL | DB | NO |                             |                        | WIDTH | LENGTH |      |    |    |    |                                |
|             |                       |    |    |    |    |    |    |    |    |    |                             |                        | m     | m      | S    | UI | MI | LI |                                |
| A           |                       |    |    |    | S  | S  |    |    |    |    | B.R                         | M                      | 5     | 2      |      |    |    |    |                                |
| B           |                       | P  |    | P  |    |    |    |    |    |    | BCP                         | M                      | 9     | 13     |      |    |    |    |                                |
| C           |                       |    |    |    |    |    |    |    |    |    | PG                          | L                      |       |        |      |    |    |    | Subsurface oil lens no sur     |
| D           |                       | P  |    | P  |    |    |    |    |    |    | BCP                         | M                      | 5     | 19     |      |    |    |    |                                |
| E           |                       | T  |    | T  |    |    |    |    |    |    | BCP                         | M                      | 4     | 12     |      |    |    |    |                                |
| F           |                       | P  |    | P  | T  | T  |    |    |    |    | BCP                         | H                      | 3     | 10     |      |    |    |    |                                |
| G           |                       |    |    |    | P  | P  |    |    |    |    | BR                          | M                      | 1     | 40     |      |    |    |    |                                |
| H           |                       | T  |    |    |    |    |    |    |    |    | CP                          | L                      | ?     | ?      |      |    |    |    | not surveyed due to time limit |

DISTRIBUTION: C = 81-100%; B = 51-80%; P = 11-50%; S = 1-10%; T = <1%

SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL #

FRAMES

| PIT<br>NO. | PIT<br>DEPTH<br>(cm) | SUBSURFACE<br>OIL CHARACTER |     |     |     |    |    |    | OILED<br>ZONE | CLEAN<br>BELOW | H2O<br>LEVEL | SHEEN<br>COLOR | PIT<br>ZONE |    |    |    | SURFACE-<br>SUBSURFACE<br>SEDIMENTS | NOTES             |
|------------|----------------------|-----------------------------|-----|-----|-----|----|----|----|---------------|----------------|--------------|----------------|-------------|----|----|----|-------------------------------------|-------------------|
|            |                      | OP                          | HOR | MOR | LOR | OF | TR | NO | cm-cm         | Y/N            | (cm)         | B R S N        | S           | UI | MI | LI |                                     |                   |
| 1          | 25                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              |                   |
| 2          | 46                   |                             |     |     |     |    |    |    | 31-40         | Y              | -            | -              |             |    |    |    | P / PG                              | Mousse lens       |
| 3          | 45                   |                             |     |     |     |    |    |    | 22-39         | Y              | -            | -              |             |    |    |    | P / PG                              | Mousse lens       |
| 4          | 30                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              |                   |
| 5          | 29                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              | peat on bottom    |
| 6          | 34                   |                             |     |     |     |    |    |    | 21-28         | Y              | -            | -              |             |    |    |    | P / PG                              | behind large rock |
| 7          | 27                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              |                   |
| 8          | 45                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              |                   |
| 9          | 47                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | PG / PG                             |                   |
| 10         | 56                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | PG / PG                             |                   |
| 11         | 36                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | CP / PG                             |                   |
| 12         | 24                   |                             |     |     |     |    |    |    | - - -         | -              | -            | -              |             |    |    |    | P / PG                              |                   |

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

PAGE 2 OF 3

TEAM NO. \_\_\_\_\_

SEGMENT KN0211

SUBDIVISION B

DATE 7, 20, 1983

[illegible]

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

**OG COMMENTS:**

LOCATION (4): At end of survey, crew located MS after rolling cobble in MITZ. It's likely survey crew missed some oil on this segment due to rising tide.

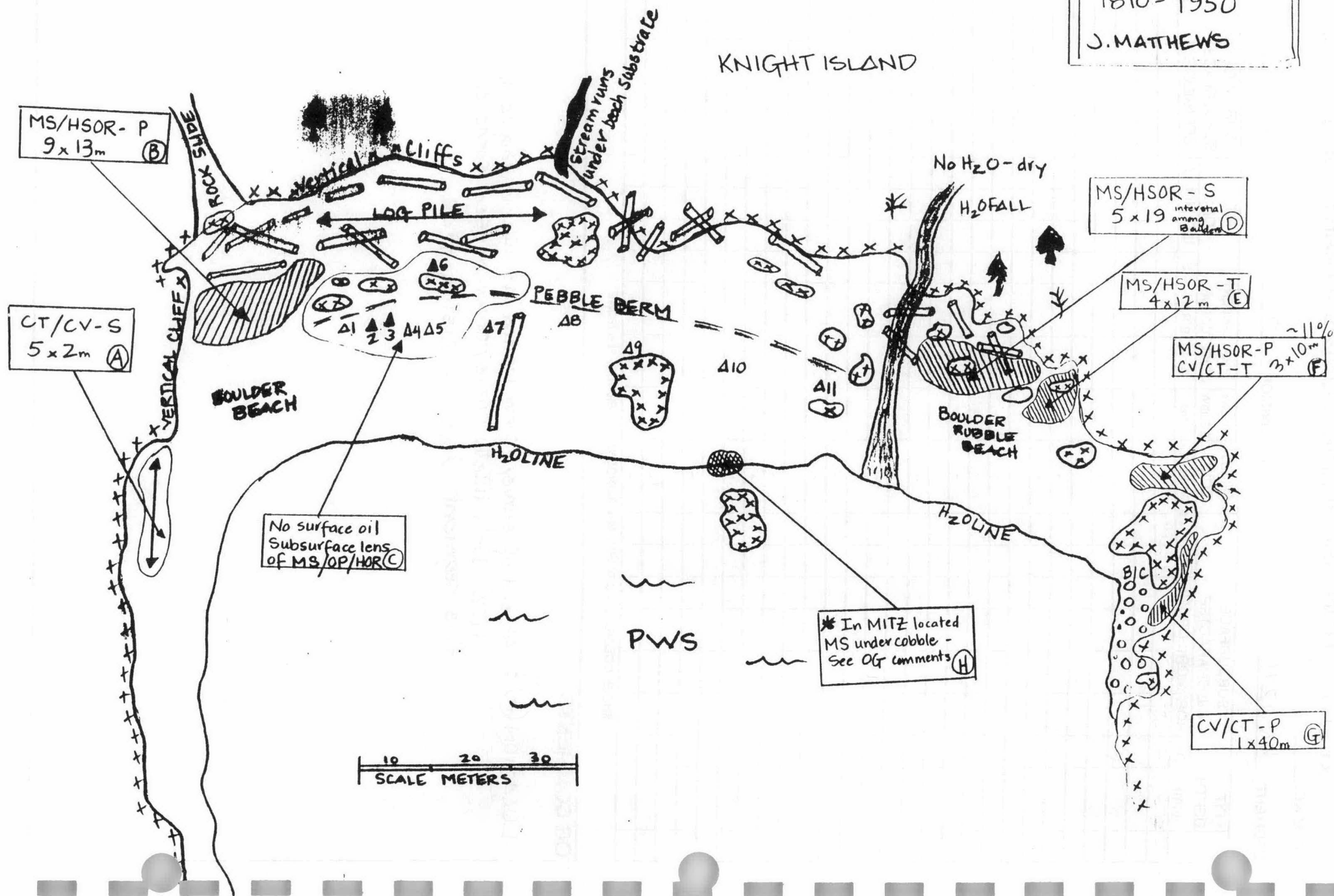
KN0211 B

7/20/93

1810-1950

J. MATTHEWS

KNIGHT ISLAND





1993 Surface Oil Summary  
Segment KN211                      Subdivision B

| Location | Area of Oiling Type in Square Meters |       |       |       |       |
|----------|--------------------------------------|-------|-------|-------|-------|
|          | AP                                   | MS    | SOR   | CV    | CT    |
| A        | 0.                                   | 0.    | 0.    | 0.6   | 0.6   |
| B        | 0.                                   | 35.1  | 35.1  | 0.    | 0.    |
| C        |                                      |       |       |       |       |
| D        | 0.                                   | 28.5  | 28.5  | 0.    | 0.    |
| E        | 0.                                   | 0.24  | 0.24  | 0.    | 0.    |
| F        | 0.                                   | 9.    | 9.    | 0.15  | 0.15  |
| G        | 0.                                   | 0.    | 0.    | 12.   | 12.   |
| H        |                                      |       |       |       |       |
| TOTALS=  | 0.                                   | 72.84 | 72.84 | 12.75 | 12.75 |

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 KN211B**

| Loc.    | 1993 PIT # | Gr. Sz. | Zn. | En. | Note | TREATMENT |        | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |      |     |     |       | WT.'ed OIL VOL. |      |      | % CHANGE WT.'ed VOL. |          |          |
|---------|------------|---------|-----|-----|------|-----------|--------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|------|-----|-----|-------|-----------------|------|------|----------------------|----------|----------|
|         |            |         |     |     |      | 1992      | 1991   | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR  | MOR | LOR | OF/TR | 1993            | 1992 | 1991 | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA      | 1-7        | P-PGpt  | U   | H   |      | NO        | NO     | 8.9                       | 0.0 | 0.0 | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 0.0                       | 0.0  | 0.0 | 0.0 | 0.0   | 44.7            | ?    | 0.0  | ?                    | ?        | Inf      |
| ZB      |            | BPC-PG  | U   | M   |      | MR, Rs    | Rs     | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 10.0 | 0.0 | 0.0 | 0.0   | 0.0             | 0.0  | 40.0 | 0.0                  | -100.0   | -100.0   |
| ZC      |            | PC-SG   | U   | H   |      | NO        | Rb, MT | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | ?                         | 0.0 | 0.0 | 0.0 | 0.0   | 0.4                       | 0.0  | 0.0 | 0.0 | 0.0   | 0.0             | ?    | 2.0  | ?                    | ?        | -100.0   |
| ZD      |            | CPG-SG  | UM  | H   |      | NO        | MT, Rb | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 5.2  | 0.0 | 0.0 | 0.0   | 0.0             | 0.0  | 20.8 | 0.0                  | -100.0   | -100.0   |
| TOTALS= |            |         |     |     |      |           |        | 8.9                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.4                       | 15.2 | 0.0 | 0.0 | 0.0   | 44.7            | 0.0  | 62.8 | Inf                  | -100.0   | -28.8    |

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.

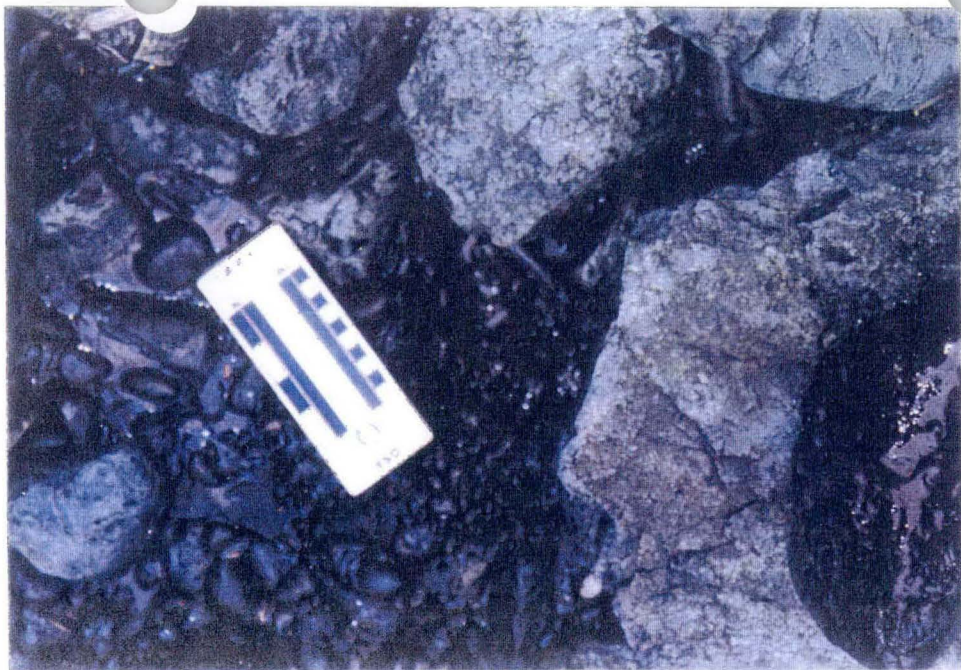
TREATMENT= cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual 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 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: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP OF MOUSSE UNDER BOULDER AND OIL ON SURFACE WITH SHEEN IN AREA B.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 2

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP OF MOUSSE UNDER BOULDER AND OIL ON SURFACE WITH SHEEN IN AREA B.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 1

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF MOUSSE UNDER BOULDER WITH SCALE IN AREA B.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 4

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF MOUSSE UNDER BOULDER AND OIL ON SURFACE WITH SHEEN IN AREA B.

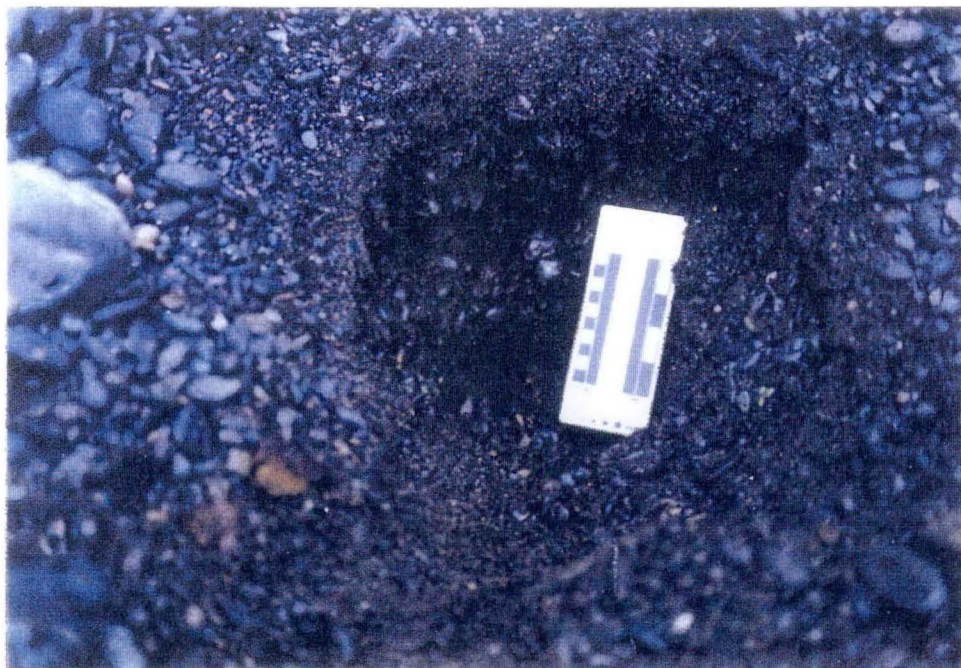
TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 3

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 46 CM PIT (2).  
LENS NOT RECORDED IN FINSAP DATA. NO FLASH IN  
PHOTO.

TAKEN BY: DIANNE MUNSON

ROLL #: 93DRM001 FRAME #: 6

INITIALS: DRM

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 46 CM PIT (2).  
LENS NOT RECORDED IN FINSAP DATA.

TAKEN BY: DIANNE MUNSON

ROLL #: 93DRM001 FRAME #: 5

INITIALS: DRM

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 45 CM PIT (3).  
LENS NOT RECORDED IN FINSAP DATA.

TAKEN BY: DIANNE MUNSON

ROLL #: 93DRM001 FRAME #: 9

INITIALS: DRM

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 46 CM PIT (2).  
LENS NOT RECORDED IN FINSAP DATA.

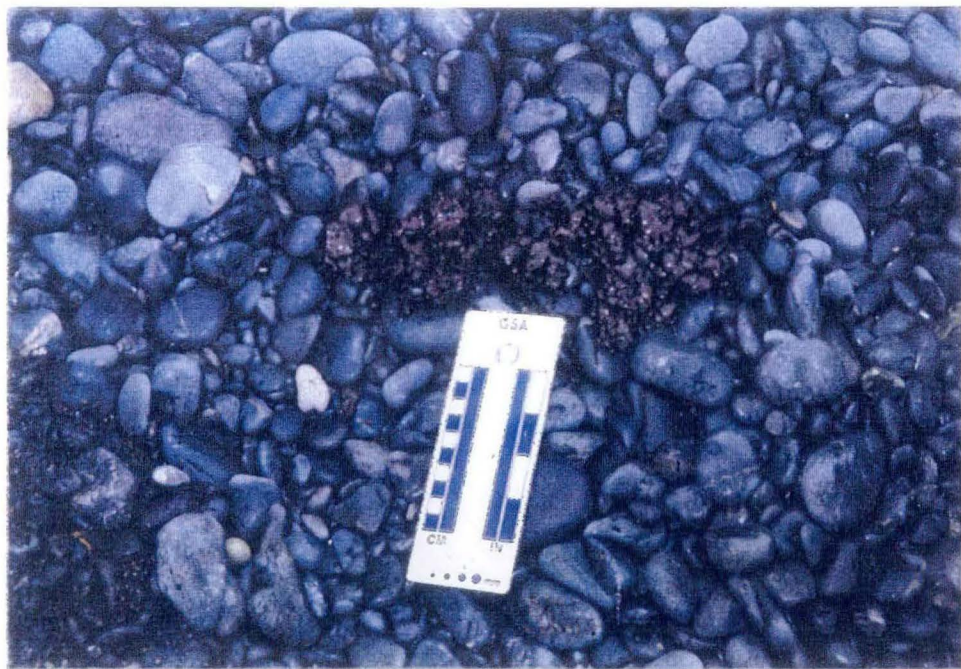
TAKEN BY: DIANNE MUNSON

ROLL #: 93DRM001 FRAME #: 7

INITIALS: DRM

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 45 CM PIT (3).  
LENS NOT RECORDED IN FINSAP DATA.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 11

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS LENS IN 45 CM PIT (3).  
LENS NOT RECORDED IN FINSAP DATA.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 10

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF SUBSURFACE OP/MS OILING TYPE  
ON COBBLE BEACH BETWEEN PITS IN AREA E.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 13

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF OP/MS OILING TYPE FROM PIT 3.

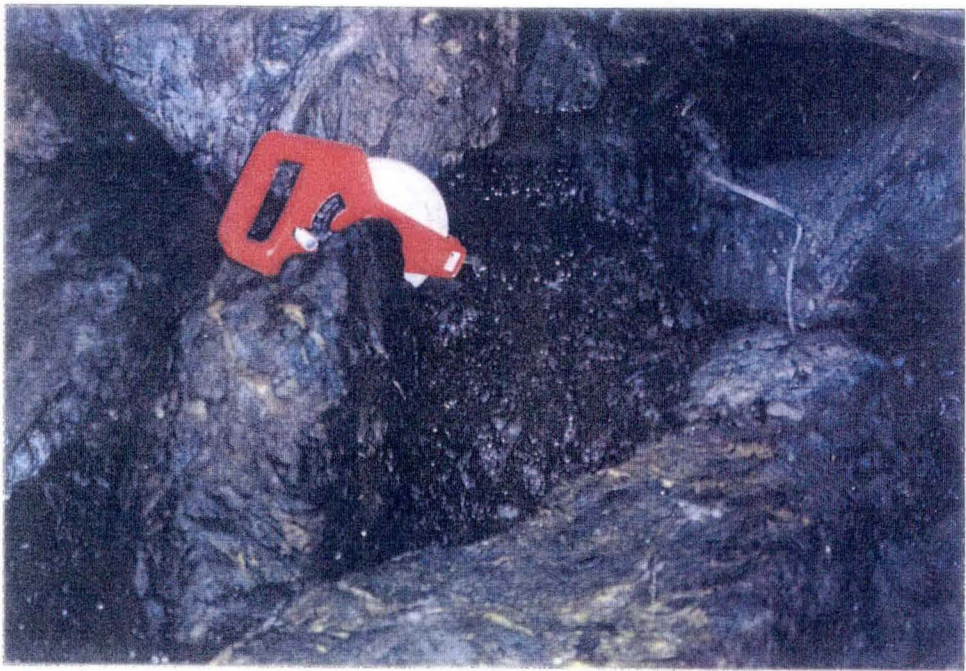
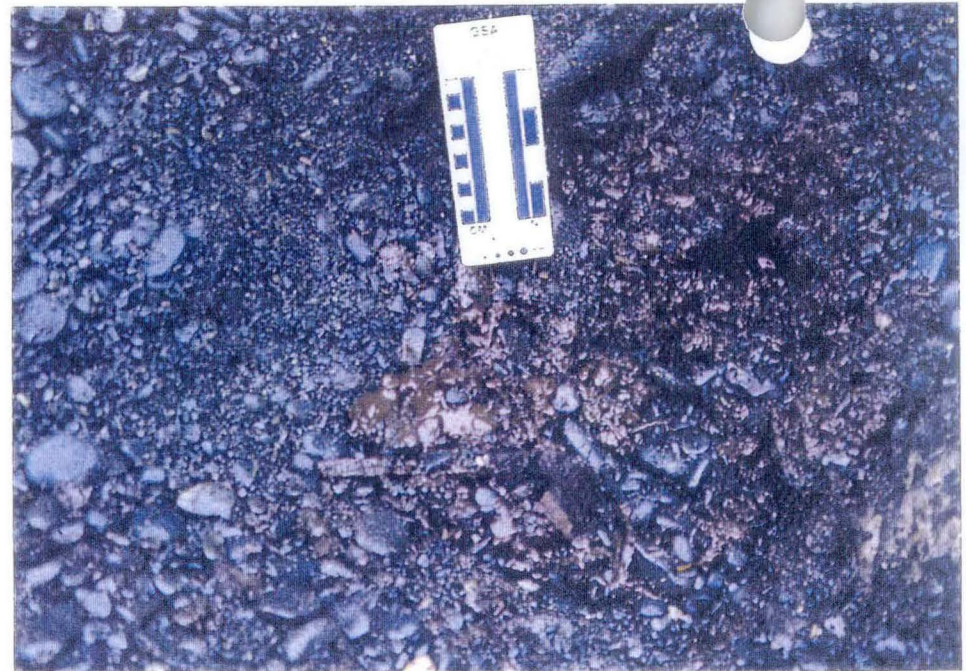
TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001 FRAME #: 12

EVIDENCE ID#: \_\_\_\_\_







# 1993 ADEC RESTORATION PROJECT # 930380

## SHORELINE OILING SUMMARY

PAGE 1 OF 3

SEGMENT KNOX

SUBDIVISION C

DATE 7/20/93

TEAM MEMBERS: Dianne Munson, Jon Matthews, Ernie Piper,  
Jim Libbert, L.J. Evans (ADEC)  
Katie Farley (ADNR), Phil Means (USCG)  
Sam Staker, Ed Owens (Exxon)

TIME 07:30 to 10:15

TIDE LEVEL -1.0 ft. to -1.0 ft.

ENERGY LEVEL: ☒ H ☐ M ☐ L

SURVEYED FROM: ☒ FOOT ☐ BOAT ☐ HELICOPTER

WEATHER: ☐ SUN ☒ CLOUDS ☐ FOG ☐ RAIN ☐ SNOW

TOTAL LENGTH SHORELINE SURVEYED: \_\_\_\_\_ m

NEAR SHORE SHEEN: ☐ BR ☐ RB ☐ SL ☒ NONE

E.O. OIL CATEGORY LENGTH: H \_\_\_\_\_ m M \_\_\_\_\_ m L \_\_\_\_\_ m VL \_\_\_\_\_ m N \_\_\_\_\_ m NS \_\_\_\_\_ m

| C | SURFACE OIL CHARACTER |    |    |     |    |    |    |    |    |    | SURFACE SEDIMENT TYPE | SHORE SLOPE V H M L | AREA    |          | ZONE |    |    |    | NOTES |
|---|-----------------------|----|----|-----|----|----|----|----|----|----|-----------------------|---------------------|---------|----------|------|----|----|----|-------|
|   | AP                    | MS | TB | SOR | CV | CT | ST | FL | DB | NO |                       |                     | WIDTH m | LENGTH m | S    | UI | MI | LI |       |
| A | B                     |    |    | B   | S  | S  |    |    |    |    | PCBR                  | M                   | 4       | 15       |      |    |    |    |       |
| J |                       |    |    |     | B  | B  |    |    |    |    | R                     | V                   | 1       | 12       |      |    |    |    |       |
| C | S                     |    |    | S   | S  |    |    |    |    |    | BR                    | H                   | 4       | 15       |      |    |    |    |       |
| D | P                     |    |    | P   | S  | S  |    |    |    |    | BB                    | H                   | 4       | 30       |      |    |    |    |       |
| J | S                     |    |    | S   |    |    |    |    |    |    | B                     | M                   | 20      | 15       |      |    |    |    |       |
| F | P                     |    |    | P   | S  | S  |    |    |    |    | B                     | M                   | 5       | 12       |      |    |    |    |       |
| B |                       |    |    |     |    | P  |    |    |    |    | R                     | V                   | 2       | 20       |      |    |    |    |       |
| L | S                     |    |    | S   |    |    |    |    |    |    | BC                    | M                   | 6       | 30       |      |    |    |    |       |

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

OPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL # \_\_\_\_\_

FRAMES \_\_\_\_\_

| PIT NO. | PIT DEPTH (cm) | SUBSURFACE OIL CHARACTER |     |     |     |    |    |    | OILED ZONE cm-cm | CLEAN BELOW Y/N | H2O LEVEL (cm) | SHEEN COLOR B R S N | PIT ZONE |    |    |    | SURFACE-SUBSURFACE SEDIMENTS | NOTES                               |
|---------|----------------|--------------------------|-----|-----|-----|----|----|----|------------------|-----------------|----------------|---------------------|----------|----|----|----|------------------------------|-------------------------------------|
|         |                | OP                       | HOR | MOR | LOR | OF | TR | NO |                  |                 |                |                     | S        | UI | MI | LI |                              |                                     |
| 1       | 23             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, B, P, G, P, G             |                                     |
| 2       | 21             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, C, P, P, G                |                                     |
| 3       | 22             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | C, P, G, P, G                |                                     |
| 4       | 27             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, C, P, C, P, G             |                                     |
| 5       | 18             |                          |     |     |     |    |    |    | 2-6              | -               | -              | -                   |          |    |    |    | R, C, P, C, P, G             |                                     |
| 6       | 20             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, C, P, P, G                |                                     |
| 7       | 21             |                          |     |     |     |    |    |    | 2-7              | -               | -              | -                   |          |    |    |    | B, C, P, P, G                | UNDER CLEAN SEDS                    |
| 8       | 25             |                          |     |     |     |    |    |    | 13-17            | -               | -              | -                   |          |    |    |    | B, C, P, P, G                | UNDER CLEAN SEDS OIL DOZ.           |
| 9       | 28             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, G                |                                     |
| 10      | 13             |                          |     |     |     |    |    |    | 2-6              | -               | -              | -                   |          |    |    |    | R, B, P, P, G                | MOUSE ON UNDERSIDE OF RIMED BOULDER |
| 11      | 12             |                          |     |     |     |    |    |    | 1-U              | U               | 7-12           | B                   |          |    |    |    | R, C, P, P, G                |                                     |
| 12      | 19             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, G, S             |                                     |
| 13      | 19             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, G, S             |                                     |
| 14      | 25             |                          |     |     |     |    |    |    | 2-25             | N               | -              | -                   |          |    |    |    | R, B, C, P, P, G, R          | ROCK UNDER                          |
| 15      | 21             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, C, P, P, G                |                                     |
| 16      | 24             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | R, C, P, P, G, S             |                                     |
| 17      | 18             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, S                |                                     |
| 18      | 11             |                          |     |     |     |    |    |    | 1-11             | N               | -              | -                   |          |    |    |    | R, C, P, P, G                | POOLED MS ON SURFACE NEAR PIT       |
| 19      | 25             |                          |     |     |     |    |    |    | 4-12             | Y               | -              | -                   |          |    |    |    | R, C, P, P, G                |                                     |
| 20      | 24             |                          |     |     |     |    |    |    | -                | -               | 17-24          | N                   |          |    |    |    | R, C, P, G, P, G, S          |                                     |
| 21      | 16             |                          |     |     |     |    |    |    | 1-15             | Y               | -              | -                   |          |    |    |    | B, C, P, P, G                |                                     |
| 22      | 26             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, G                |                                     |
| 23      | 34             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | B, C, P, P, G                |                                     |

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

1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

RUA COVE

CATION KNIGHT IS. SEGMENT KN0213 SUBDIVISION C DATE 7/20/93

ACTION DNR Division of Land

NAME KATE FARLEY SIGNATURE Kate M. Farley

This site was still heavily oiled in the low  
tidal regions. On the uplands of Rua Cove (privately  
owned) is an abandoned copper mine site. The area  
was last actively mined in the 1930's. It's possible  
that a mineral transfer facility may be requested  
and constructed on the tidelands. The presence of  
oil should be noted but probably wouldn't deter the  
transfer facility from occurring.

AFFILIATION

NAME Phil Means / USCG/DIT

SIGNATURE [Signature]

Concern w/ Shoreline Oiling Summary as written. Shoreline activities  
(pits, breakup of minor asphalt coverings) not expected to result  
in detectable on-water release.

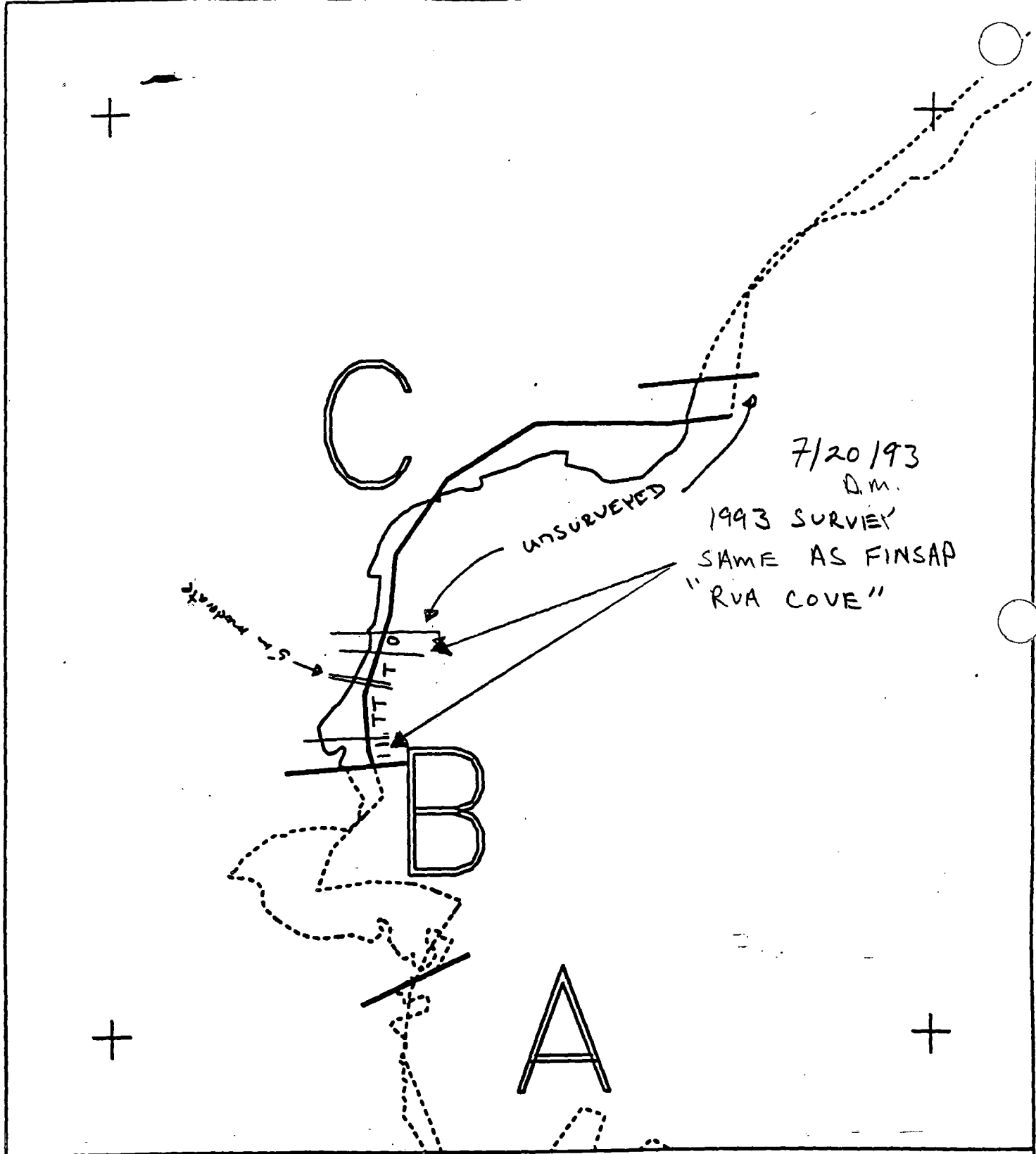
AFFILIATION

NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

AFFILIATION

NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_



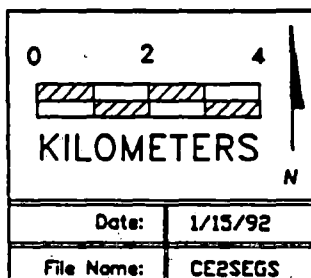
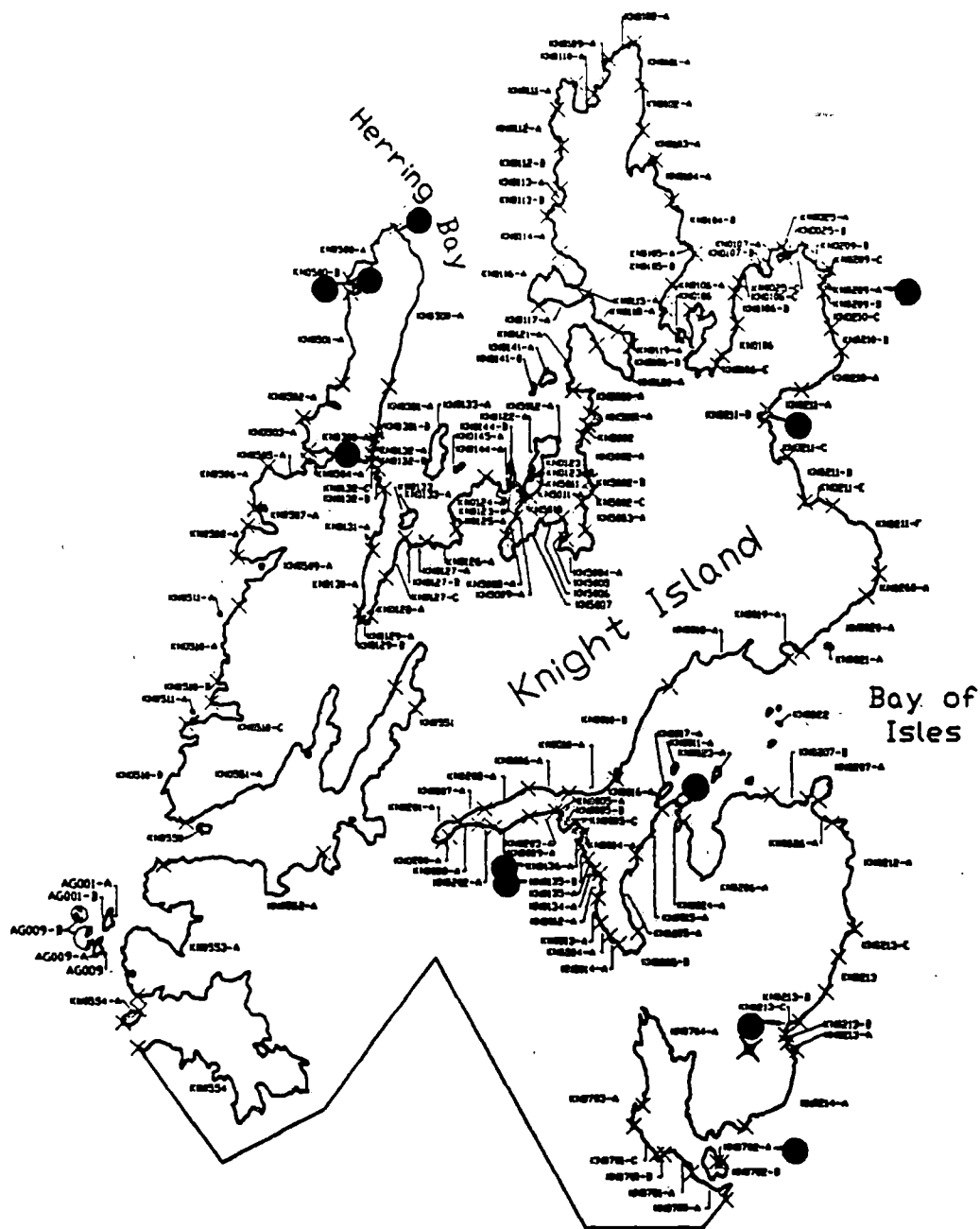


|      |            |
|------|------------|
| XXXX | Wide       |
| //// | Medium     |
| ---- | Narrow     |
| TTTT | Very Light |
| 0000 | No Oil     |

KN0213 C  
 ADEC Subsegment Length: 438m  
 METERS  
 100 200  
 AK State Plane Zone 4  
 660213c

Subdivision Field Map  
 Map Key: KNIK0213C  
 Name: Reimer  
 Date: 5/30/92  
 Date Entered:





Prince William Sound  
Central area #2  
Beach Sub-Segment Map  
Map Projection: UTM, Zone 6

— Beach Segments  
X Subdivision Endticks

One significant area of OP and HOR subsurface oil remains at this site (location ZA). This oil occurs in the upper intertidal zone below generally clean surface boulders and in the subsurface sandy, granular matrix (see photos of pit #10). This subsurface oil was not recorded in 1991 and 1992 but was very likely present. Two smaller areas had minor amounts of subsurface oil in 1993 and showed improvement since 1992 (they were not properly recorded in 1991). These locations are ZB and ZC (pits 3-9) on the south border of the site.



