1993 SHORELINE ASSESSMENT DATA REPORT: VOLUME 5
(Transect Surveys)

Prepared by the

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for the

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Project #930380

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Introduction

This report presents data collected during the 1993 Shoreline Assessment Project The primary purpose of Volume 5 is to present the field data and photographs from 13 detailed transect surveys in Prince William Sound (see location maps following this introduction). In 1991, the Alaska Department of Environmental Conservation (ADEC) established nine of the sites surveyed in 1993 as part of a long-term monitoring program (ADEC, 1991). ADEC surveyors visited these sites again during the summer of 1992 (ADEC, 1992). Although the datum stakes used in 1993 were not established until the summer of 1991, most of the sites have surveys dating back to the summer of 1989.

Four of the transects surveyed during the 1993 Shoreline Assessment Project were established by the National Oceanic and Atmospheric Administration (NOAA) in September of 1989 (Michel et al., 1991; Michel and Hayes, 1991; Michel and Hayes, 1993a; Michel and Hayes, 1993b). The most recent survey prior to the 1993 survey occurred during the summer of 1992 and those data are presented here for comparison. NOAA personnel did not survey these sites in 1993. One should refer to Michel and Hayes (1991) and Michel and Hayes (1993a) for a detailed discussion of the geology of the NOAA transect sites.

The reader should refer to the main report of the 1993 Shoreline Assessment Project for a discussion of the purpose, logistics, analysis, conclusions, and recommendations of the survey. Field data from ground surveys also conducted as part of the 1993 Shoreline Assessment are presented in Volumes 1 through 4 of this data report.

Data Presentation

ADEC transect site numbers are prefixed with 'ADEC' and NOAA sites with 'NOAA'. Each transect site has its own section in the report. The alphanumeric geographic nomenclature for identifying portions of the shoreline is the same in this report as was developed during the cleanup operation and used in previous year's surveys. The following information is included for each transect:

1) A general discussion and analysis of the physical setting and oiling conditions since 1991 for the ADEC transects and since 1992 for the NOAA sites.

2) Graphs with plotted profiles, subsurface oiling, and surface sediment grain size.

3) Location maps.

4) Field sketch.

5) Transect field data.

6) Stratigraphic (pit) field data.

7) Photographs. Photographs taken during the survey that are badly out of focus, improperly exposed, or redundant are not included.

Survey Techniques

Surveyors used the same techniques as those used during previous transect surveys. Sites were visited within two hours of low tide and always when the tide level was lower than plus two meters.

Transect surveys entail measuring the elevation along a line oriented perpendicular to the shoreline trend and visually estimating sedimentological and oiling conditions along that line (transect). Two metal datum stakes established in the supratidal serve to orient the direction of the beach profile (transect) and provide a consistent horizontal and vertical starting point. At some sites, instead of two stakes, one stake or a stable natural feature, such as a bedrock promontory, may be used as the datum, and surveyors orient the transect using a compass direction. The Emery method (Emery, 1961) was used to measure the profiles for this study.

Detailed subsurface oiling and stratigraphic data are collected at pits located along the transect line. So that repetitive pitting of the beach along a particular profile does not affect the observations, pits for this study were dug two meters to the right of the transect lines as one faces landward. In addition to data collected along the transect line, some pits were dug and observations made in the surrounding area.

Field oiling classifications regarding types of surface oil and percent coverage are the same as previous surveys (Exxon Corporation, 1991) and are presented in table 1. Subsurface oiling classifications (Exxon Corporation, 1991) are also the same and are presented in table 1. These oiling classifications were designed for the consistent collection of qualitative field data. The categories are broad and reflect the limitations of qualitative observations in areas of complicated geology and oiling conditions. These general classifications are now in wide use (Owens and Taylor, 1993).

Weighted Oiled-Sediment Volume (*WOSV*)

An effort is made here to provide a semi-quantitative measure for the amount of subsurface oil remaining along a transect. Weighted oiled-sediment volume is defined as follows.

$$WOSV = (5T_{OP} + 4T_{HOR} + 3T_{MOR} + 2T_{LOR} + 1T_{OF} + 0.1T_{Tr}) * 1^2 m / 1m$$

where ***WOSV*** is weighted oiled-sediment volume; T_{OP} is the thickness of an OP horizon in meters; T_{HOR} is the thickness of a HOR horizon in meters, and so on for the other oiling types. Each oiling type is multiplied by an arbitrary weight reflecting relative oil concentration. The sum is multiplied by 1 square meter to provide a volume and then divided by 1 meter to express the volume per length of the transect. The ***WOSV*** parameter is a way to track the relative amounts of oil in space and time.

Table 1: Field Oiling Classifications

Surface Oil Types	Abbreviation	Definition
asphalt pavement	AP	Heavily oiled beach sediments held cohesively together.
mousse/pooled oil	MS	Any oil/water emulsion with a thickness of more than 1 cm.
tar balls, patties, tar patties	TB	Small, distinct oil deposits lying on top of the beach surface; possibly binding debris but typically not sediments
surface oil residue	SOR	Significantly oil coated beach sediments in the top 5 cm; sediments do not form a cohesive layer; may be described as heavy or light.
cover	CV	Oil more than 1 mm to 1 cm thick.
coat	CT	Oil more than 0.1 mm to less than or equal to 1 mm thick; can be easily scratched off with fingernail.
stain	ST	Oil less than or equal to 0.1 mm thick; cannot be easily scratched off with fingernail.
film or sheen	FL	Transparent or translucent film or sheen.
oiled debris	DB	Any oiled debris or cleanup material stranded on a shore.

Surface Oil Distribution Classes	Abbreviation	Definition	Value for Calculations
continuous	C	Area or band with 91% to 100% oil coverage.	96%
broken	B	Area or band with 51% to 90% coverage.	70%
patchy	P	Area or band with 11% to 50% coverage.	30%
splash	S	Area or band with 1% to 10% coverage.	6%
trace	T	Area or band with less than 1% coverage.	1%

Subsurface Oil Types	Abbreviation	Definition	Weighting Value
oil pore	OP	Pore spaces are completely filled with oil resulting in oil oozing out of sediments - water cannot penetrate OP zone.	5
heavy oil residue	HOR	Pore spaces partially filled with oil residue but not generally flowing out of sediments.	4
medium oil residue	MOR	Heavily coated sediments; pore spaces are not filled with oil - pore spaces may be filled with water.	3
light oil residue	LOR	Sediments lightly coated with oil.	2
oil film	OF	Continuous layer of sheen or film on sediments - water may bead on sediments.	1
trace	TR	Discontinuous film; spots of oil on sediments; an odor or tackiness with no visible evidence of oil.	0.1

References

ADEC, 1991, Shoreline Evaluation Surveys 1991 Contaminated Site Long Term Monitoring Program: Volumes I and II: Exxon *Valdez* Oil Spill Response Center, The Alaska Department of Environmental Conservation.

ADEC, 1992, Shoreline Evaluation Surveys 1992 Contaminated Site Long Term Monitoring Program: Exxon *Valdez* Oil Spill Response Center, The Alaska Department of Environmental Conservation.

EMERY, K.O., 1961, A simple method of measuring beach profiles: Limnology and Oceanography, v. 6, p. 90-93.

EXXON CORPORATION, 1991, MAYSAP Survey Manual, May Shoreline Assessment Program: Exxon Corporation Exxon *Valdez* Oil Spill Response, Anchorage Alaska.

MICHEL, J. AND HAYES, M.O., 1993a, Evaluation of the condition of Prince William Sound Shorelines following the Exxon *Valdez* Oil Spill and Subsequent Shoreline Treatment: Volume 1: Summary of Results - Geomorphological Shoreline Monitoring Survey of the Exxon *Valdez* Spill Site, Prince William Sound, Alaska September 1989-August 1992: NOAA Technical Memorandum NOS ORCA 73.

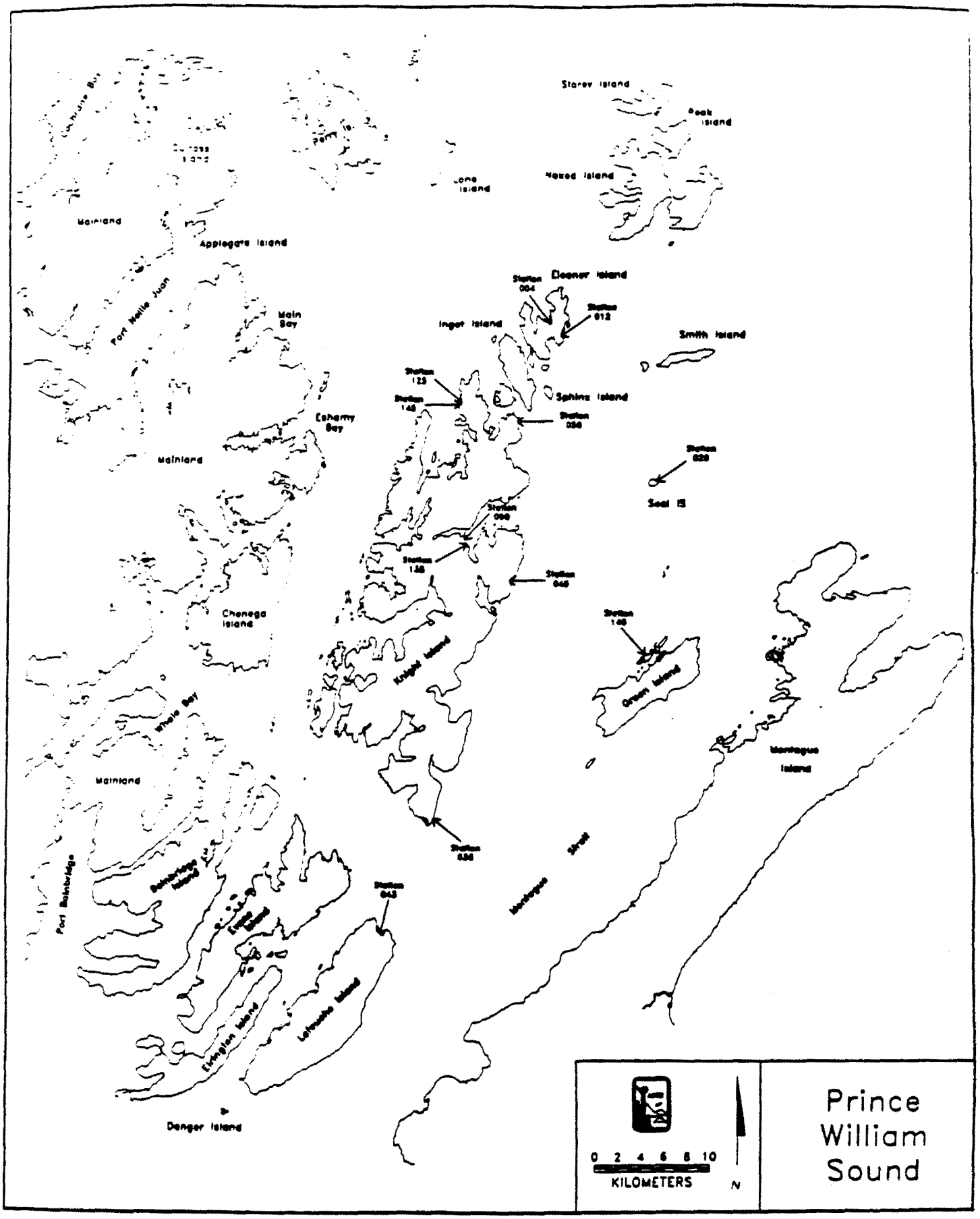
MICHEL, J. AND HAYES, M.O., 1993b, Persistence and weathering of Exxon *Valdez* oil in the intertidal zone - 3.5 years later: Proceedings, 1993 International Oil Spill Conference, American Petroleum Institute, Washington, D.C., p. 279-286.

MICHEL, J. AND HAYES, M.O., 1991, Geomorphological Controls on the Persistence of Shoreline Contamination from the Exxon *Valdez* Oil Spill: National Oceanic and Atmospheric Administration, Seattle, Washington. 306 pp.

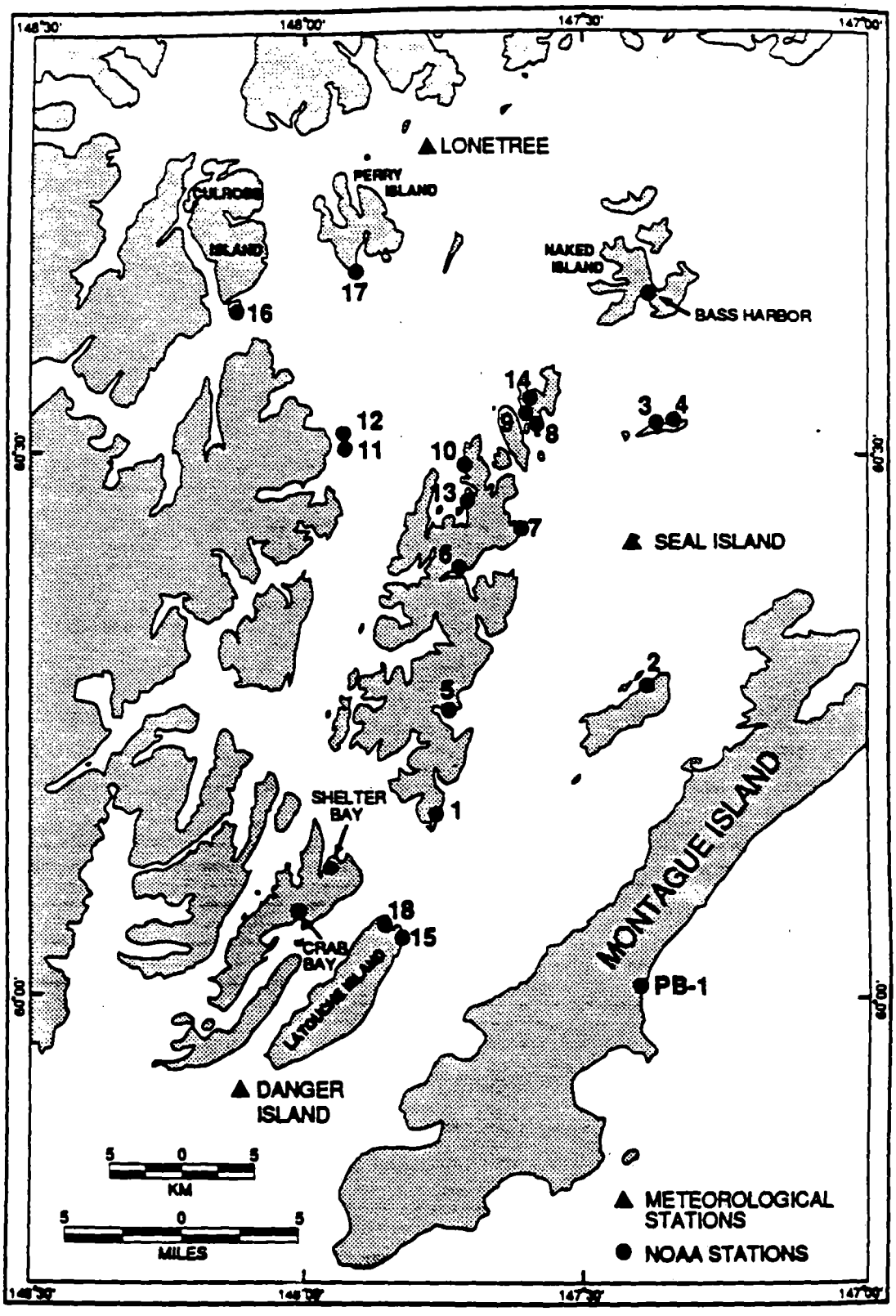
MICHEL, J., HAYES, M.O., SEXTON, W.J., GIBEAUT, J.C., AND HENRY, C., 1991, Trends in natural removal of the Exxon *Valdez* oil spill in Prince William Sound from September 1989 to May 1990: Proceedings, 1991 International Oil Spill Conference, American Petroleum Institute, Washington, D.C., p. 181-187.

OWENS, E.H. AND TAYLOR, E., 1993. A proposed standardization of terms and definitions for shoreline oiling assessment. Proceedings of the 1993 Arctic and Marine Oil Spill Programme (AMOP), Technical Seminar, Calgary, Alberta.

ADEC transect sites



NOAA transect sites from Michel and Hayes (1991)



ADEC - 004

TRANSECT: ADEC-004*

SEGMENT: EL 056 C

LOCATION: Knight Island North Group, head of the eastern arm of Northwest Bay on Eleanor Island.

OTHER STUDIES

1993 Shoreline Assessment gound survey.
1991 and 1992 shoreline ground survey sites.
Subtidal study #3, subtidal sediment traps, benthic samples, and sediment core.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

Pocket beach at the head of a protected bay. The head of the pocket consists of mixed sand and rounded pebble and small cobble gravel which grade to angular cobbles and small boulders in the lower intertidal and to the east and west. Two intermittent streams cross the beach at the center of the pocket. These streams were dry during the 1993 survey. Limbs of the pocket consist of small and large boulders.

Along the transect, the upper beach consists of sub-rounded pebbles with a sand and granule matrix. A lag surface of large rounded pebbles is present, and the stratigraphy in 1993 included 3 distinct layers of large and small pebbles overlying a framework of large cobbles and small boulders at about 25 cm depth. Sediments increase in size down the beach with angular cobbles dominating in the mid-intertidal zone with scattered boulders in the lower intertidal

In 1993, a small pebble and cobble berm was present in the lower part of the upper intertidal 15 m from the back stake. Another very subtle berm was present lower on the profile and 25 m from the back stake. There has been a net deposition of about 10 to 20 cm in the mid- to upper-intertidal zones since 1992. The profile showed no net change from 1991 to 1992. The distinct sedimentary layers as described above and the profile data are evidence that this beach may experience erosion and deposition episodes that cause elevation changes of at least 20 cm.

Environmental Sensitivity Index (ESI)

Type 6; mixed sand and gravel along the transect.
Type 8; sheltered rocky on the limbs of the pocket beach.