**SEGMENT:** KN 213 C

**LOCATION:** Knight Island Outer Group, eastern shore of Knight Island in Rua Cove.

**OTHER STUDIES**

ADEC transect station #49

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

Irregular embayment. This site is separated from an anadromous stream to the south by irregular bedrock outcrops and a pebble berm that spans an area between the landward cliff a seaward bedrock outcrop. The area surveyed includes subangular boulders and cobbles with a sandy, granular matrix in the subsurface. The boulders are generally larger at the base of the cliff in the supra and upper part of the upper intertidal zone than in the lower part of the upper and upper part of the mid-intertidal zone. The boulders in the lower mid-intertidal and the lower intertidal zones are also comparatively large. Bedrock outcrops in the lower intertidal and along the south border of this site exert much control on the sediment dynamics.

**Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 7; gravel beach.

**Fetches and Directions (kilometers)**

NE= 65; E= 24; SE= 14; S= 33

**Energy Level**

High with some bedrock-protected moderate locations.

**GENERAL BIOLOGICAL SETTING**

Anadromous stream bordering to the south.

**OILING SUMMARY**

Six locations of significant AP and SOR were found at this site. At all locations, the surface oil occurred between surface boulders (some very large) and on or between bedrock outcrops. All locations except 'E' are in the upper intertidal. Location 'E' is in the mid-intertidal zone. It appears that significant improvement has occurred in the concentrations and overall amounts of surface oil since 1991 on the south side of the site (general area of locations 'A', 'B', 'C', and 'E' in 1993). In 1991, concentrations of 30 to 60% AP and SOR were reported for this area, and in 1991, concentrations had dropped to less than 11%. Considerable manual removal was performed in this area in 1991 and 1992. Area 'E' does not appear to have improved since 1991, and in fact, 1993 surveyors recorded more oil here than in 1991. Surface oil in the large boulders along the back of the beach (locations 'D' and 'H'), and on the north side (location 'F') do not appear to have improved much since 1991. Locations 'D' and 'H' apparently were not treated in 1991 but location 'F' was manually treated. Some significant CV and CT areas persist at this site.

KN 213 C

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH OVERVIEW PHOTO LOOKING SOUTH  
TOWARD AREA D AND E IN SKETCH MAP.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 22

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH OVERVIEW PHOTO LOOKING SOUTH  
TOWARD AREA B IN SKETCH MAP.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 21

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH OVERVIEW PHOTO LOOKING NORTH IN  
AREA G IN SKETCH MAP. END OF SEGMENT.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 24

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KN0211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH OVERVIEW PHOTO LOOKING NORTH IN  
AREA F IN SKETCH MAP. SURVEY TEAM DOCUMENTING OIL.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 23

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP OF SUBSURFACE OP/MS OILING  
TYPE IN PIT WITH SCALE.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 16

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: CLOSEUP OF SUBSURFACE OP/MS OILING  
TYPE ON COBBLE BEACH WITH SCALE.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 14

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH OVERVIEW PHOTO LOOKING SOUTH  
TOWARD AREA B IN SKETCH MAP.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 20

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 07/20/93 TIME: -0-

SEGMENT#: KNO211

STATION#: -0-

LOCATION: NE KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PHOTO OF SURFACE MOUSSE BETWEEN  
BOULDERS IN AREA E.

TAKEN BY: DIANNE MUNSON

INITIALS: DRM

ROLL #: 93DRM001

FRAME #: 17

EVIDENCE ID#: \_\_\_\_\_

PAGE 2 OF 3

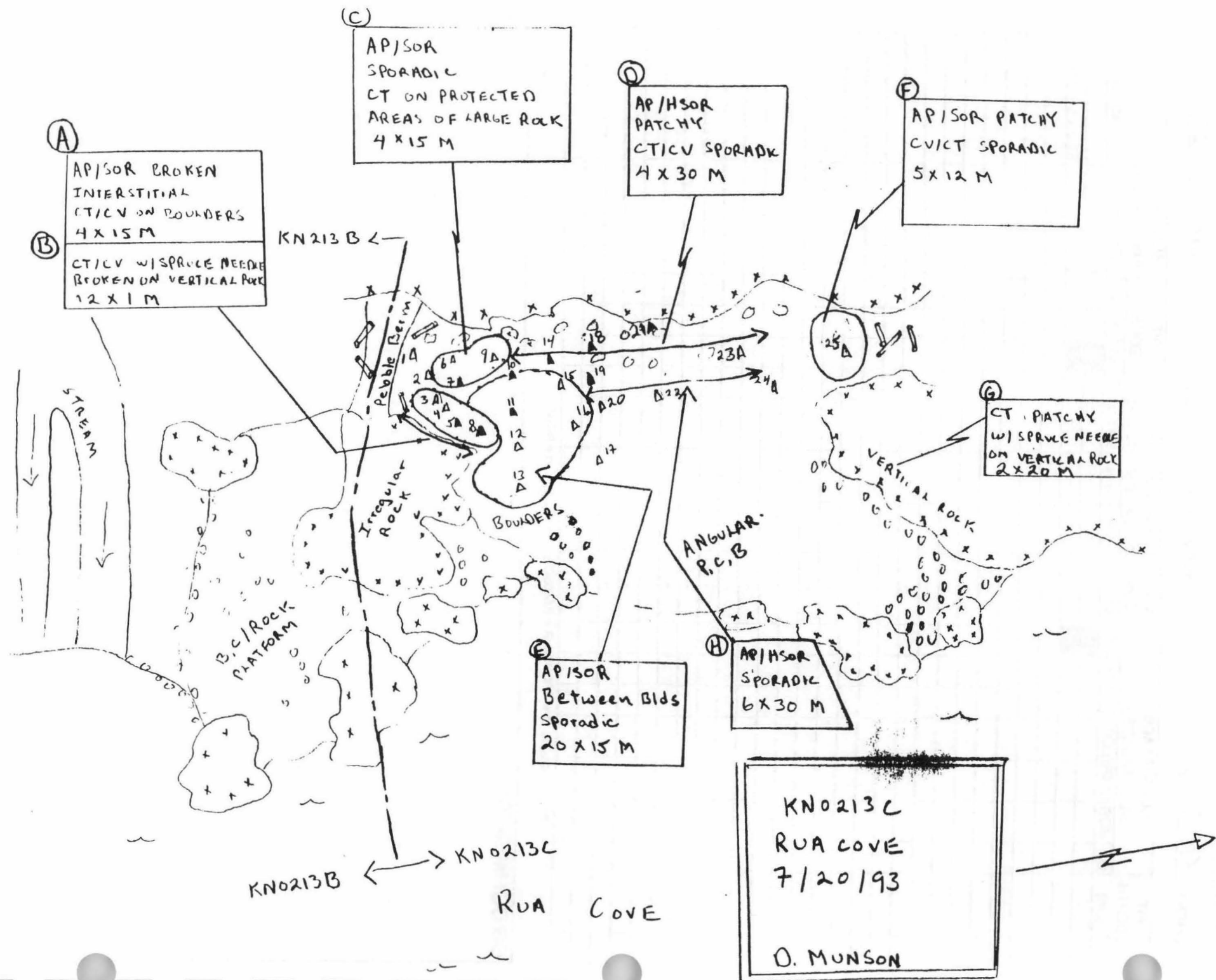
DATE 7, 20, 1943

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

**OG COMMENTS:**



C 2000 2001



1993 Surface Oil Summary  
Segment KN213                      Subdivision C

| Location | Area of Oiling Type in Square Meters |    |       |      |      |
|----------|--------------------------------------|----|-------|------|------|
|          | AP                                   | MS | SOR   | CV   | CT   |
| A        | 42.                                  | 0. | 42.   | 3.6  | 3.6  |
| B        | 0.                                   | 0. | 0.    | 8.4  | 8.4  |
| C        | 3.6                                  | 0. | 3.6   | 0.   | 3.6  |
| D        | 36.                                  | 0. | 36.   | 7.2  | 7.2  |
| E        | 18.                                  | 0. | 18.   | 0.   | 0.   |
| F        | 18.                                  | 0. | 18.   | 3.6  | 3.6  |
| G        | 0.                                   | 0. | 0.    | 0.   | 12.  |
| H        | 10.8                                 | 0. | 10.8  | 0.   | 0.   |
| TOTALS=  | 128.4                                | 0. | 128.4 | 22.8 | 38.4 |

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 KN213C**

| Loc. | 1993 PIT #           | Gr. Sz. | Zn. | En. | Note | TREATMENT |        | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |     |     |     |       | WT.'ed OIL VOL. |      |      | % CHANGE WT.'ed VOL. |          |          |
|------|----------------------|---------|-----|-----|------|-----------|--------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|-----------------|------|------|----------------------|----------|----------|
|      |                      |         |     |     |      | 1992      | 1991   | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | 1993            | 1992 | 1991 | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA   | 10,11,14,15,18,19,21 | BCPR-PG | U   | H   |      | MR, Rs    | NO     | 6.8                       | 3.2 | 0.0 | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 47.0            | ?    | 0.0  | ?                    | ?        | Inf      |
| ZB   | 6,7,9                | BCP-PG  | U   | M   |      | MT, Rs    | Rs, MR | 0.0                       | 1.0 | 0.0 | 0.0 | 0.0   | 3.8                       | 1.1 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 4.1             | 23.3 | 0.0  | -82.5                | Inf      | Inf      |
| ZC   | 3-5, 8               | BCP-PG  | U   | M   |      | MT, Rs    | Rs, MR | 0.6                       | 0.0 | 0.0 | 0.0 | 0.6   | 0.0                       | 1.6 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.4 | 0.2   | 3.0             | 6.4  | 0.8  | -53.1                | 700.0    | 275.0    |
|      |                      |         |     |     |      | TOTALS=   |        | 7.4                       | 4.2 | 0.0 | 0.0 | 0.6   | 3.8                       | 2.7 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.4 | 0.2   | 54.0            | 29.7 | 0.8  | 82.3                 | 1606.3   | 6655.0   |

**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.

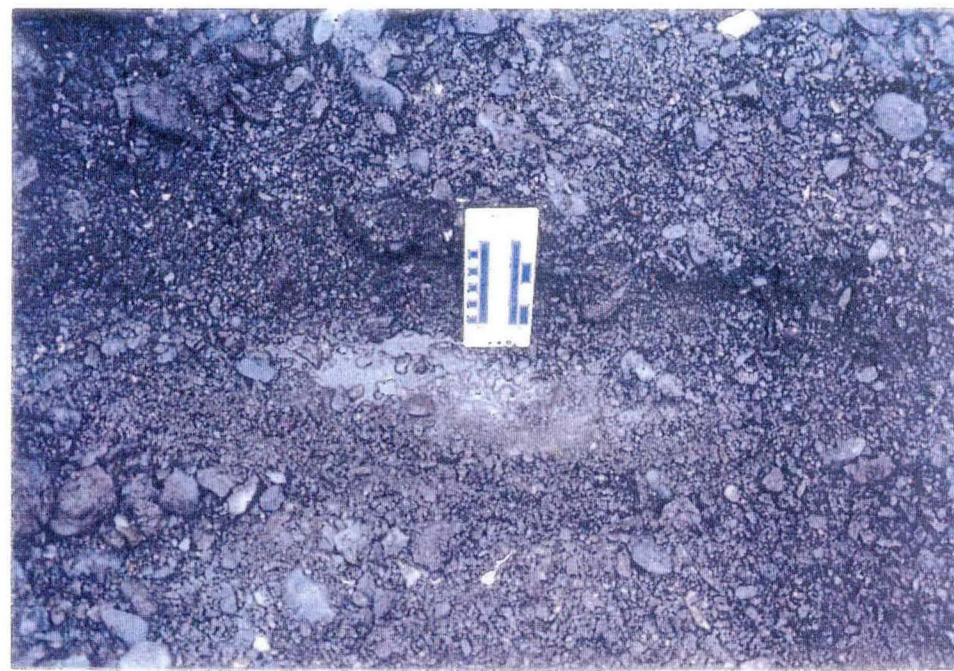
**TREATMENT**= cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual 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 VOL.**= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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: July 20, 1993 Time: 08:27 (8:27 am)Location (segment #): KN213CReason for taking photo: Coat with spruce  
needles (close-up, with flash) in rocks  
near intertidal zoneTaken by: L.J. Evans *LJE*Roll #: LJE002 Frame #: 033

## OFFICIAL PHOTOGRAPH

ADEC

Date: July 20, 1993 Time: 08:15 (8:15 am)Location (segment #): KN213CReason for taking photo: Overview from right  
under cliff; OP in frame 28 just to the  
rightTaken by: L.J. Evans *LJE*Roll #: LJE002 Frame #: 031

## OFFICIAL PHOTOGRAPH

ADEC

Date: July 20, 1993 Time: 09:00 (9:00 am)Location (segment #): KN213CReason for taking photo: Pit 7Taken by: L.J. Evans *LJE*Roll #: LJE003 Frame #: 001

## OFFICIAL PHOTOGRAPH

ADEC

Date: July 20, 1993 Time: 08:28 (8:28 am)Location (segment #): KN213CReason for taking photo: Coat with spruce  
needles (without flash) in rocks near  
intertidal zone.Taken by: L.J. Evans *LJE*Roll #: LJE002 Frame #: 034







OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:05 (9:05 am)

Location (segment #): KN213C

Reason for taking photo: Pit 10

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 004

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:00 (9:00 am)

Location (segment #): KN213C

Reason for taking photo: Pit 7 (out of focus -  
no good)

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 002

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:12 (9:12 am)

Location (segment #): KN213C

Reason for taking photo: Pit 11 & area just to  
side, showing surface HOR between  
cobble

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 006

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:10 (9:10 am)

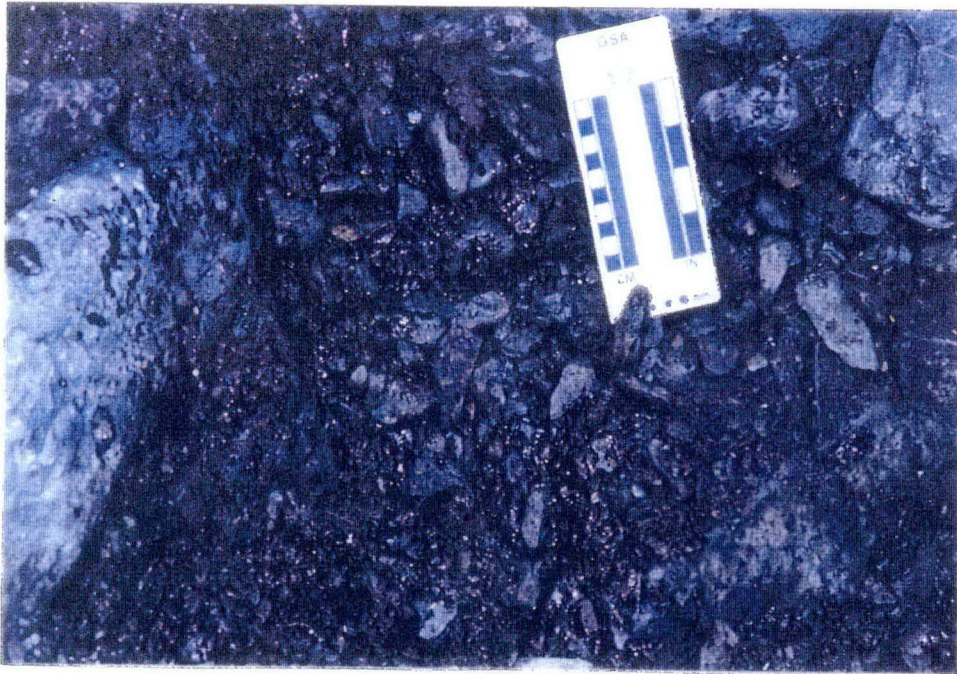
Location (segment #): KN213C

Reason for taking photo: Pit 11, Joni Matthews

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 005







**OFFICIAL PHOTOGRAPH ADEC**

Date: July 20, 1993 Time: 09:15 (9:15 am)

Location (segment #): KN213C

Reason for taking photo: Pit 14 (with flash)

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 007

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 20, 1993 Time: 09:05 (9:05 am)

Location (segment #): KN213C

Reason for taking photo: Pit 10

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 003

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 20, 1993 Time: 09:22 (9:22 am)

Location (segment #): KN213C

Reason for taking photo: Pit 18

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 012

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 20, 1993 Time: 09:15 (9:15 am)

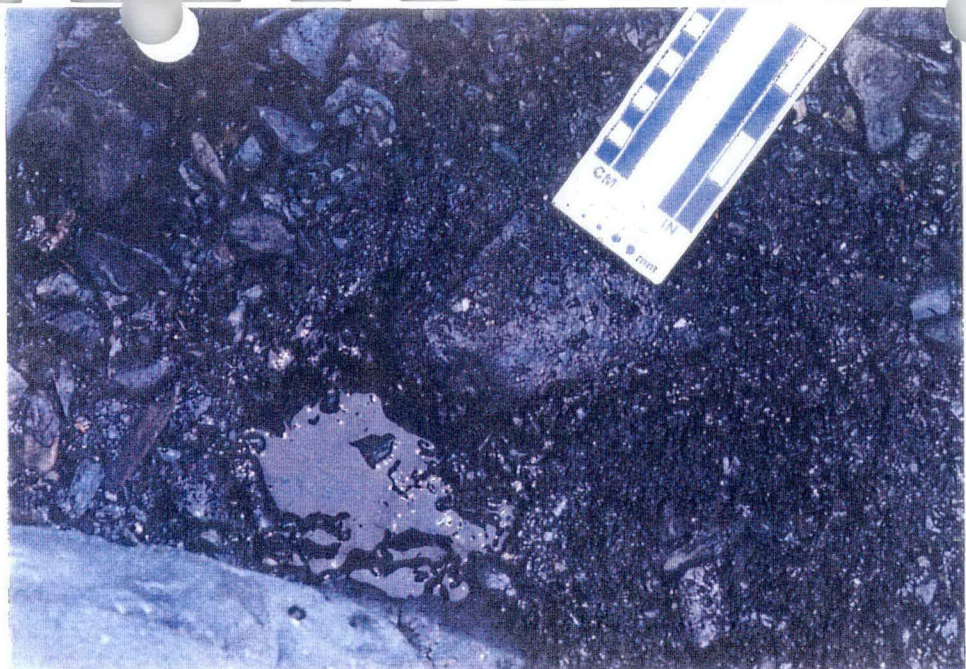
Location (segment #): KN213C

Reason for taking photo: Pit 14

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 010

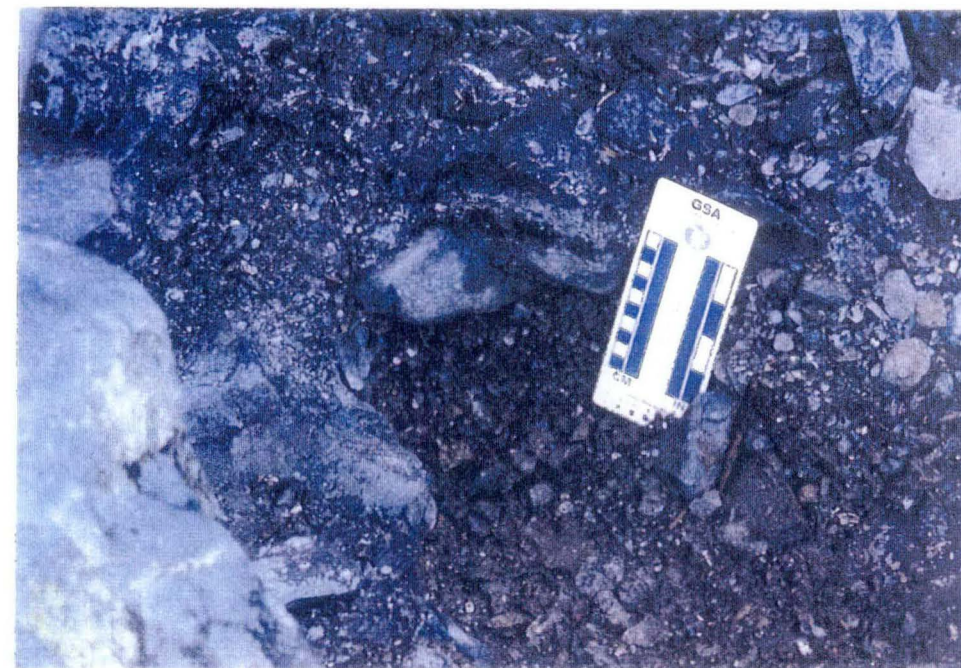
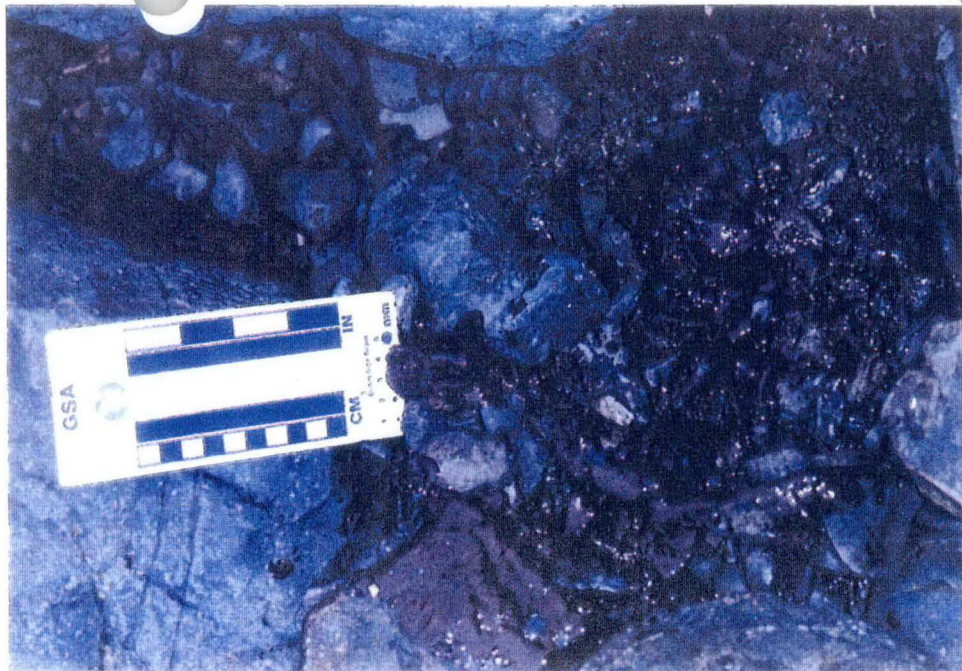






**OFFICIAL PHOTOGRAPH****ADEC**Date: July 20, 1993 Time: 09:30 (9:30 am)Location (segment #): KN213CReason for taking photo: Pit 19Taken by: L.J. Evans *LJE*Roll #: LJE003 Frame #: 015**OFFICIAL PHOTOGRAPH****ADEC**Date: July 20, 1993 Time: 09:23 (9:23 am)Location (segment #): KN213CReason for taking photo: Pit 18 (close-up)Taken by: L.J. Evans *LJE*Roll #: LJE003 Frame #: 013**OFFICIAL PHOTOGRAPH****ADEC**Date: July 20, 1993 Time: 09:38 (9:38 pm)Location (segment #): KN213CReason for taking photo: Pit 21Taken by: L.J. Evans *LJE*Roll #: LJE003 Frame #: 020**OFFICIAL PHOTOGRAPH****ADEC**Date: July 20, 1993 Time: 09:32 (9:32 am)Location (segment #): KN213CReason for taking photo: Pit 19 (close-up)Taken by: L.J. Evans *LJE*Roll #: LJE003 Frame #: 017







OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:41 (9:41 am)

Location (segment #): KN213C

Reason for taking photo: Pit 25

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 024

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:38 (9:38 am)

Location (segment #): KN213C

Reason for taking photo: Pit 21

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 021

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:41 (9:41 am)

Location (segment #): KN213C

Reason for taking photo: Pit 25

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 027

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:41 (9:41 am)

Location (segment #): KN213C

Reason for taking photo: Pit 25

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 025







OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:42 (9:42 am)

Location (segment #): KN213C

Reason for taking photo: Dr. Gibeaut pointing  
out datum.

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 029

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:41 (9:41 am)

Location (segment #): KN213C

Reason for taking photo: View up transect  
toward datum at base of cliff. Float  
coat on rock point is datum point.

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 028

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:43 (9:43 am)

Location (segment #): KN213C

Reason for taking photo: Dr. Gibeaut pointing  
out datum

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 031

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:42 (9:42 am)

Location (segment #): KN213C

Reason for taking photo: Dr. Gibeaut pointing  
out datum

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 030







OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:45 (9:45 am)

Location (segment #): KN213C

Reason for taking photo: View back up transect.

Dr. Gibeaut, DEC, Katie Farley, DNR.

Red float coat at far end of transect marks datum.

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 033

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:44 (9:44 am)

Location (segment #): KN213C

Reason for taking photo: Overview of transect, just slightly N or transect line. Note red float coat on datum at cliff wall.

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 032

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 07:46 (7:46 am)

Location (segment #): KN213C

Reason for taking photo: Overview from S edge of segment

Taken by: L.J. Evans *LJE*

Roll #: LJE002 Frame #: 026

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 09:50 (9:50 am)

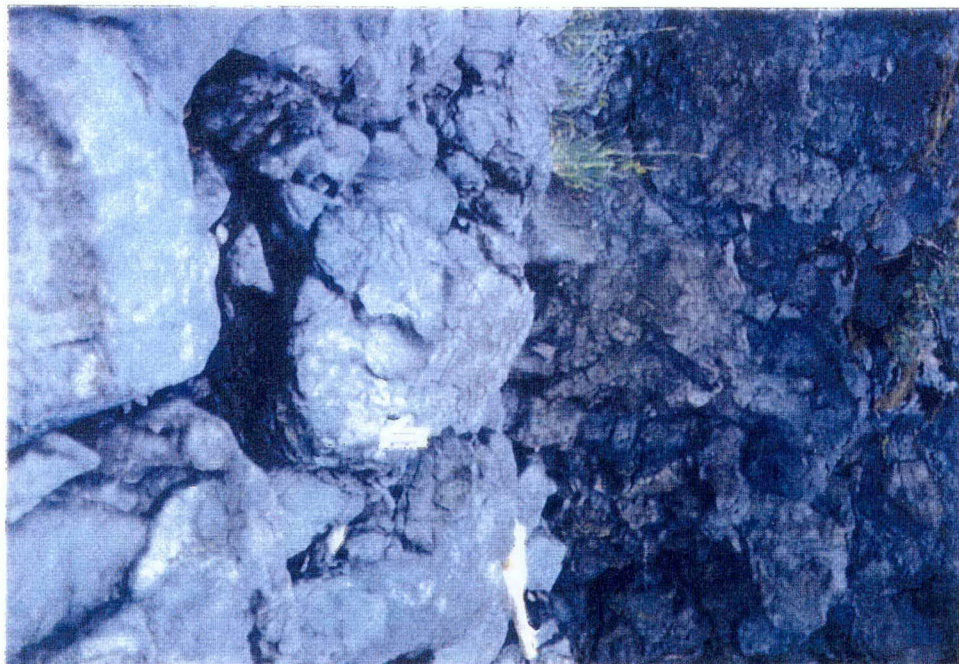
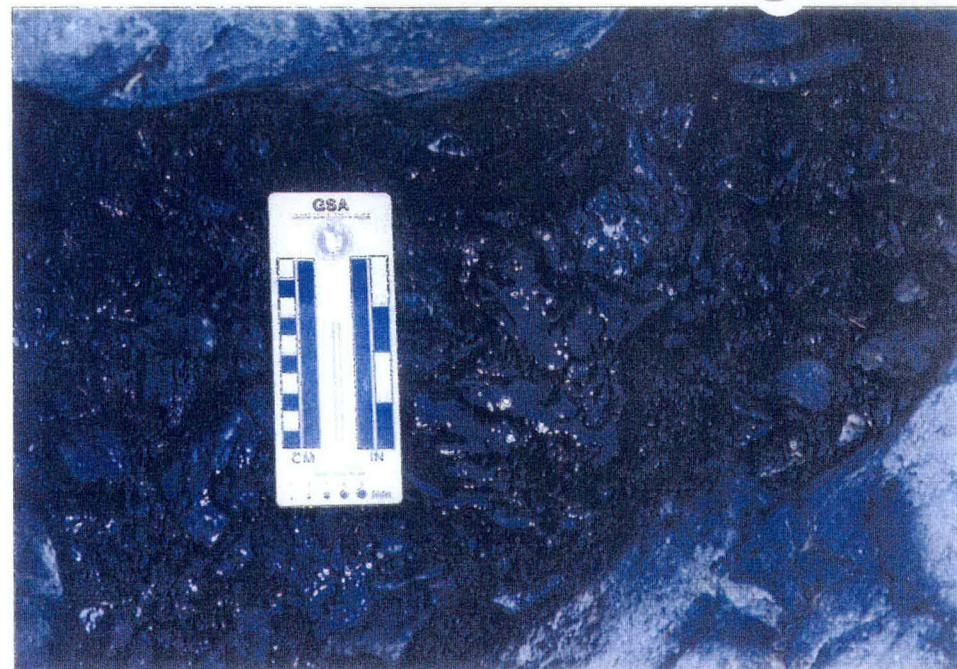
Location (segment #): KN213C

Reason for taking photo: View back up length of transect

Taken by: L.J. Evans *LJE*

Roll #: LJE003 Frame #: 034







OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 08:00

Location (segment #): KN213C

Reason for taking photo: OP between boulders  
near base of cliff

Taken by: L.J. Evans *LJE*

Roll #: LJE002 Frame #: 028

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 07:47 (7:47 am)

Location (segment #): KN213C

Reason for taking photo: Overview from S  
edge of segment

Taken by: L.J. Evans *LJE*

Roll #: LJE002 Frame #: 027

TOP

OFFICIAL PHOTOGRAPH ADEC

Date: July 20, 1993 Time: 08:05 (8:05 am)

Location (segment #): KN213C

Reason for taking photo: Cliff above OP  
patch in frame 28

Taken by: L.J. Evans *LJE*

Roll #: LJE002 Frame #: 029

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**SEGMENT:** KN 300 A

**LOCATION:** Knight Island North Group, northwest mouth of Herring Bay at Herring Pt.

## **OTHER STUDIES**

## **PHYSICAL SETTING**

### **Coastal Morphology and Sedimentology**

Three irregular pocket beaches separated by headlands. The western most beach, beach 'A', contains subangular boulders and bedrock outcrops on its western end while the eastern portion is more open and contains a rounded pebble, cobble, gravel beach with an underlying sandy matrix and peat in some locations. Pebble berms are also present here as is a mussel bed. Fresh water runoff is significant at all three beaches.

The middle beach, beach 'B', has a prominent bedrock outcrop in the lower intertidal zone protecting a cobble, pebble gravel beach with pebble berms. Peat was also found in the bottom of some pits dug in this beach. Oiled mussels occur on the landward side of the lower intertidal bedrock.

The eastern most beach, beach 'C', is the smallest of the three and contains more boulders than the others.

### **Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 7; gravel beach.

### **Fetches and Directions (kilometers)**

N= 48

### **Energy Level**

Moderate with some low areas.

## **GENERAL BIOLOGICAL SETTING**

Mussel beds.

Eagle nest.

## **OILING SUMMARY**

One area of MS (location 'A') and another of AP (location 'B') between and beneath boulders and cobbles in a protected portion of the west end of beach 'A' are the only remaining locations of significant surface oil. AP in location 'C' apparently decreased from 1992 to 1993. Another location to the east of location 'B' that contained AP and SOR in a 3 by 10 m area and with a 5 to 10% concentration apparently cleaned up from 1992 to 1993.