Fetches and Directions (kilometers)

NW= 31.5

Energy Level

Moderate at the transect with lower energy areas on the west limb of the pocket.

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* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 1

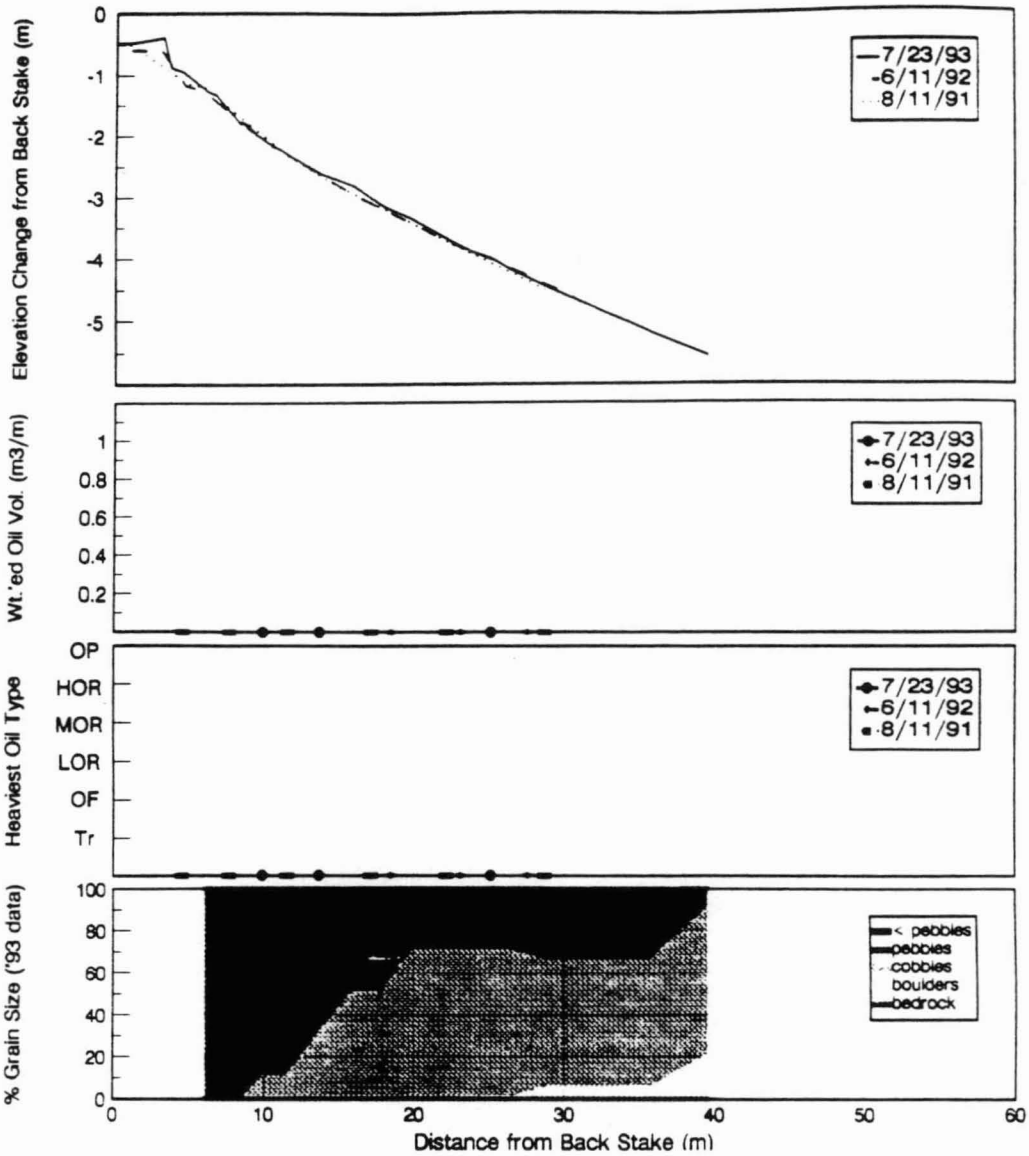
GENERAL BIOLOGICAL SETTING

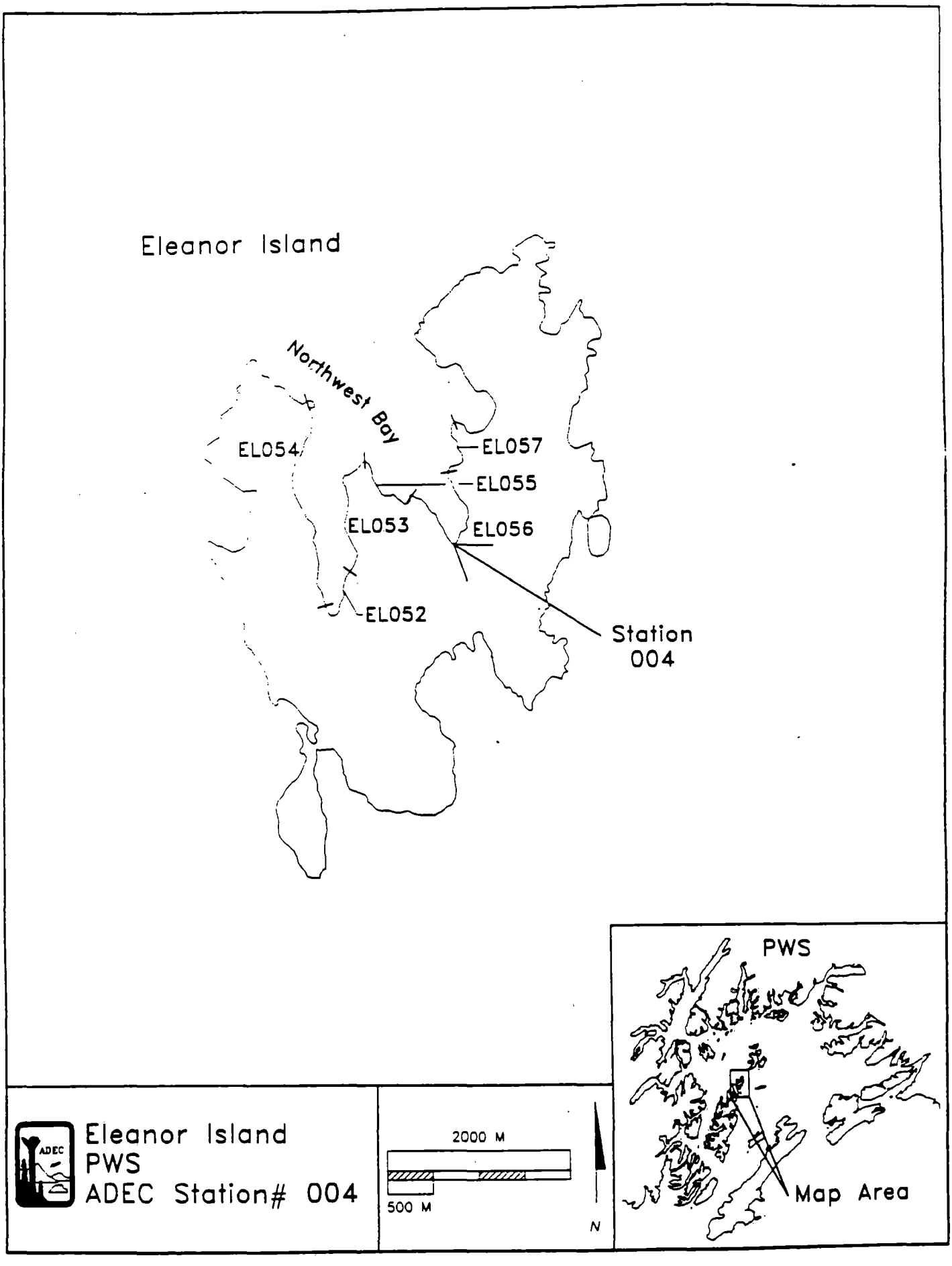
Deer harvesting.

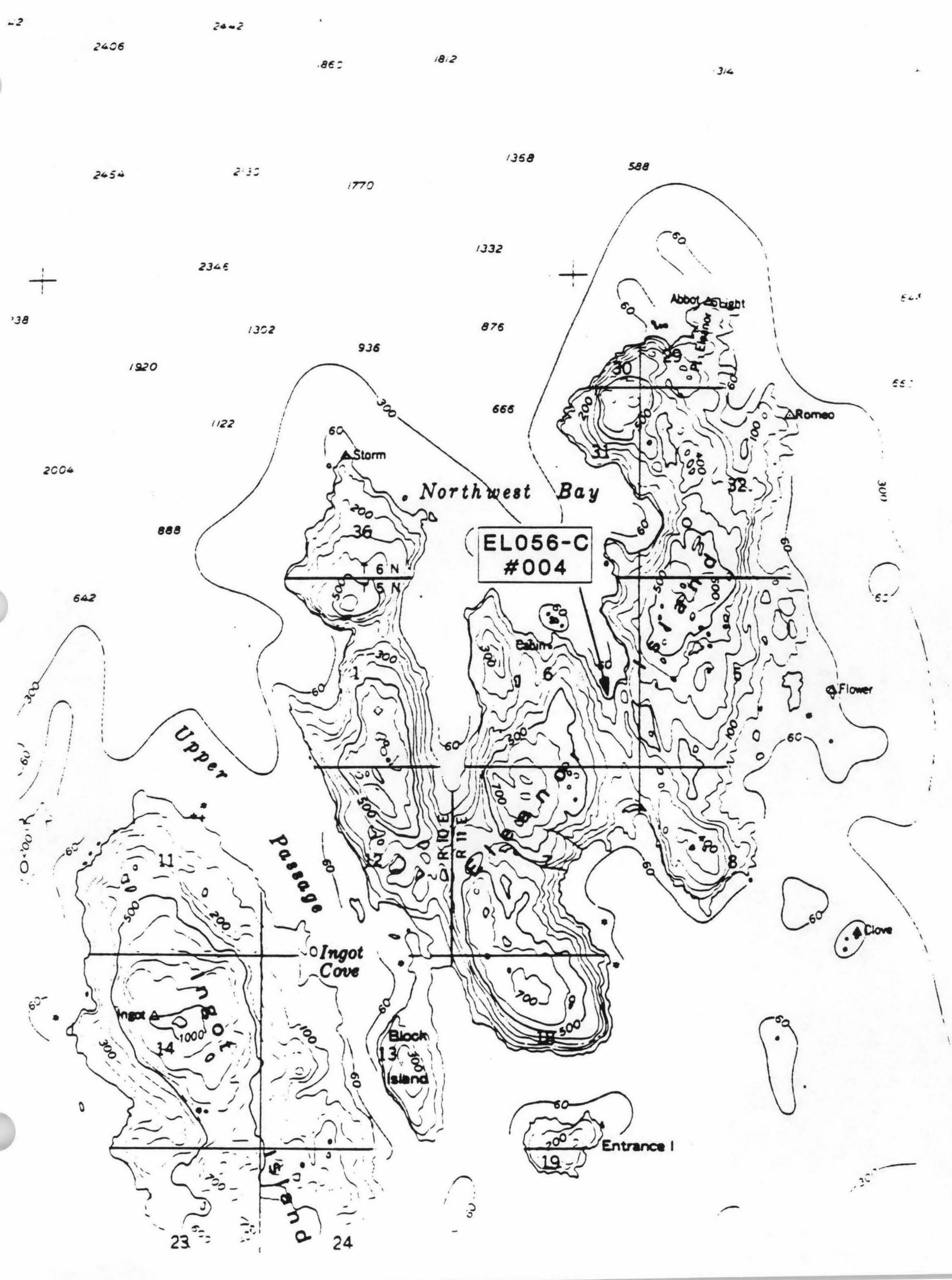
OILING SUMMARY

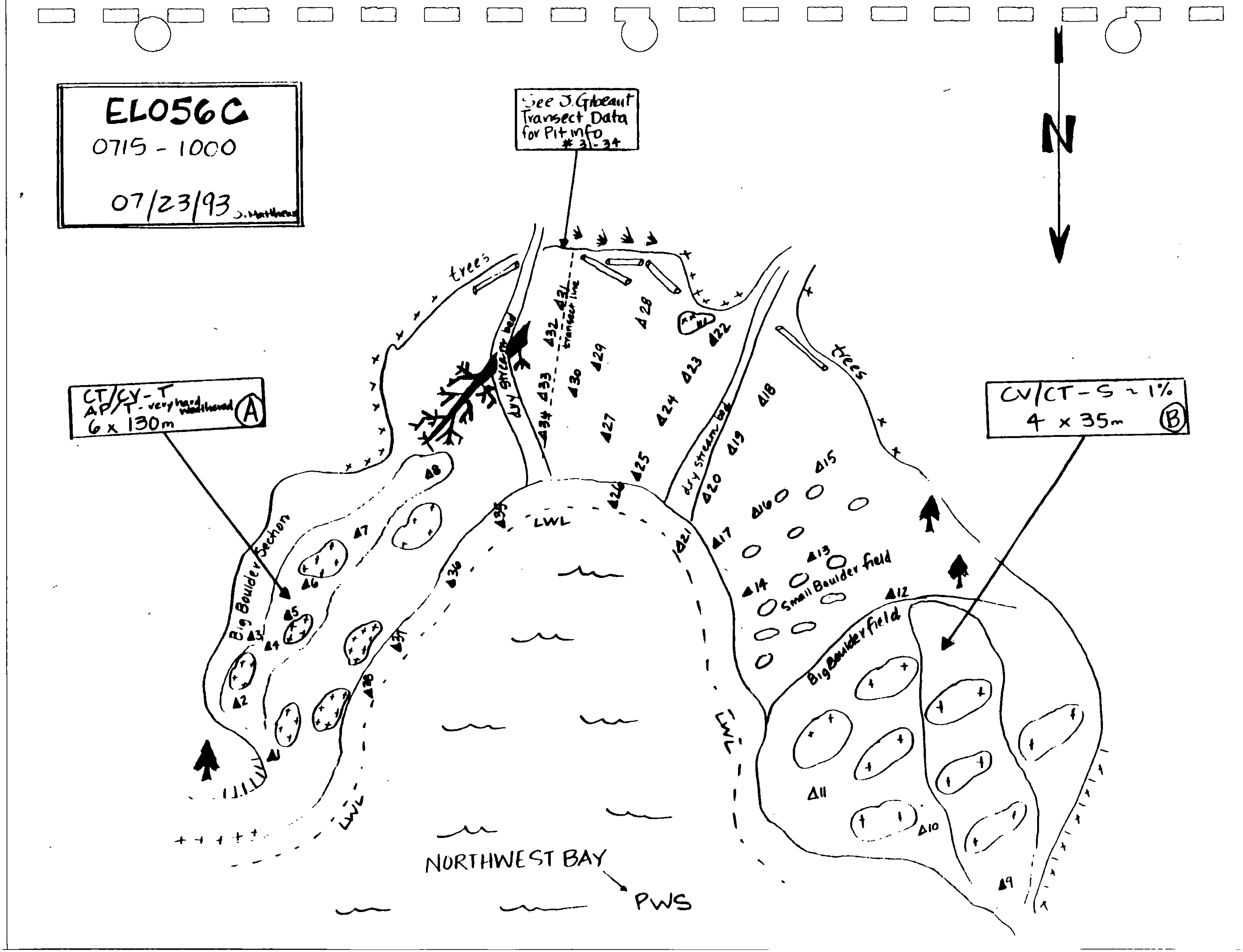
This site was originally very heavily oiled in 1989. This embayment was used as an oil collection location during skimming operations in 1989 (Ed Owens, personal communication, 7/23/93). Only a trace of surface stain was present along the transect in 1991. No surface oil was noted in 1992 or 1993. Pits dug to 40 cm depth revealed no subsurface oil in 1991, 1992, and 1993. Oil remaining in the vicinity of the transect is noted on the ground survey forms and maps of the 1993 Shoreline Survey. In 1993, Fluid, black subsurface oil was still present in the fucus zone to the west of the transect.

TRANSECT STATION ADEC-004




Eleanor Island
Northwest Bay
EL054
EL057
EL055
EL053
EL056
EL052
Station
004
PWS
Map Area
Eleanor Island
PWS
ADEC Station# 004
2000 M
500 M
N


Northwest Bay
EL056-C
#004
Upper
Passage
Ingot
Cove
Block
Island
Entrance I
Storm
Abbot
Romeo
Flower
Clove
Ingot
Cabins
T 6 N
T 5 N
R 10 E
R 11 E
36
30
29
31
32
1
6
5
12
8
11
14
13
19
23
24


EL056C
0715 - 1000
07/23/93 J. Matthews
N
See J. Gibeaut Transect Data for Pit info # 3-34
trees
CT/CY-T
AP/T - very hard weathered
6 x 130m
A
CV/CT-S ~ 1%
4 x 35m
B
dry stream bed
transect line
LWL
Big Boulder Section
Small Boulder field
Big Boulder field
NORTHWEST BAY
PWS

DATE 7-23-93 STATION: ADEC 004 SEGMENT: ~~KA~~ EL 56 C KODIAK K-UNIT: FRONT STAKE HT-(cm): [illegible]

LOCATION E. arm N.W. Bay TIDAL STAGE: BACK STAKE HT-(cm): 48

START TIME 8:40 am END TIME: 10:00 LOW TIDE: HIGH TIDE: RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B	C	P	G	S	SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.00	Ø															to front stake grass
2.20	+9															Drift logs
0.45	-48.															—
0.90	-8.															Storm rock
1.55	-31					100										-
0.60	-6.					100										Berm Crest
1.60	-47					100										—
.27	+2					100										Berm Crest (.475)
.25	-9					100										—
1.10	-20				10	90					1					—
1.77	-26				10	90										—
1.97	-27				30	70					2					—
2.30	-21				50	50										—
2.0	-33				50	50							B			—
1.95	-21				70	30							B			—
2.60	-36				70	30							B			
1.35	-17				70	30							B			60 meters west of transect BLACK MOB [illegible]
1.23	-10				70	30					3		B			

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 7/23/93 STATION: APEC004 EL ~~KH056C~~ Page 2 of 2

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.35	-19				70	30							B			—
2.45	-29			5	60	35							B			—
3.35	-36			5	60	35							B,M,F			Waterline (0900)
3.55	-37			5	60	35							B,M,F			Water line to waterline out
3,80	-37			20	70	10							B M F			TO waterline (1000)

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 7-23-93 STATION ANEC004 SEGMENT ~L56C

J. Gibeaut

Oiling description	Profile	Seds	Framework	Matrix

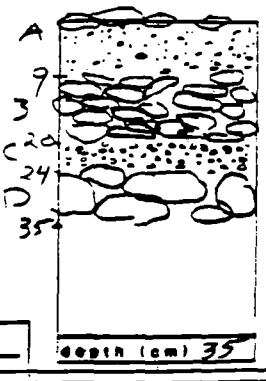
A. Sm. pebbles + granules w/ surface layer covered by 50% L. pebbles

B. L. pebbles w/ v.c sand and granular matrix

C. s. pebble layer

D. L. cobbles s. boulders w/ v.c sand granular matrix

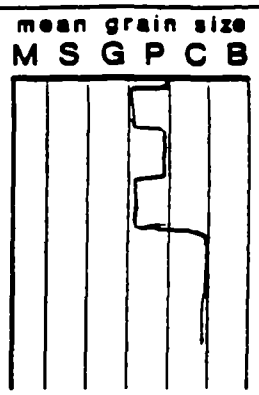
photos 1, 2

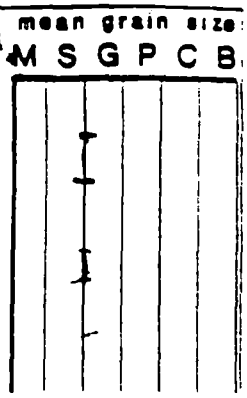


no oil

depth (cm) 35

Pit 1 (m) From FS ____



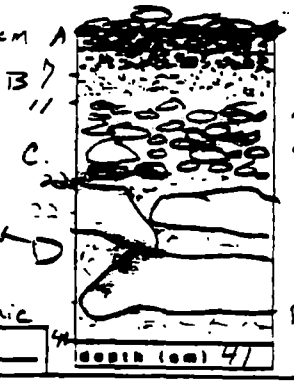


A. double layer small pebbles 0.5 cm on bottom overlain by large rounded pebbles ~6cm long deposit

B. v.c. sand granular layer

C. Large pebble layer as on surface but thicker

D. L. cobble, s. boulder framework w/ granular v.c sand matrix throughout w/ slight to moderate organic

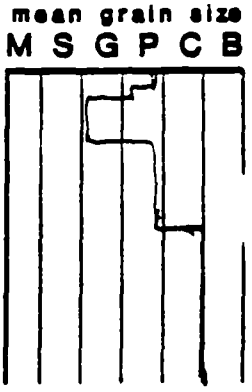


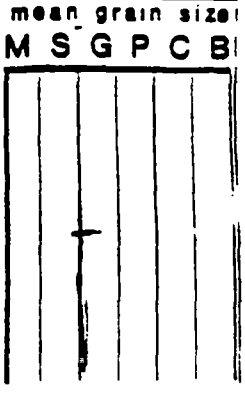
no oil

photos 3, 4, 5

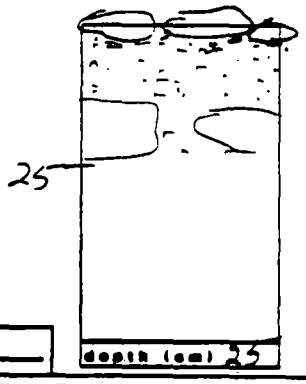
depth (cm) 41

Pit 2 (m) From FS ____





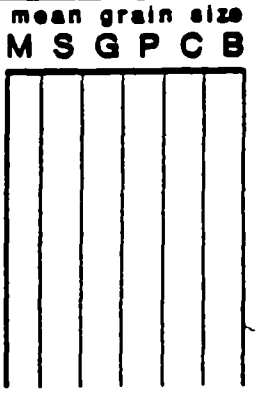
Similar stratigraphy as above.

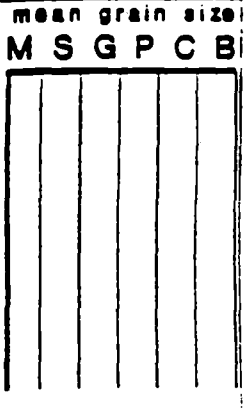


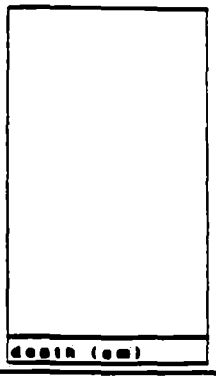
no oil

depth (cm) 25

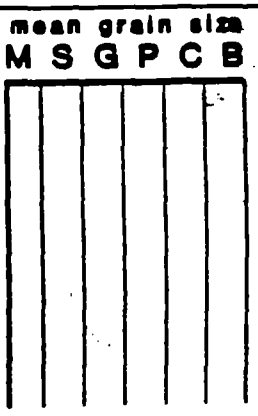
Pit 3 (m) From FS ____

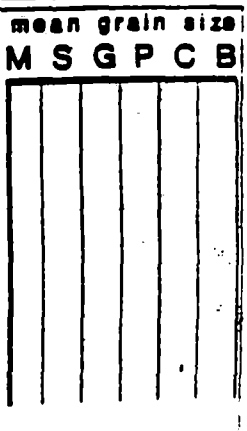






Pit ___ (m) From FS ____





Signature _____

ADEC - 012

TRANSECT: ADEC-012

SEGMENT: EL 107 C

LOCATION: Northern Islands Group, northeast facing pocket beach along the exposed eastern shore of Eleanor Island.

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This is a pocket beach with significant bedrock control. Fractured bedrock, which contains pockets of gravel and many small tide polls, occurs to each side of the transect, especially to the east. The central beach along the transect is a well-rounded, pebble, cobble, and boulder beach with scattered bedrock outcrops. The upper intertidal is dominated by pebble and cobble berms. Sediments gradually increase to predominantly boulders down the profile.

In 1993, a surface layer showing reverse grading was present in the upper intertidal zone. The upper pit, about 18 m from the back stake, graded from large pebbles and small cobbles on the surface to small pebbles at 5 cm depth. From 18 to 30 m from the back stake the surface graded layer was about 10 cm thick and showed grading from small boulders and large cobbles down to well-rounded small pebbles. A small pebble layer, bedrock, or a boulder framework with a pebble matrix lies below the surface layer in the area between 18 and 30 m from the back stake. On the lower half of the profile, surface boulders dominate.

This high-energy beach experienced net erosion in the upper part of the profile between the summers of 1991 and 1992. A pebble berm and the area below the berm eroded down to as much as 50 cm. From 1992 to 1993, the upper profile did not make a net recovery and the entire mid part of the profile from 25 to 45 m from the back stake lowered by about 40 cm. Further evidence of significant sediment movement on this beach is provided by the graded surface layers described above.

The lower part of the beach has not significantly changed.

Berm relocation occurred here in 1990, and evidence of this persists in the form of unnatural log piles in the upper and supratidal zones forming a high-relief berm.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

NE= 55

Energy Level

High.

GENERAL BIOLOGICAL SETTING

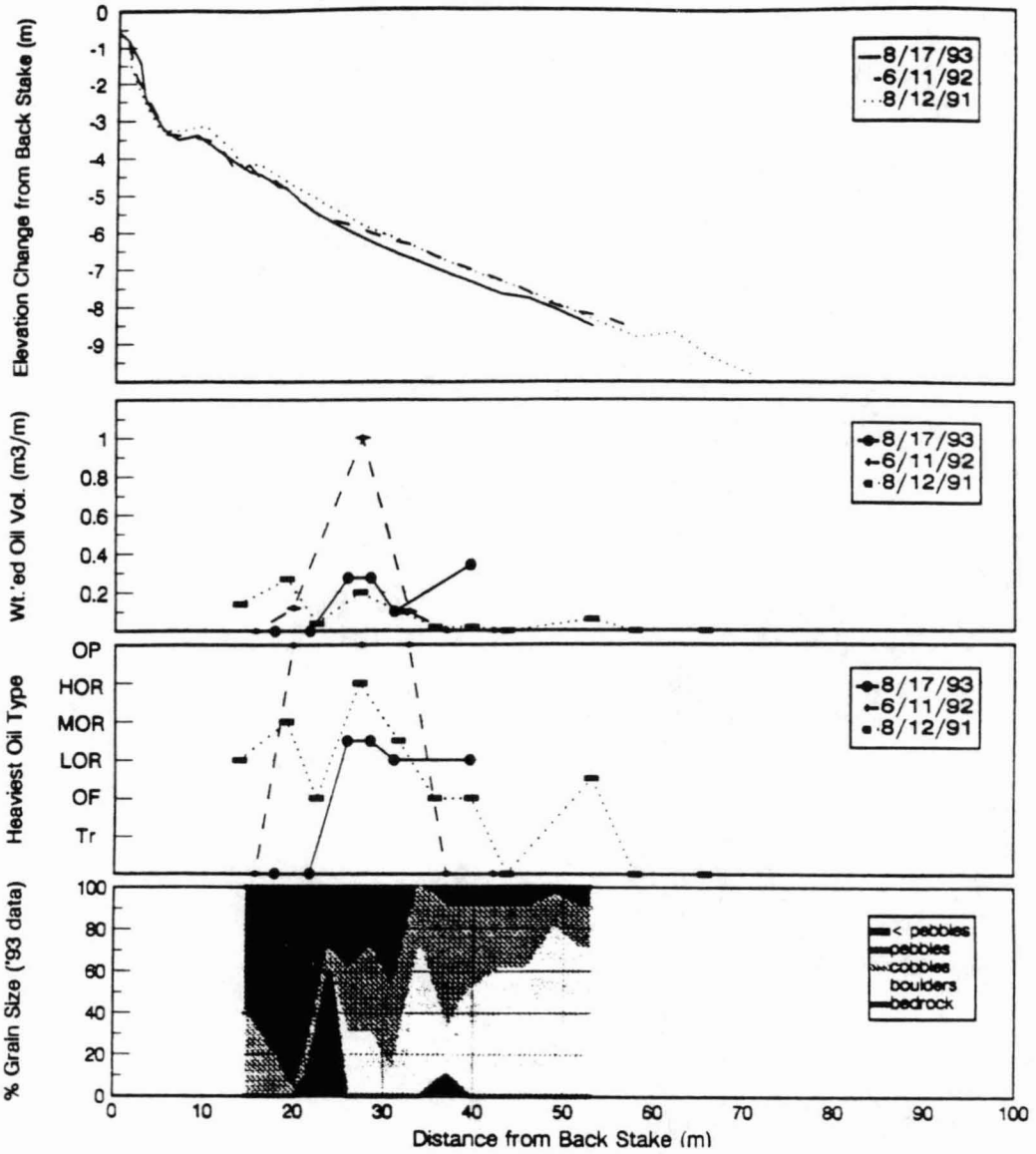
OILING SUMMARY

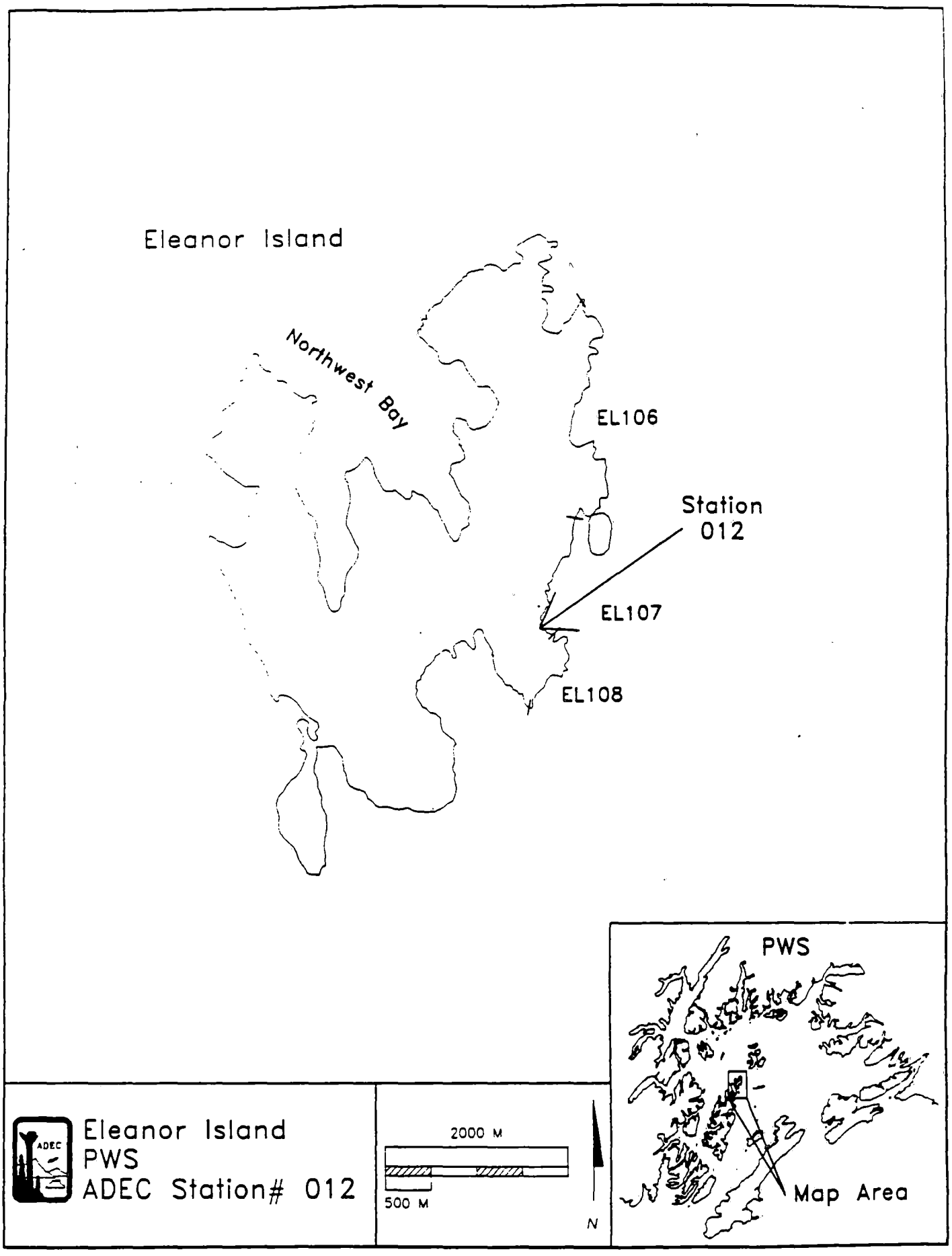
Only trace amounts of surface oil were noted along the transect in 1991 and 1992, and by 1993 no surface oil was detected. Surface oil was noted, however, to each side of the transect in 1993 as was the case in 1991 and 1992.

MOR oil was present in 1991 in the upper intertidal in and just below the high-tide berm. This oil was completely eroded by 1993.

Subsurface oil in the mid- to upper intertidal from about 25 to 45 m from the back stake, was discovered in 1993. This oil was also present in 1991 and 1992, but it has decreased in concentration from HOR/OP to LOR/MOR. The oil is roughly 20 cm shallower than in 1991 because of net erosion of the profile as described above.