Significant subsurface oil exists in at least three locations. Location ZC (pits 4,5,7, and 8, beach 'A') in an area of cobble, pebble gravel with a granular, sandy matrix and underlying

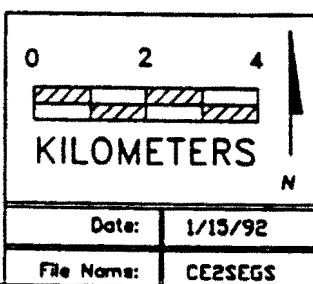
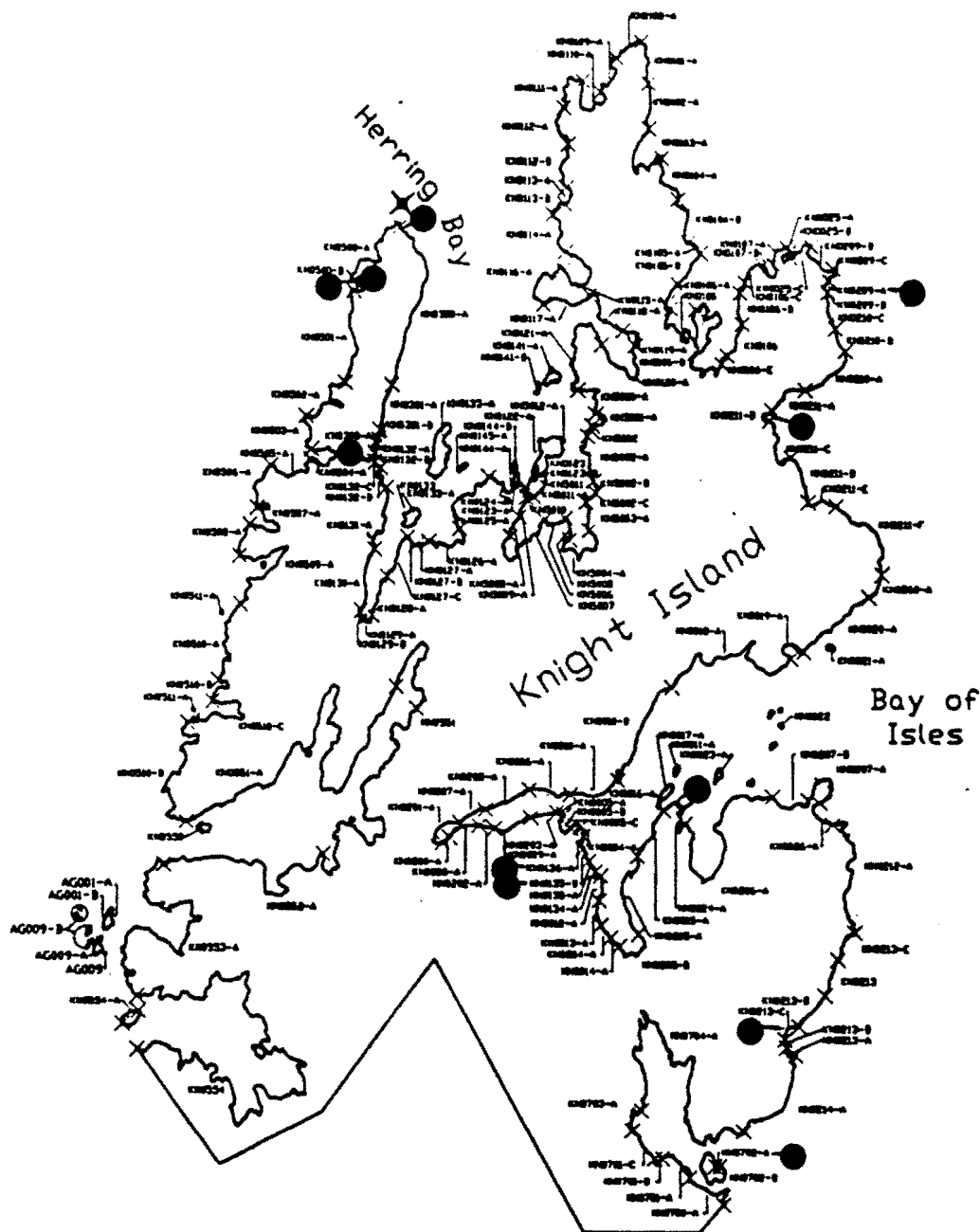
peat did not improve with respect to weighted oiled-sediment volume since 1991 and still contains HOR oil despite it being mechanically tilled in 1991. It should be noted, however, that the amount of OP oil significantly decreased at this site.

Location ZD (pits 12-14), which is in the fucus zone of beach 'B', was not discovered in 1991 or 1992 and contained OP and HOR in 1993.

Location ZE (pits 15-19, 21-23), which spans the upper, mid, and lower intertidal zones still contains significant amounts of LOR, MOR, and HOR oil. A mussel bed also occurs in this area. This area was mechanically tilled in 1991 and has greatly improved since 1991 with none of the OP oil present in 1991 remaining in 1993.

Locations ZF, ZG, and ZH, which span the upper to lower intertidal of beach 'C', had MOR and a lesser amount of HOR in 1991. Only small amounts of LOR and MOR remain here in 1993, thus this beach greatly improved since 1991 despite the lack of treatment.





Prince William Sound  
Central area #2  
Beach Sub-Segment Map  
Map Projection: UTM, Zone 6

— Beach Segments  
X Subdivision Endticks

# Herring Point

site # 1 of 1

KN-500

KN-300

6/22/93

AREA OF 1993  
SURVEY, SAME AS  
FINSAP SITE 1

in survey area

HERRING BAY

-501

KN0300A

Segment Reference Map  
Exxon Coastline

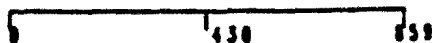
Map Key: KNKN0300

▲ EAGLE NEST

— STREAMS



METERS



AK State Plane Zone 4  
660300



1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

LOCATION KNIGHT IS SEGMENT KNO300

SUBDIVISION A

DATE 6/22/93

AFFILIATION DNR  
NAME Wyn Menefee

SIGNATURE Wyn Menefee

Below pit 11 on the bed rock out cropping mussels have LOR below them in cracks. Some sheen given when disturbed. The oil found subsurface at Loc A look like fresh oil, not even degraded. Very heavy.

The middle beach seems to be the worst with heavy oil subsurface. Even minimal disturbance in LZT brings oil to surface. In pits with water ie 12 or 13, the oil blackens the water. Minimal Disturbance brings odor. Mussels growing in oil and some 3-5m over oil.

South Beach had unusual <sup>high</sup> concentration of 1. texines in one spot. Photographed. On oil.

2 oyster catchers, immature eagle, other trail in woods. Further treatment Recommended

AFFILIATION

NAME IVAN NANCE, LT, USCGR

SIGNATURE Ivan Nance

SUBSURFACE OIL PRESENT AS NOTED, WORKING SUMMARY.

AFFILIATION U.S. Forest Service

NAME Yic Baer

SIGNATURE Yic Baer

Minor amounts of surface tar/asphalt. Several small areas with significant subsurface oil, but question need for additional treatment of subsurface oil.

AFFILIATION

NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

PAGE 1 OF 3

SUBDIVISION A

**TEAM MEMBERS:**

E. PIPER - ADEC

D MUNSON - ADEC

M. PROFITA - ADEC

Y. BAER - USFS

W. MENEFEE - ADNR I. NAUCE - USCG

TIME 10 : 10 to 13 : 00

TIDE LEVEL -2.8 ft. to +4.0 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

EST. OIL CATEGORY LENGTH: H\_\_\_\_\_m M\_\_\_\_\_m L\_\_\_\_\_m VL\_\_\_\_\_m N\_\_\_\_\_m NS\_\_\_\_\_m

**DISTRIBUTION: C = 91-100%; B = 81-90%; F = 71-80%; S = 61-70%; T = <60%**

**SLOPE: V = VERTICAL: H = HIGH ANGLE: M = MEDIUM ANGLE: L = LOW ANGLE      PHOTO ROLL #**

## FRAMES

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



PAGE 2 OF 2

DATE 6, 22, 93

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

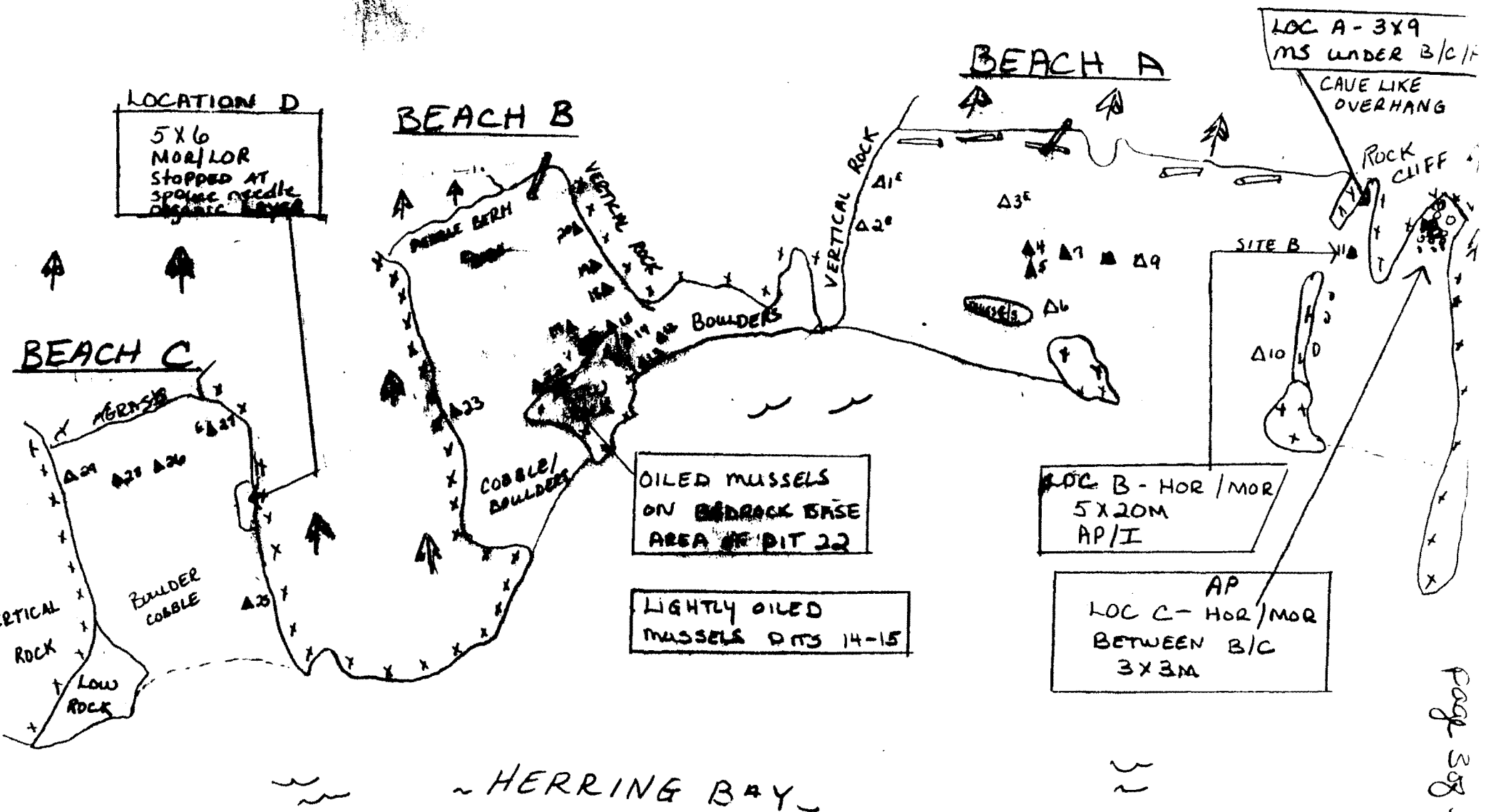
- OTTER TRAIL
- EAGLE
- 7 BABY BROWN SPARROW(?) FOLLOWING CREW ON BEACH
- 2 OYSTER CATCHERS
- HIGH CONCENTRATION OF LITERING IN ONE ROUNDED SPOT

KN0300A

6/22/93

M. PROFITA

KNIGHT ISLAND



1993 Surface Oil Summary  
Segment KN300 Subdivision A

| Location | Area of Oiling Type in Square Meters |      |     |    |      |
|----------|--------------------------------------|------|-----|----|------|
|          | AP                                   | MS   | SOR | CV | CT   |
| A        | 0.                                   | 1.62 | 0.  | 0. | 0.   |
| B        | 6.                                   | 0.   | 0.  | 0. | 0.   |
| C        | 0.54                                 | 0.   | 0.  | 0. | 0.54 |
| TOTALS=  | 6.54                                 | 1.62 | 0.  | 0. | 0.54 |

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 KN300A**

| Loc.    | 1993 PIT #  | Gr. Sz.  | Zn. | En. | Note     | TREATMENT |       | 1993 OILED SED. VOL. (m3) |      |      |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |      |      |     |       | WT.'ed OIL VOL. |      |       | % CHANGE WT.'ed VOL. |          |          |
|---------|-------------|----------|-----|-----|----------|-----------|-------|---------------------------|------|------|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|------|------|-----|-------|-----------------|------|-------|----------------------|----------|----------|
|         |             |          |     |     |          | 1992      | 1991  | OP                        | HOR  | MOR  | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR  | MOR  | LOR | OF/TR | 1993            | 1992 | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA      |             | BC-PG    | U   | L   |          | NO        | NO    | 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 | 0.0   | 0.2             | 0.0  | 0.0   | Inf                  | 0.0      | Inf      |
| ZB      | 11          | BP-PG    | U   | L   |          | NO        | NO    | 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 | 0.0   | 0.0             | 0.0  | 0.0   | 0.0                  | 0.0      | 0.0      |
| ZC      | 4,5,7,8     | CP-PGpt  | M   | M   | ORGANICS | NO        | ET,Rb | 0.0                       | 15.3 | 0.0  | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 3.5                       | 7.7  | 0.0  | 0.0 | 0.0   | 61.2            | 0.0  | 48.3  | Inf                  | -100.0   | 26.8     |
| ZD      | 12-14       | BP-PG    | L   | M   | FUCUS    | NO        | NO    | 4.4                       | 4.4  | 2.1  | 0.0 | 0.0   | 0.0                       | 0.3 | 0.2 | 0.0 | 0.0   | ?                         | ?    | ?    | ?   | ?     | 46.2            | 1.6  | ?     | 2787.5               | ?        | ?        |
| ZE      | 15-19,21-23 | BCP-PGpt | UML | L   | MUSSELS  | NO        | ET    | 0.0                       | 5.1  | 10.6 | 7.1 | 35.4  | 0.0                       | 2.2 | 1.2 | 0.0 | 0.0   | 17.8                      | 15.3 | 2.0  | 0.0 | 0.0   | 66.4            | 12.4 | 156.2 | 434.3                | -92.0    | -57.5    |
| ZF      | 25          | C-GP     | L   | M   | MUSSELS  |           | NO    | ?                         | 0.0  | 0.0  | ?   | 1.2   | 0.0                       | 0.0 | 0.0 | 0.2 | 0.0   | 0.0                       | 0.0  | 15.0 | 0.0 | 0.0   | ?               | 0.4  | 45.0  | ?                    | -99.1    | ?        |
| ZG      |             | CP-GP    | UM  | M   | ORGANICS | NO        | NO    | 0.0                       | 0.0  | 0.8  | 0.8 | 0.0   | 0.0                       | 0.2 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0  | 10.0 | 0.0 | 0.0   | 3.8             | 1.0  | 30.0  | 290.6                | -96.8    | -87.5    |
| ZH      | 26-28       | BCP-PG   | U   | M   |          | NO        | NO    | 0.0                       | 0.0  | 0.0  | 1.1 | 6.2   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 5.0  | 0.0  | 0.0 | 0.0   | 2.2             | 0.0  | 20.0  | Inf                  | -100.0   | -88.9    |
| TOTALS= |             |          |     |     |          |           |       | 4.4                       | 24.9 | 13.5 | 8.9 | 42.8  | 0.0                       | 2.7 | 1.4 | 0.2 | 0.0   | 21.3                      | 28.0 | 27.0 | 0.0 | 0.0   | 180.0           | 15.4 | 299.5 | 1069.3               | -94.9    | -39.9    |

**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.

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**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.







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KNO300 STATION#: -0-  
LOCATION: KNIGHT ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: PIT 5 HOR IN THE LITZ. BROWN GLOBULES  
ON BACK HOLE; RAINBOW SHEEN FRONT HOLE.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 17 EVIDENCE ID#: \_\_\_\_\_

Taken by: Sheen front hole M. Profita  
Roll #: 93MSP003 Frame #: 17

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KNO300 STATION#: -0-  
LOCATION: KNIGHT ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: PIT 7 HOR IN THE LITZ. BROWN GLOBULES  
ON WATER.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 19 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita  
Roll #: 93MSP003 Frame #: 19

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT: KNO300 STATION: -0-  
LOCATION: KNIGHT ISLAND  
KEYWORD: -0-  
REASON FOR TAKING PHOTO: HOR IN THE MITZ AT PIT 4.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 16 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita  
Roll #: 93MSP003 Frame #: 16

Roll #: 93MSP002 Frame #: 37  
Taken by: M. Profita

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP002 FRAME #: 37 EVIDENCE ID#: \_\_\_\_\_

SEGMENT: KNO300 STATION: -0-  
LOCATION: KNIGHT ISLAND  
KEYWORD: -0-  
REASON FOR TAKING PHOTO: PIT #7 IN THE MITZ - SHOWING HOR..  
strong odor.

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: 1030

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KN0300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: MOUSSE UNDER BOULDER COBBLE PEBBLE AT CAVE LIKE STRUCTURE-3 x 9 METER AREA.

TAKEN BY: MARIANNE PROFITA

INITIALS: \_\_\_\_\_

ROLL #: 93MSP003 FRAME #: 21 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 21

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KN0300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: OVERVIEW OF CAVE LIKE CLIFF WITH 3 x 9 METER AREA OF MOUSSE UNDER B/C/P.

TAKEN BY: MARIANNE PROFITA

INITIALS: \_\_\_\_\_

ROLL #: 93MSP003 FRAME #: 23 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 23

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KN0300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: MOUSSE UNDER BOULDER COBBLE PEBBLE AT CAVE LIKE STRUCTURE-3 x 9 METER AREA.

TAKEN BY: MARIANNE PROFITA

INITIALS: \_\_\_\_\_

ROLL #: 93MSP003 FRAME #: 20 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 20

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KN0300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: MOUSSE UNDER BOULDER COBBLE PEBBLE AT CAVE LIKE CLIFF-3 x 9 METER AREA.

TAKEN BY: MARIANNE PROFITA

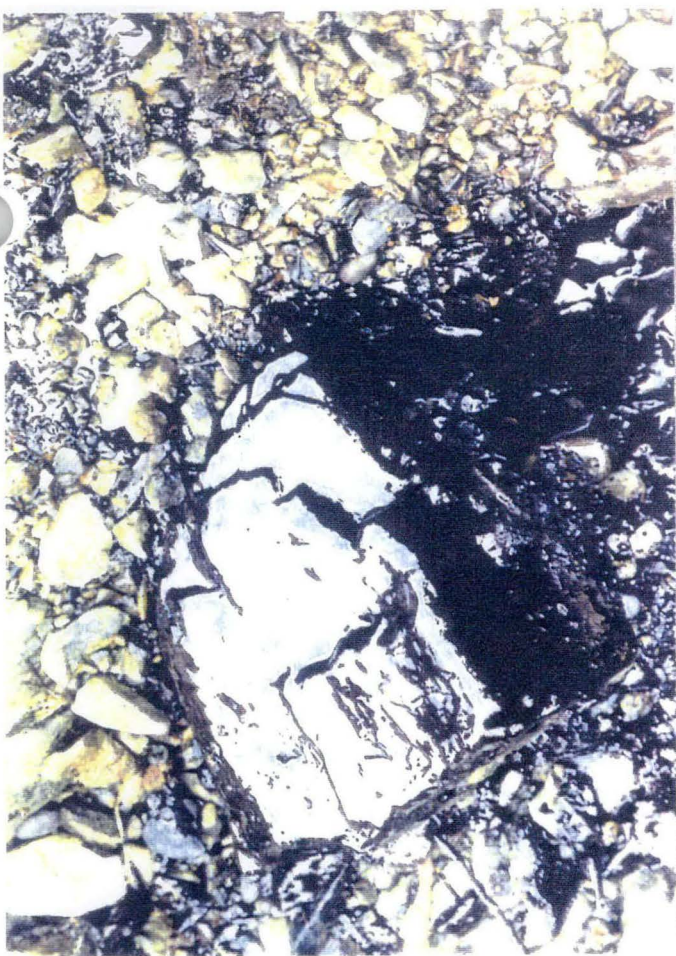
INITIALS: \_\_\_\_\_

ROLL #: 93MSP003 FRAME #: 22 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 22







Roll #: 93MSP003 Frame #: 25

Taken by: M. Profita

TAKEN BY: MARIANNE PROFITA  
ROLL #: 93MSP003 FRAME #: 25 EVIDENCE ID#: INITIALS:

REASON FOR TAKING PHOTO: MOUSSE ON AND UNDER BOULDER.  
KEYWORDS: -0-

LOCATION: KNIGHT ISLAND

SEGMENT#: KNO300

STATION#: -0-

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KNO300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH 1 SITE A OVERVIEW-MOUSSE UNDER B/C.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 24 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 24

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KNO300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH C-OVERVIEW OF HIGH CONCENTRATION OF SNAILS.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 27 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 27

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 06/22/93 TIME: -0-

SEGMENT#: KNO300

STATION#: -0-

LOCATION: KNIGHT ISLAND

KEYWORDS: -0-

REASON FOR TAKING PHOTO: BEACH C-HIGH CONCENTRATION OF SNAILS AT NORTH CLIFF.

TAKEN BY: MARIANNE PROFITA INITIALS: \_\_\_\_\_  
ROLL #: 93MSP003 FRAME #: 26 EVIDENCE ID#: \_\_\_\_\_

Taken by: M. Profita

Roll #: 93MSP003 Frame #: 26

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 09:15

Location (segment #): KN405A

Reason for taking photo: Pit 23

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 006

49E

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 09:30

Location (segment #): KN405A

Reason for taking photo: Pit 25

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 008

TOP

49E

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 08:50

Location (segment #): KN405A

Reason for taking photo: Pit 18

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 005

49E

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 09:30

Location (segment #): KN405A

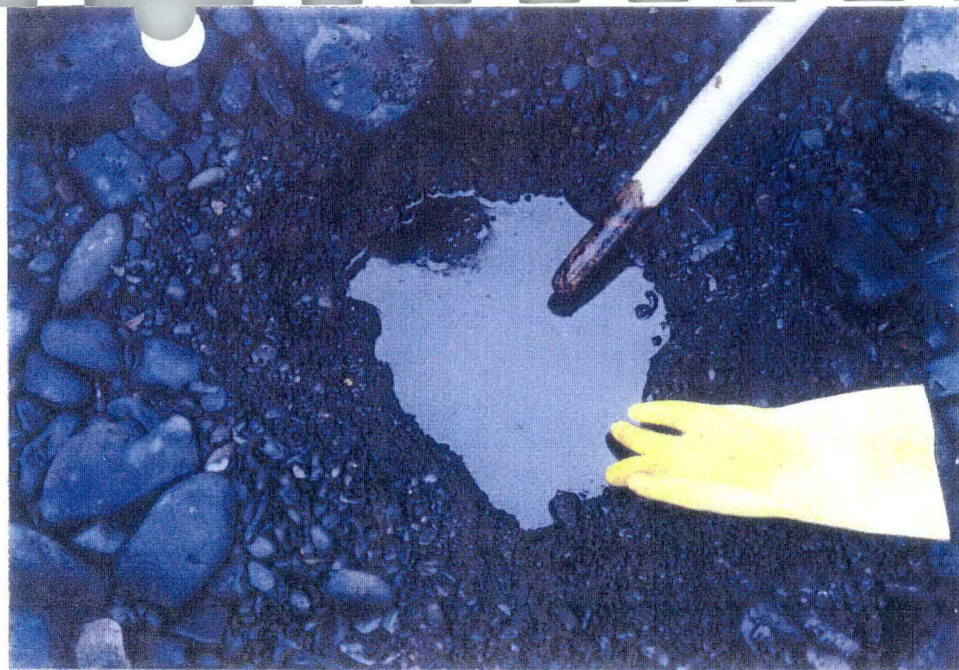
Reason for taking photo: Pit 25

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 007

49E







**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 08:00

Location (segment #): KN405A

Reason for taking photo: Tarry, tacky coat  
supra intertidal zone in logs & cobble

Taken by: L.J. Evans

Roll #: LJE 001 Frame #: 002

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 08:40

Location (segment #): KN405A

Reason for taking photo: Pit 15, LOR

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 004

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 08:00

Location (segment #): KN405A

Reason for taking photo: Tarry, tacky coat  
in supra intertidal zone in logs &  
cobble.

Taken by: L.J. Evans

Roll #: LJE 001 Frame #: 001

**OFFICIAL PHOTOGRAPH ADEC**

Date: July 17, 1993 Time: 08:23

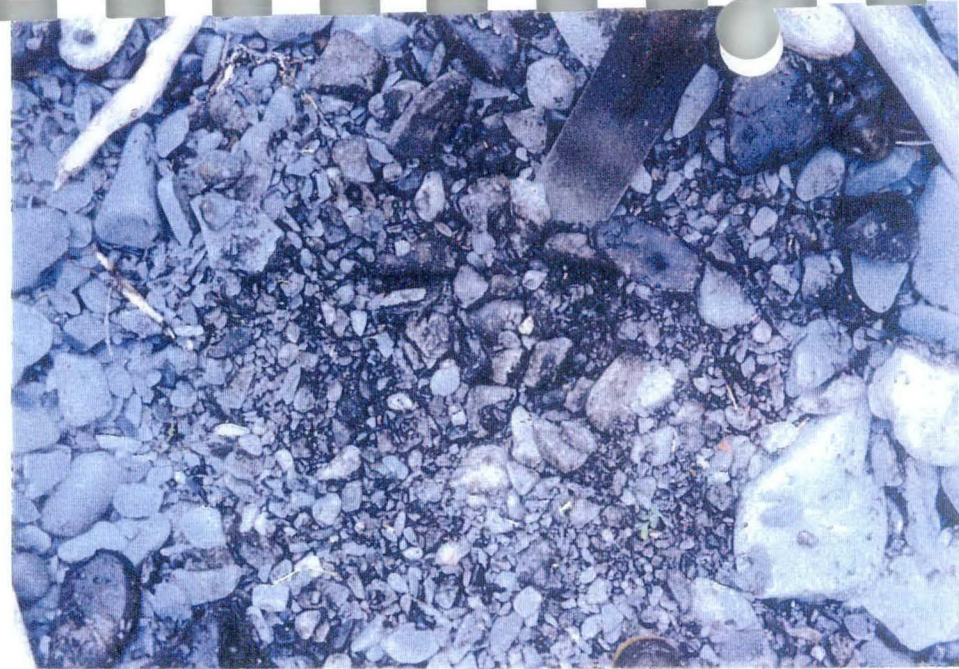
Location (segment #): KN 405A

Reason for taking photo: Tarry, tacky coat in  
in supra intertidal zone in logs and  
cobble.

Taken by: L.J. Evans

Roll #: LJE001 Frame #: 003







**SUBSURFACE OIL SUMMARY FOR SEGMENT KN405A**

| Loc. 1993 PIT # Gr. Sz. Zn. En. Note |       |         |    |   |                | TREATMENT |            | 1993 OILED SED. VOL. (m3) |     |      |      |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |     |     |     |       | WT.'ed OIL VOL. |      |      | % CHANGE WT.'ed VOL. |          |          |
|--------------------------------------|-------|---------|----|---|----------------|-----------|------------|---------------------------|-----|------|------|-------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|-----------------|------|------|----------------------|----------|----------|
|                                      |       |         |    |   |                | 1992      | 1991       | OP                        | HOR | MOR  | LOR  | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | 1993            | 1992 | 1991 | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA                                   | 40-41 | C-CPG   | M  | H | SOR ON SURFACE | NO        | BR         | 5.6                       | 0.0 | 0.0  | 0.0  | 0.0   | ?                         | ?   | ?   | ?   | ?     | ?                         | ?   | ?   | ?   | ?     | 28.0            | ?    | ?    | ?                    | ?        | ?        |
| ZB                                   | 14-27 | BCR-CPG | UM | H |                | NO        | BR, Rs, Rb | 0.0                       | 9.1 | 68.4 | 57.6 | 37.8  | ?                         | ?   | ?   | ?   | ?     | ?                         | ?   | ?   | ?   | ?     | 356.8           | ?    | ?    | ?                    | ?        | ?        |
| ZC                                   | 1-12  | BCR-PG  | U  | H |                | NO        | BR         | 0.0                       | 0.0 | 31.3 | 21.3 | 25.0  | ?                         | ?   | ?   | ?   | ?     | ?                         | ?   | ?   | ?   | ?     | 136.3           | ?    | ?    | ?                    | ?        | ?        |
|                                      |       |         |    |   |                | TOTALS=   |            | 5.6                       | 9.1 | 99.7 | 78.9 | 62.8  | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 521.1           | 0.0  | 0.0  | Inf                  | 0.0      | Inf      |

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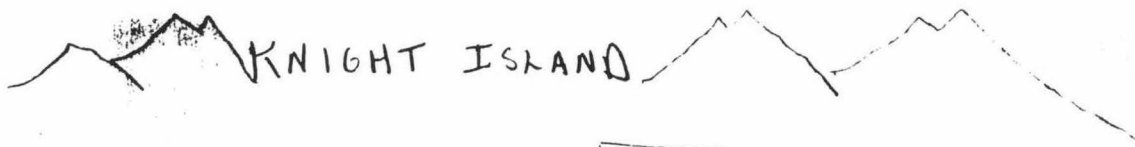


1993 Surface Oil Summary  
Segment KN405                      Subdivision A

| Location | Area of Oiling Type in Square Meters |      |      |    |    |
|----------|--------------------------------------|------|------|----|----|
|          | AP                                   | MS   | SOR  | CV | CT |
| A        | 0.                                   | 0.   | 0.   | 0. | 0. |
| B        | 0.                                   | 26.6 | 26.6 | 0. | 0. |
| TOTALS=  | 0.                                   | 26.6 | 26.6 | 0. | 0. |

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%

0  
100  
200  
METERS



KNIGHT ISLAND

TARRY CT/ST  
ON COBBLES / PEBBLES  
SUIT 2. TRACE OIL  
ON DRIFT LOGS



MONTAGUE STRAIT

MOUSE / HSOR  
VISIBLE ON SURFACE  
AMONGST COBBLES / LOGS  
EXTENDS TO SURFACE OF  
7 X 4 METERS CONTINUOUS

"CABLE ROCK"

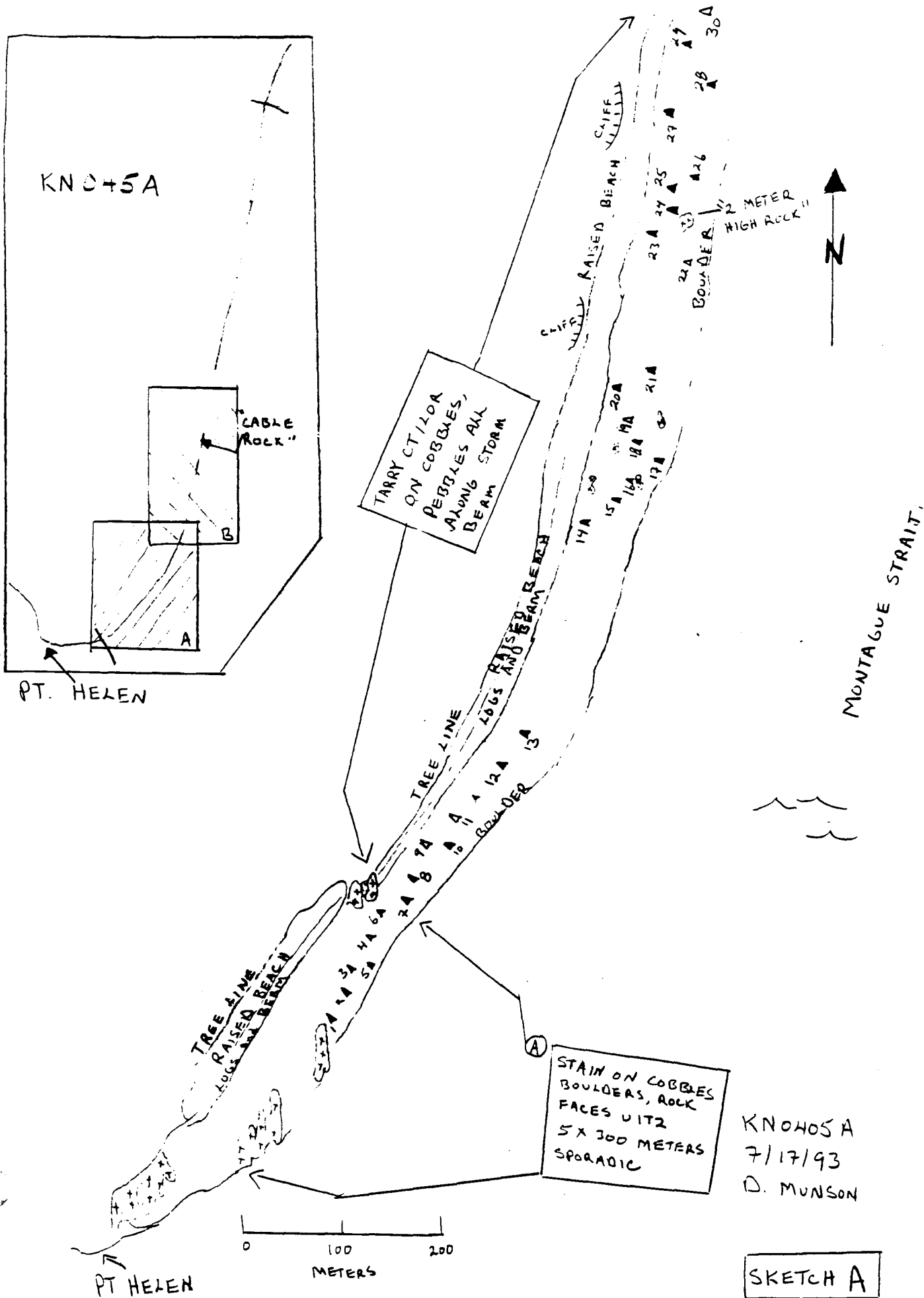
NOAA TEST  
SITE



KN0405A  
7/17/93  
D. MUNSIN

SKETCH B





KNO405A  
7/17/93  
D. MUNSON

SKETCH A

## RESTORATION SHORELINE OILING SUMMARY (CONT.)

PAGE    OF   TEAM NO.           SEGMENT KN0405SUBDIVISION ADATE 7/17/1983

| T<br>NO. | PIT<br>DEPTH<br>(cm) | SUBSURFACE<br>OIL CHARACTER |     |     |     |    |    |    | OILED<br>ZONE<br>cm-cm | CLEAN<br>BELOW<br>Y/N | H2O<br>LEVEL<br>(cm) | SHEEN<br>COLOR<br>B R S N | PIT<br>ZONE |    |    |    | SURFACE-<br>SUBSURFACE<br>SEDIMENTS | NOTES                             |
|----------|----------------------|-----------------------------|-----|-----|-----|----|----|----|------------------------|-----------------------|----------------------|---------------------------|-------------|----|----|----|-------------------------------------|-----------------------------------|
|          |                      | OP                          | HOR | MOR | LOR | OF | TR | NO |                        |                       |                      |                           | S           | UI | MI | LI |                                     |                                   |
| 21       | 22                   |                             |     |     |     |    |    |    | 12-32                  | N                     | 23-32                | B                         |             |    |    |    | R/B/C/P,G                           | Directly Behind<br>Two Meter Rock |
| 22       | 29                   |                             |     |     |     |    |    |    | 16-29                  | N                     | —                    | —                         |             |    |    |    | B/C/P                               |                                   |
| 26       | 21                   |                             |     |     |     |    |    |    | 11-26                  | V                     | 26-31                | B                         |             |    |    |    | B/C/P,G                             |                                   |
| 22       | 44                   |                             |     |     |     |    |    |    | 27-44                  | N                     | —                    | —                         |             |    |    |    | B/C/P,G                             |                                   |
| 28       | 33                   |                             |     |     |     |    |    |    | 29-33                  | N                     | —                    | —                         |             |    |    |    | B/C/P,G                             |                                   |
| 29       | 45                   |                             |     |     |     |    |    |    | 32-45                  | N                     | —                    | —                         |             |    |    |    | B/C/P,G                             |                                   |
| 30       | 25                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P,G                             |                                   |
| 31       | 31                   |                             |     |     |     |    |    |    | 16-31                  | N                     | —                    | —                         |             |    |    |    | B/B/C/P,G,S                         |                                   |
| 32       | 32                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/B/C/P,G,S                         |                                   |
| 33       | 29                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/P,G                               |                                   |
| 34       | 32                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P                               |                                   |
| 35       | 27                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P                               |                                   |
| 36       | 34                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P,G                             |                                   |
| 37       | 32                   |                             |     |     |     |    |    |    | 13-22                  | —                     | —                    | —                         |             |    |    |    | C/C/P                               |                                   |
| 38       | 36                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/P/P,M                             |                                   |
| 39       | 33                   |                             |     |     |     |    |    |    | 13-33                  | N                     | —                    | —                         |             |    |    |    | C/P,G,S                             |                                   |
| 40       | 24                   |                             |     |     |     |    |    |    | 2-23                   | Y                     | —                    | —                         |             |    |    |    | C/C,P,G                             |                                   |
| 41       | 23                   |                             |     |     |     |    |    |    | 4-23                   | N                     | —                    | —                         |             |    |    |    | C/C,P,G                             |                                   |
| 42       | 36                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/C,P                             |                                   |
| 43       | 33                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/C,P                             |                                   |
| 44       | 29                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/P,G                               |                                   |
| 45       | 26                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/P,G,S                             |                                   |
| 46       | 25                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/P,G,S                             |                                   |
| 47       | 27                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P,G,S                           |                                   |
| 48       | 36                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | B/C/P,G,S                           |                                   |
| 49       | 28                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | R/C/C,P                             |                                   |
| 50       | 34                   |                             |     |     |     |    |    |    | —                      | —                     | —                    | —                         |             |    |    |    | C/C,P                               |                                   |
| 51       | 32                   |                             |     |     |     |    |    |    |                        |                       |                      |                           |             |    |    |    | C,P/C,P                             |                                   |

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

## OG COMMENTS:

- Difficult to reach clean sediments when digging pits due to Rock, Boulder and cobble in substrate.

- Subsurface oiling was heaviest in the vicinity of "2 METER HIGH ROCK" and at location ~150 meters to the south of "CABLE ROCK".

- Two Humpback whales and several sea lions were observed just offshore.



PAGE 1 OF 3

SUBDIVISION A

DATE 7 / 17 / 93

**M MEMBERS:** JONI MATTHEWS - ADEC  
DIANNE MUNSON - ADEC  
PHIL MEANS - USSG  
LT EVANS - ADEC  
KATIE FARLEY - AONR

ME 06:50 to 11:50 TIDE LEVEL -0.8 ft. to +8.5 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

ST. OIL CATEGORY LENGTH: H\_\_\_\_\_m M\_\_\_\_\_m L\_\_\_\_\_m VL\_\_\_\_\_m N\_\_\_\_\_m NS\_\_\_\_\_m

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

SLOPE: V = VERTICAL: H = HIGH ANGLE: M = MEDIUM ANGLE: L = LOW ANGLE    PHOTO ROLL # EJE - 001    FRAMES 1-10

| T<br>NO | PIT<br>DEPTH<br>(cm) | SUBSURFACE<br>OIL CHARACTER |     |     |     |    |    | OILED<br>ZONE<br>cm-cm | CLEAN<br>BELOW<br>Y/N | H2O<br>LEVEL<br>(cm) | SHEEN<br>COLOR<br>B R S N | PIT<br>ZONE |   |    |    | SURFACE<br>SUBSURFACE<br>SEDIMENTS | NOTES                             |
|---------|----------------------|-----------------------------|-----|-----|-----|----|----|------------------------|-----------------------|----------------------|---------------------------|-------------|---|----|----|------------------------------------|-----------------------------------|
|         |                      | OP                          | HOR | MOR | LOR | OF | TR |                        |                       |                      |                           | NO          | S | UI | MI |                                    |                                   |
|         | 25                   |                             |     |     |     |    |    | 19 -25                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 2       | 32                   |                             |     |     |     |    |    | 18 -32                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 3       | 28                   |                             |     |     |     |    |    | 17 -28                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
|         | 30                   |                             |     |     |     |    |    | -                      | —                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 5       | 33                   |                             |     |     |     |    |    | 26 -33                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 6       | 36                   |                             |     |     |     |    |    | -                      | —                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 7       | 24                   |                             |     |     |     |    |    | 12 -24                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            | Rock at Bottom                    |
| 8       | 24                   |                             |     |     |     |    |    | 13 -24                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 9       | 36                   |                             |     |     |     |    |    | -                      | —                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 10      | 21                   |                             |     |     |     |    |    | 12 -21                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
|         | 32                   |                             |     |     |     |    |    | -                      | —                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
| 12      | 47                   |                             |     |     |     |    |    | 42 -47                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            | CF on underside of<br>of boulders |
| 13      | 20                   |                             |     |     |     |    |    | 5 -20                  | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            | Tarry St under boulders           |
| 14      | 34                   |                             |     |     |     |    |    | 19 -34                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            | Behind large boulders             |
| 15      | 27                   |                             |     |     |     |    |    | 8 -27                  | U                     | 21-27                | B                         |             |   |    |    | R.C/P/G S                          |                                   |
| 16      | 32                   |                             |     |     |     |    |    | 9 -22                  | U                     | 23-32                | B                         |             |   |    |    | R.C/P/G S                          |                                   |
| 17      | 40                   |                             |     |     |     |    |    | U - U                  | U                     | —                    | —                         |             |   |    |    | R.C/P/G S                          |                                   |
| 18      | 32                   |                             |     |     |     |    |    | 7 - U                  | U                     | 22-32                | B                         |             |   |    |    | R.C/P/G S                          |                                   |
|         | 29                   |                             |     |     |     |    |    | 18 -29                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G S                          |                                   |
|         | 28                   |                             |     |     |     |    |    | 5 -28                  | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |
|         | 17                   |                             |     |     |     |    |    | 3 - U                  | U                     | 10-21                | S                         |             |   |    |    | R.C/P/G                            |                                   |
| 22      | 24                   |                             |     |     |     |    |    | 7 -10                  | Y                     | 20-24                | S                         |             |   |    |    | R.C/P/G                            |                                   |
| 23      | 46                   |                             |     |     |     |    |    | 10 -46                 | N                     | —                    | —                         |             |   |    |    | R.C/P/G                            |                                   |

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

**1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET**

STATION KNIGHT ISLAND SEGMENT KN-4 SUBDIVISION \_\_\_\_\_ DATE 1/1/93

AFFILIATION \_\_\_\_\_  
NAME Phil Means SIGNATURE [Signature]

Not heavily oiled subsurface pits (vicinity of "2 meter rock")  
seemed to have "relatively" fresh oil. Relatively meaning it  
didn't seem to be 4 yrs old. ADEC to analyze sample  
for distinctive characteristics. Previously visited KN0405 in Jun '92.

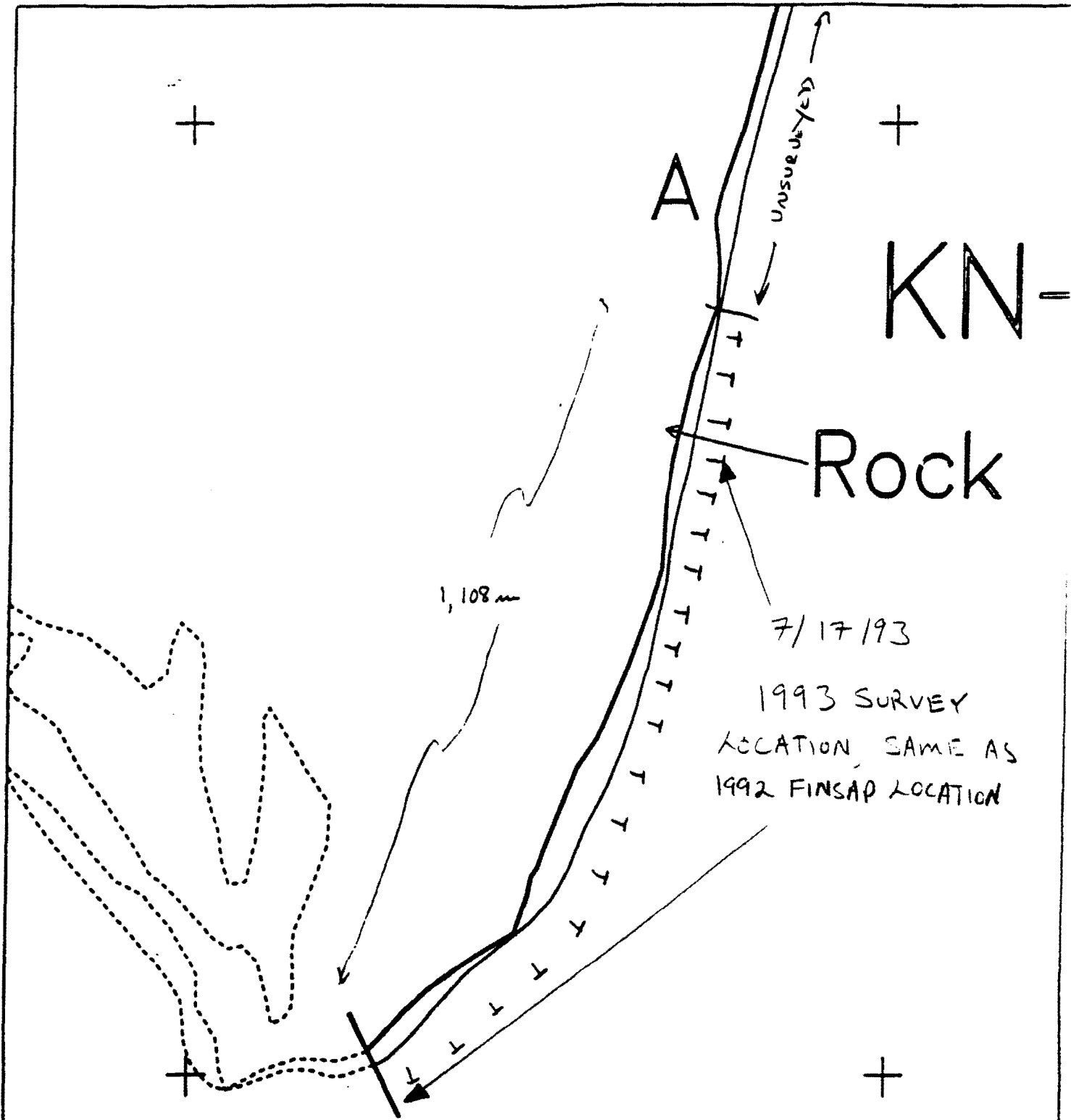
AFFILIATION DNR, Div. of Land  
NAME Kathleen Farley SIGNATURE [Signature]

The areas where the subsurface oil was heaviest  
should be cleansed for restoration purposes.  
The two areas near "2 meter high rock" and "cable  
rock" are close in proximity and are both  
oiled enough to warrant some additional work.  
this area is significant for commercial fishing, subsistence  
use by nearby Chenega Villagers, and apparently for deer harvesting  
on Chenega burned uplands.

AFFILIATION \_\_\_\_\_  
NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

AFFILIATION \_\_\_\_\_  
NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_



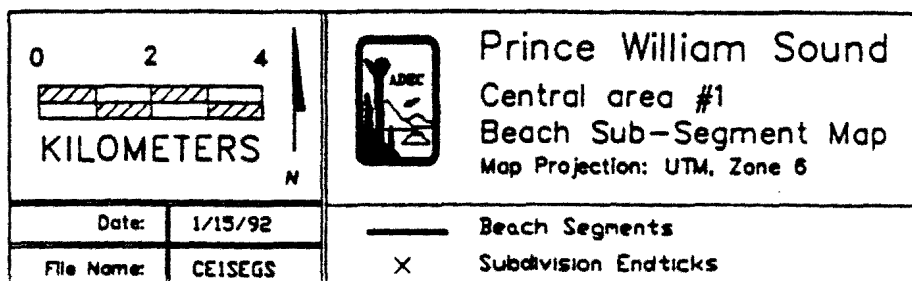
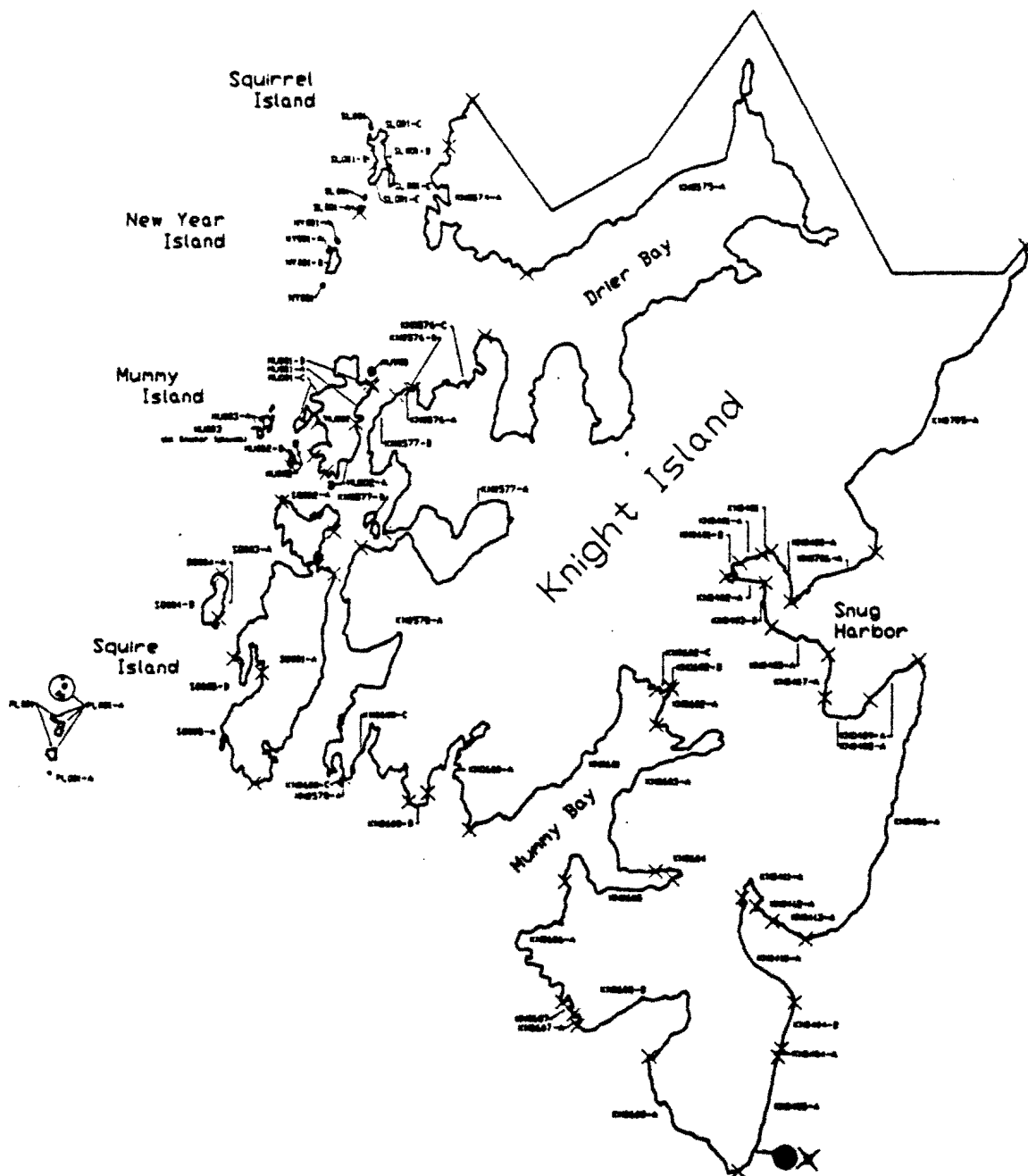


XXXX Wide  
 //// Medium  
 ---- Narrow  
 TTTT Very Light  
 0000 No Oil

KN0405 A  
 ADEC Subsegment Length: 2528m  
 METERS  
 0 200 400  
 AK State Plane Zone 4  
 kn0405a



Subdivision Field Map  
 Map Key: KNIK0405Aa  
 Name: HARPER  
 Date: 15 MAY 92  
 Date Entered:





Three locations of significant subsurface oil were recorded in 1993. ZA is an OP location associated with surface oil in location 'B' described above. Subsurface oil was not recorded here in 1991.

Location ZB includes pits 14 through 27, which contains LOR through HOR oil below clean boulders and cobbles and adjacent to bedrock. This location encompasses "2-Meter High Rock." Because of differences in previous surveys it is impossible to judge the trend in total oiled-sediment volume, but it does appear that OP oil has decreased here since 1991.

Location ZC is defined by pits 1 through 12 and contains LOR and MOR below clean boulders and cobbles in the southern portion of the site. There has been no discernible improvement here since 1991.

All the above subsurface locations were aggressively treated in 1991.

**SEGMENT:** KN 405 A

**LOCATION:** Knight Island Outer Group, Point Helen.

### **OTHER STUDIES**

ADEC transect station #36

NOAA transect station #N-1

### **PHYSICAL SETTING**

#### **Coastal Morphology and Sedimentology**

Straight beach with rounded boulders and cobbles in the mid to lower intertidal zones. The upper intertidal zone includes well-developed pebble berms, and the supra intertidal consist of a prominent drift log and cobble storm berm. This storm berm was relocated in 1991 along most of the site. Beach sediments consist of 2 to 4 layers of boulders and cobbles overlying boulders and cobbles with a granular, sandy matrix. Several layers of large pebbles are often present just below the surface armor layer and above the matrix layer. Bedrock outcrops are locally important along this long stretch of beach. Multiple berms and mid to upper intertidal swash bars oriented to the south have been observed. Lower intertidal boulder swash bars have also been observed. Profile data at the ADEC and NOAA transects, however, indicate that the mid-intertidal region of this beach does not exhibit large net sediment erosion or deposition. Overall, grain size tends to increase from the upper to the lower intertidal.

#### **Environmental Sensitivity Index (ESI)**

Type 7; gravel beach.

#### **Fetches and Directions (kilometers)**

NE= 93; E= 14; SE= 19; S=19

#### **Energy Level**

High with some local bedrock protected areas being moderate.

### **GENERAL BIOLOGICAL SETTING**

Eagle nest.

Deer harvesting.

Fish harvesting.

### **OILING SUMMARY**

In 1993, this site was surveyed from the NOAA transect site south to the point. Only one area had significant surface oil. This area is location 'B' and is a 4 by 7 m area with over 90% coverage of MS and SOR between boulders and cobbles in the mid intertidal zone. Location 'B' is located about 150 m south of "Cable Rock." Although this location of surface oiling was not recorded in 1991, several other areas of high concentrations of SOR were present in 1991 that were not present in 1993. Overall, surface oiling has probably significantly decreased since 1991. Tarry CV, CT, and ST still occur in trace amounts on cobbles and logs in the storm berm.





OFFICIAL PHOTOGRAPH ADEC

Date: July 17, 1993 Time: 10:42

Location (segment #): KN405A

Reason for taking photo: Pit 40

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 010

OFFICIAL PHOTOGRAPH ADEC

Date: July 17, 1993 Time: 10:00

Location (segment #): KN405A

Reason for taking photo: oiled log in supra  
intertidal zone, underneath other logs

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 009



**SEGMENT:** KN 500 A

**LOCATION:** Knight Island North Group, west side of Knight Island west and south of Herring Point.

## **OTHER STUDIES**

## **PHYSICAL SETTING**

### **Coastal Morphology and Sedimentology**

Two separate sites were surveyed. Site #1 is a portion of an embayment, and an anadromous stream flows across it. A pebble tidal flat associated with the stream dominates the site. A dense mussel bed occurs on the flat. The northern portion of the site is partitioned by bedrock outcrops and contains a pebble, cobble beach.

Site #2 is a pocket beach with a pebble lower beach and pebble and cobble upper beach. The mid-intertidal pebble beach has a peat layer at 20 to 25 cm below the surface. The northwest and southeast corners of the beach have protective bedrock outcrops.

### **Environmental Sensitivity Index (ESI)**

Type 7; gravel beach

### **Fetches and Directions (kilometers)**

NW= 37; W= 9; SW= 16

### **Energy Level**

Moderate with some low areas.

## **GENERAL BIOLOGICAL SETTING**

Eagle nest.

Anadromous stream (site #1).

Mussel bed (site #1).

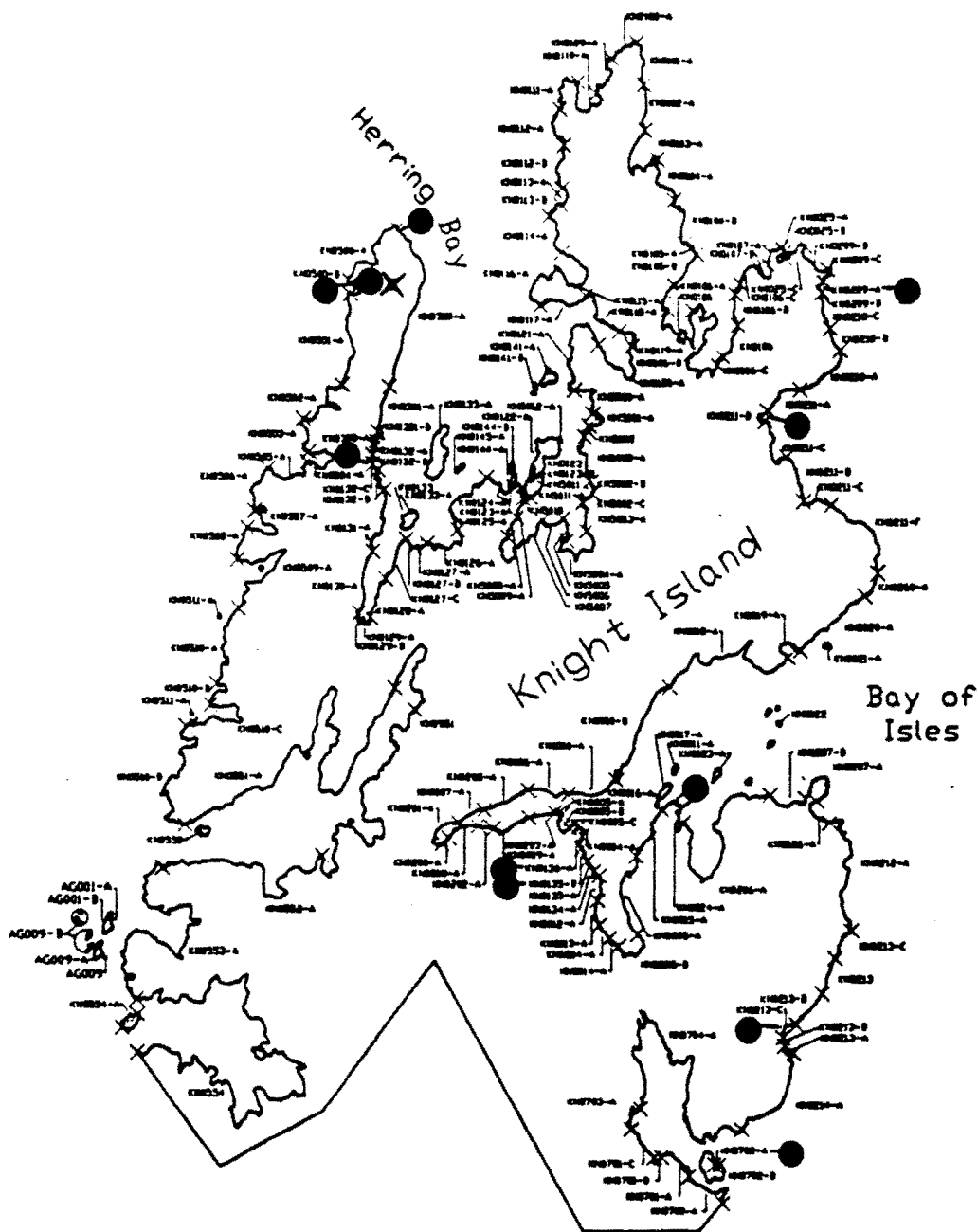
## **OILING SUMMARY**

No significant surface oil was found in 1993. No surface oil was observed in site #1 in 1991, but several areas of SOR completely cleaned up in site #2. Three areas of CV in site #2 completely cleaned up or reduced to CT from 1991 to 1993 (locations B and C).

Two locations with HOR occur in the mid to lower intertidal in site #2. The oil layer begins 5 to 20 cm below the clean surface and lies on a peat layer about 25 cm below the surface. Mostly MOR was present in 1993, but HOR was abundant in 1991, and subsurface oil covered twice the area of the beach as in 1993. Therefore, significant improvement has occurred here despite no cleanup in 1991 or 1992.

Only minor amounts of subsurface oil occur in site #1 in 1993, and only small amounts were present in 1991.

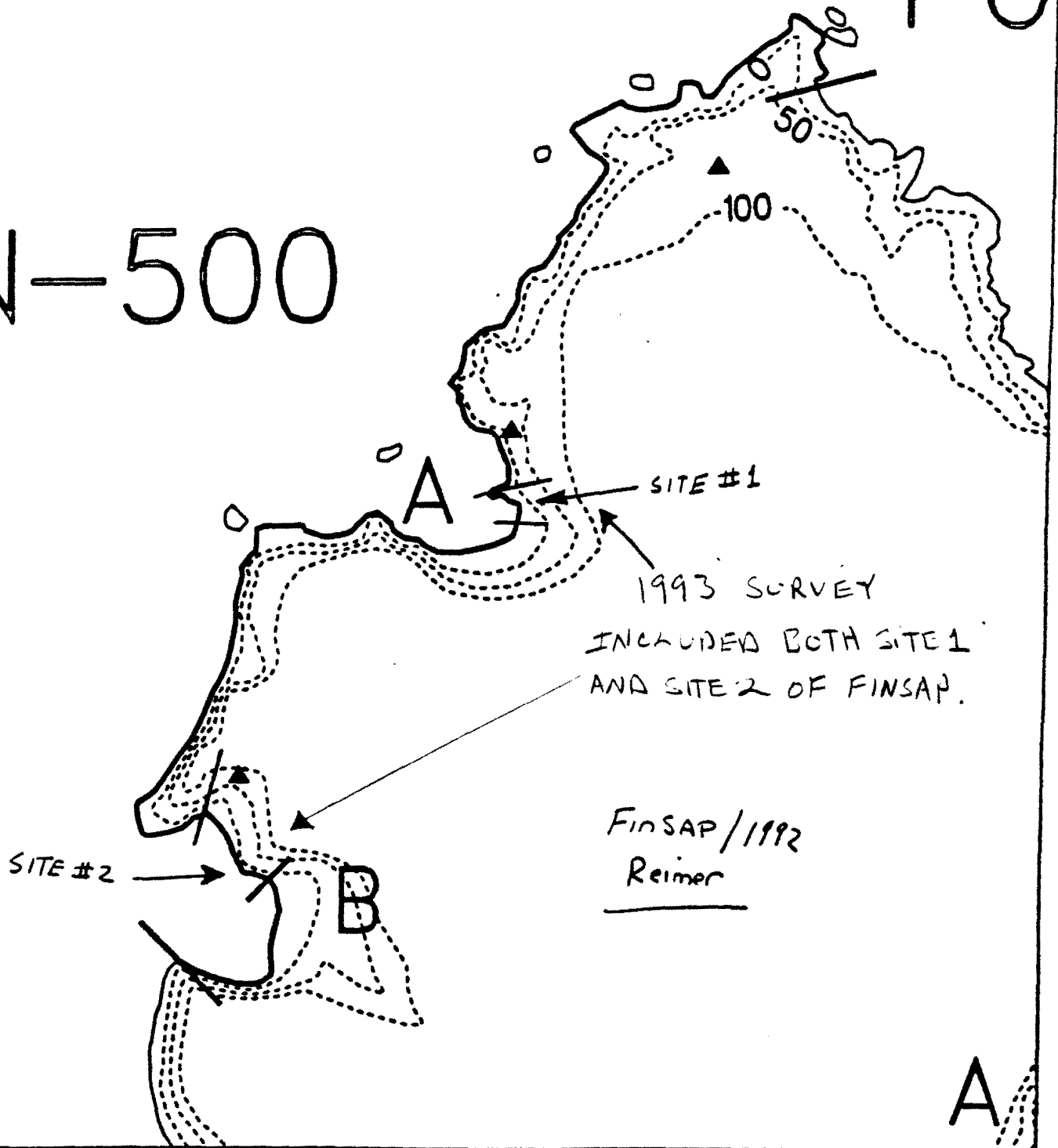




|                                                |                                                       |                                                                                                                  |
|------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <p>0 2 4<br/>KILOMETERS</p>                    |                                                       | <p><b>Prince William Sound</b><br/>Central area #2<br/>Beach Sub-Segment Map<br/>Map Projection: UTM, Zone 6</p> |
| <p>Date: 1/13/92</p> <p>File Name: CE2SEGS</p> | <p>— Beach Segments</p> <p>X Subdivision Endticks</p> |                                                                                                                  |

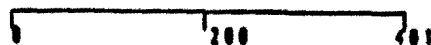
KN-500

PO



KN0500A

METERS



AK State Plane Zone 4  
660500

Segment Reference Map  
Exxon Coastline

Map Key: KNIK0500

▲ EAGLE NEST

— STREAMS

1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

LOCATION KNIGHT ISLAND SEGMENT KN2500 SUBDIVISION A DATE 6/23/93

AFFILIATION ADNR

NAME Wyn Menefee

SIGNATURE Wyn Menefee

Site 1: 4 eagles present (one immature). Found oil beyond where past surveys showed oil. No treatment recommended.

Site 2: One band of oil traverses beach. Oil is down far enough that surface disturbance won't bring up oil. ~~Some~~ Some mussels by A2P+27 in amongst the fucus. No treatment recommended.

AFFILIATION U.S. Forest Service

NAME Vic Baer

SIGNATURE Vic Baer

Small amounts of surface tar/asphalt present. Additional treatment not necessary.

AFFILIATION

NAME IVAN NANCY, USGS

SIGNATURE I. Nancy

SOME OIL IN HIGHLY PROTECTED AREAS.

AFFILIATION

NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_



# 1993 ADEC RESTORATION PROJECT # 930380

## SHORELINE OILING SUMMARY

PAGE 1 OF 4

SEGMENT KN0500

1 MEMBERS: MARIANNE PROFITA-ADEC, DIANNE MUNSON-ADEC  
WIN MENESEE-ACNR  
VIC BAER-DEFS  
IVAN NANCE-USCG

SUBDIVISION A

DATE 6/23/93

FOR SITE # 2 -> ART WEINER-DNR, MARK KUWADA-ADFG, ALLISON REIN USFS

TIME 9:45 to 13:45 TIDE LEVEL -1.6 ft. to +4.8 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

| LOCATION | SURFACE OIL CHARACTER |    |    |    |    |    |    |    |    |    | SURFACE SEDIMENT TYPE | SHORE SLOPE VHML | AREA    |          | ZONE |    |    |    | NOTES                  |
|----------|-----------------------|----|----|----|----|----|----|----|----|----|-----------------------|------------------|---------|----------|------|----|----|----|------------------------|
|          | AP                    | MS | TB | BO | CV | CT | ST | FL | DB | NO |                       |                  | WIDTH m | LENGTH m | S    | UI | MI | LI |                        |
| A        |                       |    |    | S  |    |    |    |    |    |    | R                     | V                | 3       | 6        |      |    |    |    | SUBSURFACE MOR         |
| B        |                       |    |    |    | S  |    |    |    |    |    | R                     | V                | 0.5     | 7        |      |    |    |    |                        |
| C        |                       |    |    |    | S  |    |    |    |    |    | B                     | V                | 1       | 10       |      |    |    |    |                        |
| D        |                       |    |    |    | T  |    |    |    |    |    | B                     | V                | 1       | 20       |      |    |    |    |                        |
| E        |                       |    |    |    | C  |    |    |    |    |    | R                     | V                | 1       | 1.5      |      |    |    |    |                        |
| F        |                       |    |    |    | S  |    |    |    |    |    | R                     | V                | 0.5     | 2        |      |    |    |    |                        |
| G        |                       |    |    |    | T  |    |    |    |    |    | R                     | V                | 0.5     | 18       |      |    |    |    |                        |
| H        |                       |    |    |    | S  |    |    |    |    |    | R                     | V                | 1       | 4        |      |    |    |    | Taken from field notes |

DISTRIBUTION: C = 91-100%; B = 51-80%; P = 11-50%; S = 1-10%; T = <1%

SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL # \_\_\_\_\_

FRAMES \_\_\_\_\_

| PIT NO. | PIT DEPTH (cm) | SUBSURFACE OIL CHARACTER |     |     |     |    |    |    | OILED ZONE cm-cm | CLEAN BELOW Y/N | H2O LEVEL (cm) | SHEEN COLOR B R S N | PIT ZONE |    |    |    | SURFACE-SUBSURFACE SEDIMENTS | NOTES              |
|---------|----------------|--------------------------|-----|-----|-----|----|----|----|------------------|-----------------|----------------|---------------------|----------|----|----|----|------------------------------|--------------------|
|         |                | OP                       | HOR | MOR | LOR | OF | TR | NO |                  |                 |                |                     | S        | UI | MI | LI |                              |                    |
| 1       | 30             |                          |     |     |     |    |    |    | -                |                 | -              | -                   |          |    |    |    | PG/P.G                       |                    |
| 2       | 24             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 3       | 27             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 4       | 24             |                          |     |     |     |    |    |    | 16-23            | Y               |                |                     |          |    |    |    | PG/P.G                       |                    |
| 5       | 8              |                          |     |     |     |    |    |    | 4-7              | Y               | 4-8            | B                   |          |    |    |    | PG/P.G                       |                    |
| 6       | 19             |                          |     |     |     |    |    |    | 12-U             | U               | 12-19          | R                   |          |    |    |    | PG/P.G                       |                    |
| 7       | 28             |                          |     |     |     |    |    |    | 22-28            | N               | 23-28          | N                   |          |    |    |    | PG/P.G                       | Sitting on Bedrock |
| 8       | 35             |                          |     |     |     |    |    |    | -                |                 | -              | -                   |          |    |    |    | PG/P.G                       |                    |
| 9       | 22             |                          |     |     |     |    |    |    | 8-15             | Y               | 19-22          |                     |          |    |    |    | PG/P.G                       |                    |
| 10      | 26             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 11      | 13             |                          |     |     |     |    |    |    | -                |                 | 9-13           |                     |          |    |    |    | PG/P.G                       |                    |
| 12      | 21             |                          |     |     |     |    |    |    | 17-U             | U               | 17-21          | B                   |          |    |    |    | PG/P.G                       |                    |
| 13      | 17             |                          |     |     |     |    |    |    | 8-13             | Y               | 12-17          | B                   |          |    |    |    | PG/P.G                       |                    |
| 14      | 20             |                          |     |     |     |    |    |    | 11-U             | U               |                | B                   |          |    |    |    | PG/P.G                       |                    |
| 15      | 31             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 16      | 30             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 17      | 34             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 18      | 13             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 19      | 35             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 20      | 3              |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 21      | 33             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 22      | 17             |                          |     |     |     |    |    |    | 9-U              |                 |                |                     |          |    |    |    | PG/P.G                       |                    |
| 23      | 21             |                          |     |     |     |    |    |    | -                |                 |                |                     |          |    |    |    | PG/P.G                       |                    |

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

PAGE 2 OF 4

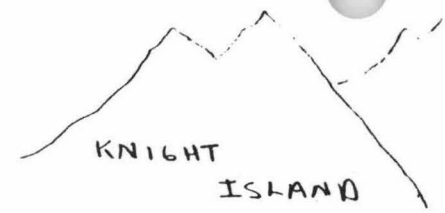
DATE 6 / 23 / 93

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

- 4 EAGLES (1 IMMATURE)
- FWS OYSTER CATCHER STUDY MEMBERS STATED THEY HAVE FOUND OIL ON LEGS OF BABY OYSTER CATCHERS  
PER WYN MENEFF - ADNR