TRANSECT STATION ADEC-012




Eleanor Island
Northwest Bay
EL106
Station
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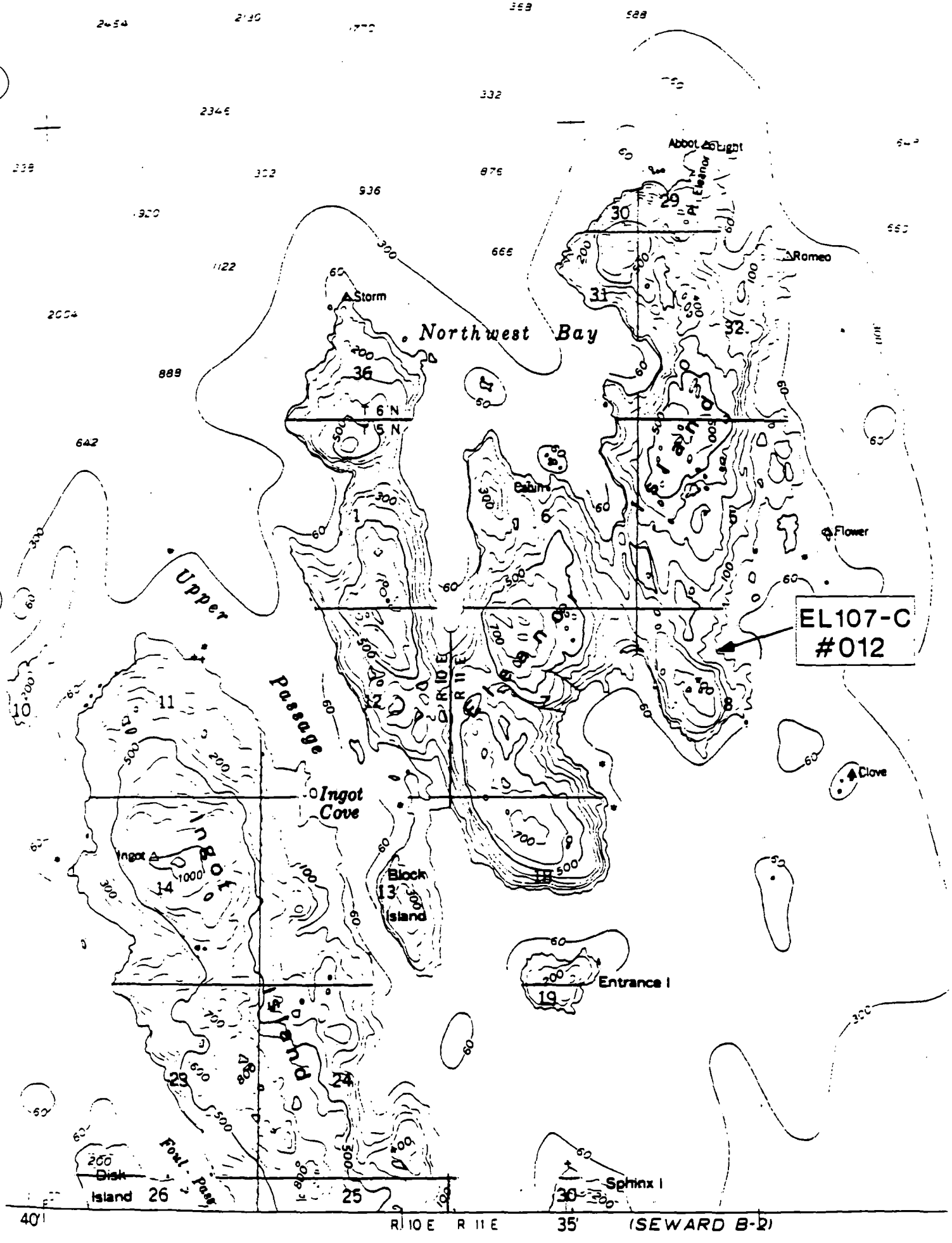
EL107
EL108
PWS
Map Area
ADEC
Eleanor Island
PWS
ADEC Station# 012
2000 M
500 M
N

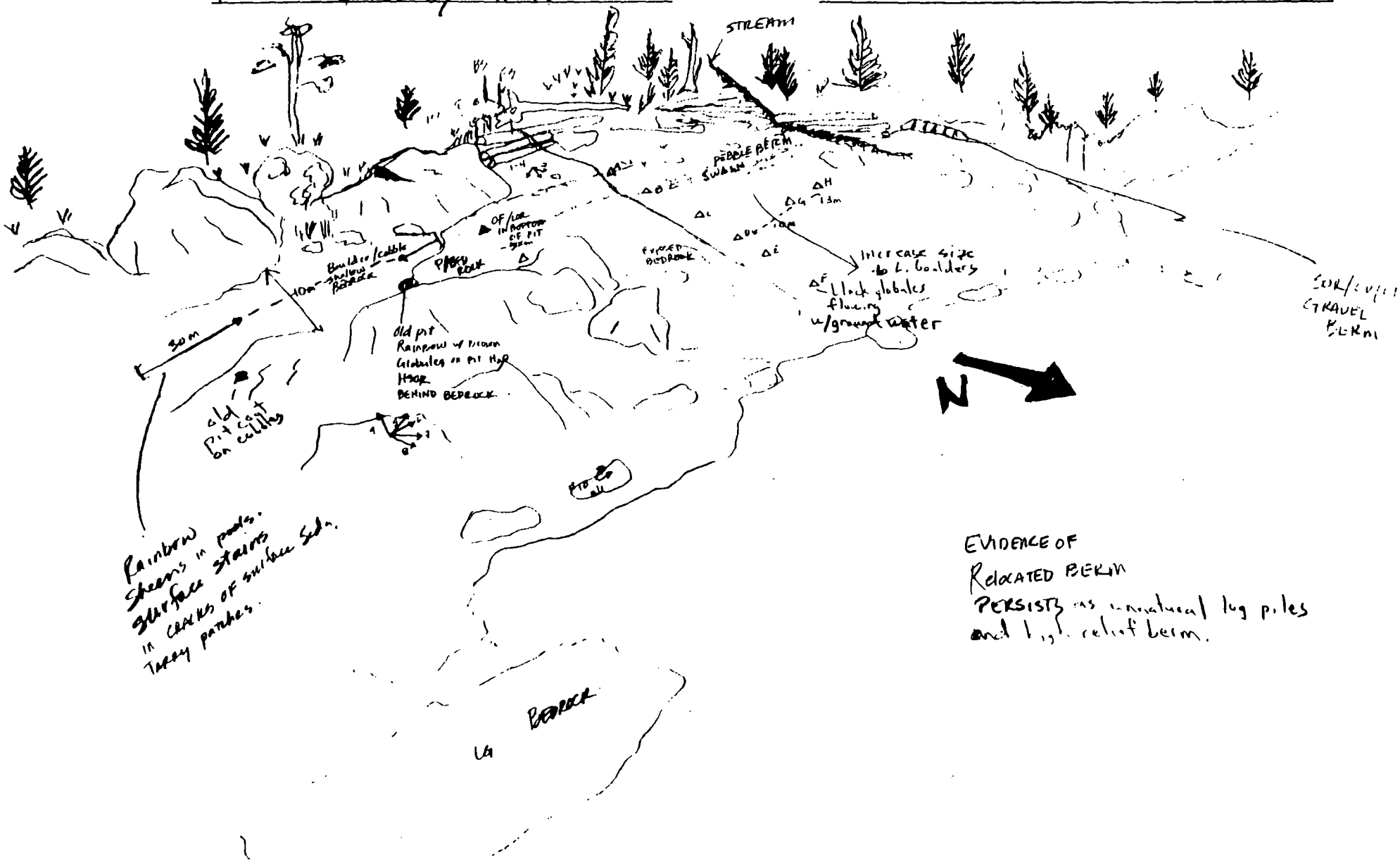

Abbot Light
Eleanor
Romeo
Storm
Northwest Bay
Cabin
Flower
Clove
Upper
Passage
Ingot
Cove
Ingot
Block
Island
Entrance I
Sphinx I
Disk
Island
Foul Pass
T 6 N
T 5 N
R 10 E
R 11 E
EL107-C
#012
40'
35'
(SEWARD B-2)

DATE Aug 17, 1993 STATION # 012 SEGMENT EL107-C KODIAK-UNIT N/A ACCESS Boat TIME 1736

LOCATION E. ELEANOR ISLAND, PWS LOW-TIDE 19:11 +.6 TEAM MEMBERS J. GIBEAUT, E. PIPER, T. FARLEY (ALYK), C. CROSS

SEDIMENT TYPE BCP WEATHER Sunny - Broken clouds PROFILE ANGLE 195° mag

TRANSECT IDENTIFIER Two metal stakes w/ tags. PHOTOGRAPHS 93CSC002 #1



DATE 8-17-93 STATION: 012 SEGMENT: EL107 C KODIAK K-UNIT: _____ FRONT STAKE HT-(cm): 52

LOCATION E ELEANOR ISLAND TIDAL STAGE: EBB BACK STAKE HT-(cm): 54

START TIME 1736 END TIME: 1812 LOW TIDE: 1947 +.6 HIGH TIDE: 0157 13.4 RecKey: _____

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S	SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.10	-27											Back stake to front stake
1.35	-60											On old stump
0.60	-100.											BACKSHORE
0.65	-29											BACKSHORE
1.40	-52											BACK SHORE
1.65	-29											To edge of drift + logs
2.15	+12											—
3.00	-51											—
2.75	-43			40 60								—
1.45	-9			30 70								To crest of pebble berm
1.30	-20			20 80								—
0.45	-9			20 80			A	NO OIL				TO PIT A
0.95	-4			10 90								—
1.45	-34			100								—
1.45	-28			10 80			B.	NO OIL				AT PIT B 10% Bedrock
2.40	-32			10 30								60% Bedrock
1.85	-23			30 30 40			C	LOR/MOR				AT PIT C
2.55	-31			30 40 30			D	LOR/MOR				AT PIT D

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

DATE 8-17-93 STATION: ADEC #012

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2.6	-28			10	40	50					E	LOR				AT PIT E
3.0	-30			70	30											
2.95	-29			20	60	10							B, P, L			10% BEDROCK
2.5	-22			50	40	10					F	LOR	B, P, L			AT PIT F
3.2	-31			60	30	10							B, P, L			—
3.3	-13			60	30	10							M, B, P, L, W			—
2.95	-29			80	15	5							M, B, P, L, W			—
2.80	-31			70	20	10					-		M, B, P, L, W			—
1.20	-14			70	20	10							M, B, P, L, W			TO WATERLINE - 1812

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

ADEC SUBSURFACE OIL PROFILE

12

DATE 8-17-93 STATION ADEC 012 SEGMENT ELLIC

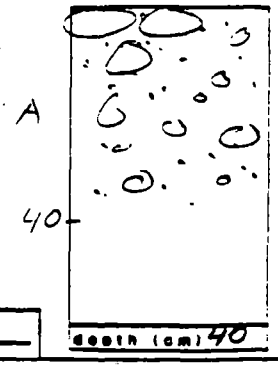
J. Gibeaut

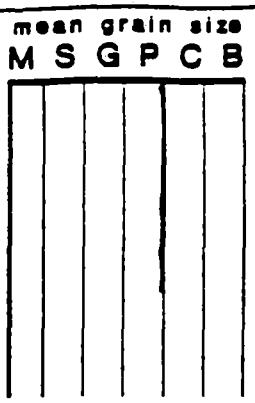
Oiling description	Profile	Seds	Framework	Matrix

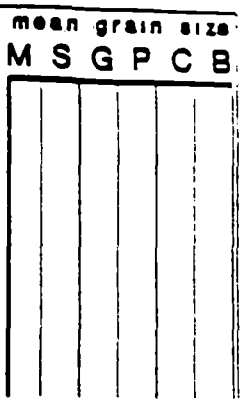
Pit A (m) From FS ____

dug on top of sparsely veg. berm

A - well-rounded pebble, cobble gravel



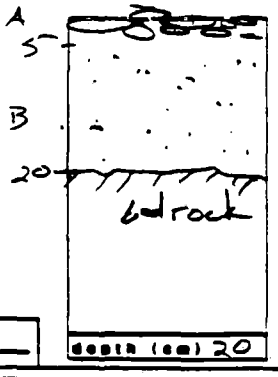


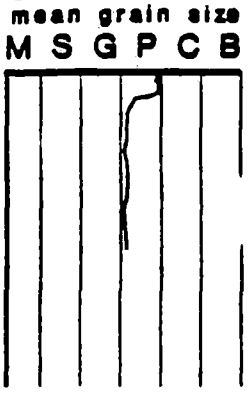


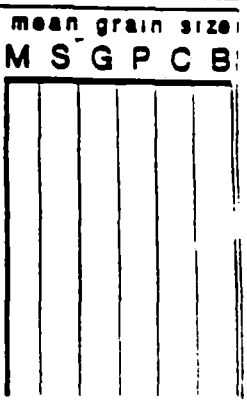
Pit B (m) From FS ____

A - L. pebble, small cobble surface, reverse graded

B - S. pebble gravel





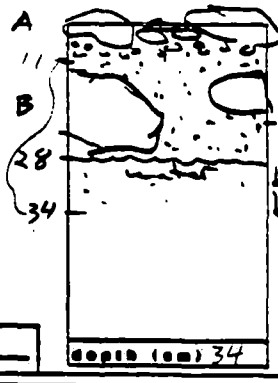


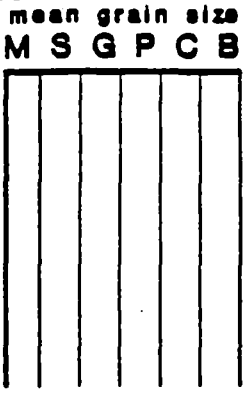
Pit C (m) From FS ____

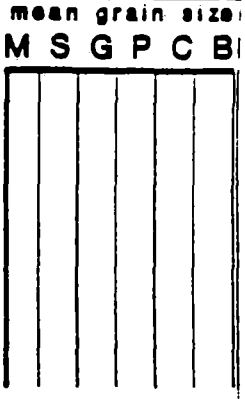
A - S. boulders, L. cobbles reverse graded to S. pebbles well rounded

B - pebble gravel in boulder L. cobble frame work

photo 2





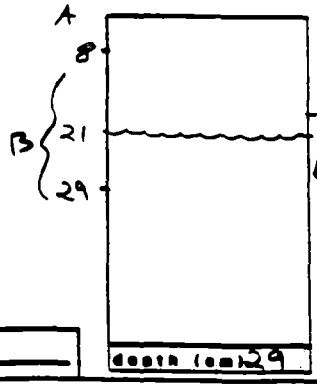


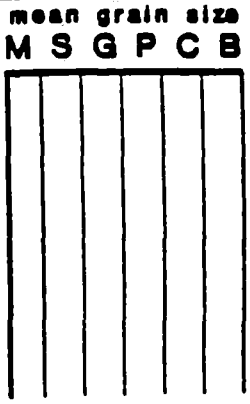
Pit D (m) From FS ____

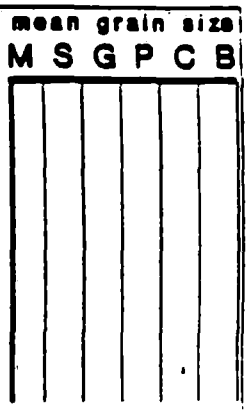
A. surface layer of pit C

B - same as B in pit C

photo 3







Signature _____

ADEC SUBSURFACE OIL PROFILE

42

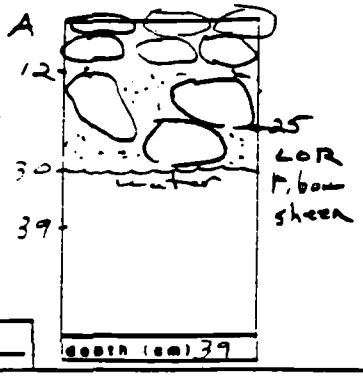
DATE 8-17-93 STATION ADEC #012 SEGMENT ELIOTT

Oiling description	Profile	Seds	Framework	Matrix

A- S. boulder, L cobble surface

B. Same framework as above w/ granular pebble matrix

photo 4



mean grain size M S G P C B

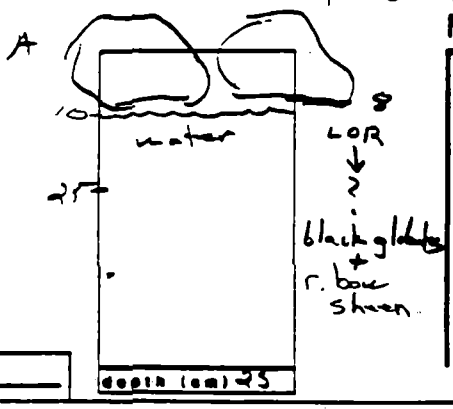
mean grain size M S G P C B

Pit E (m) From FS ____

A.- Boulder surface

B- Boulder, L. cobble framework w/ cobble matrix

photo 5



mean grain size M S G P C B

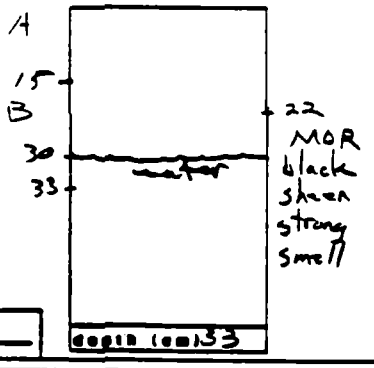
mean grain size M S G P C B

Pit E (m) From FS ____

A- L. cobbles reverse graded to S. pebbles

B- granular, pebble gravel in L. cobble matrix

photos 7, 8



mean grain size M S G P C B

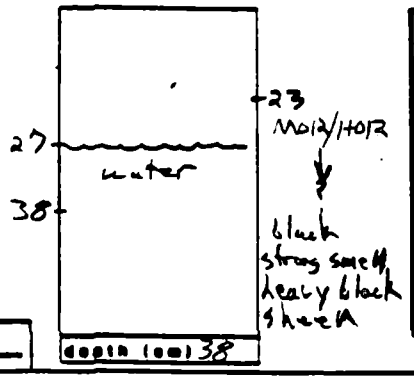
mean grain size M S G P C B

Pit G (m) From FS ____

A-

B- same as pit G

photo 6

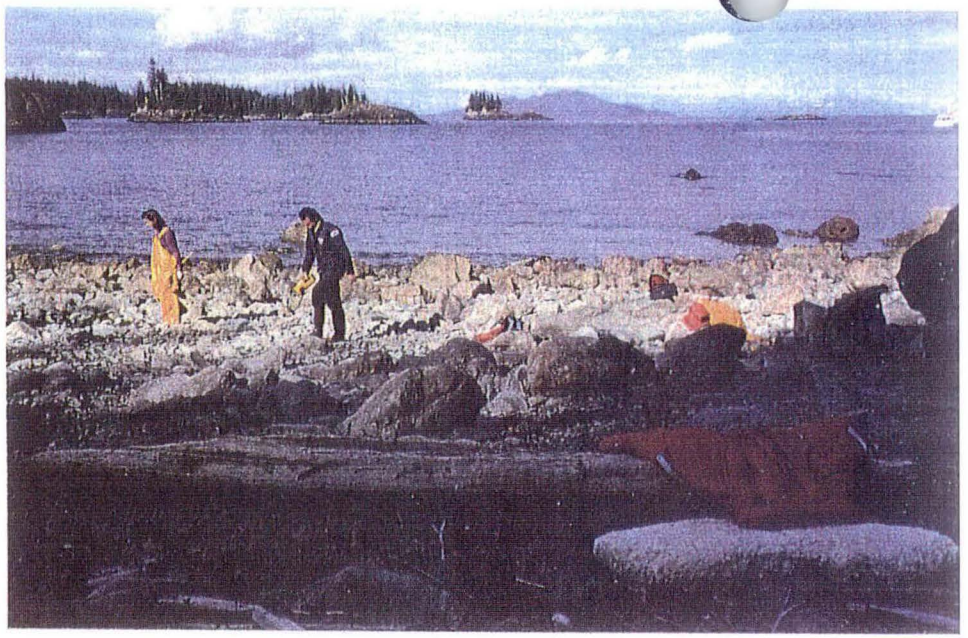


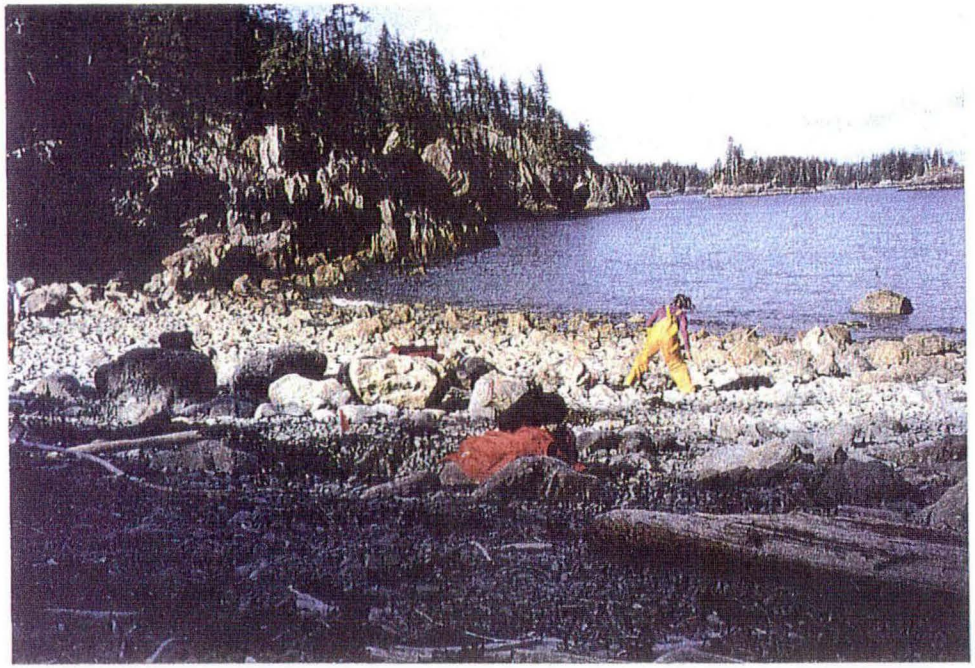
mean grain size M S G P C B

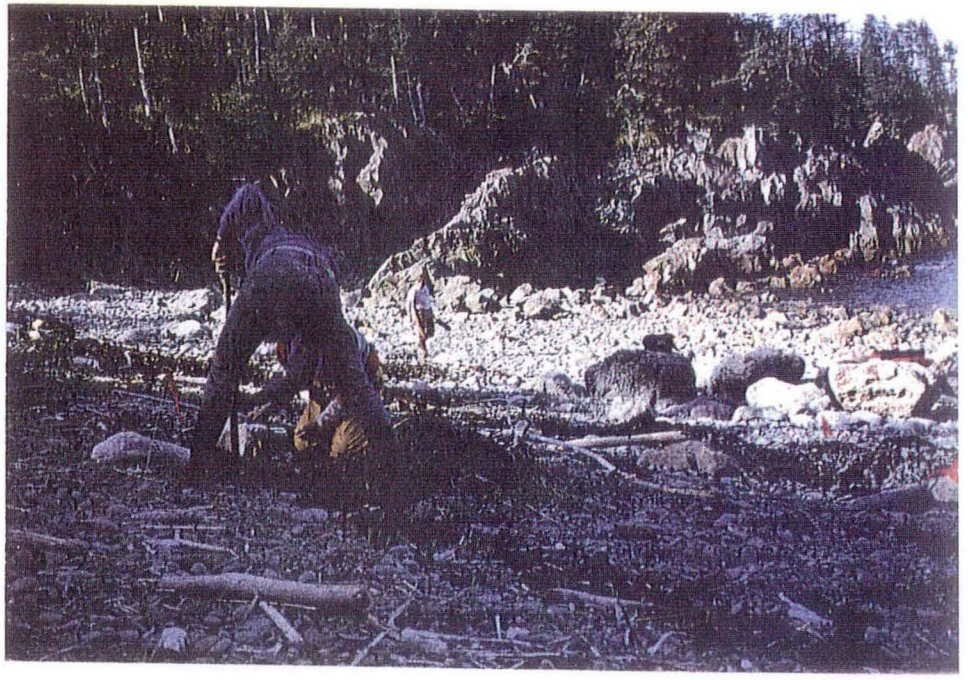
mean grain size M S G P C B

Pit H (m) From FS ____

Signature _____







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 2-6). Pan view is east to north and west. Crew also shown digging pits near profile (4-6). Photo#6 shows relocated berm.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 3 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 2-6). Pan view is east to north and west. Crew also shown digging pits near profile (4-6). Photo#6 shows relocated berm.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 2 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 2-6). Pan view is east to north and west. Crew also shown digging pits near profile (4-6). Photo#6 shows relocated berm.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 5 EVIDENCE ID#:_____

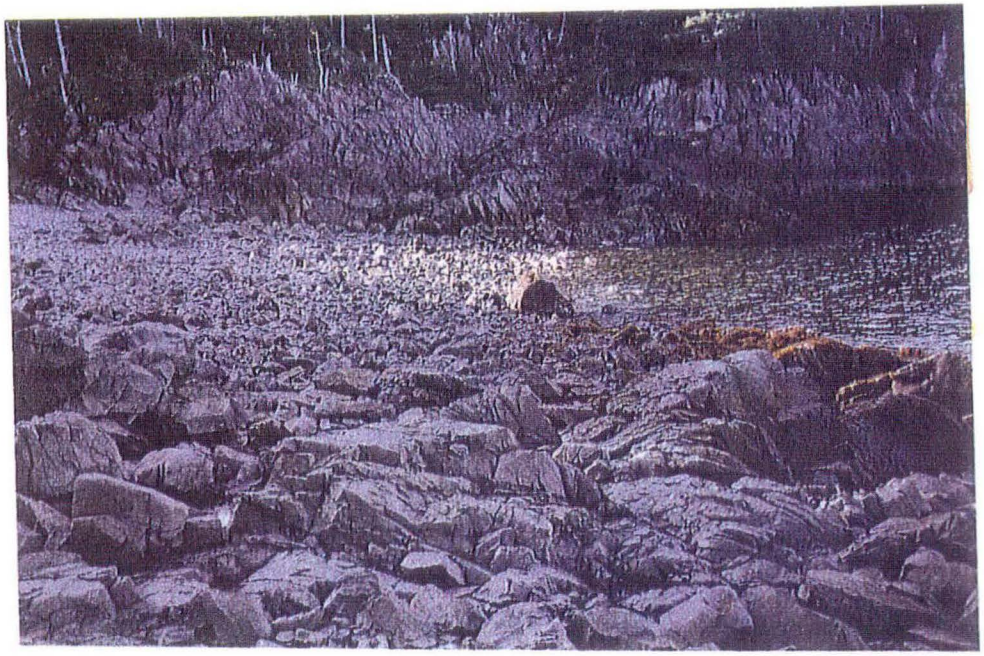
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 2-6). Pan view is east to north and west. Crew also shown digging pits near profile (4-6). Photo#6 shows relocated berm.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 4 EVIDENCE ID#:_____

ADEC-12 273



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT: EL107 STATION: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 7 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 2-6). Pan view is east to north and west. Crew also shown digging pits near profile (4-6). Photo#6 shows relocated berm.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 6 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT: EL107 STATION: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 9 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT: EL107 STATION: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 8 EVIDENCE ID#:_____

ADEC-012 3/3

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT: EL107 STATION: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 11 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT: EL107 STATION: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 10 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 1736

SEGMENT#: EL107 STATION#: 012
LOCATION: East Eleanor Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan of beach (photos 7-12). Pan view is from the east end of the sub-segment to the west.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 12 EVIDENCE ID#:_____

ADEC - 020

TRANSECT: ADEC-020

SEGMENT: SE 041 A

LOCATION: Outer Islands Group, eastern end of Seal Island.

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This site is a raised wave-cut platform with a cover of predominately rounded boulders and cobbles that are generally platy in shape. The transect is backed by tall grass. A well-developed berm consisting of large pebbles occurs just below the vegetation zone. Grain size increases rapidly along the transect toward the water. The central part of the profile is a nearly horizontal platform consisting of 60% small to large boulders, 30% cobbles, and 10% pebbles. The transect drops off rapidly where it crosses a bedrock ledge. Stranded vegetable wrack was more than 20 cm thick in a continuous band across the upper part of this profile in 1993.

In 1993, the water table in the mid and upper intertidal was only about 10 cm below the surface despite it being low tide. Toward the landward part of the horizontal central platform, well-rounded surface boulders overlie a pebble layer 2 to 3 grains thick, and below the pebble layer, a slightly muddy, sandy, organic, pebble gravel is present. In the bottom of the pits, at 20 cm depth, a peaty, muddy, sandy, pebble gravel occurs. In the central part of the platform, the surface layer consist of boulders with interstitial cobbles and pebbles. The underlying clean pebble layer present landward was not present in this part of the profile. Farther toward the water, but still on the platform, a pit dug 38 m from the back stake, revealed a stiff organic anoxic clay at 14 cm below the surface.

The profiles from 1991, 1992, and 1993 reveal a static beach. However, the rounded sediments, the high-tide pebble berm, and the stratigraphy indicate that some sediment movement occurs on the platform and most significantly on the upper part of the platform. It should be noted that the apparent shift in the movement of the seaward edge of the platform in 1992 is caused by the surveyors taking a slightly different track down the beach.

Large supratidal bedrock outcrops nearly surround the site and protect it from wave energy. The raised platform configuration also serves to protect the site from waves.

Environmental Sensitivity Index (ESI)

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

Fetches and Directions (kilometers)

NE= 54; E= 36; SE= 19

Energy Level
Moderate.

GENERAL BIOLOGICAL SETTING
seal haulout area.

OILING SUMMARY
This site was heavily oiled in 1989. Treatment in 1989 included hand wiping, header hose flood, cold/warm water low/moderate pressure wash, and steam cleaning of rock faces. In 1990, the site still had heavy oiling and treatment included manual removal of pooled oil, asphalt pavement, mousse, and OP sediments as well as manual raking, spot washing, and had wiping.

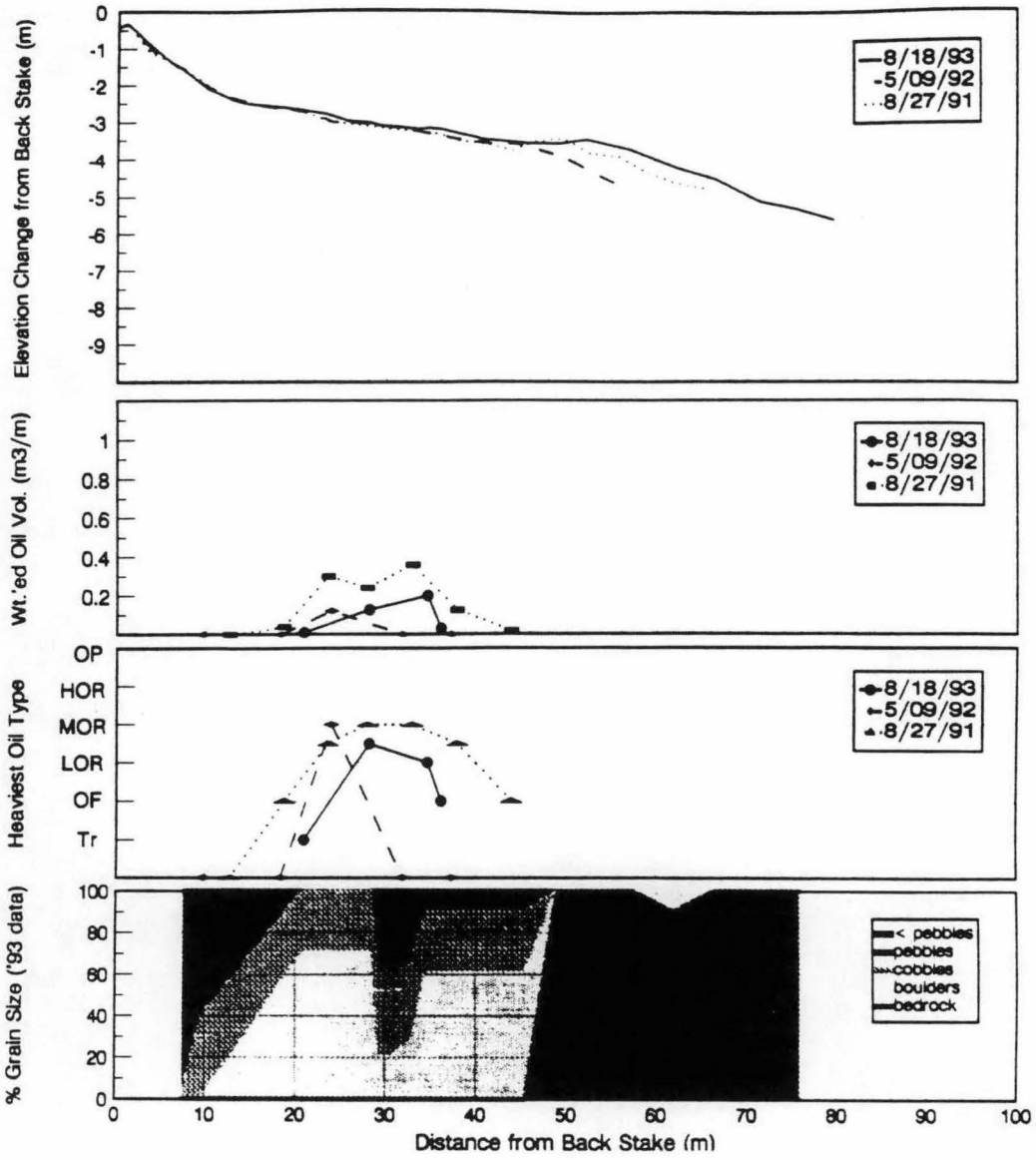
In 1991, SOR persisted on the surface at concentrations of up to 25% in the central part of the platform. The heaviest subsurface oiling was MOR also in the central platform. Treatment in 1991 included manual raking and oil recovery using sorbents and a header flood. Customblen was also applied.

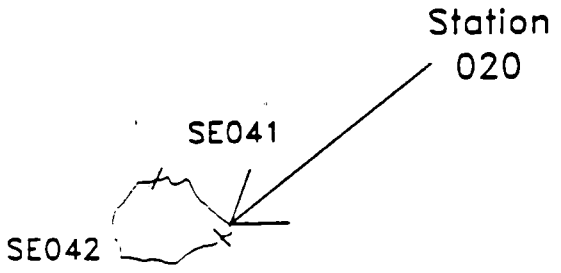
In 1992, the site was visited after treatment occurred. Treatment included manual removal of pooled oil, asphait pavement, mousse, and OP sediments, manual raking, spot washing, and hand wiping. A few days after treatment, surveyors discovered only trace amounts of surface oil along the transect and only one pit with MOR oil in the upper part of the central platform. Thus a significant improvement over 1991 conditions was recorded. Surveyors did note, however, that surface sheening was occurring.

In 1993, surveyors discovered essentially no surface oil. The central part of the platform still contained LOR/MOR but in a smaller area than in 1991. A significant improvement in surface and subsurface oiling occurred from 1991 to 1993, but the 1993 subsurface oiling was heavier than in 1992. This may be caused by the 1992 survey taking place immediately after cleanup activity.

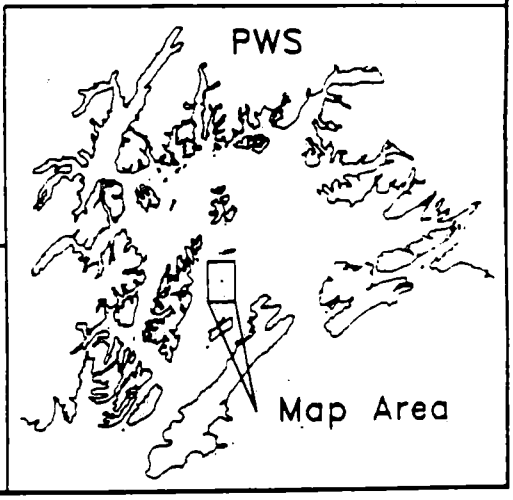
To the north of the profile and in a slightly more sheltered area, HOR persists at a depth of 10 cm and in an unknown thickness. Active sheening was also noted at this site.