KIN 5007  
6/23/9-  
D. MUNSON

SITE #



KNIGHT ISLAND

(A) MOR IN PITS AREA  
3x6 METERS  
NOT SURVEYED LAST YEAR

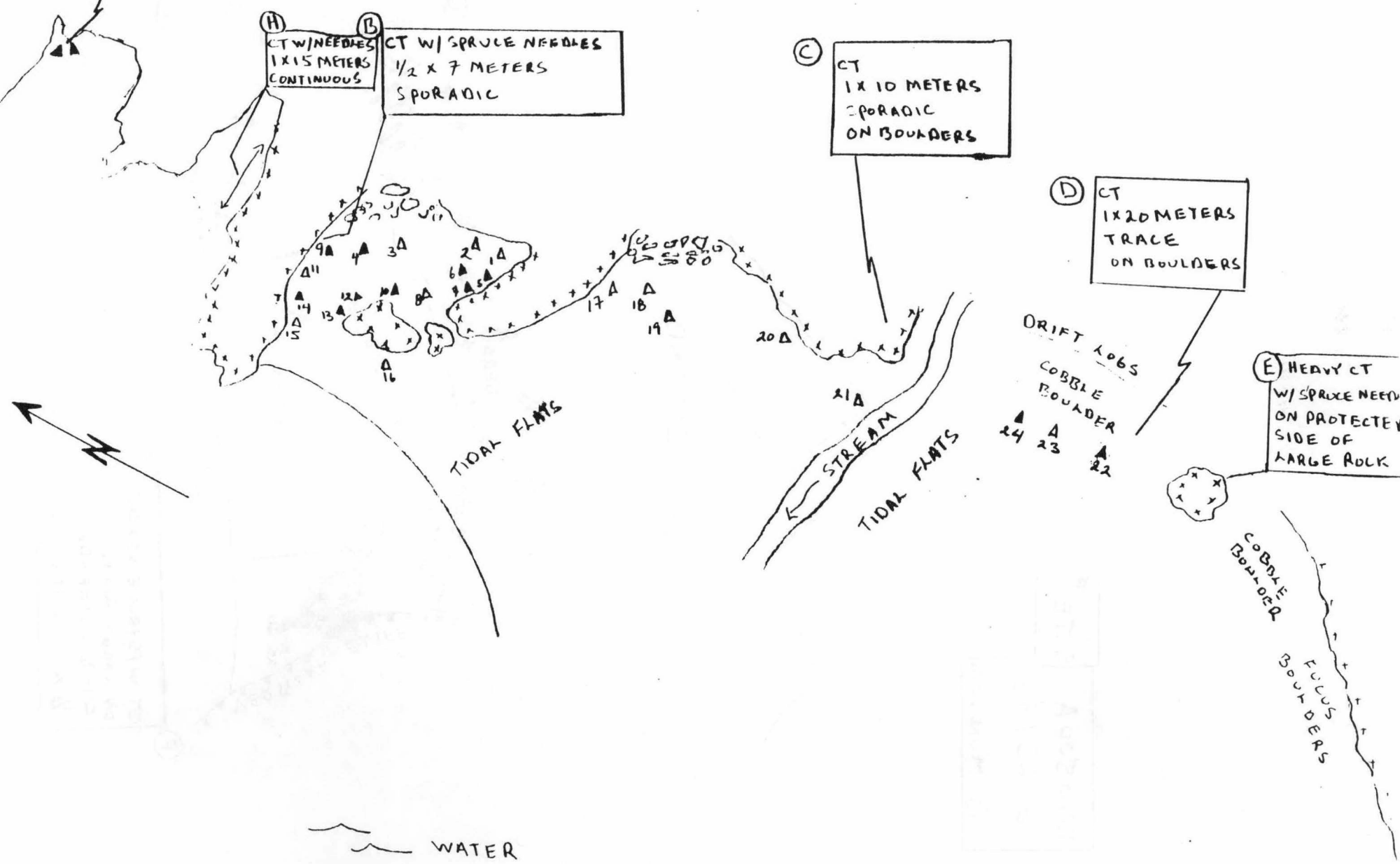
(H) CT W/ NEEDLES  
1x15 METERS  
CONTINUOUS

(B) CT W/ SPRUCE NEEDLES  
1/2 x 7 METERS  
SPORADIC

(C) CT  
1x10 METERS  
SPORADIC  
ON BOULDERS

(D) CT  
1x20 METERS  
TRACE  
ON BOULDERS

(E) HEAVY CT  
W/ SPRUCE NEED  
ON PROTECTEY  
SIDE OF  
LARGE ROCK





KNO500A

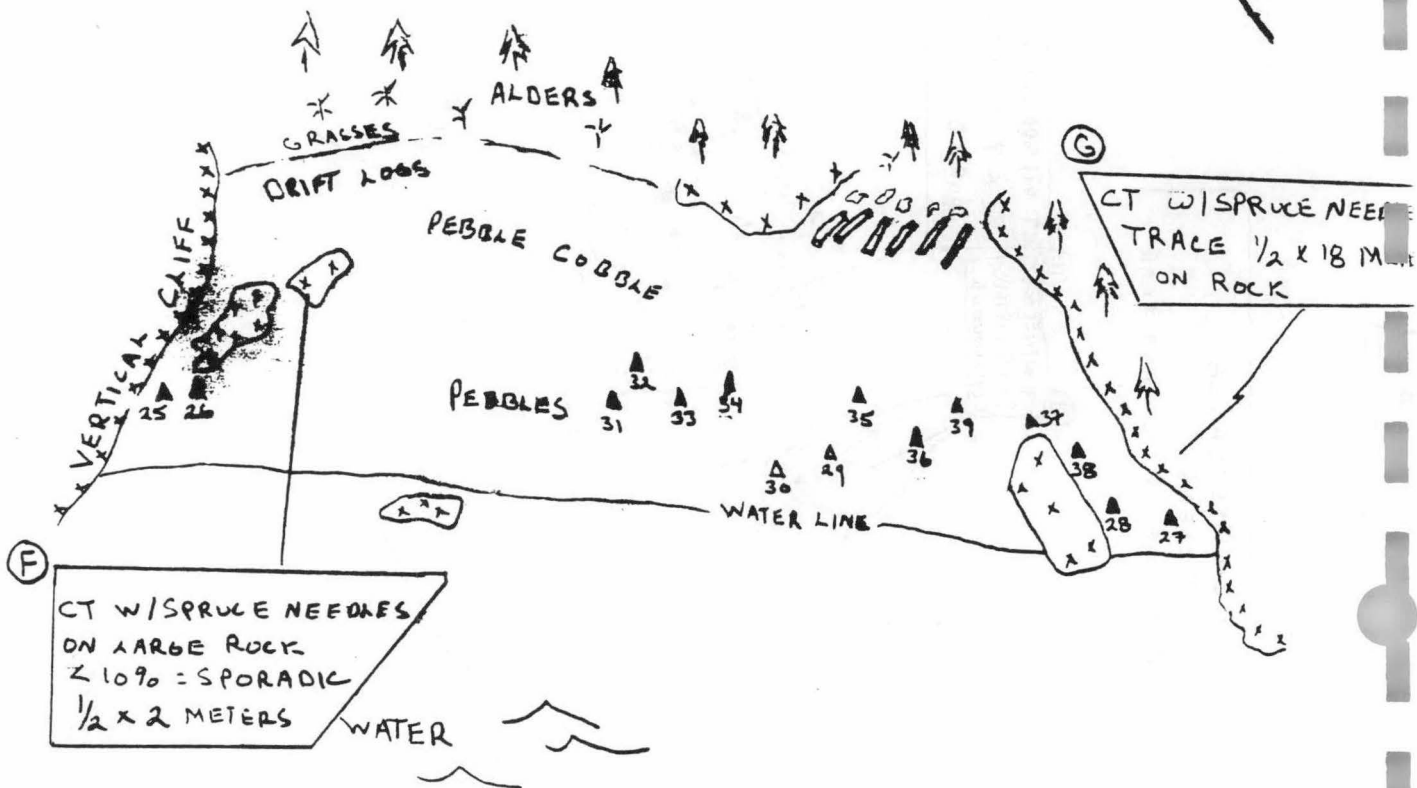
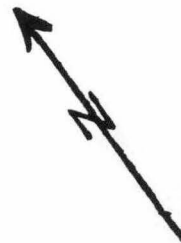
SITE #2

6/23/93

D. MUNSON



KNIGHT ISLAND



1993 Surface Oil Summary  
Segment KN500 Subdivision A

| Location | Area of Oiling Type in Square Meters |    |      |    |       |
|----------|--------------------------------------|----|------|----|-------|
|          | AP                                   | MS | SOR  | CV | CT    |
| A        | 0.                                   | 0. | 1.08 | 0. | 0.    |
| B        | 0.                                   | 0. | 0.   | 0. | 0.21  |
| C        | 0.                                   | 0. | 0.   | 0. | 0.6   |
| D        | 0.                                   | 0. | 0.   | 0. | 0.1   |
| E        | 0.                                   | 0. | 0.   | 0. | 1.425 |
| F        | 0.                                   | 0. | 0.   | 0. | 0.06  |
| G        | 0.                                   | 0. | 0.   | 0. | 0.045 |
| H        | 0.                                   | 0. | 0.   | 0. | 0.24  |
| TOTALS=  | 0.                                   | 0. | 1.08 | 0. | 2.68  |

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 KN500A**

|      |            |           |     |     |      | TREATMENT |      | 1993 OILED SED. VOL. (m3) |     |      |     |       | 1992 OILED SED. VOL. (m3) |     |      |     |       | 1991 OILED SED. VOL. (m3) |      |      |     |       | WT.'ed OIL VOL. |      |       | % CHANGE WT.'ed VOL. |          |          |
|------|------------|-----------|-----|-----|------|-----------|------|---------------------------|-----|------|-----|-------|---------------------------|-----|------|-----|-------|---------------------------|------|------|-----|-------|-----------------|------|-------|----------------------|----------|----------|
| Loc. | 1993 PIT # | Gr. Sz.   | Zn. | En. | Note | 1992      | 1991 | OP                        | HOR | MOR  | LOR | OF/TR | OP                        | HOR | MOR  | LOR | OF/TR | OP                        | HOR  | MOR  | LOR | OF/TR | 1993            | 1992 | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA   | 27-39      | P-SPGPt   | ML  | M   |      | NO        | NO   | 0.0                       | 2.1 | 11.6 | 2.9 | 3.9   | ?                         | 0.0 | 12.2 | 6.1 | 11.0  | 0.0                       | 40.0 | 10.0 | 0.0 | 0.0   | 49.0            | ?    | 190.0 | ?                    | ?        | -74.2    |
| ZB   | 25,26      | BCP-PGSpt | L   | M   |      | NO        | NO   | 0.0                       | 0.7 | 0.6  | 0.0 | 0.0   | ?                         | ?   | ?    | ?   | ?     | ?                         | ?    | ?    | ?   | ?     | 4.7             | ?    | ?     | ?                    | ?        | ?        |
| ZC   | 22-24      | BCP-PG    | LM  | M   |      | NO        | NO   | 0.0                       | 0.0 | 0.0  | 0.0 | 2.4   | ?                         | ?   | ?    | ?   | ?     | 0.0                       | 0.0  | 0.0  | 0.2 | 0.0   | 0.0             | ?    | 0.4   | ?                    | ?        | -100.0   |
| ZD   | 1-15       | PG-PGS    | UM  | L   |      | NO        | MT   | 0.0                       | 0.2 | 2.1  | 0.4 | 0.0   | 0.0                       | 0.0 | 0.0  | 0.0 | 0.6   | 0.0                       | 0.0  | 0.6  | 0.0 | 0.0   | 8.0             | 0.0  | 1.8   | Inf                  | -100.0   | 346.0    |
| ZE   | 40,41      | ?         | U   | M   |      | NO        | NO   | 0.0                       | 0.0 | 0.9  | 0.0 | 0.0   | ?                         | ?   | ?    | ?   | ?     | ?                         | ?    | ?    | ?   | ?     | 2.7             | ?    | ?     | ?                    | ?        | ?        |
| ZF   |            | P-PG      | UML | M   |      | NO        | MT   | 0.0                       | 0.0 | 0.0  | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0  | 0.2 | 0.0   | 0.0                       | 0.0  | 0.0  | 0.4 | 0.0   | 0.0             | 0.4  | 0.8   | -100.0               | -50.0    | -100.0   |
|      |            |           |     |     |      | TOTALS=   |      | 0.0                       | 3.0 | 15.2 | 3.3 | 6.3   | 0.0                       | 0.0 | 12.2 | 6.3 | 11.7  | 0.0                       | 40.0 | 10.6 | 0.6 | 0.0   | 64.4            | 0.4  | 193.0 | 15999.6              | -99.8    | -66.6    |

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 VOL.= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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:** KN 500 B

**LOCATION:** Knight Island North Group, west shore of Knight Island south of Herring Point.

## **OTHER STUDIES**

### **PHYSICAL SETTING**

#### **Coastal Morphology and Sedimentology**

Pocket beach with an anadromous stream entering at the head. The beach is a low-angle sandy, granular, pebble gravel. Large swash bars extending half the length of the beach have been observed here in the previous years. Well-developed high-tide berms are present. Boulder and cobble sediments occur at the base of the cliffs on the limbs of the pocket.

#### **Environmental Sensitivity Index (ESI)**

Type 6; mixed sand and gravel beach.

#### **Fetches and Directions (kilometers)**

#### **Energy Level**

NW= 37; W= 9; SW= 16

### **GENERAL BIOLOGICAL SETTING**

Anadromous stream.

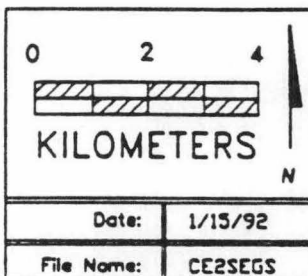
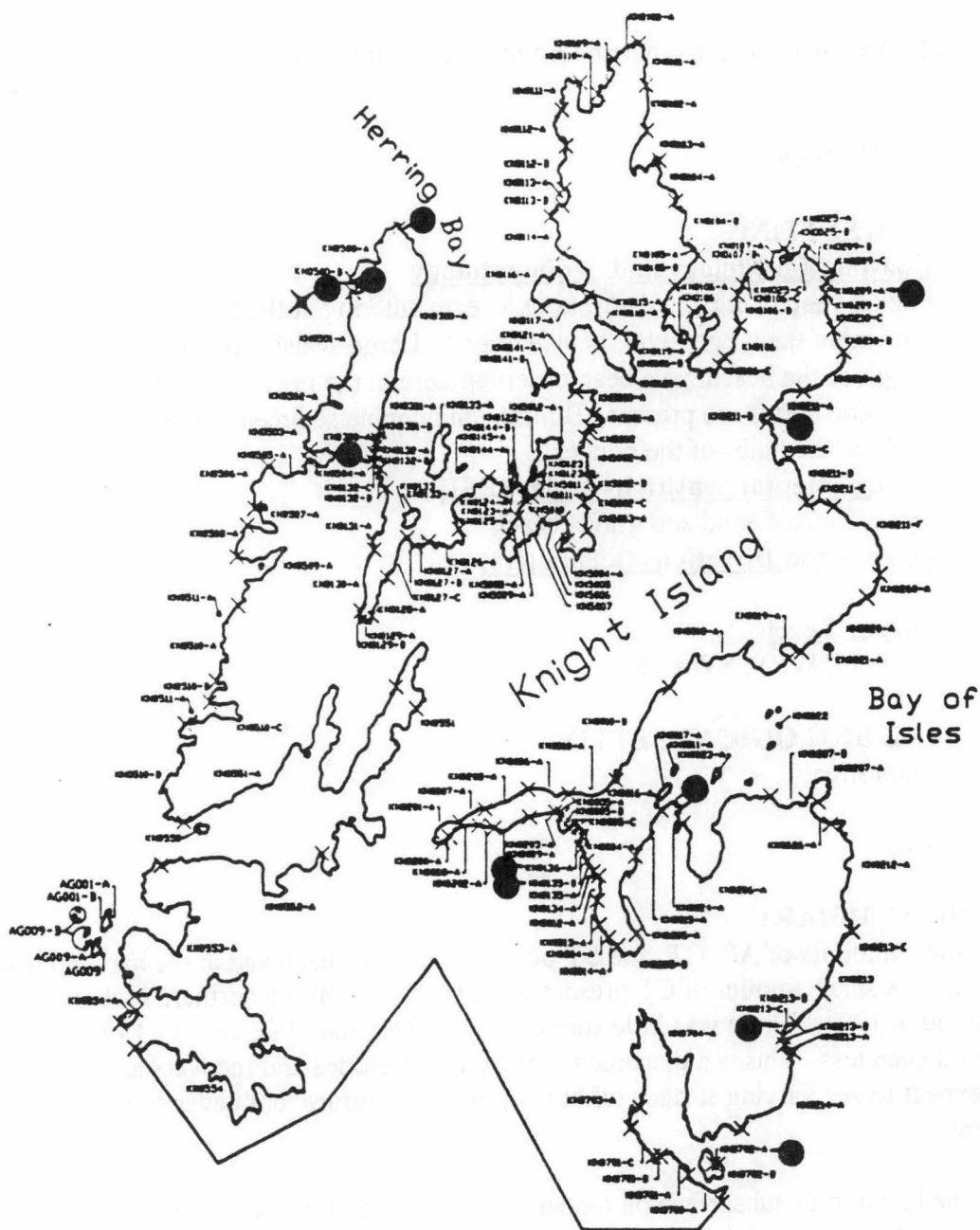
Eagle nest.

Mussel beds.

### **OILING SUMMARY**

Only trace amounts of AP, CT, and ST occur across the beach and in the mid and lower intertidal. A small amount of CT present on the bedrock on the northern limb in 1992 was not found in 1993. There was little surface oil in 1991, and 1992 and the 1993 survey detected even less. This is a dynamic beach and as it erodes and recovers after storms one may expect to see varying surface oil conditions in the future, but never significant amounts.

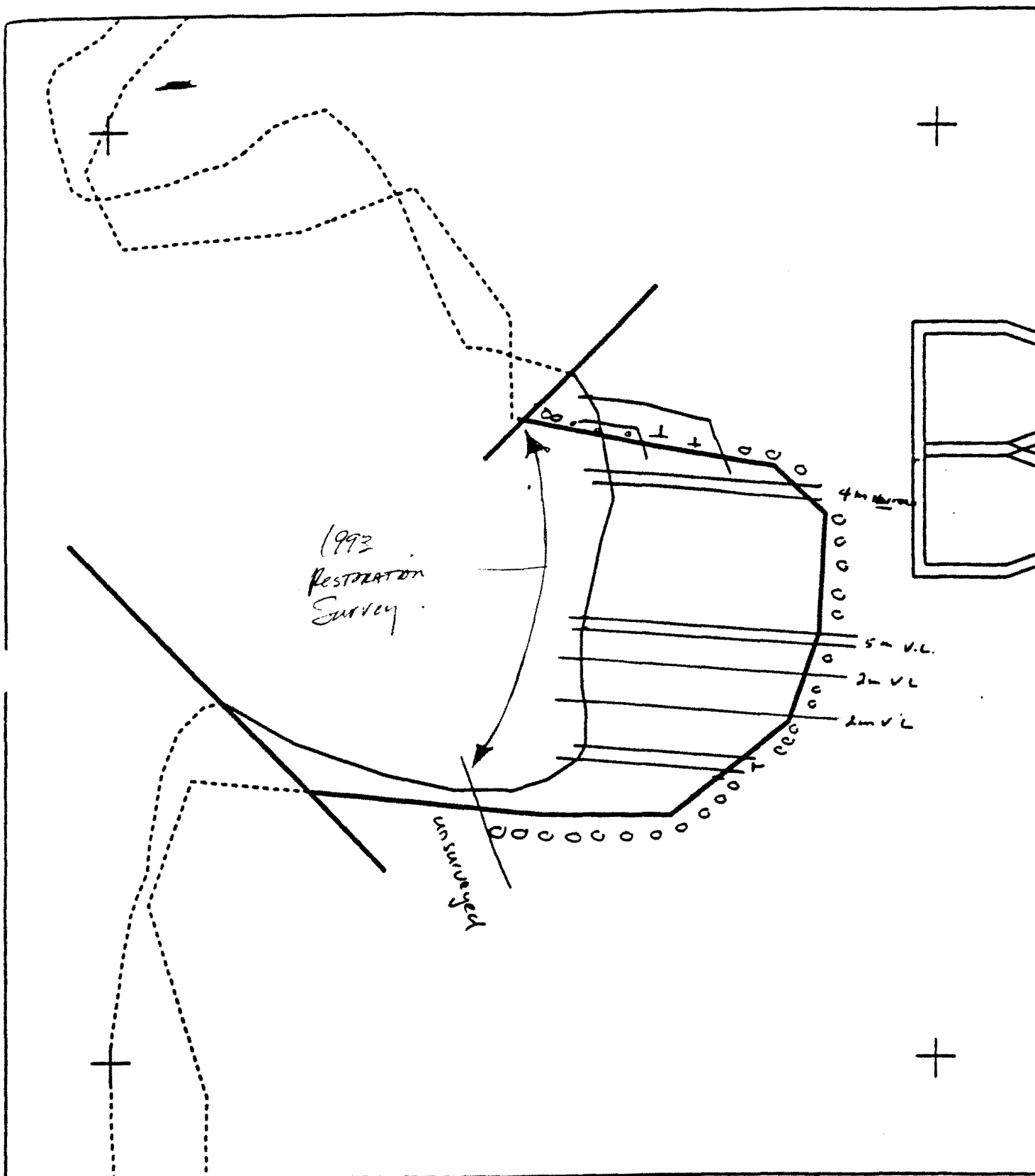
Only one location of subsurface oil remains at this site, and it is a location in granular, pebble, cobble sediments in the southeast corner of the beach. LOR conditions were discovered here in 1993. Large amounts of LOR and MOR with minor volumes of HOR occurred across the beach in the mid and lower intertidal zone in 1991. This oil has apparently completely disappeared, at least partly due to aggressive mechanical tilling in 1991 and manual tilling and removal in 1992.



Prince William Sound  
Central area #2  
Beach Sub-Segment Map  
Map Projection: UTM, Zone 6

— Beach Segments  
× Subdivision Endticks





XXXX  
///  
---  
TTTT  
0000

Wide  
Medium  
Narrow  
Very Light  
No Oil

KN0500 B

ADEC Subsegment Length: 379m

METERS

AK State Plane Zone 4  
4405000



Subdivision Field Map  
Map Key: KNKN0500B  
Name: Reimer  
Date: 5/17/92  
Data Entered:

1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

LOCATION KNIGHT IS SEGMENT KN0500 SUBDIVISION B DATE 6/23/93

AFFILIATION

NAME IVAN NANCE, LT, USCGA

SIGNATURE Ivan Nance

COMPARED TO LAST YEAR THE AREA SEEMED MUCH CLEANER. SHEENING WAS ONLY EVIDENT WHERE WE DUG. LAST YEAR SHEENING WAS EVIDENT WHENEVER THE TIDE CAME IN. CONCUR WITH CONDITIONS NOTED ON CHART AND OILING SUMMARY SUMMARY.

AFFILIATION U.S. Forest Service

NAME Vic Baer

SIGNATURE Vic Baer

Very little surface tar/asphalt present.  
Subsurface oiled areas much improved over last year, and  
addition treatment not necessary.

AFFILIATION ADNR

NAME Wyn Menefee

SIGNATURE Wyn Menefee

Concur with findings.

AFFILIATION

NAME

SIGNATURE

# 1993 ADEC RESTORATION PROJECT # 930380 SHORELINE OILING SUMMARY

PAGE 1 OF 2

SEGMENT KN500

MEMBERS: D. MUNSON - ADEC  
M. PROFITA - ADEC  
V. BAER - USFS  
N. MENTZER - ADNR  
A. WEINER - ADNR

M. Kuwada - ADF+G  
A. REIN - USFS

SUBDIVISION B

DATE 6/23/93

ME 12:00 to 13:20

TIDE LEVEL -1.1 ft. to +4.0 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

EST. OIL CATEGORY LENGTH: H \_\_\_\_\_ m M \_\_\_\_\_ m L \_\_\_\_\_ m VL \_\_\_\_\_ m N \_\_\_\_\_ m NS \_\_\_\_\_ m

| STATION | SURFACE OIL CHARACTER |    |    |    |    |    |    |    |    |    | SURFACE SEDIMENT TYPE | SHORE SLOPE V H M L | AREA    |          | ZONE |    |    |    | NOTES                            |
|---------|-----------------------|----|----|----|----|----|----|----|----|----|-----------------------|---------------------|---------|----------|------|----|----|----|----------------------------------|
|         | AP                    | MS | TB | SO | CV | CT | ST | FL | DB | NO |                       |                     | WIDTH m | LENGTH m | S    | UI | MI | LI |                                  |
| 1       |                       |    | T  |    |    |    |    |    |    |    | B                     | M                   | -       | -        |      |    |    |    | No field data for length/w. etc. |
| 2       | T                     |    |    |    |    | T  | T  |    |    |    | PG                    | L                   | -2      | -9       |      |    |    |    | See sketch for area of oiling    |
| 3       |                       |    | T  | T  |    |    |    |    |    |    | B                     | M                   | -       | -        |      |    |    |    |                                  |
| 4       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 5       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 6       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 7       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 8       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 9       |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 10      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 11      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 12      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 13      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 14      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 15      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 16      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 17      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 18      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 19      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 20      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 21      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 22      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 23      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 24      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |
| 25      |                       |    |    |    |    |    |    |    |    |    |                       |                     |         |          |      |    |    |    |                                  |

DISTRIBUTION: C = 81-100%; S = 61-80%; P = 41-60%; B = 21-40%; T = <21%

SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL # \_\_\_\_\_

FRAMES \_\_\_\_\_

| PIT NO. | DEPTH (cm) | SUBSURFACE OIL CHARACTER |     |     |     |    |    |    | OILED ZONE cm-cm | CLEAN BELOW Y/N | H2O LEVEL (cm) | SHEEN COLOR B R N | PIT ZONE |    |    |    | SURFACE-SUBSURFACE SEDIMENTS | NOTES            |
|---------|------------|--------------------------|-----|-----|-----|----|----|----|------------------|-----------------|----------------|-------------------|----------|----|----|----|------------------------------|------------------|
|         |            | OP                       | HOR | MOR | LOR | OF | TR | NO |                  |                 |                |                   | S        | UI | MI | LI |                              |                  |
| 1       | 22         |                          |     |     |     |    |    |    | 6-12             | Y               |                |                   |          |    |    |    | BC PG                        |                  |
| 2       | 31         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG G                         | MUSSEL BEDS      |
| 3       | 27         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG G                         | MUSSEL BEDS      |
| 4       | 23         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG G                         | MUSSEL BEDS      |
| 5       | 31         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG G                         | MUSSEL BEDS      |
| 6       | 29         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | CP S                         | MUSSEL BEDS      |
| 7       | 25         |                          |     |     |     |    |    |    | 2-6              | Y               |                |                   |          |    |    |    | BC S                         | BOULDER/MUSSEL S |
| 8       | 17         |                          |     |     |     |    |    |    | 2-6              | Y               |                |                   |          |    |    |    | CP S                         | MUSSELS          |
| 9       | 23         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG S                         | MUSSELS          |
| 10      | 29         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG S                         | MUSSELS          |
| 11      | 28         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG S                         | MUSSELS          |
| 12      | 20         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG GS                        |                  |
| 13      | 32         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG GS                        |                  |
| 14      | 56         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG GS                        |                  |
| 15      | 41         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG GS                        |                  |
| 16      | 36         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | CP PG                        |                  |
| 17      | 30         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | CP PG                        |                  |
| 18      | 25         |                          |     |     |     |    |    |    | -                |                 | 11 18          |                   |          |    |    |    | CP PG                        |                  |
| 19      | 25         |                          |     |     |     |    |    |    | 15-32            | U               | 32             |                   |          |    |    |    | CP PG                        |                  |
| 20      | 5          |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | CP PG                        |                  |
| 21      | 25         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | CP PG                        |                  |
| 22      | 24         |                          |     |     |     |    |    |    | 5-24             | Y               |                |                   |          |    |    |    | CP PG                        |                  |
| 23      | 25         |                          |     |     |     |    |    |    | -                |                 |                |                   |          |    |    |    | PG G                         |                  |

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



PAGE 2 OF 3

DATE 6, 23, 93

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

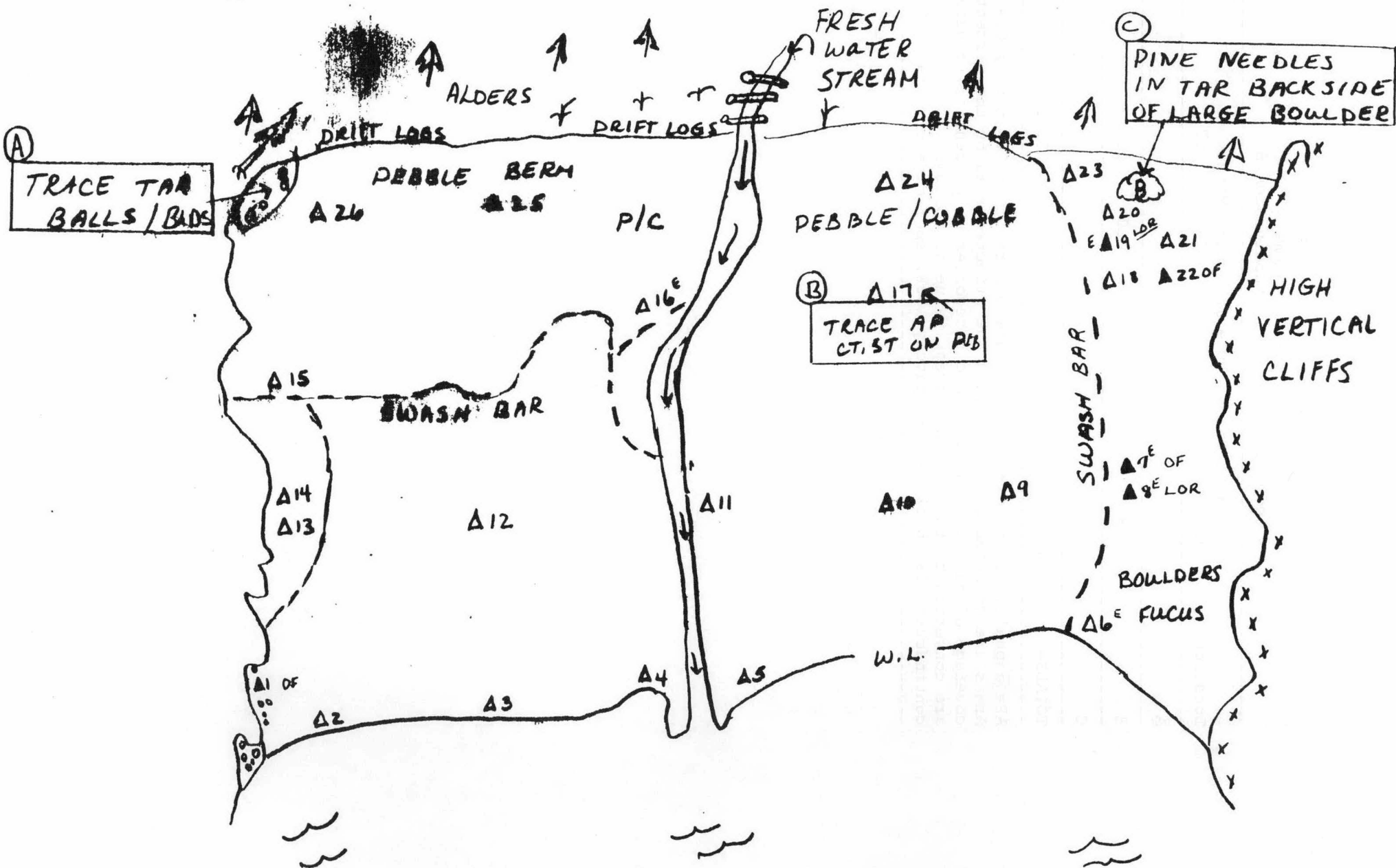
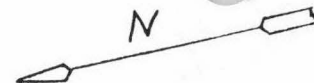
**OG COMMENTS:**

KNIGHT ISLAND

KN0500 B

6/23/93

M. PROFITA



1993 Surface Oil Summary  
Segment KN500                      Subdivision B

| Location | Area of Oiling Type in Square Meters |     |     |     |      |
|----------|--------------------------------------|-----|-----|-----|------|
|          | AP                                   | MS  | SOR | CV  | CT   |
| A        |                                      |     |     |     |      |
| B        | 0.09                                 | 0.0 | 0.0 | 0.0 | 0.09 |
| C        |                                      |     |     |     |      |
| TOTALS=  | 0.09                                 | 0.  | 0.  | 0.  | 0.09 |

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 KN500B**

| Loc.    | 1993 PIT #  | Gr. Sz. | Zn. | En. | Note    | TREATMENT |          | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |     |      |       |       | WT.'ed OIL VOL. |      |       | % CHANGE WT.'ed VOL. |          |          |
|---------|-------------|---------|-----|-----|---------|-----------|----------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|-----|------|-------|-------|-----------------|------|-------|----------------------|----------|----------|
|         |             |         |     |     |         | 1992      | 1991     | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR  | LOR   | OF/TR | 1993            | 1992 | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA      | 1           | BC-PG   | S   | M   |         | NO        | ET       | 0.0                       | 0.0 | 0.0 | 0.0 | 0.2   | ?                         | ?   | ?   | ?   | ?     | ?                         | ?   | ?    | ?     | ?     | 0.0             | ?    | ?     | ?                    | ?        | ?        |
| ZB      | 18,19,21,22 | CP-PG   | U   | M   |         | NO        | NO       | 0.0                       | 0.0 | 0.0 | 3.3 | 3.7   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | ?                         | ?   | ?    | ?     | ?     | 6.5             | 0.0  | ?     | Inf                  | ?        | ?        |
| ZC      | 7,8         | BCP-SPG | L   | M   | MUSSELS | NO        | NO       | 0.0                       | 0.0 | 0.0 | 0.2 | 0.2   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.4   | 0.0                       | 0.0 | 0.0  | 0.0   | 0.0   | 0.5             | 0.0  | 0.0   | Inf                  | 0.0      | Inf      |
| ZD      |             | GP-SPG  | L   | M   |         | MT        | ET,MT    | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 4.2 | 7.7   | 0.0                       | 7.3 | 1.8  | 1.9   | 0.0   | 0.0             | 8.4  | 38.2  | -100.0               | -78.1    | -100.0   |
| ZE      |             | PG-PGS  | ML  | M   |         | MT, Rb    | ET,MT,SR | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 1.2 | 1.0   | 0.0                       | 0.0 | 58.5 | 159.7 | 46.8  | 0.0             | 2.4  | 494.9 | -100.0               | -99.5    | -100.0   |
| ZF      |             | P-PGS   | M   | M   |         | NO        | ET,MT    | 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  | 0.8   | 0.0   | 0.0             | 0.0  | 1.6   | 0.0                  | -100.0   | -100.0   |
| TOTALS= |             |         |     |     |         |           |          | 0.0                       | 0.0 | 0.0 | 3.5 | 4.1   | 0.0                       | 0.0 | 0.0 | 5.4 | 9.1   | 0.0                       | 7.3 | 60.3 | 162.4 | 46.8  | 7.0             | 10.8 | 534.7 | -34.7                | -98.0    | -98.7    |

**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 VOL.**= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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:** KN 702 A

**LOCATION:** Knight Island Outer Group, on small island in the mouth of Marsha Bay.

**OTHER STUDIES**

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

Protected cove with pebble cobble tidal flat fronting a lagoon. Sediments are subangular cobbles and pebbles on the surface with smaller pebbles and sandy, granular matrix in the subsurface. A sheltered narrow, gravel beach occurs around the perimeter of the lagoon. Along the entrance to this cove is a high-angle boulder slope with angular boulders. Another cove that branches away from the lagoon area is a long narrow protected area with cobble and pebble sediments and a peat bog at the upper end. Boulders occur along the sides of this cove.

**Environmental Sensitivity Index (ESI)**

Type 7; gravel beach.

Type 8; sheltered rocky.

Type 9; sheltered tidal flats.

**Fetches and Directions (kilometers)**

NE= 65; but obscured by beach orientation, rocks, and islands.

**Energy Level**

Low with some very low areas.

**GENERAL BIOLOGICAL SETTING**

Eagle nest.

**OILING SUMMARY**

Two locations with significant amounts and concentrations of AP and SOR occur at this site. At location 'D', friable AP and SOR occur amongst boulders and cobbles and appear buried in places. At location 'G' exceptionally hard AP occurs between cobbles and boulders. Conditions do not appear to have improved much since 1991 despite manual removal at both locations in 1991 and at 'D' in 1992.

Large and concentrated areas of CV and CT occur on the cliff and boulders at the base of the cliff at the entrance of the site (locations 'A' and 'B'). This condition does not appear to have improved since 1991.