TRANSECT STATION ADEC-020





Seal Is

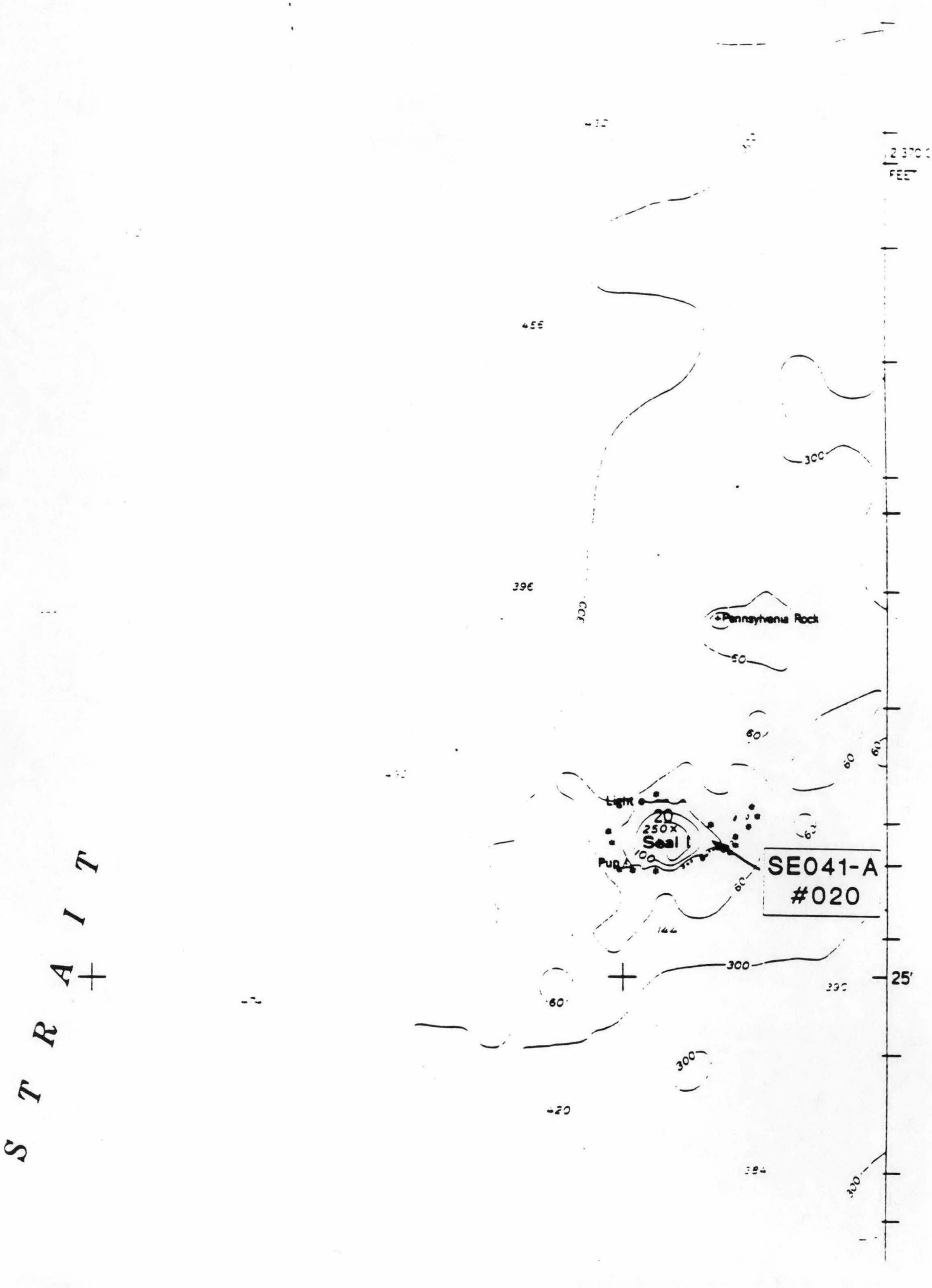


Seal Island
PWS
ADEC Station# 020

2000 M

500 M

N

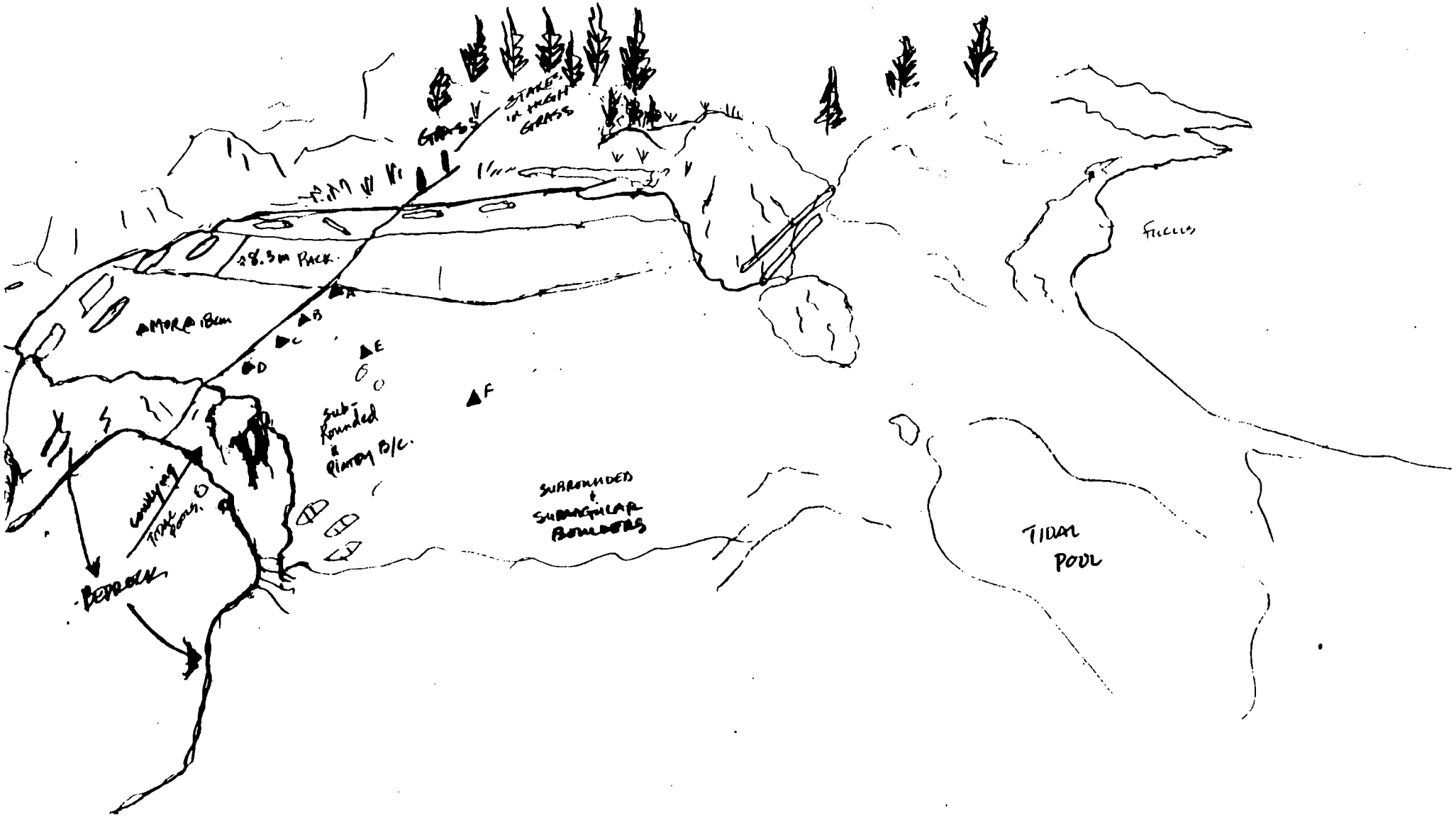

STRAIT
FEET
456
300
396
Pennsylvania Rock
60
Light
20
250 x
Seal
Pup A
100
SE041-A
#020
142
300
25'
60
300
420
300

DATE 8.18.93 STATION 020 SEGMENT SG041 A KODIAK-UNIT N/A ACCESS BOAT TIME

LOCATION SEAL ISLAND, PWS LOW-TIDE 0817 (2.4) TEAM MEMBERS J. GIBEAUT, E. PIPER, K FARLEY, C. CROSBY

SEDIMENT TYPE B/C/R/P WEATHER OVERCAST PROFILE ANGLE 6.1° mag

TRANSECT IDENTIFIER TWO METAL STAKES & TAGS PHOTOGRAPHS 93CSC003 1-15

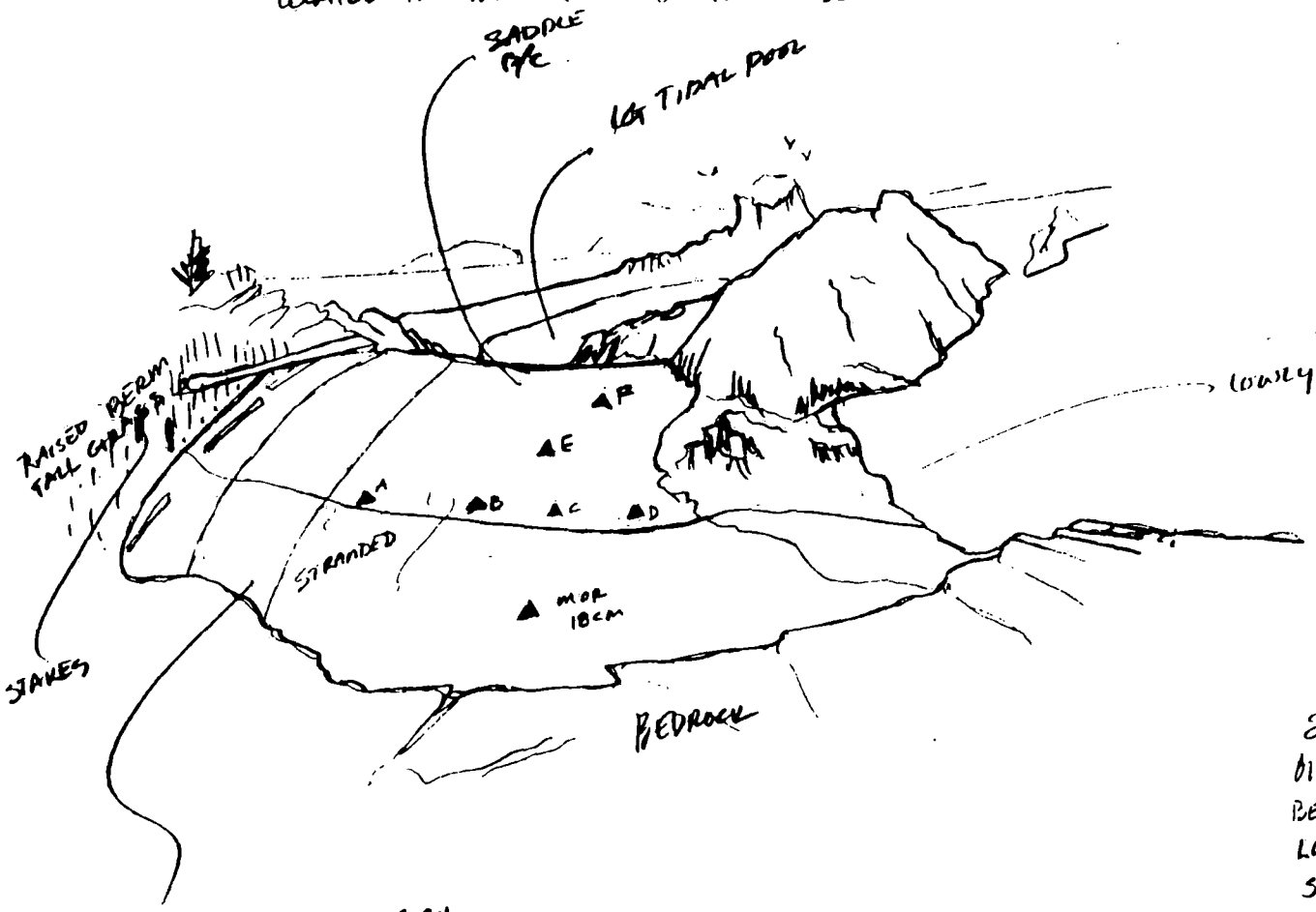


DATE 8-18-93 STATION 020 SEGMENT SE041A KODIAK-UNIT n/a ACCESS BOAT TIME 16:00

LOCATION SEAL ISLAND PWS LOW-TIDE 0817 -2.4 TEAM MEMBERS J. GIBEAUT, E. PIPER, K FARLEY, C. CROSBY

SEDIMENT TYPE R/B/c/P WEATHER OVERCAST - occassional sprinkles PROFILE ANGLE 61° mag

TRANSECT IDENTIFIER TWO METAL STAKES W/ TAGS LOCATED IN TALL GRASS ON RAISED BERM PHOTOGRAPHS 93CSC 002 - 24 93CSC 003 1-15



Surface seds - B/c/P - SUBANGT/SUB. ROUNDED
OILING PERSISTS IN MHTZ & HHTZ
BEHIND BEDROCK SHELF LOCATED IN LOWER INTERTIDAL —
SHEENS NOTED THROUGHOUT BEACH IN RUNOFF - (UNDISTURBED SEDS) & TIDAL POOLS.

DATE 8-18-93 STATION: 020 SEGMENT: SE041A KODIAK K-UNIT: N/A FRONT STAKE HT-(cm): 43

LOCATION SEAL ISLAND TIDAL STAGE: FLOOD 0 to +1 BACK STAKE HT-(cm): 44

START TIME 1000 END TIME: 1030 LOW TIDE: 0817 -2.4 HIGH TIDE: 1441 12.4 RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S	SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.0	+10											BACK TO FRT STAKE GRASS, RAISED BERM
1.50	-33											GRASS DRIFT, SOME COBBLE
2.46	-53											TO BASE OF RAISED BERM
1.37	-23											TO EDGE OF VEGETATION & BERM
1.15	-18			P 100								TO BERM CREST
2.37	-46			C 40 P 60								EDGE RACK LINE
1.45	-9			TOTAL COVERAGE								EEL GRASS RACK
2.53	-8			OF RACK TO								RACK & STRANDED ALGAE
2.27	-4			22 cm DEEP								RACK " 22 cm IN DEPTH
1.97	-7											"
2.55	-12			B 40 C 30/70 P 0/30			A	TRACE.				PARTIAL COVER STRANDED ALGAE TO PIT "A"
2.15	-17			B 70 C 30/90 P 0/30								STRANDED ALGAE
2.52	-6			B 70 C 30/90 P 0/30								"
0.82	-8			B 70 C 30/40 P 0/30			B	LOW/MOD				EDGE OF STRANDED ALGAE TO PIT "B" TRACE SHEEN (R) TAR SPATTERS
1.95	-2			B 20 C 40/20 P 40/40 G 0/40								TRACE SHEEN (R)
2.45	-7			B 20 C 40/20 P 40/40 G 0/40								TRACE SHEEN (R)
1.27	+3			B 30 C 40/30 P 30/40 G 0/30								TRACE LT (R) SHEEN IN RUNOFF
1.49	-4			B 60 C 30/60 P 10/90 G 0/10			C	LOW (W) 9cm				TO PIT "C" TRACE SHEEN (R) "

Corrections by S. Gibeaut

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

DATE 8-10-93 STATION: [illegible]

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
4.45	-25			60	30	10			T		D	(F - 11 to 14				10 PIT "D" TRACE SHEEN (R) IN PUDDLE
5.0	-11			60	30	10			T				VB			TO EDGE OF BEDROCK PALE VEG. CT (R) SHEEN
3.60	-0			60	30	10							VBFM			ROCK
3.0	+13												BPFAM			ROCK HIGH POOLS
5.0	-30												BPFAM			ROCK HIGH POOLS
4.75	-45												BPFAM			ROCK HIGH POOLS
4.75	-35			10									BPFAM			ROCK 90% STRANDED ALGAE
4.80	-59												BPFAM			ROCK STRANDED ALGAE
4.50	-23												BPFAM			BEDROCK
3.70	-27												BPFAM			TO WATER LINE 10% ROCK

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [< 10 mm = Sheen] [10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

ADEC SUBSURFACE OIL PROFILE

DATE 8-18-93 STATION ADEC #20 SEGMENT SE 041A

#25 #3 25-30

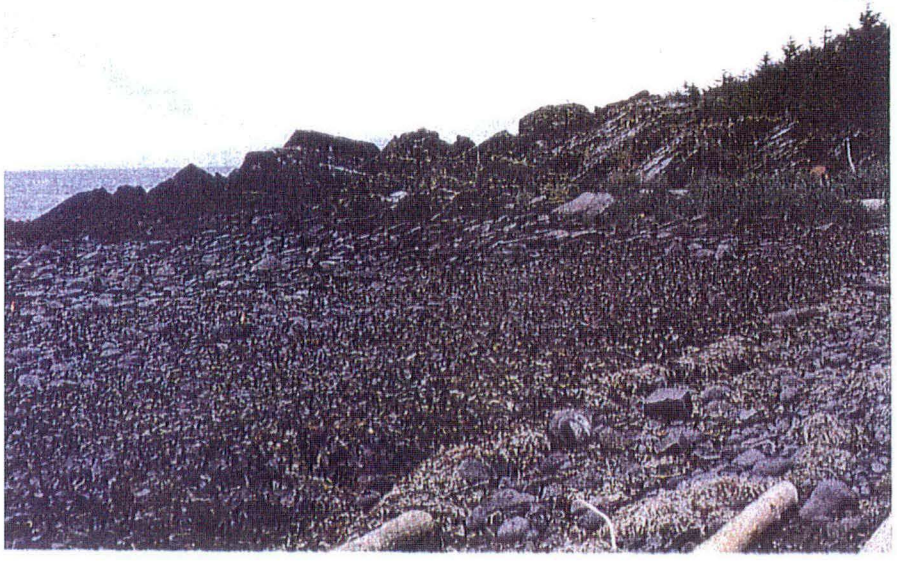
Oiling description	Profile	Seds	Framework	Matrix
A- well-rounded surface boulders B- ... layer 2-3 ... thick C- muddy, ... sand, pebble gravel ... organics D- peaty, muddy, sandy pebble gravel Pit A (m) From FS ____	A. B 3 ... 9 C 20 D 27 depth (cm) 27	no oil 9 Trace r. bow sheen 20	mean grain size M S G P C B	mean grain size M S G P C B
A- boulder surface layer w/ interstitial cobbles + pebbles B- sandy, pebble gravel Pit B (m) From FS ____	photo #19 A 6 B 11 depth (cm) 11	no oil 6 LOR/MOR brown sheen w/ black globules	mean grain size M S G P C B	mean grain size M S G P C B
A- L. ... boulders w/ L. cobbles + pebbles interstitial B- same as B above ~~C- stiff organic clay - anoxic~~ Pit C (m) From FS ____	photo #20 A 9 B 19 depth (cm) 19	no oil 9 LOR brown sheen w/ black globules	mean grain size M S G P C B	mean grain size M S G P C B
A- ... surface boulders w/ interstitial cobbles + pebbles B- sandy pebble gravel C- stiff organic clay - anoxic Pit D (m) From FS ____	photo #21 A B 11 14 C 37 depth (cm) 37	no oil 11 OF 14 no oil r. bow sheen w/ black globules	mean grain size M S G P C B	mean grain size M S G P C B

Signature ____________________

DATE 8-18-93 STATION [illegible] SEGMENT SEC41A

Oiling description	Profile	Seds	Framework (mean grain size: M S G P C B)	Matrix (mean grain size: M S G P C B)
A - surface boulders cobbles + cobbles B - sandy pebble gravel Pit E (m) From FS ____	photo # 22 & 23 A - 0–10; B - 10–21 depth (cm) 21	trace tar (A) tar blebs, heavy black sheen (B)		
A - surface boulders w/ interstitial pebbles + cobbles B - sandy pebble gravel Pit E (m) From FS ____	photo # 24 A - 0–10; B - 10–22–28 depth (cm) 28	10 HOR ↓ 22 heavy black sheen		
Pit ____ (m) From FS ____	depth (cm)			
Pit ____ (m) From FS ____	depth (cm)			

Signature ____________________



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan (27-29) of beach to the south of ADEC station #20 showing bedrock outcrop and weather station. Orange flagging mark pit locations.
TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 28 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan (27-29) of beach to the south of ADEC station #20 showing bedrock outcrop and weather station. Orange flagging mark pit locations.
TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 27 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview shots of SE041A and ADEC transect #020 location.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 2 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pan (27-29) of beach to the south of ADEC station #20 showing bedrock outcrop and weather station. Orange flagging mark pit locations.
TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #:93CSC002 FRAME #: 29 EVIDENCE ID#:_____

ADEC-020 2/5

4

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From top of 'saddle'.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 4 EVIDENCE ID#:_____

3

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview shots of SE041A and ADEC transect #020 location.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 3 EVIDENCE ID#:_____

6

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From top of 'saddle'.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 6 EVIDENCE ID#:_____

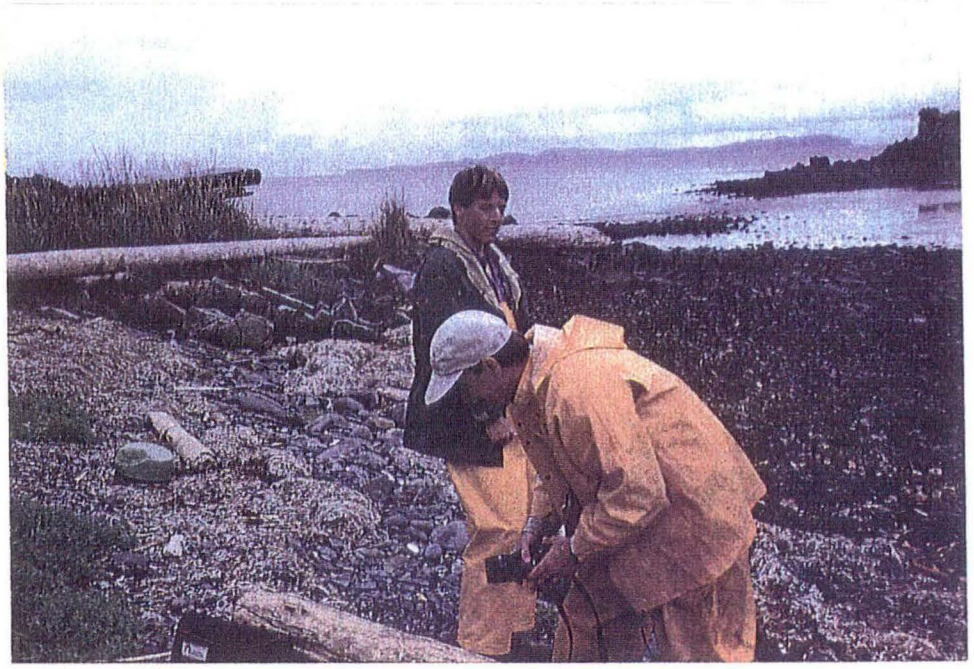
5

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From top of 'saddle'.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 5 EVIDENCE ID#:_____



8

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From top of 'saddle'.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 8 EVIDENCE ID#:_____

7

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From top of 'saddle'.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 7 EVIDENCE ID#:_____

10

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 10 EVIDENCE ID#:_____

9

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 9 EVIDENCE ID#:_____

ADEC-000413

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:View down transect; photos of SE041A and ADEC station #020. Stakes located in tall grass of backshore.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 15 EVIDENCE ID#:_____

15

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:View down transect; photos of SE041A and ADEC station #020. Stakes located in tall grass of backshore.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 13 EVIDENCE ID#:_____

13

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (UITZ; from bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 14 EVIDENCE ID#:_____

14

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

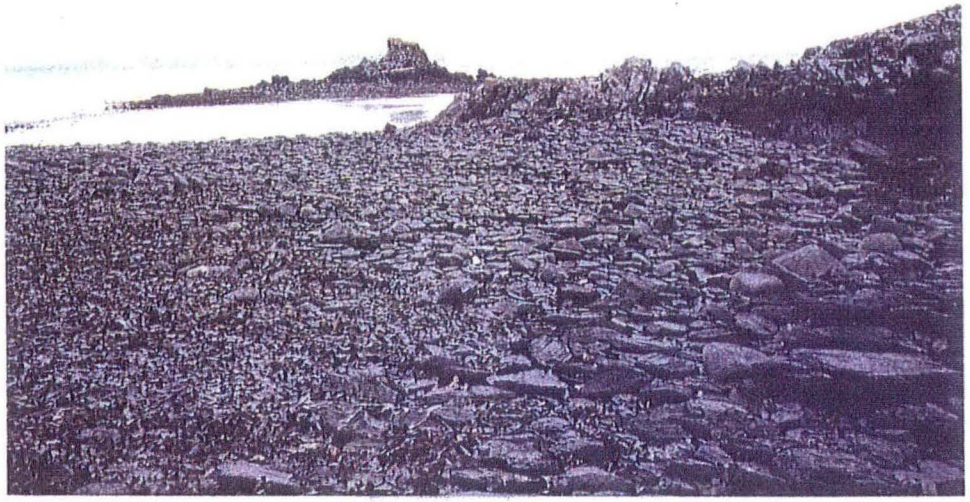
SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (UITZ; from bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 16 EVIDENCE ID#:_____

16

20th Century Plastics
1-800-767-0777
STOCK# PPV840-000

ADBC-020 5/5



11

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT: SE041 STATION: 020
LOCATION: Seal Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 11 EVIDENCE ID#:

12

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1030

SEGMENT#: SE041 STATION#: 020
LOCATION: Seal Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Series of overview photos of SE041A and ADEC station #020 locale. (From bedrock at end of subseg.)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 12 EVIDENCE ID#:_____

ADEC - 049

TRANSECT: ADEC-049*

SEGMENT: KN 213 C

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

OTHER STUDIES

1993 Shoreline Assessment Ground Survey.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect is in an 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 and 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.

The transect starts at the bedrock cliff and crosses large angular boulders at the base of the cliff. Cobbles and pebbles increase in abundance and boulders decrease in the mid intertidal zone on the top of a berm-like feature. Boulders again increase in abundance and size farther down the profile in the lower intertidal zone. Sediments are generally subrounded.

A boulder and cobble armor is present across the entire transect. There are no high-tide berms present.

The same datum was not used for the 1991 and 1993 surveys, therefore, profile comparisons cannot be made. A profile was not measured in 1992.

See the photos for the natural rock feature used as the datum in 1993.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

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

Energy Level

High.

GENERAL BIOLOGICAL SETTING

Anadromous stream bordering to the south.

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* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 3

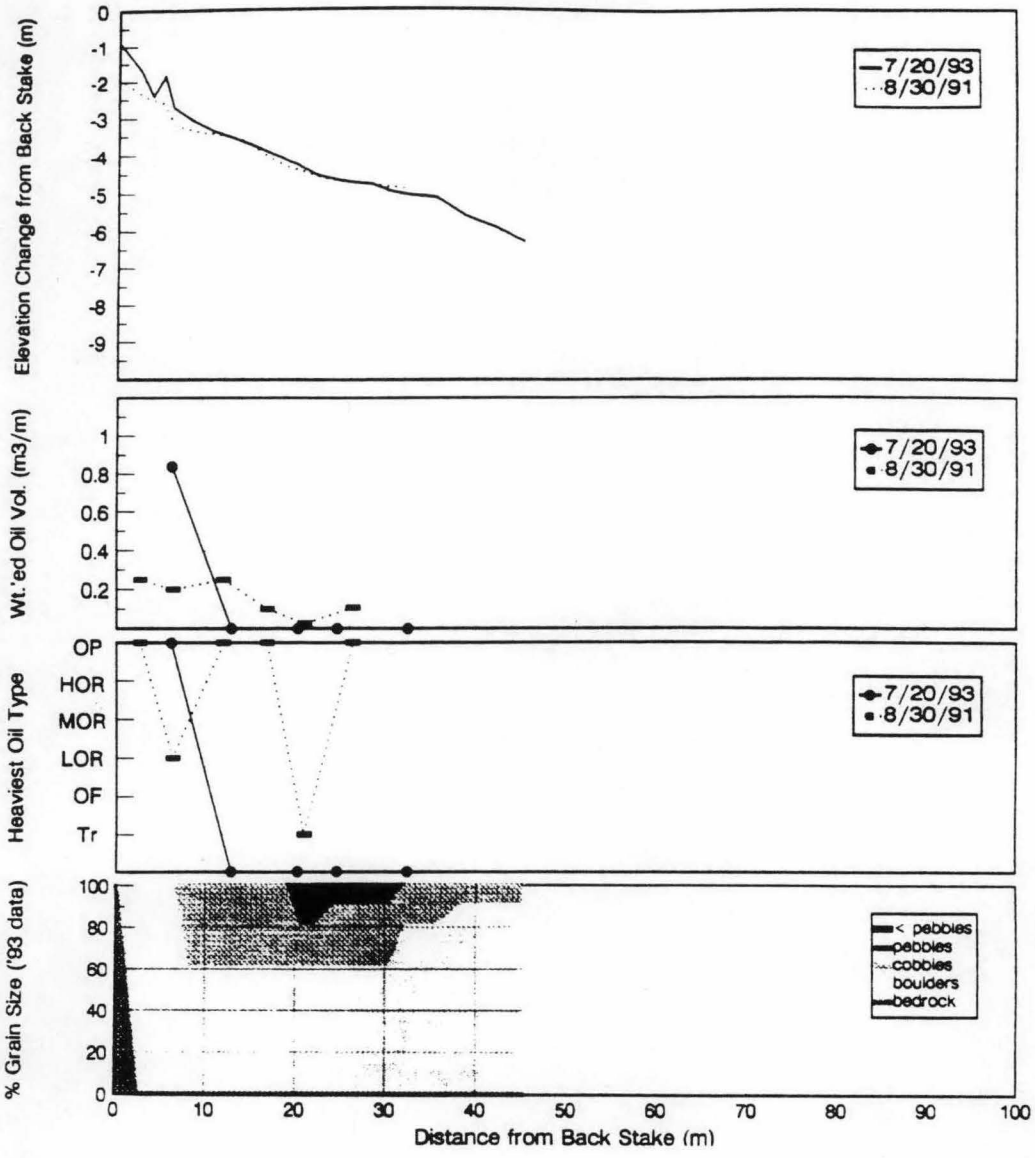
OILING SUMMARY

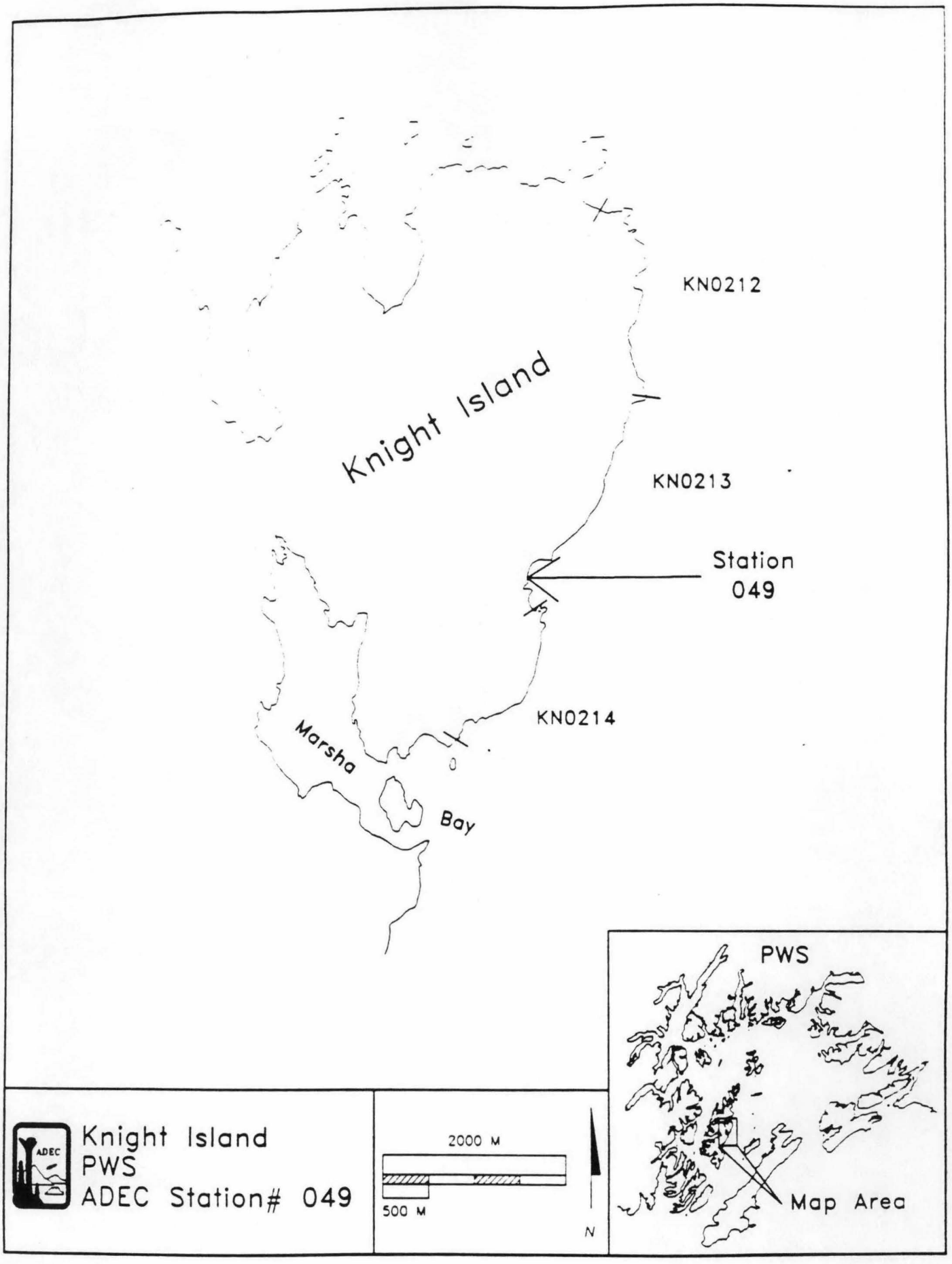
Surface oil along the transect in 1991 was concentrated at the base of the cliff. ST, CT, and CV occurred in concentrations of up to 10%. By 1993, concentrations had reduced to 2%.

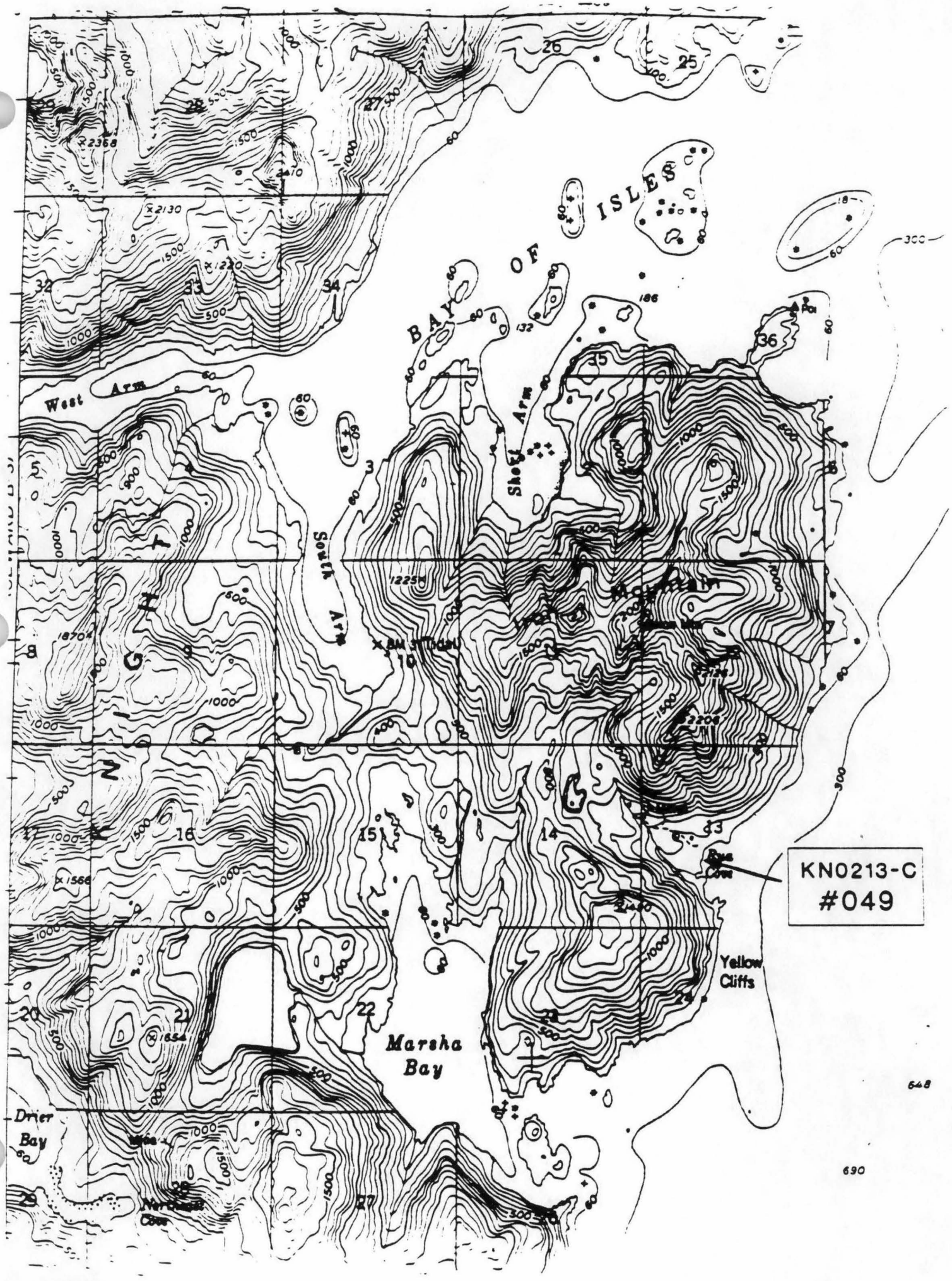
Subsurface oil has shown significant improvement since 1991. In 1991, OP was detected in pits spanning the mid and upper intertidal zones. By 1993, subsurface oil was confined to the upper-most part of the upper intertidal zone. Sediments lower down the beach were free of oil.