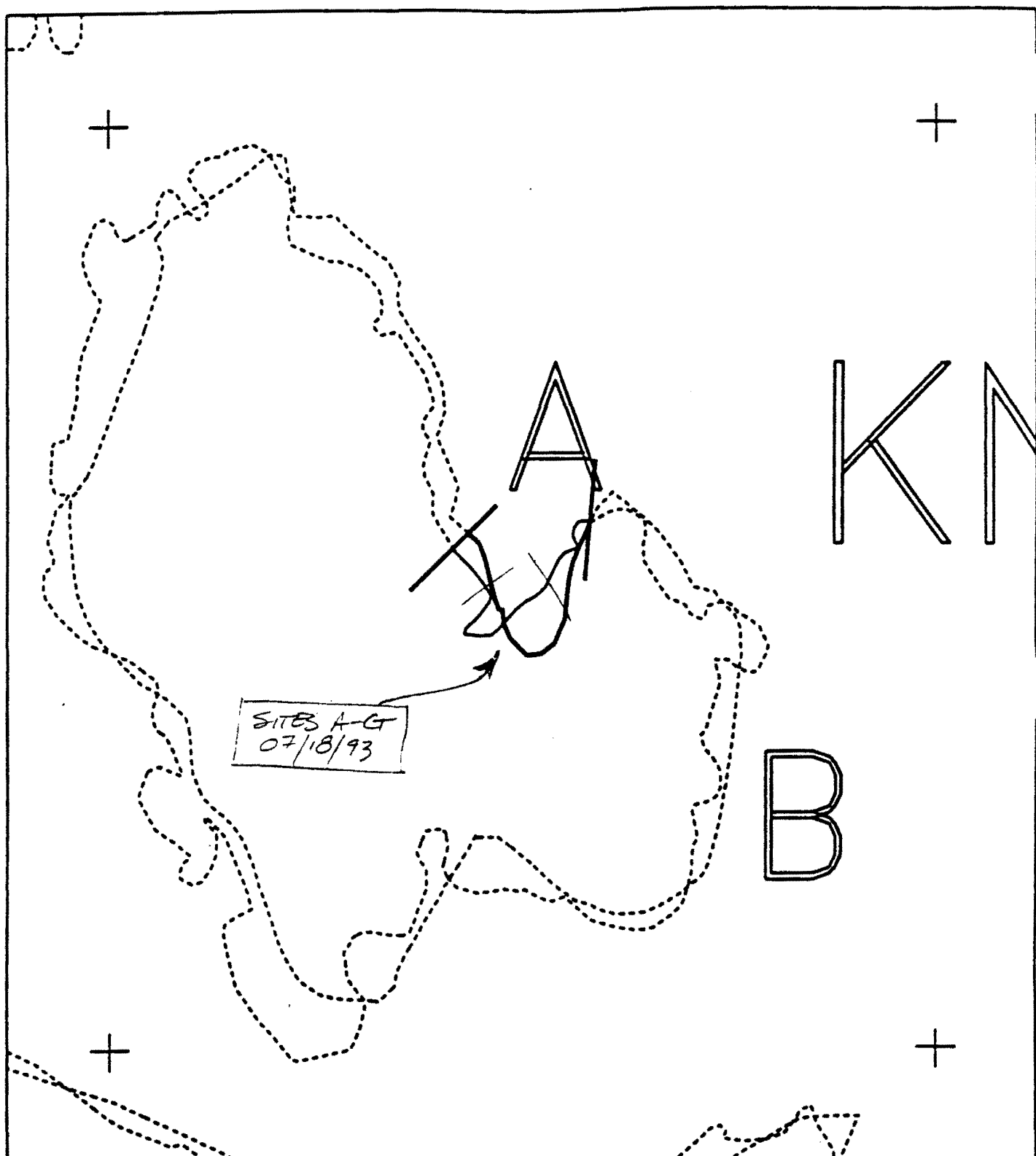
Sheening still occurs when gravely sediments are disturbed around the edge of the lagoon (see photo LJE001-23). In 1992, surveyors suggested that a closer look be taken at the biological conditions of the lagoon area.

A small area of HOR exists in the narrow cove in the vicinity of pits 23 and 24 (subsurface location ZA). This area was not recorded as having subsurface oil in 1991 or 1992.



Area ZB, which includes pits 8 through 12, contains MOR and what appears to be buried AP (see photo LJE001-19). This site occurs in the upper intertidal zone in sandy, granular pebble and cobble gravel. Improvement has occurred here since 1991 as is evidenced by the total reduction of HOR. Manual tilling and removal in 1991 and 1992 enhanced the observed reduction.





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

**KN0702 A**  
 ADEC Subsegment Length: 218m  
 METERS

5 100 200  
 AK State Plane Zone 4  
 kn0702a



Subdivision Field Map  
 Map Key: KNKN0702A  
 Name: CSC  
 Date: 18 July 1993  
 Date Entered:



1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

MARSHA

C. TON BAY

SEGMENT KN0702

SUBDIVISION A

DATE 7/18/93

AFFILIATION DNR, Division of Land

NAME Katie Farley

SIGNATURE

Katie Farley

This site was located on an island near the outlet of Marsha Bay. The DUS Area Plan (June 1988) designated Marsha Bay as a potential history site. This site received heavy impact--along with other areas within Marsha Bay. There was high mortality among Mytilus edulis in the lagoon at the site but I did see live mussels interspersed around the segment.

AFFILIATION

NAME

SIGNATURE

AFFILIATION

NAME

SIGNATURE

AFFILIATION

NAME

SIGNATURE

# 1993 ADEC RESTORATION PROJECT # 930380 SHORELINE OILING SUMMARY

PAGE 1 OF 3

SEGMENT KNO 70.2

TEAM MEMBERS: E. Piper, J. Gibbault, J. Matthews, D. Munson  
J. Evans - ADEC  
Katie Farley - ADNR  
Phil Means - USCG  
Ed Owens, Sam Stoker - Exxon

SUBDIVISION A

DATE 07/18/93

TIME 16:40 to 18:50

TIDE LEVEL +6.0 ft. to 2.6 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

| L<br>O<br>C | SURFACE OIL CHARACTER |    |    |     |    |    |    |    |    |    | SURFACE<br>SEDIMENT<br>TYPE | SHORE<br>SLOPE<br>V H M L | AREA       |             | ZONE |    |    |    | NOTES                        |
|-------------|-----------------------|----|----|-----|----|----|----|----|----|----|-----------------------------|---------------------------|------------|-------------|------|----|----|----|------------------------------|
|             | AP                    | MS | TB | SOR | CV | CT | ST | FL | DB | NO |                             |                           | WIDTH<br>m | LENGTH<br>m | S    | UI | MI | LI |                              |
| A           | S                     |    |    | S   | R  | B  |    |    |    |    | R, B                        | V, H                      | 1          | 30          |      |    |    |    |                              |
| B           | T                     |    |    | T   | P  | P  |    |    |    |    | B                           | H                         | 3          | 5           |      |    |    |    |                              |
| C           | S                     |    |    | S   |    | S  |    |    |    |    | R, B                        | M                         | 5          | 30          |      |    |    |    | AP IS FRIABLE AMONGST C.     |
| D           | P                     |    |    | P   |    | S  | S  |    |    |    | R, C                        | L                         | 10         | 22          |      |    |    |    | AP IS FRIABLE, SOME AP IS IS |
| E           |                       |    |    |     |    | S  |    |    |    |    | R                           | V                         | 1          | 15          |      |    |    |    |                              |
| F           |                       |    |    | S   |    | S  |    |    |    |    | B, C                        | M                         | 3          | 35          |      |    |    |    |                              |
| G           | S                     |    |    | S   |    | S  |    |    |    |    | B, C                        | M                         | 8          | 20          |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |
|             |                       |    |    |     |    |    |    |    |    |    |                             |                           |            |             |      |    |    |    |                              |

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

PHOTO ROLL #

L-1001-

FRAMES 19-23

| PIT<br>NO. | PIT<br>DEPTH<br>(cm) | SUBSURFACE<br>OIL CHARACTER |     |     |     |    |    |    | OILED<br>ZONE<br>cm-cm | CLEAN<br>BELOW<br>Y/N | H2O<br>LEVEL<br>(cm) | SHEEN<br>COLOR<br>B R S H | PIT<br>ZONE |    |    |    | SURFACE-<br>SUBSURFACE<br>SEDIMENTS | NOTES                |
|------------|----------------------|-----------------------------|-----|-----|-----|----|----|----|------------------------|-----------------------|----------------------|---------------------------|-------------|----|----|----|-------------------------------------|----------------------|
|            |                      | OP                          | HOR | MOR | LOR | OF | TR | MO |                        |                       |                      |                           | S           | UI | MI | LI |                                     |                      |
| 1          | 26                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G, S                     |                      |
| 2          | 17                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G, S                     |                      |
| 3          | 15                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G, S                     |                      |
| 4          | 15                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G                        |                      |
| 5          | 22                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G                        |                      |
| 6          | 23                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G                        |                      |
| 7          | 20                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G, S                     |                      |
| 8          | 25                   |                             |     |     |     |    |    |    | 7-9                    | Y                     |                      |                           |             |    |    |    | B, C, P/P, G                        | BURIED AP FRIABLE    |
| 9          | 21                   |                             |     |     |     |    |    |    | 8-5                    | Y                     |                      |                           |             |    |    |    | C, P/P, G                           | BURIED AP, FRIABLE   |
| 10         | 17                   |                             |     |     |     |    |    |    | 5-8                    | Y                     |                      |                           |             |    |    |    | C, P/P, G                           |                      |
| 11         | 16                   |                             |     |     |     |    |    |    | 6-10                   | Y                     |                      |                           |             |    |    |    | C, P/P, G                           |                      |
| 12         | 21                   |                             |     |     |     |    |    |    | 10-13                  | Y                     |                      |                           |             |    |    |    | P/P, G                              |                      |
| 13         | 30                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | C, P/P, G                           |                      |
| 14         | 31                   |                             |     |     |     |    |    |    | V -                    | U                     | 28-31                | S                         |             |    |    |    | P/P, G                              |                      |
| 15         | 16                   |                             |     |     |     |    |    |    | V - U                  | U                     | 8-16                 | B                         |             |    |    |    | P/G                                 |                      |
| 16         | 22                   |                             |     |     |     |    |    |    | 1-7                    |                       | 14-22                |                           |             |    |    |    | C, P/P, G, M                        | High Organic Content |
| 17         | 26                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | P/P, G                              |                      |
| 18         | 26                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | B, C, P/P, G                        |                      |
| 19         | 26                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | P/P, G                              |                      |
| 20         | 31                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | P/G/P, G, S                         |                      |
| 21         | 16                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | P/G/P, G, S                         |                      |
| 22         | 24                   |                             |     |     |     |    |    |    | -                      |                       |                      |                           |             |    |    |    | P/P, G, P                           | Pent IN AREA         |
| 23         | 24                   |                             |     |     |     |    |    |    | 9-12                   | Y                     |                      |                           |             |    |    |    | P/G/P, G, S                         |                      |

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

PAGE 2 OF 3

TEAM NO. \_\_\_\_\_

ENT KN0702

SUBDIVISION A

DATE 07/18/1983

[illegible]

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

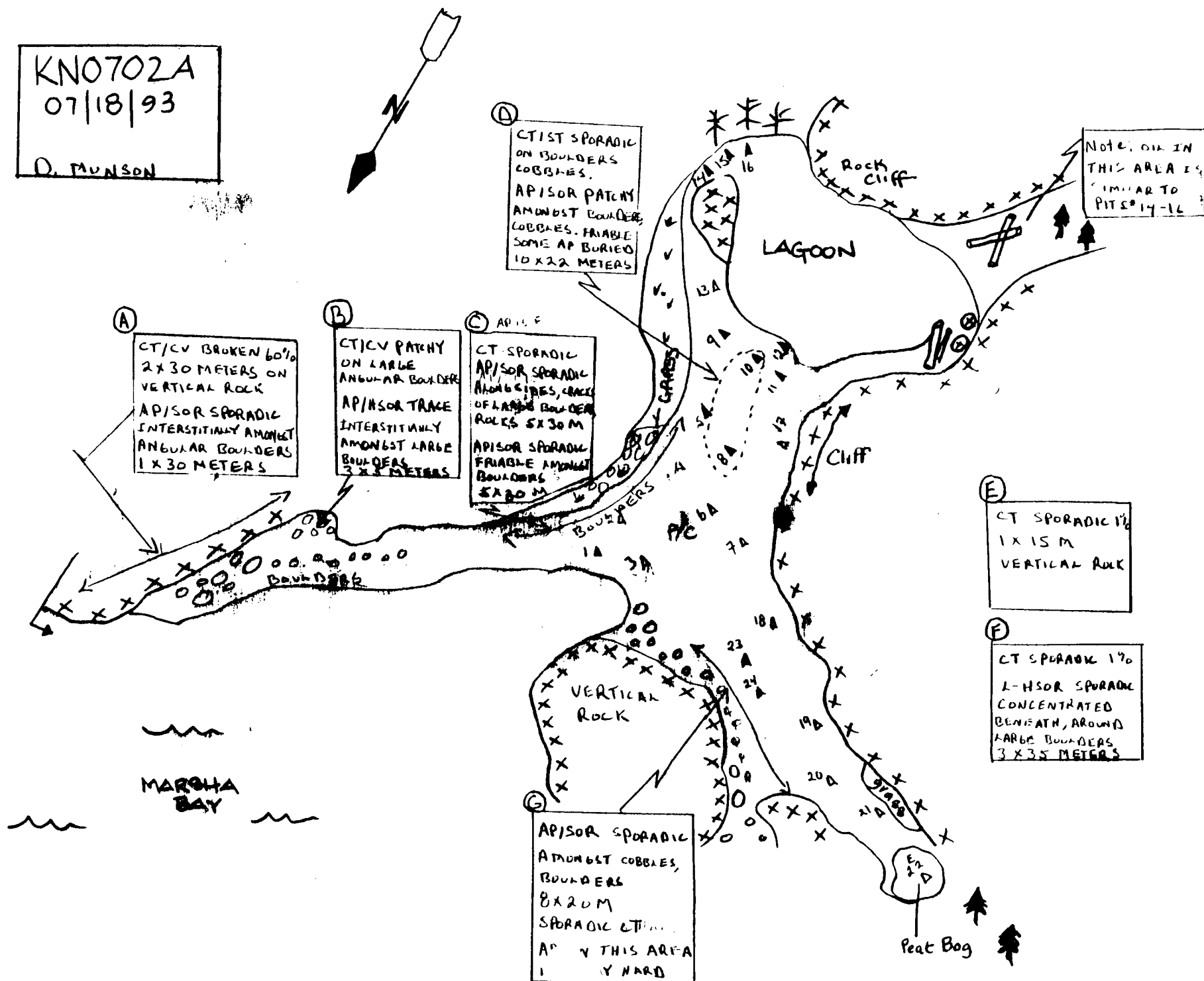
**OG COMMENTS:**



KN0702A

07/18/93

D. MUNSON



1993 Surface Oil Summary  
Segment KN702                      Subdivision A

| Location | Area of Oiling Type in Square Meters |    |        |      |      |
|----------|--------------------------------------|----|--------|------|------|
|          | AP                                   | MS | SOR    | CV   | CT   |
| A        | 1.8                                  | 0. | 1.8    | 21.  | 21.  |
| B        | 0.075                                | 0. | 0.075  | 4.5  | 4.5  |
| C        | 9.                                   | 0. | 9.     | 0.   | 9.   |
| D        | 66.                                  | 0. | 66.    | 0.   | 13.2 |
| E        | 0.                                   | 0. | 0.     | 0.   | 0.9  |
| F        | 0.                                   | 0. | 6.3    | 0.   | 6.3  |
| G        | 9.6                                  | 0. | 9.6    | 0.   | 9.6  |
| TOTALS=  | 86.475                               | 0. | 92.775 | 25.5 | 64.5 |

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 KN702A**

| Loc. 1993 PIT # Gr. Sz. Zn. En. Note |       |         |   |    |                  | TREATMENT |            | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |     |     |     |       | WT.'ed OIL VOL. |      |        | % CHANGE WT.'ed VOL. |          |          |
|--------------------------------------|-------|---------|---|----|------------------|-----------|------------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|-----------------|------|--------|----------------------|----------|----------|
|                                      |       |         |   |    |                  | 1992      | 1991       | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | 1993            | 1992 | 1991   | 92 to 93             | 91 to 92 | 91 to 93 |
| 2A                                   | 23,24 | CPG-PGS | U | L  |                  | NO        | MR, Rs     | 0.0                       | 0.5 | 0.0 | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 1.9             | ?    | 0.0    | ?                    | ?        | Inf      |
| 2B                                   | 8-12  | PC-SGH  | U | VL | BURIED AP IN '93 | MB, Rs    | MR, Rs, MT | 0.0                       | 0.0 | 3.2 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 3.6 | 0.0   | 0.0                       | 4.2 | 3.2 | 0.0 | 0.0   | 9.5             | 7.1  | 26.5   | 34.3                 | -73.2    | -64.0    |
| 2C                                   | 14-16 | CP-PGSM | U | VL | ORGANICS         | NO        | NO         | 0.0                       | 0.2 | 0.3 | 0.0 | 1.3   | 0.0                       | 0.0 | 0.0 | 0.4 | 0.0   | 0.0                       | 0.0 | 0.4 | 0.0 | 1.9   | 0.8             | 0.8  | 137.6  | 0.0                  | 137.6    |          |
| 2D                                   |       | C-GP    | U | VL |                  | MB, Rs    | NO         | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.2 | 0.0 | 0.0   | ?                         | ?   | ?   | ?   | ?     | 0.0             | 0.6  | ?      | -100.0               | ?        | ?        |
| 2E                                   |       | PCB-GP  | U | VL |                  | ?         | NO         | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.2 | 0.2 | 0.0 | 0.0   | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 1.5             | 0.0  | -100.0 | Inf                  | 0.0      |          |
| TOTALS=                              |       |         |   |    |                  |           |            | 0.0                       | 0.7 | 3.5 | 0.0 | 1.3   | 0.0                       | 0.2 | 0.4 | 4.0 | 0.0   | 0.0                       | 4.2 | 3.2 | 0.4 | 0.0   | 13.4            | 10.0 | 27.3   | 33.3                 | -63.3    | -51.1    |

**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 VOL.**= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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: July 18, 1993 Time: 18:31 (6:31 pm)

Location (segment #): KN702A

Reason for taking photo: Overall view, asphalt  
in frame 019 at lower left, canyon to  
right of frame, lagoon to left

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 020

OFFICIAL PHOTOGRAPH ADEC

Date: July 18, 1993 Time: 18:30 (6:30 pm)

Location (segment #): KN702A

Reason for taking photo: Broken asphalt

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 019

OFFICIAL PHOTOGRAPH ADEC

Date: July 18, 1993 Time: 18:33 (6:33 pm)

Location (segment #): KN702A

Reason for taking photo: Lagoon overview; frame  
taken from cliff wall visible <sup>on right</sup> in frame  
# 020

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 022

OFFICIAL PHOTOGRAPH ADEC

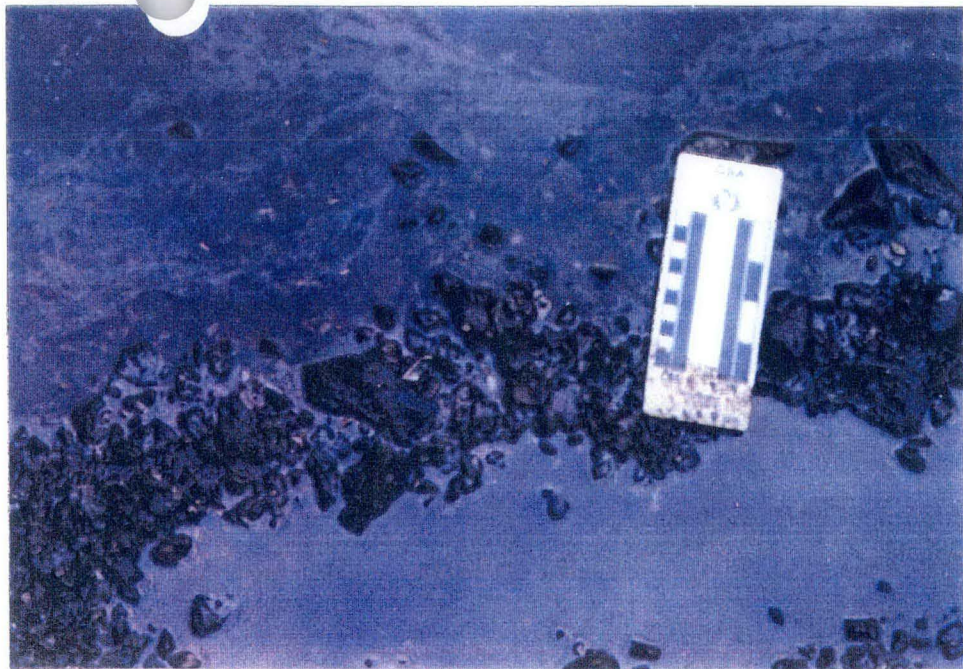
Date: July 18, 1993 Time: 18:32 (6:32 pm)

Location (segment #): KN702A

Reason for taking photo: Asphalt right on surface,  
near site of photo 019

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 021





OFFICIAL PHOTOGRAPH ADEC

Date: July 18, 1993 Time: 18:34 (6:34pm)

Location (segment #): KN702A

Reason for taking photo: Sheen resulting from  
disturbing sediments in back of lagoon

Taken by: L.J. Evans *LJE*

Roll #: LJE001 Frame #: 023

**LA 015 B**

**SEGMENT:** LA 015 B

**LOCATION:** Chenega Area Group, north end of Latouche Island east of Sleepy Bay.

## **OTHER STUDIES**

## **PHYSICAL SETTING**

### **Coastal Morphology and Sedimentology**

Rounded, boulder and cobble gravel beach, wave cut platforms with boulder veneers, and rocky outcrops. This beach is partitioned by several bedrock outcrops that project seaward perpendicular to shore. Gravel berms and storm berms are well developed. The gravel beach portion on the west end of the site contains well-rounded surface cobbles and small boulders with increasing grain size down beach. In the subsurface, a pebble and granular matrix occurs. Large boulders and bedrock outcrops form protective areas on the margins of this gravel beach.

### **Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 2; exposed wave-cut platform.

Type 7; gravel beach.

### **Fetches and Directions (kilometers)**

NE= 110

### **Energy Level**

High.

## **GENERAL BIOLOGICAL SETTING**

Eagle nest.

Finfish harvesting.

## **OILING SUMMARY**

Several locations of AP and SOR exist at this site amongst boulders and cobbles and in vertical fractures of bedrock. It is difficult to evaluate, but it does appear that surface oil has reduced since 1991, particularly in the western gravel beach area.

Several areas of HOR and OP subsurface locations persist at this site. The largest area is location ZA, which is beneath clean boulder and cobble surface sediments in the western beach (pits 10,11,12-25, 27, and 28). The amount of OP oil has significantly reduce at this location since 1991, but the overall amount of oil has remained constant.

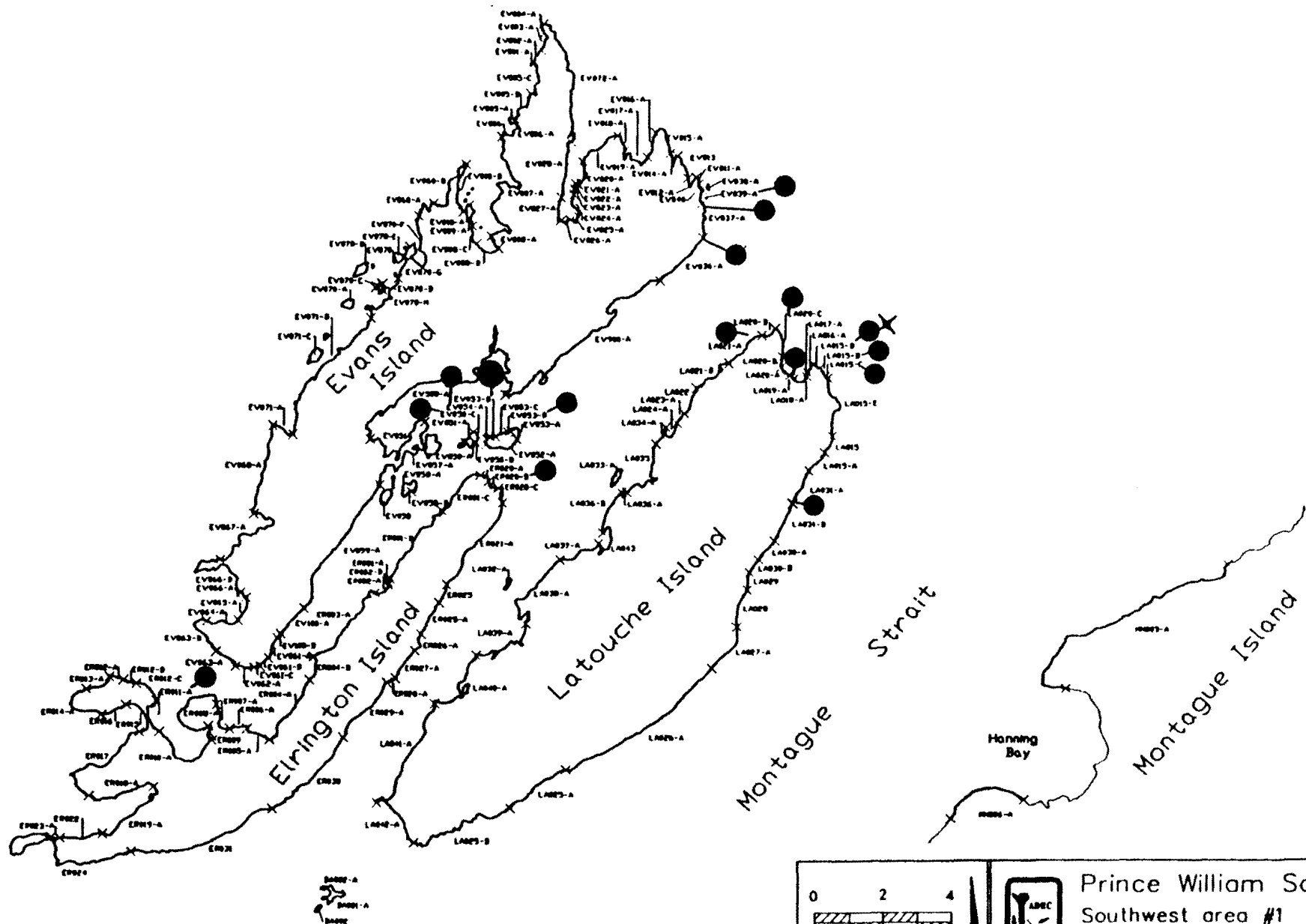
Another location (ZB, pits 1,3,5, and 6) to the west of ZA is in a very large boulder field. This location reduced from OP conditions to LOR and HOR conditions from 1991 to 1993.



Location ZD (pits 34-36, and 39) contains HOR oil but has also greatly reduced since 1991 when OP was present. This area is in the upper to mid-intertidal zone and bedrock is near the surface.

No oil was recorded at location ZC (pits 31 and 32) in 1991 or 1992, but the 1993 survey discovered a small amount of HOR and OP.

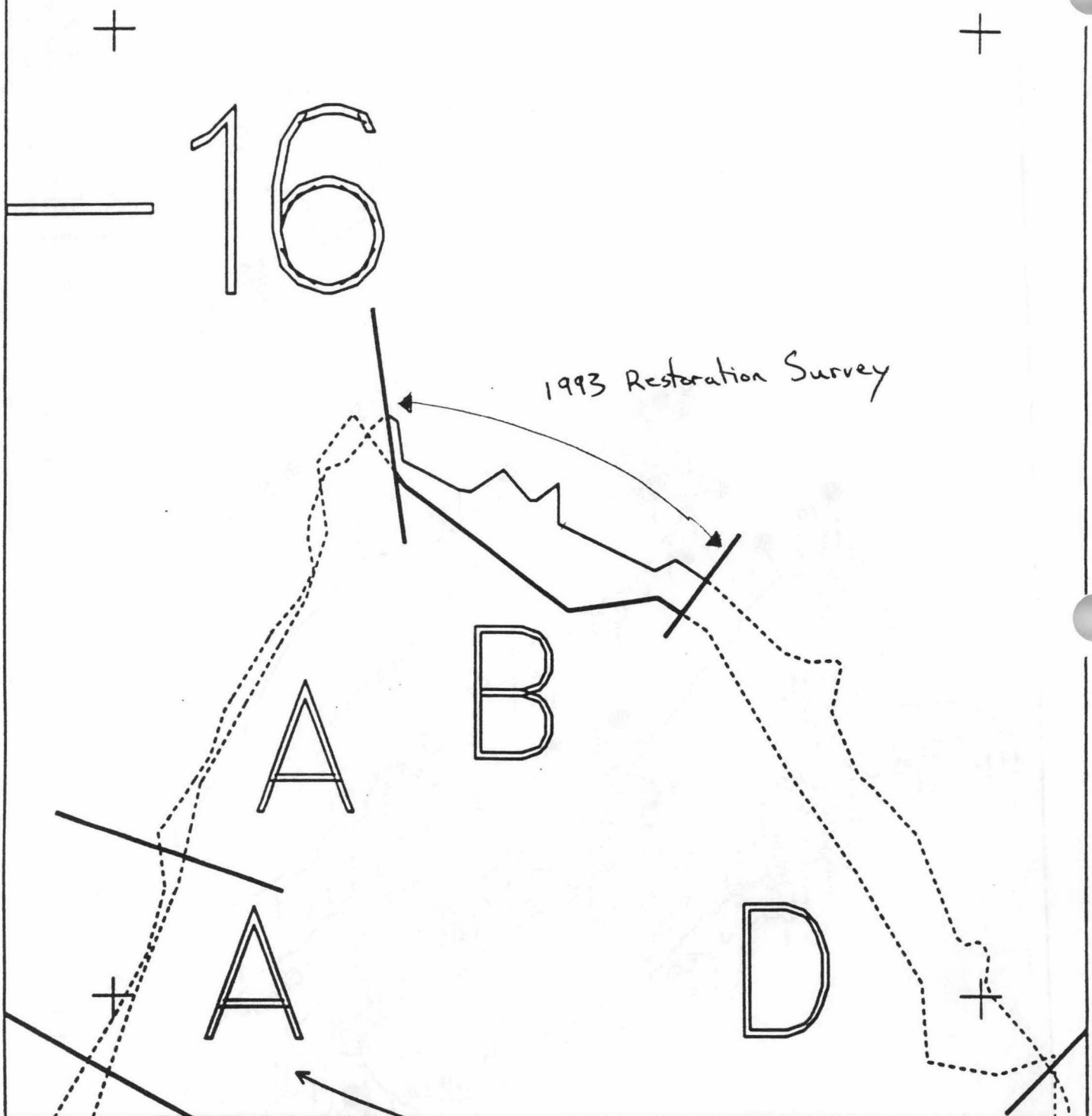
Overall this site has significantly improved since 1991, and this is despite no subsurface treatment in 1991 or 1992.



Danger Island

|                             |         |                                        |
|-----------------------------|---------|----------------------------------------|
| <p>0 2 4<br/>KILOMETERS</p> |         | Beach Segments<br>Subdivision Endticks |
| Date:                       | 1/13/92 |                                        |
| File Name:                  | SWISEGS |                                        |

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



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

LA015 B

ADEC Subsegment Length: 234m

METERS

0 100 200

AK State Plane Zone 4  
pld015b



Subdivision Field Map

Map Key: PWSLA015B

Name: DM

Date: 8-19-93

Date Entered:



1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

SECTION Latouche I SEGMENT LA015 SUBDIVISION B DATE 8/19/93

AFFILIATION

NAME

SIGNATURE

AFFILIATION

NAME

SIGNATURE

AFFILIATION

NAME

SIGNATURE

AFFILIATION

NAME

SIGNATURE

# 1993 ADEC RESTORATION PROJECT # 930380 SHORELINE OILING SUMMARY

PAGE 1 OF 3

SEGMENT LA015

SUBDIVISION B

DATE 8/19/93

TEAM MEMBERS: DIANNE MUNKSON, JONI MATTHEWS,  
JIM GIBBAUT, CLARA CROSBY (ADEC)  
SAM STOKER, ANDY TEAL (EXXON)  
KATIE FARLEY (CADNR)

TIME 06:40 to 10:00

TIDE LEVEL 2.8 ft. to -0.8 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

| L<br>O<br>C | SURFACE OIL CHARACTER |    |    |     |    |    |    |    |    |    | SURFACE<br>SEDIMENT | SHORE<br>SLOPE | AREA  |        | ZONE |    |    |    | NOTES |
|-------------|-----------------------|----|----|-----|----|----|----|----|----|----|---------------------|----------------|-------|--------|------|----|----|----|-------|
|             | AP                    | MS | TB | SOR | CV | CT | ST | FL | DB | NO | TYPE                | VHML           | WIDTH | LENGTH | S    | UI | MI | LI |       |
|             |                       |    |    |     |    |    |    |    |    |    |                     |                | m     | m      |      |    |    |    |       |
| A           |                       |    |    |     |    | TT |    |    |    |    | B                   |                | 1     | 4      |      | X  |    |    |       |
| B           |                       |    |    | P   |    |    |    |    |    |    | B                   |                | 2     | 3      |      |    |    |    |       |
| C           | S                     |    |    | S   |    |    |    |    |    |    | BCP                 |                | 20    | 17     |      |    |    |    |       |
| D           | S                     |    |    | S   |    |    |    |    |    |    | BC                  |                | 8     | 19     |      | X  |    |    |       |
| E           | S                     |    |    | S   |    |    |    |    |    |    | BC                  | H              | 23    | 3      |      | X  |    |    |       |
| F           |                       |    |    |     |    | TT |    |    |    |    | R                   |                | 0.5   | 5      |      | X  |    |    |       |
| G           | S                     |    |    | S   |    |    |    |    |    |    | BCR                 |                | 52    | 10     |      | X  |    |    |       |
|             |                       |    |    |     |    |    |    |    |    |    |                     |                |       |        |      |    |    |    |       |

DISTRIBUTION: C = 81-100%; B = 61-80%; P = 11-50%; S = 1-10%; T = <1%

SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL #

FRAMES

| PIT NO. | PIT DEPTH (cm) | SUBSURFACE OIL CHARACTER |     |     |     |    |    |    | OILED ZONE cm-cm | CLEAN BELOW Y/N | H2O LEVEL (cm) | SHEEN COLOR B R S N | PIT ZONE |    |    |    | SURFACE-SUBSURFACE SEDIMENTS | NOTES               |
|---------|----------------|--------------------------|-----|-----|-----|----|----|----|------------------|-----------------|----------------|---------------------|----------|----|----|----|------------------------------|---------------------|
|         |                | OP                       | HOR | MOR | LOR | OF | TR | NO |                  |                 |                |                     | S        | UI | MI | LI |                              |                     |
| 1       | 16             |                          |     |     |     |    |    |    | U-U              | U               | 14-16          | B                   |          |    |    |    | BC/PG                        | AT BASE OF BEDR     |
| 2       | 12             |                          |     |     |     |    |    |    | -                |                 | 7-12           |                     |          |    |    |    | BC/PG                        | AT BASE OF BEDR     |
| 3       | 15             |                          |     |     |     |    |    |    | U-U              | U               | -              | -                   |          |    |    |    | BC/PG                        | SILVER SHEEN ON PEB |
| 4       | 19             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 5       | 38             |                          |     |     |     |    |    |    | 28-38            | N               | 31-38          | B                   |          |    |    |    | BC/CPG                       | MS ON PEBBLE        |
| 6       | 14             |                          |     |     |     |    |    |    | 5-11             | Y               | -              | -                   |          |    |    |    | BC/CPG                       | MS ON PEBBLE        |
| 7       | 20             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/CP                        |                     |
| 8       | 48             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | CP/P                         |                     |
| 9       | 28             |                          |     |     |     |    |    |    | -                | -               | 21-28          | N                   |          |    |    |    | BC/CPG                       |                     |
| 10      | 38             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 11      | 22             |                          |     |     |     |    |    |    | 6-9              | N               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 11B     | 22             |                          |     |     |     |    |    |    | 9-22             | N               | -              | -                   |          |    |    |    | BC/CPG                       | Continuation of P.  |
| 12      | 24             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 13      | 29             |                          |     |     |     |    |    |    | 15-17            | Y               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 14      | 34             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 15      | 37             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 16      | 48             |                          |     |     |     |    |    |    | 10-48            | N               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 17      | 27             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/PG                        |                     |
| 18      | 21             |                          |     |     |     |    |    |    | 4-17             | Y               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 19      | 29             |                          |     |     |     |    |    |    | 14-18            | Y               | -              | -                   |          |    |    |    | CP/CPG                       |                     |
| 20      | 36             |                          |     |     |     |    |    |    | -                | -               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 21      | 27             |                          |     |     |     |    |    |    | 6-16             | Y               | -              | -                   |          |    |    |    | BC/CPG                       |                     |
| 22      | 19             |                          |     |     |     |    |    |    | 2-10             | Y               | -              | -                   |          |    |    |    | BC/PG                        |                     |

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

## RESTORATION SHORELINE OILING SUMMARY (cont.)

PAGE 2 OF 3

TEAM NO. \_\_\_\_\_

S. T. LAOISSUBDIVISION BDATE 8 / 19 / 1997

| PIT NO. | PIT DEPTH (cm) | SUBSURFACE OIL CHARACTER |     |     |     |    |    | OILED ZONE<br>cm-cm | CLEAN BELOW<br>Y/N | H2O LEVEL<br>(cm) | SHEEN COLOR<br>B R S N | PIT ZONE |    |    |    | SURFACE-SUBSURFACE SEDIMENTS | NOTES                  |
|---------|----------------|--------------------------|-----|-----|-----|----|----|---------------------|--------------------|-------------------|------------------------|----------|----|----|----|------------------------------|------------------------|
|         |                | OP                       | HOR | MOR | LOR | OF | TR |                     |                    |                   |                        | S        | UI | MI | LI |                              |                        |
| 24      | 31             |                          |     |     |     |    |    | 3-31                | N                  | 24-31             | R                      |          |    |    |    | BCP/PG                       |                        |
| 24      | 32             |                          |     |     |     |    |    | 2-7                 | N                  |                   |                        |          |    |    |    | BCP/PG                       |                        |
| 248     | 32             |                          |     |     |     |    |    | 7-32                | N                  |                   |                        |          |    |    |    | BCP/PG                       | Below Cobble Arm       |
| 25      | 23             |                          |     |     |     |    |    | 3-U                 |                    | 14-23             | B                      |          |    |    |    | BCP/PG                       |                        |
| 26      | 31             |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    | PC/PG                        |                        |
| 27      | 27             |                          |     |     |     |    |    | 4-U                 | U                  | 17-27             | S                      |          |    |    |    | BCP/PG                       | WEATHERED / APALKE     |
| 28      | 22             |                          |     |     |     |    |    | 8-11                | N                  | -                 | -                      |          |    |    |    | BCP/PG                       |                        |
| 28      | 22             |                          |     |     |     |    |    | 11-20               | Y                  | -                 | -                      |          |    |    |    | BCP/PG                       |                        |
| 29      | 21             |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    | BCP/PG                       |                        |
| 30      | 16             |                          |     |     |     |    |    | -                   |                    | 14-16             | N                      |          |    |    |    | BC/CPG                       |                        |
| 31      | 32             |                          |     |     |     |    |    | 0-U                 |                    | 22-32             | BR                     |          |    |    |    | BC/PG                        |                        |
| 32      | 13             |                          |     |     |     |    |    | 0-U                 | U                  | 7-13              | B                      |          |    |    |    | BC/PG                        | BROWN GLOBULES NW      |
| 33      | 22             |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    | BC/PG                        |                        |
| 34      | 9              |                          |     |     |     |    |    | U-U                 | U                  |                   |                        |          |    |    |    | BCP/PG                       | ON BEDROCK             |
| 35      | 13             |                          |     |     |     |    |    | U-U                 | U                  | 9-13              | R                      |          |    |    |    | BCP/PG                       |                        |
| 36      | 10             |                          |     |     |     |    |    | -                   |                    | 7-10              | N                      |          |    |    |    | BCP/PG                       |                        |
| 37      | 16             |                          |     |     |     |    |    | -                   |                    | 7-16              | N                      |          |    |    |    | BCP/PG                       |                        |
| 38      | 31             |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    | BCP/PG                       | AT BASE OF BEDROCK     |
| 39      | 17             |                          |     |     |     |    |    | 0-U                 | U                  | 10-17             | B                      |          |    |    |    | BCP/PG                       |                        |
| 40      | 36             |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    | CP/P                         |                        |
| 41      | ?              |                          |     |     |     |    |    | 11-30               | N                  | 24-30             | B                      |          |    |    |    | CP/P                         |                        |
| 42      | ?              |                          |     |     |     |    |    | -                   |                    | 7-10              | N                      |          |    |    |    | BCP/P                        | LARGE GLOB/BEDROCK     |
| 43      | 20             |                          |     |     |     |    |    | 5-U                 | U                  | 13-20             | B                      |          |    |    |    | BCP/P                        | BLACK GLOBULES ON P.H. |
|         |                |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    |                              |                        |
|         |                |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    |                              |                        |
|         |                |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    |                              |                        |
|         |                |                          |     |     |     |    |    | -                   |                    |                   |                        |          |    |    |    |                              |                        |

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

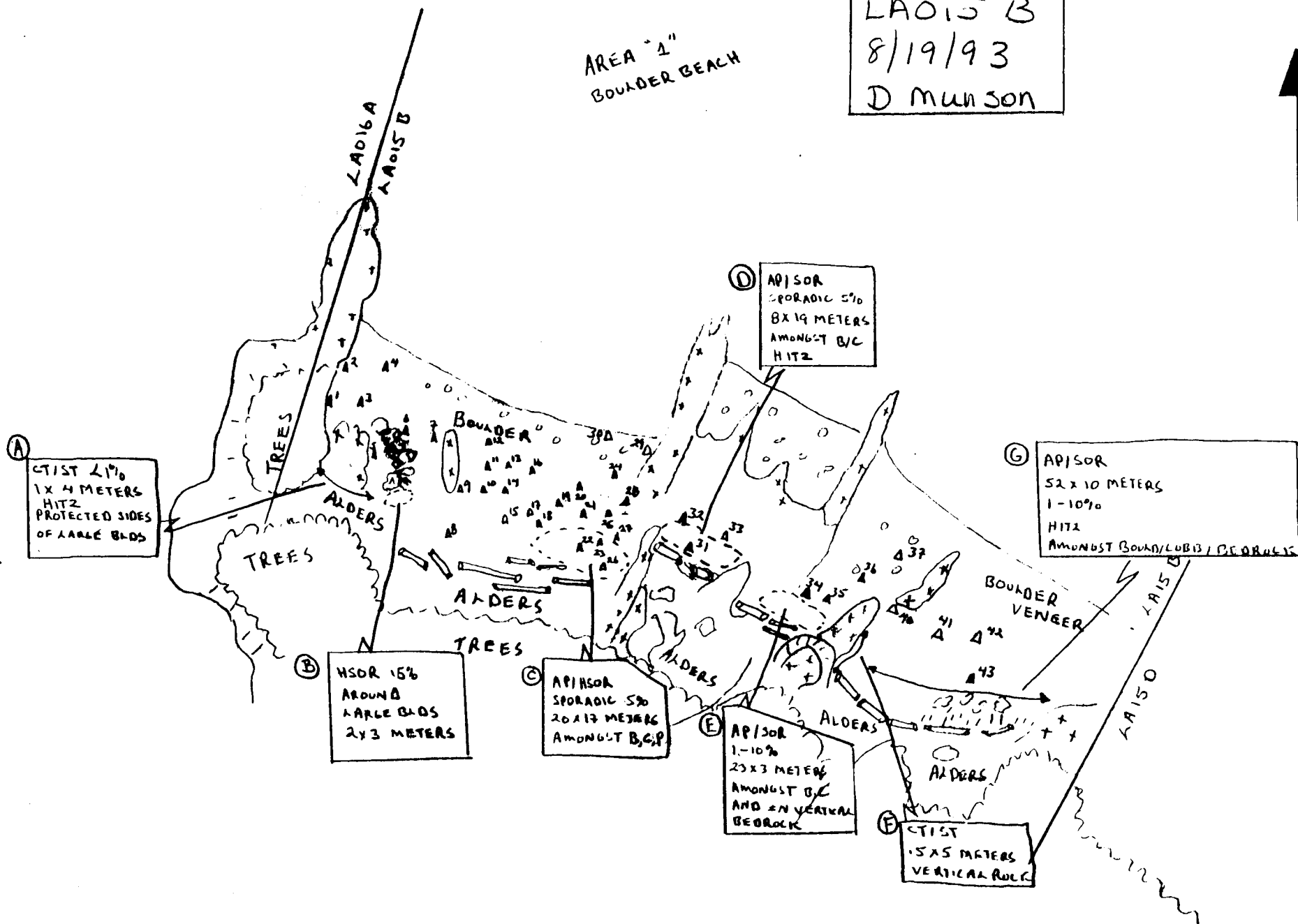
OG COMMENTS:



AREA "1"  
BOULDER BEACH

LAO 15 B  
8/19/93  
D Munson

N



7  
3  
1  
6  
0  
4

1993 Surface Oil Summary  
Segment LA015                      Subdivision B

| Location | Area of Oiling Type in Square Meters |    |       |    |        |
|----------|--------------------------------------|----|-------|----|--------|
|          | AP                                   | MS | SOR   | CV | CT     |
| A        | 0.                                   | 0. |       | 0. | 0.02   |
| B        | 0.                                   | 0. | 1.8   | 0. | 0.     |
| C        | 20.4                                 | 0. | 20.4  | 0. | 0.     |
| D        | 9.12                                 | 0. | 9.12  | 0. | 0.     |
| E        | 4.14                                 | 0. | 4.14  | 0. | 0.     |
| F        | 0.                                   | 0. | 0.    | 0. | 0.0125 |
| G        | 31.2                                 | 0. | 31.2  | 0. | 0.     |
| TOTALS=  | 64.86                                | 0. | 66.66 | 0. | 0.0325 |

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 LA015B**

| Loc.    | 1993 PIT #        | Gr. Sz. | Zn. | En. | Note              | TREATMENT |      | 1993 OILED SED. VOL. (m3) |      |      |     |       | 1992 OILED SED. VOL. (m3) |      |      |     |       | 1991 OILED SED. VOL. (m3) |      |     |      |       | WT.'ed OIL VOL. |       |       | % CHANGE WT.'ed VOL. |          |          |
|---------|-------------------|---------|-----|-----|-------------------|-----------|------|---------------------------|------|------|-----|-------|---------------------------|------|------|-----|-------|---------------------------|------|-----|------|-------|-----------------|-------|-------|----------------------|----------|----------|
|         |                   |         |     |     |                   | 1992      | 1991 | OP                        | HOR  | MOR  | LOR | OF/TR | OP                        | HOR  | MOR  | LOR | OF/TR | OP                        | HOR  | MOR | LOR  | OF/TR | 1993            | 1992  | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| 2A      | 10,11,12-25,27,28 | BCP-CPG | UM  | H   |                   | NO        | NO   | 17.5                      | 14.1 | 36.5 | 0.0 | 0.0   | 0.0                       | 18.0 | 45.0 | 0.0 | 0.0   | 31.9                      | 26.1 | 0.0 | 0.0  | 0.0   | 253.3           | 207.0 | 263.9 | 22.4                 | -21.6    | -4.0     |
| 2B      | 1,3,5,6           | BC-BCPG | U   | H   | V. LARGE BOULDERS | NO        | NO   | 0.0                       | 8.8  | 0.0  | 8.8 | 8.3   | ?                         | ?    | ?    | ?   | ?     | 15.0                      | 0.0  | 0.0 | 60.0 | 0.0   | 52.8            | ?     | 195.0 | ?                    | ?        | -72.9    |
| 2C      | 31,32             | BC-PG   | U   | H   |                   | NO        | NO   | 1.2                       | 2.9  | 0.0  | 0.0 | 0.0   | 0.0                       | 0.0  | 0.0  | 0.0 | 0.0   | 0.0                       | 0.0  | 0.0 | 0.0  | 1.4   | 17.4            | 0.0   | 0.0   | Inf                  | 0.0      | Inf      |
| 2D      | 34-36,39          | BCP-PGR | UM  | H   |                   | NO        | NO   | 0.0                       | 5.0  | 0.0  | 0.0 | 11.0  | ?                         | ?    | ?    | ?   | ?     | 20.0                      | 0.0  | 0.0 | 0.0  | 0.0   | 20.0            | ?     | 100.0 | ?                    | ?        | -80.0    |
| 2E      | 41,43             | BCP--P  | M   | H   |                   | NO        | NO   | 0.0                       | 0.0  | 1.4  | 0.0 | 0.0   | ?                         | ?    | ?    | ?   | ?     | 0.0                       | 0.0  | 0.0 | 0.0  | 0.0   | 4.1             | ?     | 0.0   | ?                    | ?        | Inf      |
| 2F      |                   | PB-R    | S   | H   |                   | NO        | NO   | 0.0                       | 0.0  | 0.0  | 0.0 | 0.0   | ?                         | ?    | ?    | ?   | ?     | 0.3                       | 0.0  | 0.0 | 0.0  | 0.0   | 0.0             | ?     | 1.6   | ?                    | ?        | -100.0   |
| 2G      |                   | CB-PSG  | S   | H   |                   | NO        | NO   | 0.0                       | 0.0  | 0.0  | 0.0 | 0.0   | ?                         | ?    | ?    | ?   | ?     | 0.0                       | 0.0  | 0.0 | 0.0  | 0.0   | 0.0             | ?     | 0.1   | ?                    | ?        | -100.0   |
| TOTALS= |                   |         |     |     |                   |           |      | 18.7                      | 30.8 | 37.9 | 8.8 | 19.3  | 0.0                       | 18.0 | 45.0 | 0.0 | 0.0   | 67.2                      | 26.1 | 0.0 | 60.0 | 1.4   | 347.5           | 207.0 | 560.6 | 67.9                 | -63.1    | -38.0    |

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.

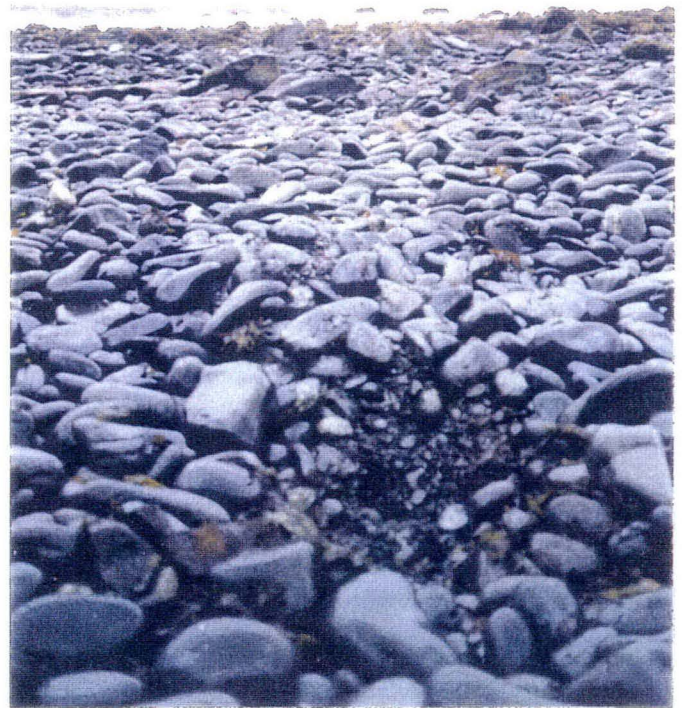
TREATMENT= cleanup treatment occurring at the subsite for the given year, ET= equipment tilling (heavy equipment), MT= manual tilling, BR= berm relocation, SR= sediment relocation, Rb= oiled-sediment removal from subsurface, Rs= oiled-sediment removal from the surface, MB= manual breakup, MR= manual 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 VOL.= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pit #6 located at western end of subseg. Photo showing HOR documented from -5 to -11cm.

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 4

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Location of pit #11 in MITZ. View is generally to the north/seaward showing rounded B/C surface sediment.

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 8

EVIDENCE ID#: \_\_\_\_\_

TAKEN BY: Clara Crosby  
ROLL #: 93CSC004  
FRAME #: 3  
EVIDENCE ID#: \_\_\_\_\_  
INITIALS: \_\_\_\_\_

oil.  
B/C/Rock that provides wave shelter for persisting  
REASON FOR TAKING PHOTO: Seaward from pit #6 showing large  
KEYWORDS: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
SEGMENT#: LA015  
STATION#: -0-

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: HOR documented from -6 to -9cm in pit #11.

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 5

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015 STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Gibeaut at pit #18. HOR found from  
-4 to -17cm.

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

INITIALS: \_\_\_\_\_

FRAME #: 10

EVIDENCE ID#: \_\_\_\_\_

TAKEN BY: Clara Crosby  
ROLL #: 93CSC004 FRAME #: 9 EVIDENCE ID#: \_\_\_\_\_

REASON FOR TAKING PHOTO: Location of pit #11 in MITZ. View is  
to the eastern end of subsegment from pit #11  
showing bld/cbl surf seds & area "C".

KEYWORD: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

SEGMENT: LA015 STATION: -0-

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015 STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Dianne, Joni, and Jim Bob at Pit #21.  
View is to the northwestern end of seg.

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

INITIALS: \_\_\_\_\_

FRAME #: 15

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015 STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pit #18; HOR found from -4 to -17cm.

TAKEN BY: Clara Crosby

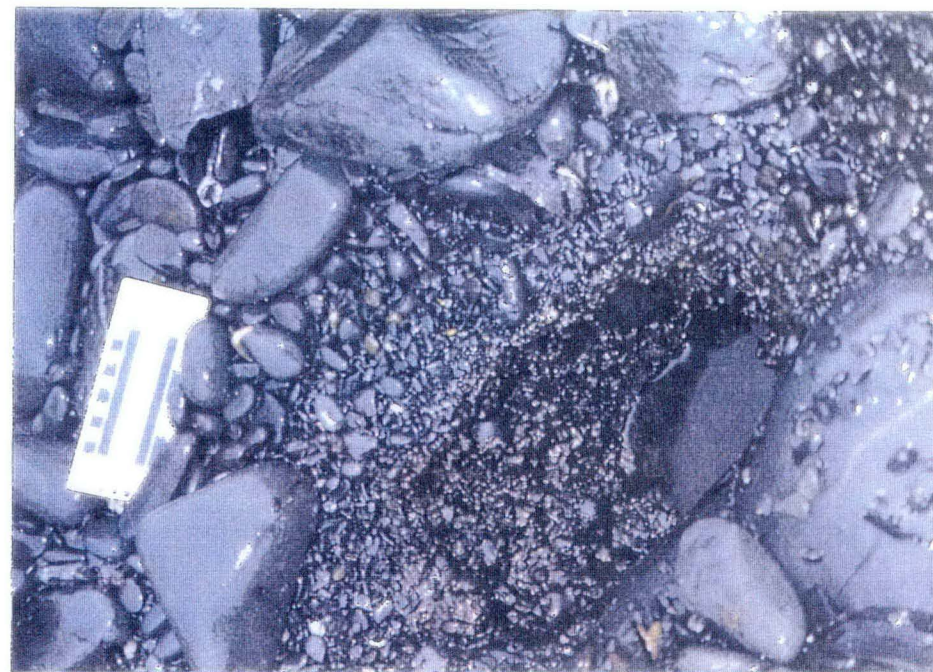
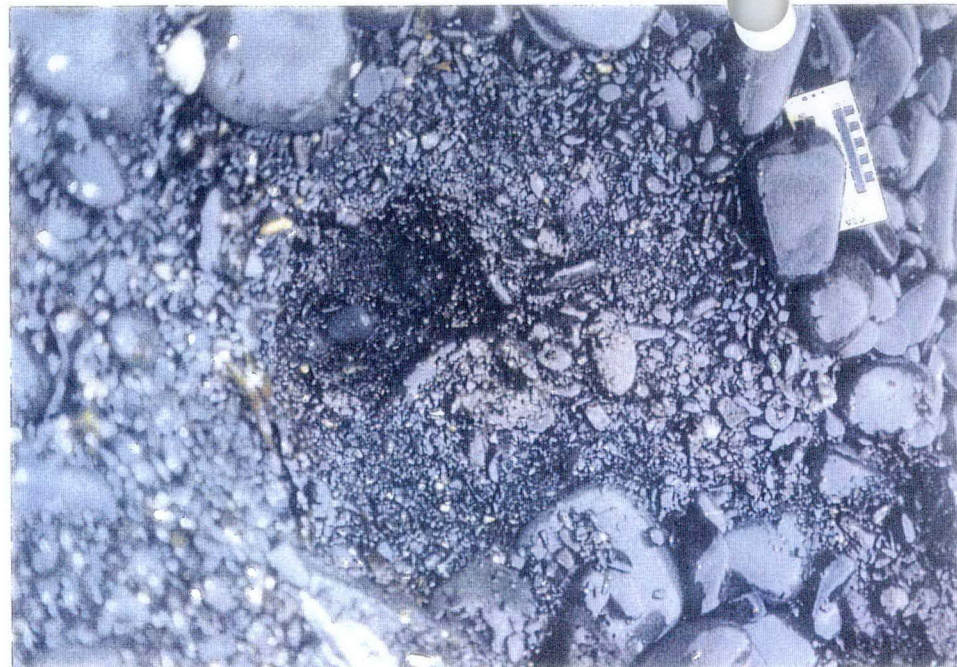
ROLL #: 93CSC004

INITIALS: \_\_\_\_\_

FRAME #: 12

EVIDENCE ID#: \_\_\_\_\_







16

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Pit #19; HOR found from -14 to -18cm.

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

FRAME #: 18

INITIALS: \_\_\_\_\_

EVIDENCE ID#: \_\_\_\_\_

15

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Example of HSOR and AP found in location "C".

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

FRAME #: 16

INITIALS: \_\_\_\_\_

EVIDENCE ID#: \_\_\_\_\_

22

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pit #23; OP lense from -03 to -31cm.

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

FRAME #: 22

INITIALS: \_\_\_\_\_

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Pit #23; OP lense from -03 to -31cm.

TAKEN BY: Clara Crosby

ROLL #: 93CSC004

FRAME #: 19

INITIALS: \_\_\_\_\_

EVIDENCE ID#: \_\_\_\_\_

6/1





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29) of area "C" and "D". Shallow bedrock platform with B/C veneer (Area "D"). Sporadic surface oiling obsd area "C" and "D".

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 25

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29) of area "C" and "D". Photo is of shallow bedrock platform with B/C veneer (Area "D").

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 23

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29). Photo is of area "C". Sporadic surface oiling obsd area "C" and "D".

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 27

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29) of area "C" and "D". Photo is of shallow bedrock platform with B/C veneer (Area "D").

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 26

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29) of area "C" and "D". Shallow bedrock platform with B/C veneer (Area "D"). Sporadic surface oiling obsd area "C" and "D".

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 29

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Pan overview (photos 23-29). Photos are of area "C". Sporadic surface oiling obsd area "C" and "D".

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 28

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pan overview to west from area "E". Bedrock platform with B/C veneer.

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 33

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Pit #23 showing OP oiling from -2 to -10cm.

TAKEN BY: Clara Crosby

INITIALS: \_\_\_\_\_

ROLL #: 93CSC004

FRAME #: 32

EVIDENCE ID#: \_\_\_\_\_



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015 STATION#: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: Pan overview to west from area "E".  
Bedrock platform with B/C veneer.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC004 FRAME #: 35 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 0700

SEGMENT#: LA015 STATION#: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: Pan overview to west from area "E".  
Bedrock platform with B/C veneer.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC004 FRAME #: 34 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT: LA015 STATION: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORD: -0-  
REASON FOR TAKING PHOTO: Restoration survey. One of a series  
of overview shots of LA15B. View is from bedrock  
outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 7 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT#: LA015 STATION#: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: Restoration survey. One of a series  
of overview shots of LA15B. View is from bedrock  
outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 2 EVIDENCE ID#: \_\_\_\_\_





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT: LA015 STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Restoration survey. One of a series of overview shots of LA15B. View is from bedrock outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 11 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT#: LA015 STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Restoration survey. One of a series of overview shots of LA15B. View is from bedrock outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 13 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: Restoration survey. One of a series of overview shots of LA15B. View is from bedrock outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 9 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/19/93 TIME: 10:00

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: Restoration survey. One of a series of overview shots of LA15B. View is from bedrock outcrop at east end of subseg to the west.

TAKEN BY: Clara Crosby INITIALS: \_\_\_\_\_  
ROLL #: 93CSC005 FRAME #: 12 EVIDENCE ID#: \_\_\_\_\_

1. The first part of the document is a list of the names of the persons who have been named in the document. The names are listed in alphabetical order. The names are: [illegible]





LAUIS

**SEGMENT:** LA 015 C

**LOCATION:** Chenega Area Group, northeast coast of Latouche Island.

**OTHER STUDIES**

NOAA transect station #N-15.

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

This is an asymmetric pocket beach with an anadromous stream along the eastern end. A boulder area occurs along the eastern limb. The western limb is a straight boulder beach more than 400 m long, the first 200 m of which was surveyed in 1993. The central part of the site is a rounded cobble and boulder gravel beach with well-developed high-tide berms and a storm berm and upper intertidal zone that was significantly altered in 1990 during a storm berm relocation operation. Boulders increase in abundance down the beach relative to cobbles.

**Environmental Sensitivity Index (ESI)**

Type 7; gravel beach.

**Fetches and Directions (kilometers)**

NE= 110

**Energy Level**

High.

**GENERAL BIOLOGICAL SETTING**

Anadromous stream.

Eagle nest.

Deer harvesting.

**OILING SUMMARY**

Only one area has significant surface oil remaining in 1993. Location 'A' is located along the boulder beach on the western limb of the pocket. High concentrations of AP and SOR occur interstitially between large immobile boulders and bedrock in the upper and mid-intertidal zones. There may have been some improvement at this location since 1991 when SOR conditions were reported as 75% coverage as opposed to less than 50% in 1993. It also appears that some of the SOR has converted to AP. Nonetheless, considerable oil remains.

An area of CT on the east side of the stream (location 'C') cleaned up considerably since 1991 when 35% coverage was reported. In 1993 less than 1% CT was reported here.

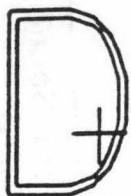
ST along the upper inter of the central gravel beach also appears to have improved since 1991.

No significant subsurface oil remains at this site, and this is a great improvement since 1991. Three subsurface locations occur in the mid to upper intertidal zones. One to the

east of the stream, one to the west of the stream in the central gravel beach, and one at the beginning of the boulder beach on the west limb. All three sites were mechanically tilled in 1991, and manual removal took place at the western most site in 1992. The central gravel beach area was also the subject of extensive tilling in the mid and upper intertidal and berm relocation in 1990.







# SURFACE OIL MAP

unsurveyed

TTTT

5m VERY LIGHT

Y. LIGHT: 85m  
NO. 510m  
U.S. 120m

C

Annotated FINSAP  
MAP: - 1993  
Survey - LOCATIONS  
A - C -

17



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

LA015 C  
ADEC Subsegment Length: 715m  
METERS  
0 100 200  
AK State Plane Zone 4  
pld01Sc



Subdivision Field Map  
Map Key: PWSLA015  
Name: HARPER  
Date: 16 May 92  
Date Entered:

1993 ADEC RESTORATION PROJECT #930380  
SHORELINE SURVEY COMMENT SHEET

LOCATION LAKE HE IS SEGMENT 1A015 SUBDIVISION 6 DATE 3/4/93

AFFILIATION

NAME USCG - BOB TRAILS

SIGNATURE

Robert S. Trails

BEACH WAS ESSENTIALLY CLEAN; SOME LOG AND SPASH IN BOPLUGS  
ON BOTH SIDES OF BEACH. ONE PIT W/LOGS DID NOT OBSERVE PITS 7, 8 & 19.  
GENERALLY CONCUR W/ CONDITIONS INDICATED ON MAP & PIT LOGS.

AFFILIATION

NAME KATIE FARLEY

DNR

DIV. OF LAND

SIGNATURE

Kathleen M. Farley

This site is used by subsistence users and  
anadromous fish. These activities would be affected  
by the condition of the site as is. The feasibility  
of further restoration should be discussed.

AFFILIATION

NAME

SIGNATURE



AFFILIATION

NAME

SIGNATURE



PAGE 1 OF 3

SUBDIVISION C

DATE 0, 4, 1993

TEAM MEMBERS: D. MUNSON, G. PIPER, C. CROSBY  
R. KUMBE; ADEC - K. FARLEY  
ADNR; - K. HARICH; FS -  
B. TRAVIS; USCGT T. KELLEY &  
S. STOKER; EXXON

TIME 09:30 to 12:00

TIDE LEVEL -1.0 ft. to 4.0 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

EST. OIL CATEGORY LENGTH: H\_\_\_\_m M\_\_\_\_m L\_\_\_\_m VL\_\_\_\_m N\_\_\_\_m NS\_\_\_\_m

**DISTRIBUTION: C = 81-100%; B = 51-80%; P = 11-50%; S = 1-10%; T = <1%**

SLOPE: V = VERTICAL; H = HIGH ANGLE; M = MEDIUM ANGLE; L = LOW ANGLE PHOTO ROLL # \_\_\_\_\_ FRAMES \_\_\_\_\_

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

PAGE 2 OF 3

T LABIS

SUBDIVISION C

DATE 8, 4 198

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

**G COMMENTS:**  
Surface sediment is composed of rounded B/C/P at Southern end of subdivision. A work order was issued in 1991 that included mechanical filling & excavation for this portion of the subdivision. Very light oiling was observed in this area during the 1995 excavation survey.

The heaviest oiling observed was found in the sub-rounded Boulder/Cobble overlying Shallow Bedrock at the northern end of Subdivision. The extent of oiling (AP/MS/SOP/CV/CT/ST) was noted as 150m long x 5 to 7m wide in a patchy distribution. Oiling was found under & around Surface B/C and at the base of exposed Bedrock.

(Throughout Subdivision the detailed examination & determination of the extent of Surface coating & staining was inhibited due to the weather. - Rain)



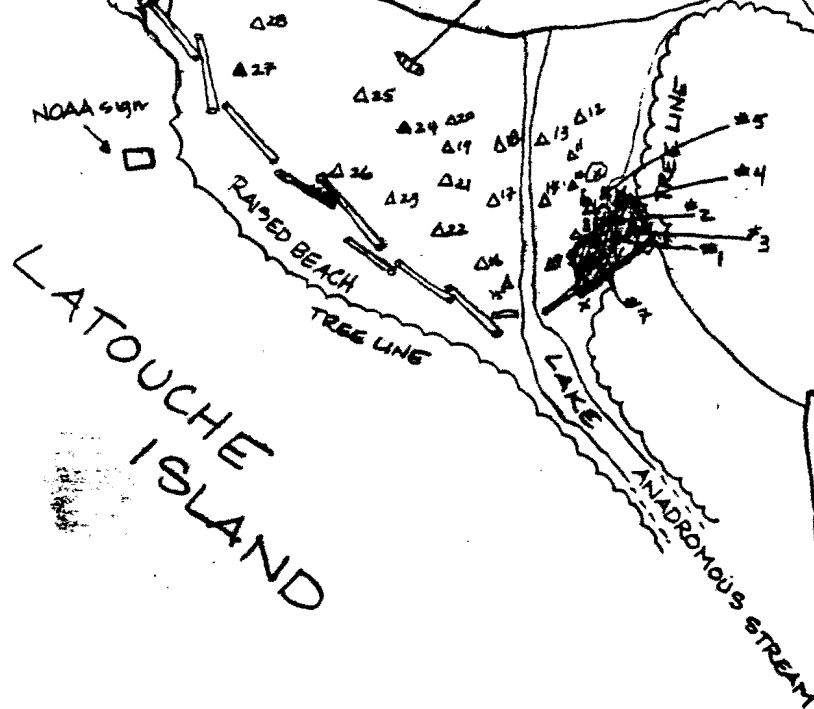
MONTAGUE  
STRAIT

**LA-15C**

8-4-93  
0930-1200

LOCATION "A"  
150m x 5-7m  
HSOR-P, AP-S,  
MS-T, CV/CT/ST-S  
along B/BEDROCK  
shoreline MID to  
UPPER INTERTIDAL

LOCATION "B"  
1 x 1m  
LSOR Trace



LATOUCHE  
ISLAND

LOCATION "C"  
4 x 15m  
<1%  
HSOR:CT



1993 Surface Oil Summary  
Segment LA015                      Subdivision C

| Location | Area of Oiling Type in Square Meters |     |         |     |     |
|----------|--------------------------------------|-----|---------|-----|-----|
|          | AP                                   | MS  | SOR     | CV  | CT  |
| A        | 54.                                  | 4.5 | 270.    | 4.5 | 4.5 |
| B        | 0.                                   | 0.  | 0.005   | 0.  | 0.  |
| C        | 0.                                   | 0.  | 0.3     | 0.  | 0.3 |
| TOTALS=  | 54.                                  | 4.5 | 270.305 | 4.5 | 4.8 |

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 LA015C**

| Loc. | 1993 PIT #  | Gr. Sz.  | Zn. | En. | Note | TREATMENT |            | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |     |     |     |       | 1991 OILED SED. VOL. (m3) |       |      |      |       | WT.'ed OIL VOL. |      |        | % CHANGE WT.'ed VOL. |          |          |
|------|-------------|----------|-----|-----|------|-----------|------------|---------------------------|-----|-----|-----|-------|---------------------------|-----|-----|-----|-------|---------------------------|-------|------|------|-------|-----------------|------|--------|----------------------|----------|----------|
|      |             |          |     |     |      | 1992      | 1991       | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR   | MOR  | LOR  | OF/TR | 1993            | 1992 | 1991   | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA   | 1-8, 10, 11 | BCPR-GPC | UM  | H   |      | NO        | ET, SR     | 0.0                       | 0.0 | 1.0 | 0.9 | 3.9   | ?                         | ?   | ?   | ?   | ?     | 7.8                       | 35.7  | 11.3 | 14.4 | 12.9  | 5.0             | ?    | 244.5  | ?                    | ?        | -98.0    |
| ZB   | 19, 24, 27  | BCP-PGS  | UM  | H   |      | NO        | ET         | 0.0                       | 0.4 | 0.0 | 0.0 | 1.0   | 0.0                       | 0.5 | 0.2 | 0.3 | 1.0   | 29.7                      | 40.1  | 19.3 | 80.3 | 78.5  | 1.6             | 3.2  | 527.9  | -50.0                | -99.4    | -99.7    |
| ZC   | 30, 31      | BCP-PGC  | UM  | H   |      | Rb        | ET, Rs, Rb | 0.0                       | 0.0 | 0.0 | 0.0 | 1.1   | 0.2                       | 1.2 | 0.0 | 0.0 | 0.0   | 39.4                      | 68.3  | 0.0  | 0.0  | 0.0   | 0.0             | 5.9  | 469.9  | -100.0               | -98.8    | -100.0   |
|      |             |          |     |     |      | TOTALS=   |            | 0.0                       | 0.4 | 1.0 | 0.9 | 6.1   | 0.2                       | 1.7 | 0.2 | 0.3 | 1.0   | 76.9                      | 144.1 | 30.7 | 94.7 | 91.5  | 6.6             | 9.0  | 1242.2 | -27.1                | -99.3    | -99.5    |

**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 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: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO PAN OF THE BEACH FROM SOUT TO  
NORTH. GOES WITH PHOTO 93RTK005 #25 - 28. #25  
STARTS A SM. DRAINAGE

TAKEN BY: RUSSELL KUNIBE INITIALS: RTK  
ROLL #: 93RTK005 FRAME #: 26 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO PAN OF THE BEACH FROM SOUT TO  
NORTH. GOES WITH PHOTO 93RTK005 #25 - 28. #25  
STARTS A SM. DRAINAGE

TAKEN BY: RUSSELL KUNIBE INITIALS: RTK  
ROLL #: 93RTK005 FRAME #: 28 EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO PAN OF THE BEACH FROM SOUT TO  
NORTH. GOES WITH PHOTO 93RTK005 #25 - 28. #25  
STARTS A SM. DRAINAGE

TAKEN BY: RUSSELL KUNIBE INITIALS: RTK  
ROLL #: 93RTK005 FRAME #: 25 EVIDENCE ID#: \_\_\_\_\_

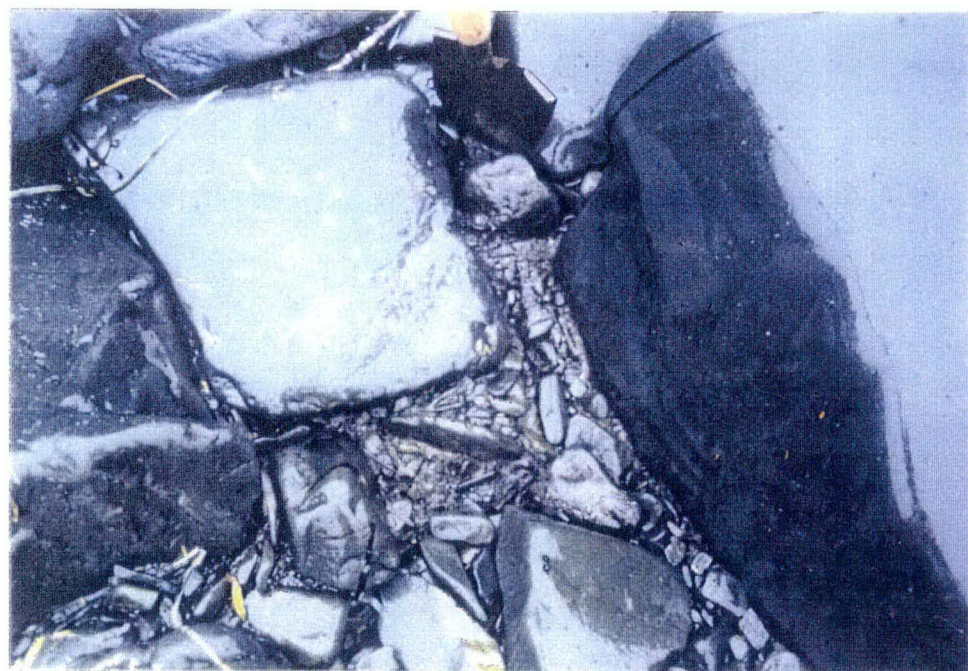
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO PAN OF THE BEACH FROM SOUT TO  
NORTH. GOES WITH PHOTO 93RTK005 #25 - 28. #25  
STARTS A SM. DRAINAGE

TAKEN BY: RUSSELL KUNIBE INITIALS: RTK  
ROLL #: 93RTK005 FRAME #: 27 EVIDENCE ID#: \_\_\_\_\_







OFFICE: ANCHORAGE      DATE: 09/14/93      TIME: 09:40

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: AT AREA B, AP/SOR AMONGST BOULDERS,  
COBBLE AND PEBBLES AT HITZ.

TAKEN BY: DIANNE MUNSON INITIALS: \_\_\_\_\_  
ROLL #: 93CSC009 FRAME #: 4 EVIDENCE ID#: \_\_\_\_\_

## OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 09:40

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: IN AREA AREA, SADDLE BEHIND BEDROCK,  
AP/SOR AMONGST BOULDERS AND COBBLES

TAKEN BY: DIANNE MUNSON INITIALS: \_\_\_\_\_  
ROLL #: 93CSC009 FRAME #: 2 EVIDENCE ID#: \_\_\_\_\_

OFFICE: ANCHORAGE      DATE: 09/14/93      TIME: 09:40

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO: AT AREA A, IN SADDLE BEHIND BEDROCK,  
AP/SOR AND CT WITH SPRUCE NEEDLES.

TAKEN BY: DIANNE MUNSON  
ROLL #: 93CSC009 FRAME #: 3 INITIALS: \_\_\_\_\_  
EVIDENCE ID#: \_\_\_\_\_

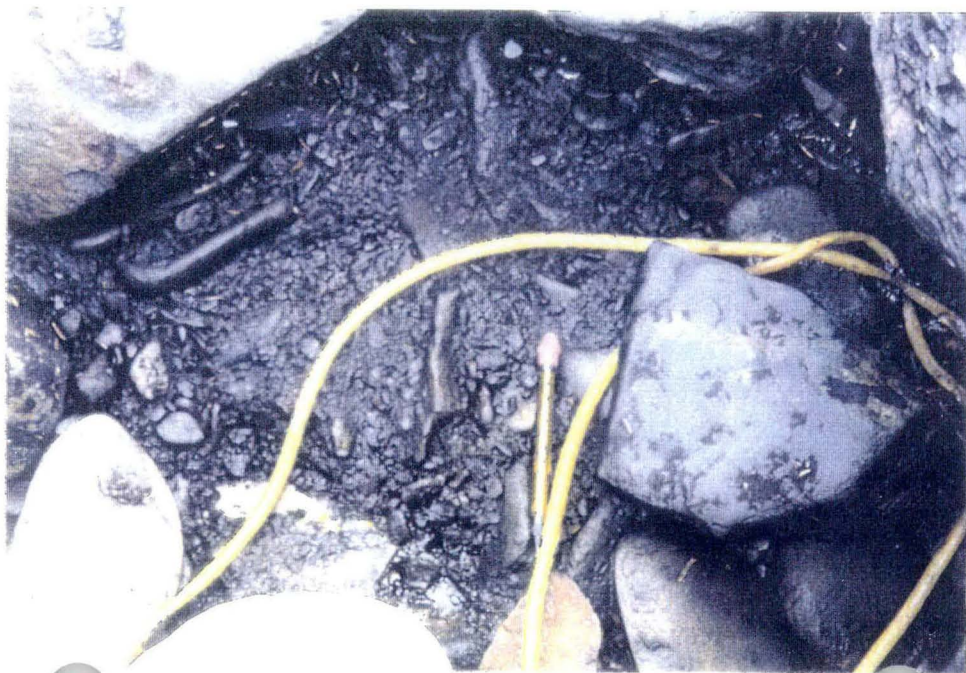
TAKEN BY: DIANNE MUNSON  
ROLL #: 93SC009  
FRAME #: 6  
EVIDENCE ID#: \_\_\_\_\_  
INITIALS: \_\_\_\_\_

SEGMENT: LA015  
STATION: -0-  
LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORD: -0-  
REASON FOR TAKING PHOTO: AT AREA B, AP/HSOR AMONGST BCP AT  
HIITZ.

OFFICE: ANCHORAGE      DATE: 09/14/93      TIME: 09:40

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:45

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO CLOSE UP OF SOME MOOSE WHICH  
SEEMED TO BE COMING OUT FROM UNDER A BOULDER.

TAKEN BY: RUSSELL KUNIBE

ROLL #: 93RTK005 FRAME #: 34

INITIALS: RTK

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:45

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO CLOSE UP OF A PIT IN THE HITZ.  
THE SURFACE PEBBLES APPEARED UNOILED. THER WAS A  
HOR TO MOR OILING BELOW THE SURFACE.

TAKEN BY: RUSSELL KUNIBE

ROLL #: 93RTK005 FRAME #: 33

INITIALS: RTK

EVIDENCE ID#: \_\_\_\_\_

**LA 015 D**



**SEGMENT:** LA 015 D

**LOCATION:** Chenega Area Group, northeast shore of Latouche Island.

**OTHER STUDIES**

**PHYSICAL SETTING**

**Coastal Morphology and Sedimentology**

Two sites were surveyed along this highly irregular shoreline with a mix of gravel beaches, rocky shores, and wave-cut platforms. Site 'A' is a rounded, cobble, pebble, and granule gravel beach with well-developed berms and storm berm. Site 'C' is a thin boulder and cobble veneer over bedrock.

**Environmental Sensitivity Index (ESI)**

Type 1; exposed rocky.

Type 2; exposed wave-cut platforms.

Type 7; gravel beach.

**Fetches and Directions (kilometers)**

NE= 110

**Energy Level**

High.

**GENERAL BIOLOGICAL SETTING**

Eagle nest.

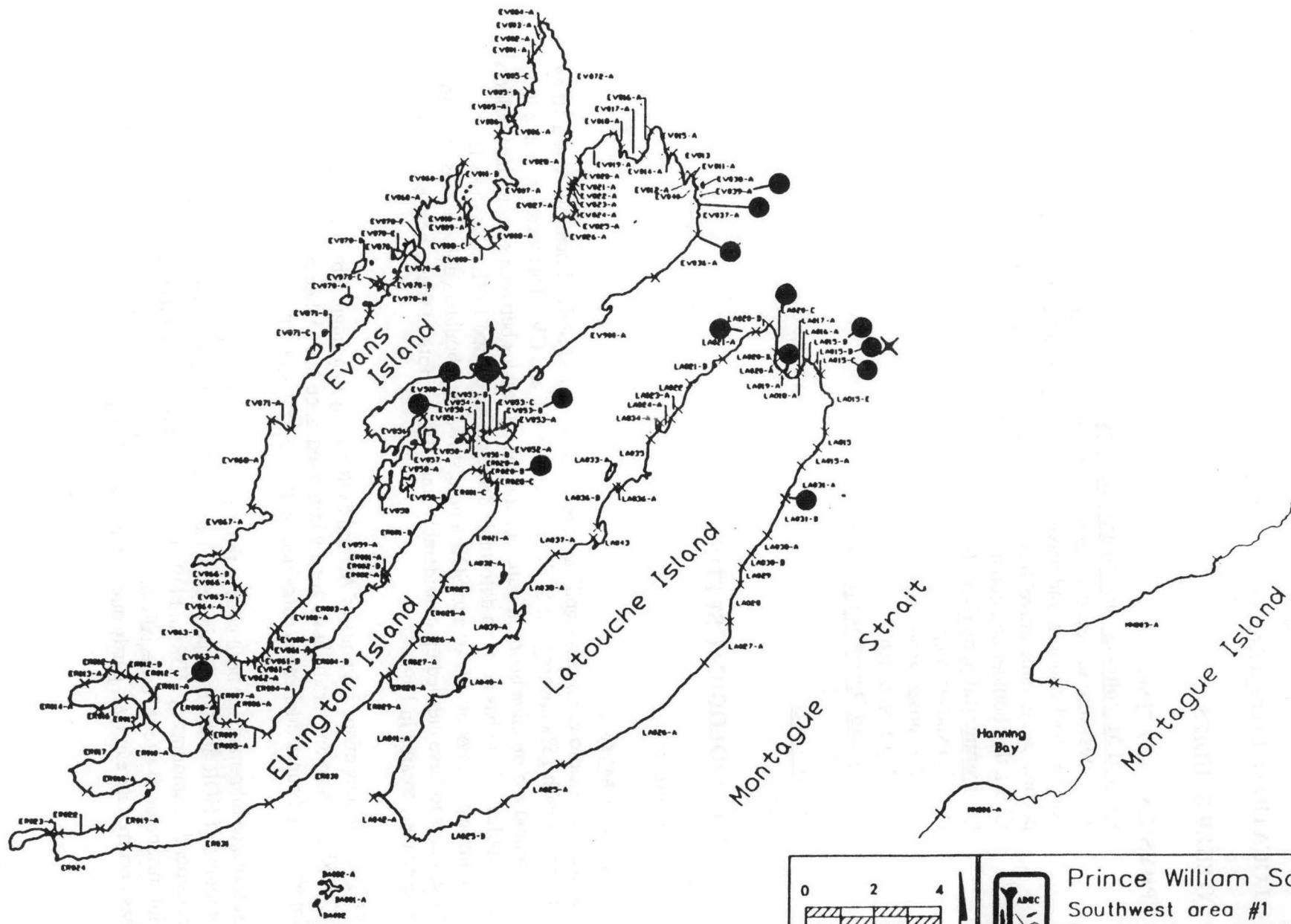
Finfish harvesting.

**OILING SUMMARY**

In site, two locations contain significant amounts of AP and SOR. Location 'A' is a 10 by 10 m area with 15% coverage of SOR and AP plus CT and CV. This location is in a low area behind a protective bedrock outcrop, and the oil resides between subangular boulders and cobbles. There has been no detectable decrease here since 1991. Location 'B' contains lesser amounts of AP and SOR amongst rounded boulders and cobbles. Location 'B' appears to have cleaned up considerably since 1991. Both of these locations were aggressively treated in 1991

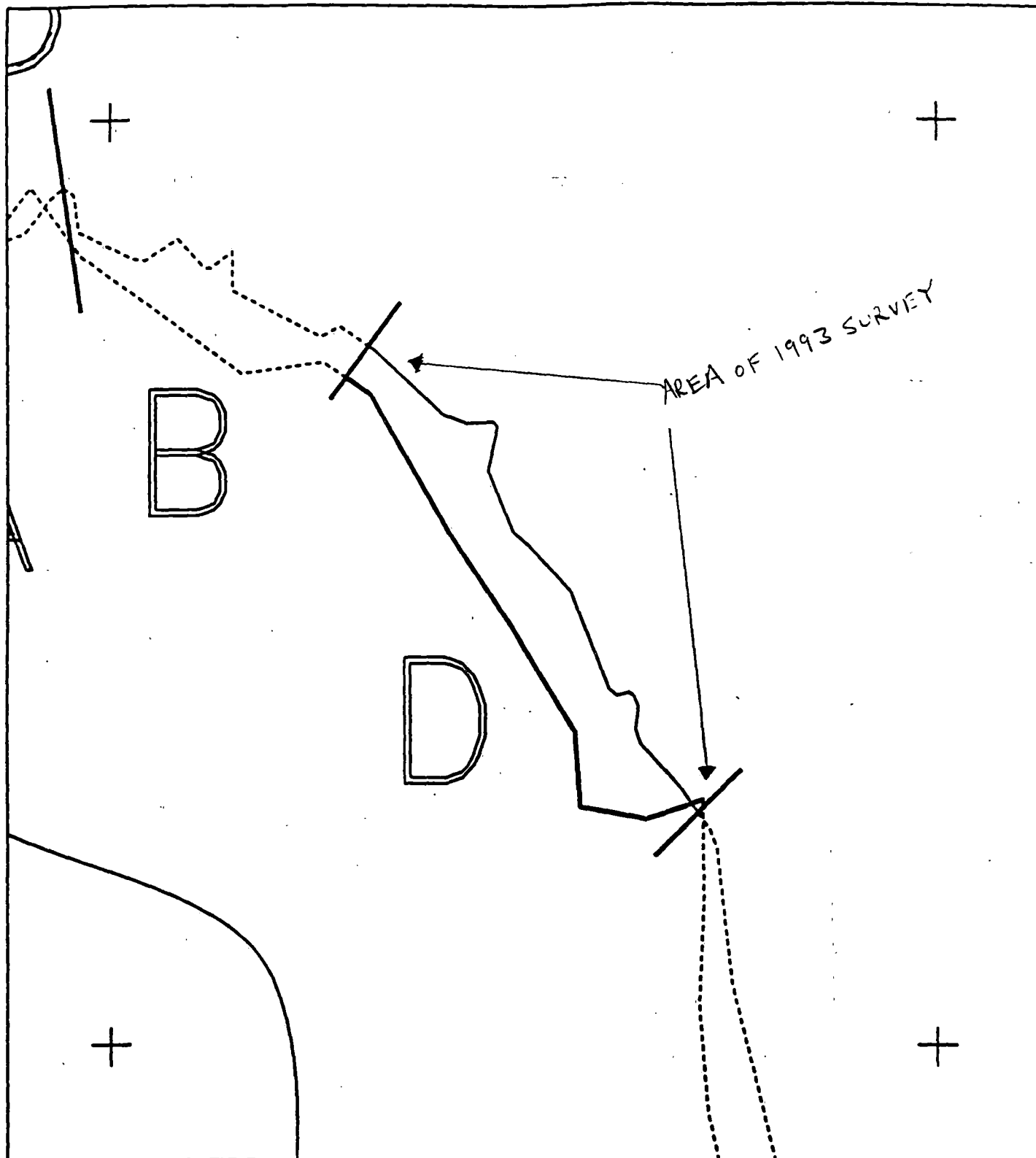
Site 'A' contains minor amounts of AP and SOR mostly in a single 6 by 3 m area (location 'C'). Site 'A' also appears to have greatly improved since 1991 when most of the upper intertidal and supra tidal zones contained SOR, CV, CT, and ST.

Subsurface oil remains at both sites in the central parts of the beaches. Relatively small amounts of HOR and OP remain below clean surface sediments. These locations each had considerable amounts of HOR and OP in 1991 when they were mechanically tilled. Subsurface oil at site 'A' especially had large amounts of oil. Tremendous improvement has occurred here at least partly due to the aggressive treatment.



Danger Island

|                                                       |                           |                                                                                                             |
|-------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------|
| <p>0 2 4<br/>KILOMETERS</p>                           |                           | <p>Prince William Sound<br/>Southwest area #1<br/>Beach Sub-Segment Map<br/>Map Projection: UTM, Zone 6</p> |
| <p>Date: 1/15/92</p>                                  | <p>File Name: SVISEGS</p> |                                                                                                             |
| <p>— Beach Segments</p> <p>x Subdivision Endticks</p> |                           |                                                                                                             |



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

**LA015 D**  
 ADEC Subsegment Length: 450m  
 METERS

0 100 200  
 AK State Plane Zone 4  
 pl015d



Subdivision Field Map  
 Map Key: PWSLA015D  
 Name: D.m.  
 Date: 9-14-93  
 Date Entered:



PAGE 1 OF 3

SEGMENT LA 015

SUBDIVISION D

9 114 193

DATE 9/17/93

TIME 8:00 to 9:00

TIDE LEVEL 3.0 ft. to 7.0 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

EST. OIL CATEGORY LENGTH: H\_\_\_\_m M\_\_\_\_m L\_\_\_\_m VL\_\_\_\_m N\_\_\_\_m NS\_\_\_\_m

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      PHOTO ROLL #**

## FRAMES

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

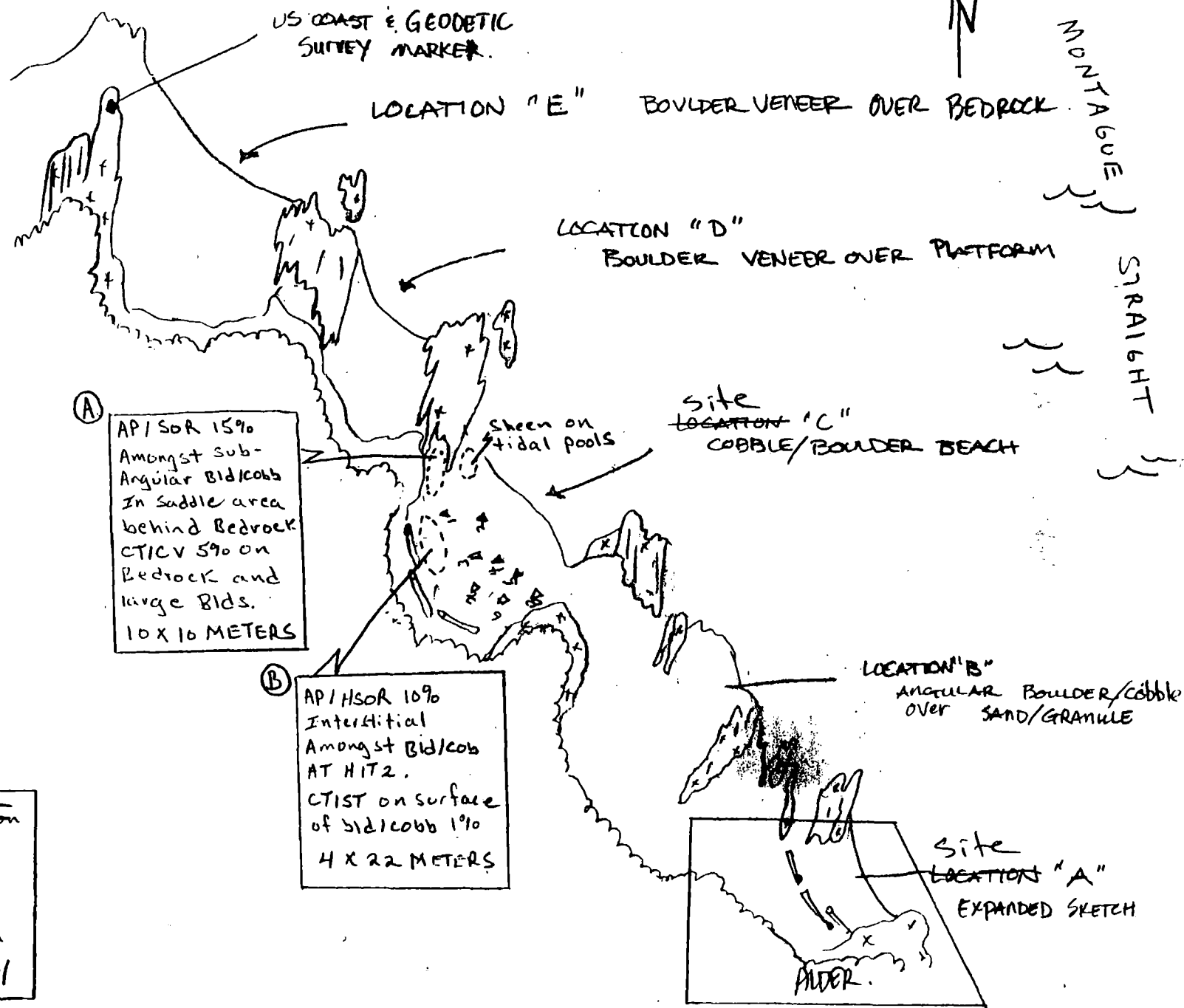
LATOUCH IS.

LA 150

Sept. 14 1993

Sept. and  
17, 1993

D. MUNSON



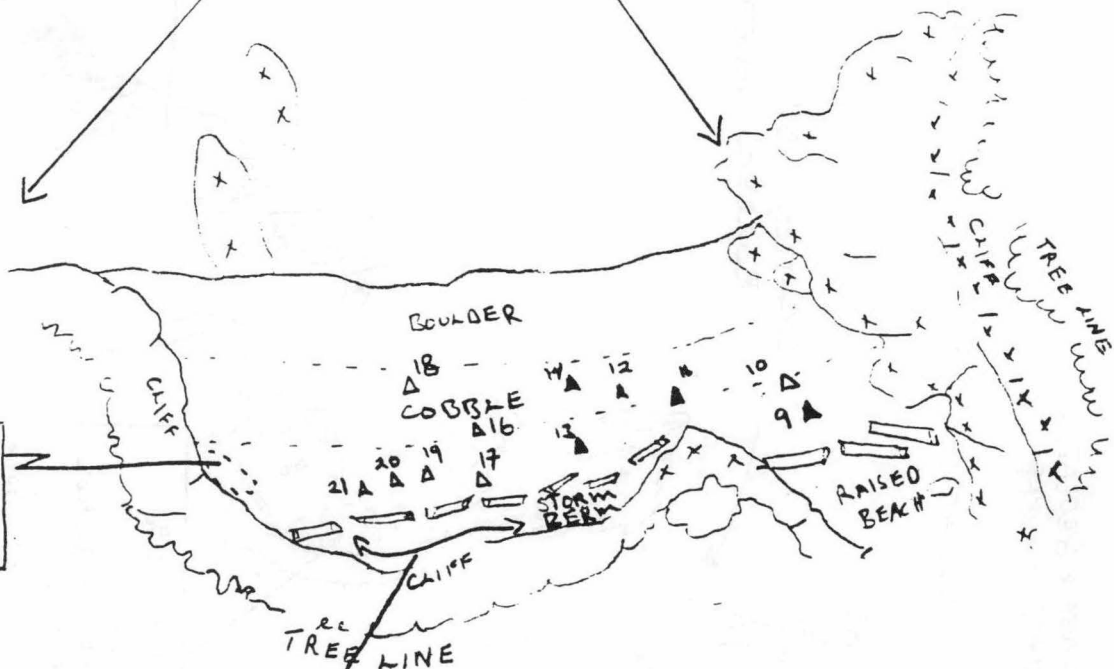
Survey included <sup>site</sup> location "C" and <sup>site</sup> location "A" due to very little oiling observed in 1992 FINSAP Survey



MONTAGUE  
STRAIGHT

Site  
~~LOCATION~~ "A"

③  
APISOR 5%  
6 X 2 METERS  
BIDS/COBBLES



④  
TACKY/TARRY LOR  
ON PEBBLES IN STORM BERM  
SUIT 2  
10 X 1 METERS  
PATCHY

Site  
~~LOCATION~~ "A"  
EXPANDED SKETCH  
LA 15 D  
Sept 17, 1993  
D. MUNSON



1993 Surface Oil Summary  
Segment LA015                      Subdivision D

| Location | Area of Oiling Type in Square Meters |    |       |    |       |
|----------|--------------------------------------|----|-------|----|-------|
|          | AP                                   | MS | SOR   | CV | CT    |
| A        | 30.                                  | 0. | 30.   | 6. | 6.    |
| B        | 5.28                                 | 0. | 5.28  | 0. | 5.28  |
| C        | 2.88                                 | 0. | 2.88  | 0. | 0.    |
| D        | 0.                                   | 0. | 0.    | 3. | 0.    |
| TOTALS=  | 38.16                                | 0. | 38.16 | 9. | 11.28 |

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 LA015D**

| Loc.    | 1993 PIT #   | Gr. Sz. | Zn. | En. | Note | TREATMENT |            | 1993 OILED SED. VOL. (m3) |     |     |     |       | 1992 OILED SED. VOL. (m3) |      |     |     |       | 1991 OILED SED. VOL. (m3) |      |      |     |       | WT.'ed OIL VOL. |       |       | % CHANGE WT.'ed VOL. |          |          |
|---------|--------------|---------|-----|-----|------|-----------|------------|---------------------------|-----|-----|-----|-------|---------------------------|------|-----|-----|-------|---------------------------|------|------|-----|-------|-----------------|-------|-------|----------------------|----------|----------|
|         |              |         |     |     |      | 1992      | 1991       | OP                        | HOR | MOR | LOR | OF/TR | OP                        | HOR  | MOR | LOR | OF/TR | OP                        | HOR  | MOR  | LOR | OF/TR | 1993            | 1992  | 1991  | 92 to 93             | 91 to 92 | 91 to 93 |
| ZA      | 1-4, 7       | BC-BCP  | U   | H   |      | MR, Rs    | Rs, BR, ET | 1.3                       | 1.8 | 0.0 | 2.4 | 0.0   | 0.0                       | 1.2  | 0.0 | 0.0 | 0.0   | 5.0                       | 13.4 | 0.0  | 0.0 | 0.0   | 18.7            | 4.8   | 78.4  | 290.5                | -93.9    | -76.1    |
| ZB      |              | BC-SGR  | S   | H   |      | MR, Rs    | Rs         | 0.0                       | 0.0 | 0.0 | 0.0 | 0.0   | 0.0                       | 0.2  | 0.0 | 0.0 | 0.0   | ?                         | ?    | ?    | ?   | ?     | 0.0             | 0.8   | ?     | -100.0               | ?        | ?        |
| ZC      | 9-14, 16, 17 | CP-PGS  | UM  | H   |      | NO        | ET, BR     | 2.3                       | 3.0 | 0.0 | 0.0 | 2.3   | 0.0                       | 24.1 | 2.8 | 0.0 | 0.0   | 20.1                      | 72.3 | 30.1 | 0.0 | 0.0   | 23.3            | 104.7 | 479.9 | -77.8                | -78.2    | -95.2    |
| ZD      |              | B-CPR   | U   | H   |      | Rs, MR    | NO         | ?                         | ?   | ?   | ?   | ?     | 0.0                       | 0.0  | 0.0 | 0.0 | 0.0   | 1.7                       | 1.7  | 2.6  | 0.0 | 0.0   | ?               | 0.0   | 22.5  | ?                    | -100.0   | ?        |
| ZE      |              | B-CPR   | U   | H   |      | Rs, MR    | Rs         | ?                         | ?   | ?   | ?   | ?     | 0.2                       | 0.0  | 0.0 | 0.0 | 0.0   | 10.0                      | 11.0 | 5.0  | 0.0 | 0.0   | ?               | 1.0   | 109.0 | ?                    | -99.1    | ?        |
| ZF      |              | BC-SGCR | U   | H   |      | NO        | Rs         | ?                         | ?   | ?   | ?   | ?     | 0.0                       | 0.0  | 0.4 | 0.0 | 0.8   | 0.8                       | 0.0  | 0.0  | 0.0 | ?     | 1.2             | 4.0   | ?     | -70.0                | ?        | ?        |
| TOTALS= |              |         |     |     |      |           |            | 3.6                       | 4.8 | 0.0 | 2.4 | 2.3   | 0.2                       | 25.5 | 3.2 | 0.0 | 0.8   | 37.5                      | 98.3 | 37.7 | 0.0 | 0.0   | 42.0            | 112.5 | 693.8 | -62.7                | -83.8    | -93.9    |

**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 VOL.**= % change in weighted oiled-sediment volume between the given years = ((year 2 - year1)/(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: 09/14/93 TIME: 11:30

SEGMENT: LA015 STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: PAN OVERVIEW OF SEGMENT VIEW IS  
UPLAND TOWARD THE WEST.

TAKEN BY: CLARA CROSBY

INITIALS: CC

ROLL #: 93CSC008

FRAME #: 24

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 11:00

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: CT/ST/CV ON BEDROCK AT LOCATION A

TAKEN BY: CLARA CROSBY

INITIALS: CSC

ROLL #: 93CSC008

FRAME #: 23

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 11:30

SEGMENT#: LA015

STATION#: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORDS: -0-

REASON FOR TAKING PHOTO: PAN OVERVIEW OF SEGMENT VIEW IS TOWARD  
THE SOUTHERN END OF THE SEGMENT

TAKEN BY: CLARA CROSBY

INITIALS: CC

ROLL #: 93CSC008

FRAME #: 27

EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 11:30

SEGMENT: LA015

STATION: -0-

LOCATION: LATOUCHE ISLAND, P.W.S.

KEYWORD: -0-

REASON FOR TAKING PHOTO: PAN OVERVIEW OF SEGMENT VIEW IS  
TOWARD THE SOUTH.

TAKEN BY: CLARA CROSBY

INITIALS: CC

ROLL #: 93CSC008

FRAME #: 25

EVIDENCE ID#: \_\_\_\_\_







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 11:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO:EXAMPLE OF SURFACE OILING, HSOR/AP ON  
SEGMENT.

TAKEN BY: CLARA CROSBY  
ROLL #: 93CSC008 FRAME #: 30

INITIALS: CC  
EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 11:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: LATOUCHE ISLAND, P.W.S.  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO:EXAMPLE OF SURFACE OILING, HSOR/AP ON  
SEGMENT.

TAKEN BY: CLARA CROSBY  
ROLL #: 93CSC008 FRAME #: 29

INITIALS: CC  
EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 09:40

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO:PIT 4 WITH HOR OILING FROM 33 TO 40 CM  
AT UITZ.

TAKEN BY: CLARA CROSBY  
ROLL #: 93CSC008 FRAME #: 34

INITIALS: \_\_\_\_\_  
EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 09:40

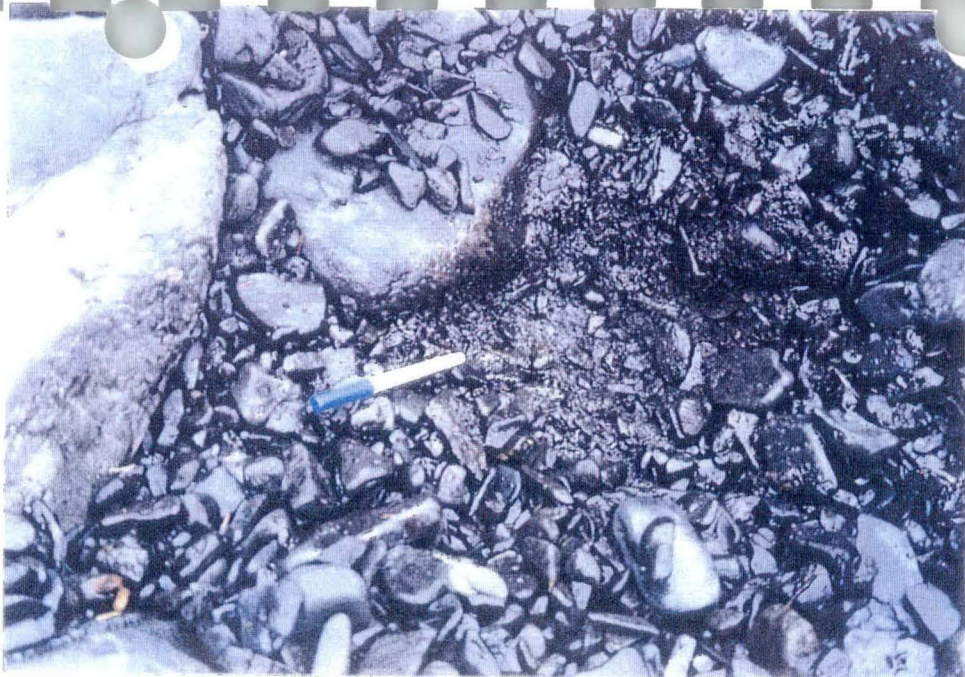
SEGMENT#: LA015 STATION#: -0-

LOCATION: NORTH EAST LATOUCHE ISLAND  
KEYWORDS: -0-  
REASON FOR TAKING PHOTO:AT AREA A IN SADDLE BEHIND SHOWS  
TARBALL ON A BOULDER AT HITZ.

INITIALS:

TAKEN BY: DIANNE MUNSON  
ROLL #: 93CSC009 FRAME #: 1 EVIDENCE ID#:





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO OVERVIEW LOOKING TO THE NORTH  
ACROSS THE BOULDER AREA AT THE NORTH END OF THE  
SUBDIV.

TAKEN BY: RUSSELL KUNIBE  
ROLL #: 93RTK005 FRAME #: 30

INITIALS: AK  
EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO OVERVIEW LOOKING TO THE SOUTH  
ACROSS THE BOULDER AREA AT THE NORTH END OF THE  
SUBDIV.

TAKEN BY: RUSSELL KUNIBE  
ROLL #: 93RTK005 FRAME #: 29

INITIALS: AK  
EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO OF THE AP TO HOR TRAPPED UNDER  
THE BOULDERS IN THE HITZ IN THE BOULDER AREA AT THE  
N. END OF THE BEACH.

TAKEN BY: RUSSELL KUNIBE  
ROLL #: 93RTK005 FRAME #: 32

INITIALS: AK  
EVIDENCE ID#: \_\_\_\_\_

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/04/93 TIME: 09:30

SEGMENT#: LA015 STATION#: -0-  
LOCATION: NE SHORE OF LATOUCHE ISLAND  
KEYWORDS: SHORELINE EVALUATION-SRVY  
REASON FOR TAKING PHOTO: PHOTO OF THE AP OILING BETWEEN THE  
BOULDERS AND COBBLES. THE BAND OF OILING IS IN THE  
HITZ IN THE BOULDER AREA OF THE BEACH.

TAKEN BY: RUSSELL KUNIBE  
ROLL #: 93RTK005 FRAME #: 31

INITIALS: AK  
EVIDENCE ID#: \_\_\_\_\_