Apparently no treatment was conducted along the transect in 1991 or 1992. Thus the significant improvement that occurred along all but the upper part of this transect is mostly natural. The oil persisting in the upper intertidal, however, has shown no improvement since 1991.

TRANSECT STATION ADEC-049




Knight Island
KN0212
KN0213
Station
049
KN0214
Marsha
Bay
PWS
Map Area
ADEC
Knight Island
PWS
ADEC Station# 049
2000 M
500 M
N

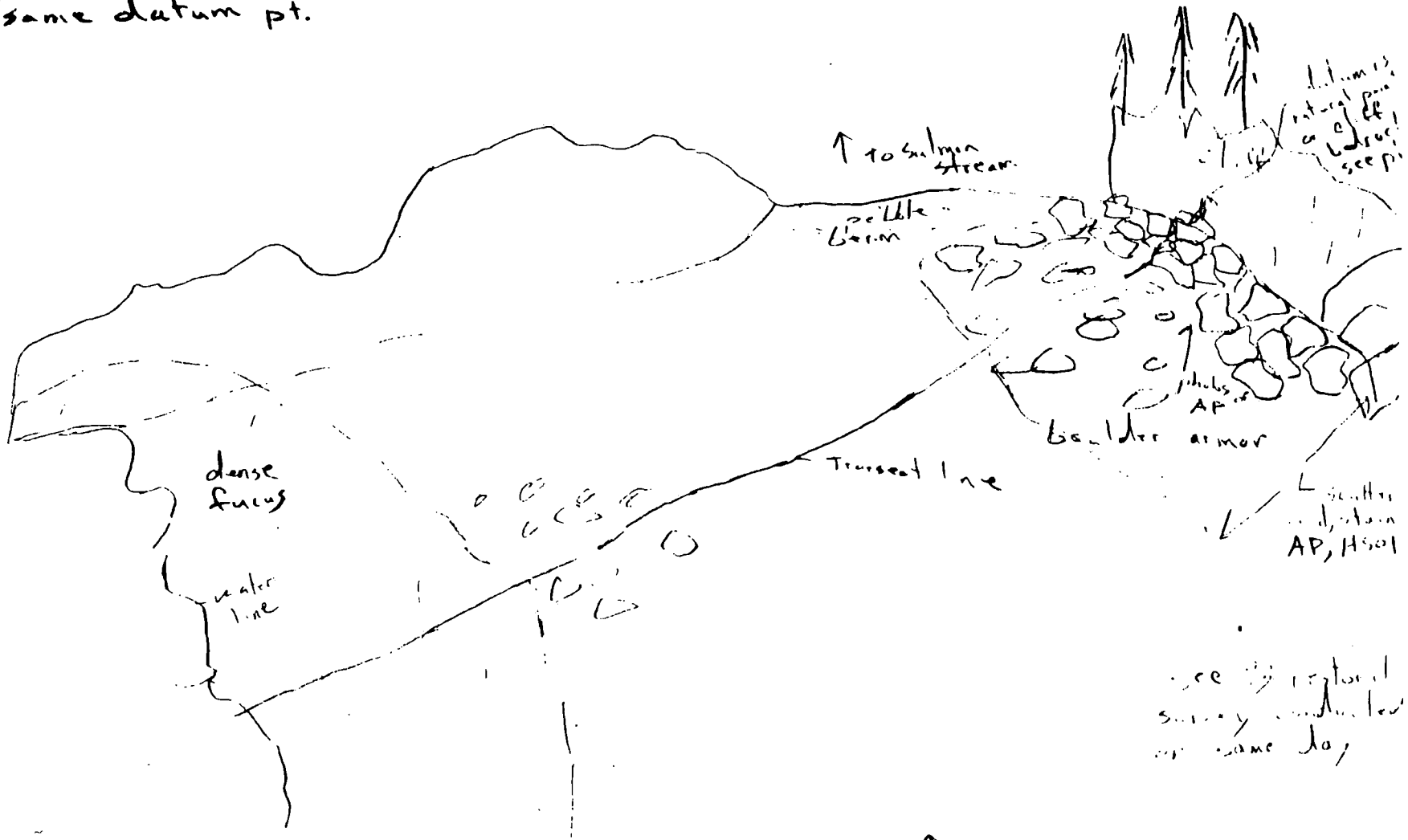

BAY OF ISLES
West Arm
South Arm
Short Arm
Marsha Bay
Yellow Cliffs
Drier Bay
KN0213-C
#049

DATE 7-20-93 STATION ADEC 49 SEGMENT KNOR13C KODIAK-UNIT _____ ACCESS _____ TIME 0915

LOCATION Rua Cove, Knight Isl LOW-TIDE _____ TEAM MEMBERS J. Gilfillan, E. Piper, ect

SEDIMENT TYPE Boulder / cobbles WEATHER overcast PROFILE ANGLE 55° M

TRANSECT IDENTIFIER bedrock - natural point on it - could not find "orange spot" used in 1991 but using photos set this transect up in the same location see photos from this survey to reoccupy same datum pt. PHOTOGRAPHS 93JC6002



DATE 7-20-93 STATION: ADFC 049 SEGMENT: KNO313C KODIAK K-UNIT: FRONT STAKE HT-(cm): None

LOCATION Rua Cove, Knight Island TIDAL STAGE: BACK STAKE HT-(cm): low natural point on B track see photos

START TIME 10 15 END TIME: 10 42 LOW TIDE: HIGH TIDE: RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
0	-89															bedrock feature, bottom point to base
2.45	-79			100					1	stain + coat						boulder rubble grassy
1.43	-73			100					2	"						"
1.25	+58			100					2	"						" top of large boulder
1.00	-89			100					2	"	1					
1.90	-29			60	40				2	"						
2.37	-30			60	40				2	"						AP, HSOR
2.47	-21			60	40				1	stain + coat	2					—
3.25	-31			60	40				<1	stain + coat	—					—
2.55	-26			60	40				0	0	—					
1.55	-14			60	20	20			0	0	3					Boulders a little smaller
1.90	-25			60	20	20			0	0	0					
2.45	-14			60	30	10			0	0	4		B,M			Boulders smaller
1.90	-6			60	30	10			0	0	—		B,M			—
1.70	-3			60	30	10			0	0	—		B,M			—
2.35	-21			60	30	10			0	0	—		B,M,F			—
1.85	-8			80	20	—			0	0	5		B,F			—
3.15	-7			80	20	—			0	0	0		B,F			Dense fucus, looks taller than previous sites

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

Oil Thickness Scale: T = 10 mm = Stain; 10 mm to 1.0 mm = Coat; > 1.0 mm = Cover

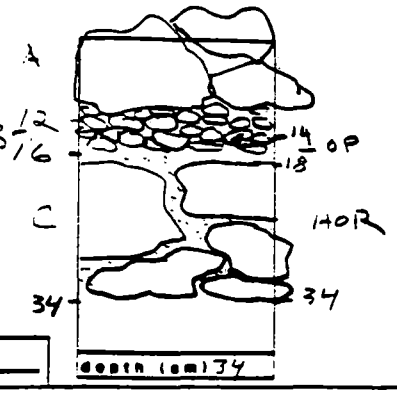
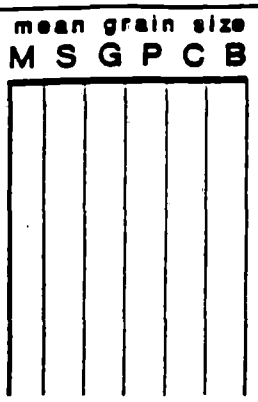
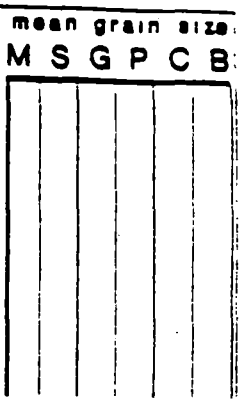
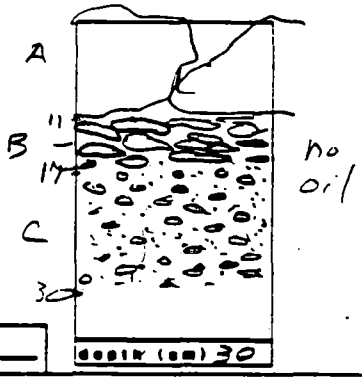
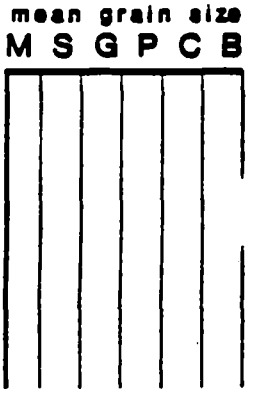
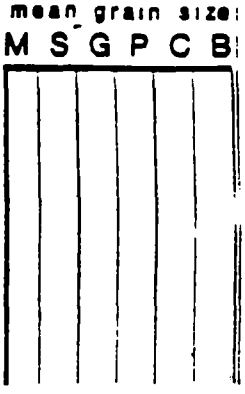
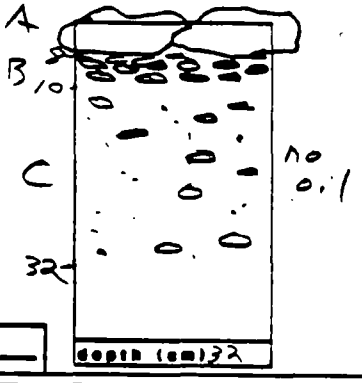
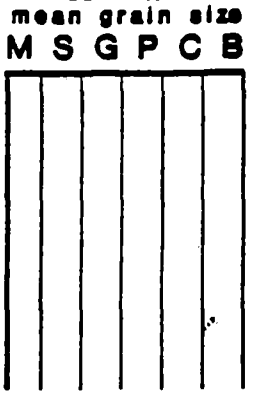
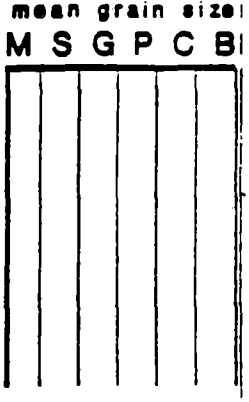
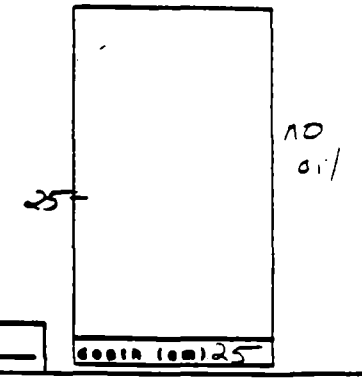
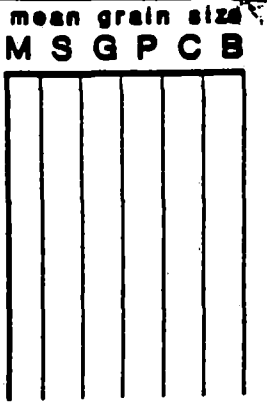
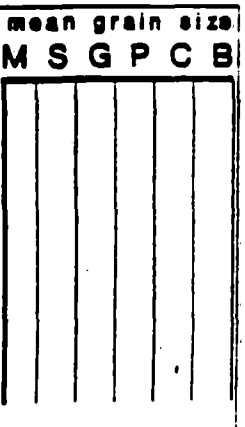
DATE 2-20-93 STATION: ADEC 049 Segment KN0213C

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
3.05	-48			90	10				0		—		F			—
3.70	-36			90	10				0	-	—		F			—
2.90	-39			90	10				0	-	—		F			waterline at 10:42 am

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 7-20-93 STATION ADEC049 SEGMENT [illegible]

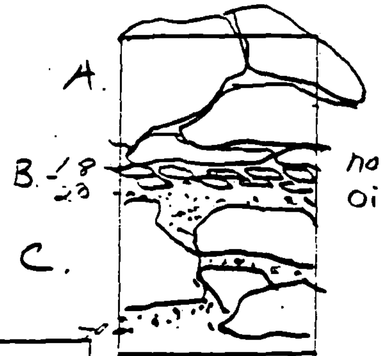
J. Gibeaut

Oiling description	Profile	Seds	Framework	Matrix
A. Subrounded boulders 50cm in size B Subrounded large pebbles 2-6cm C - boulders w/ sand, matrix w/ HOR photos 93JC6002-13/14 Pit 1 (m) From FS				
A. Subrounded boulder 50cm in size B. rounded platy large pebbles 4-6 cm C. medium pebbles w/ granular small pebble matrix photo 93JC6002-15 Pit 2 (m) From FS				
units same as above no photos Pit 3 (m) From FS				
same stratigraphy as above. no photo Pit 4 (m) From FS				

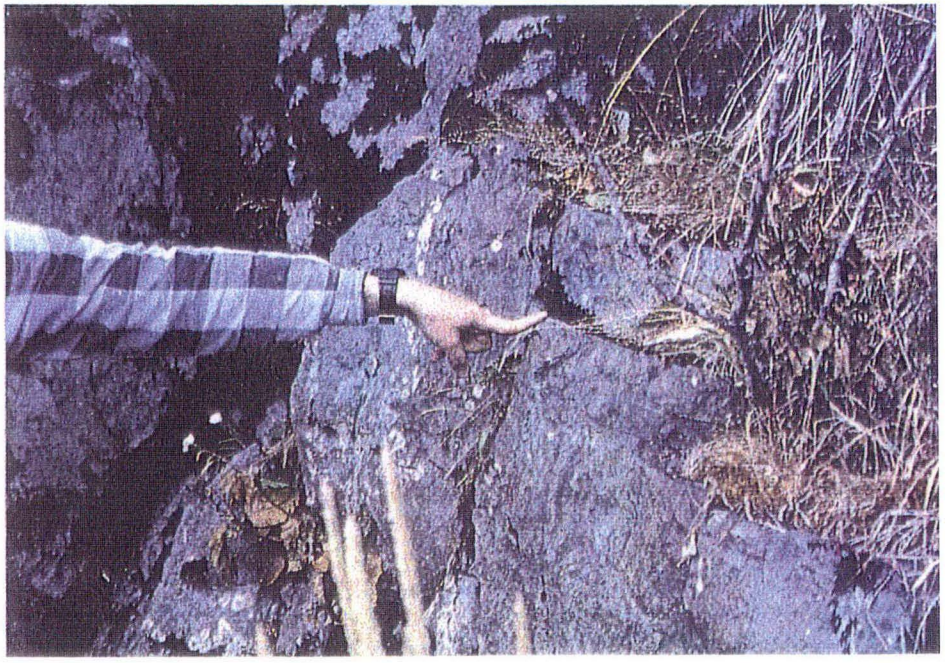
Signature _____

... SUBSURFACE OIL PROFILE

DATE 7-20-93 STATION ADEC049 SEGMENT KN0213C

Oiling description	Profile	Seds	Framework	Matrix
A. L. boulders - sub ang, 50 cm in size B. pit; L. pebbles + small boulders C. boulders w/ silty, granular small pebble matrix pht 93JCG002-16 Pit 5 (m) From FS ____	 depth (cm) 40	no oil	mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B

Signature ______________________



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

DATE 7-2-93 STATION -EC- SEGMENT [illegible]

Olling description	Profile	Seds	Framework	Matr

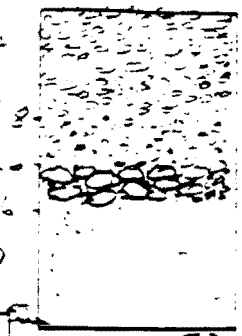
A. rounded large pebbles-cobbles

B. small pebbles 1-2cm

C. small cobbles w/ organic matrix

D. Sandy granules w/ muddy, organic

photos 93JCG002-25 + 93JCG003-1,2



mean grain size
M S G P C B

mean grain si
M S G P C

Pit 1 (m) From FS ____

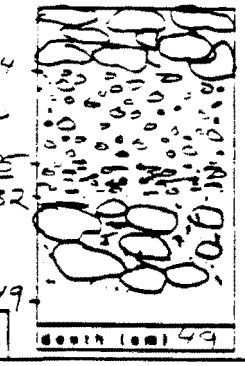
A, rounded large cobbles 15-20 cm in size

B. small to large pebbles

C. same as B but w/ organic debris

D. large cobbles w/ muddy, sandy, granule pebble matrix

photo 93JCG003-4



mean grain size
M S G P C B

mean grain si
M S G P C

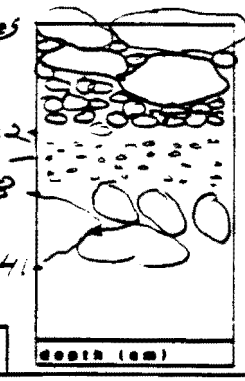
Pit 2 (m) From FS ____

A. L. cobbles small boulders - rounded - compact - shape grades down to large pebbles/s. cobbles

B. medium pebbles

C. L. cobbles - small boulders w/ sandy, v granule matrix pebbly

photo 93JCG003-5



mean grain size
M S G P C B

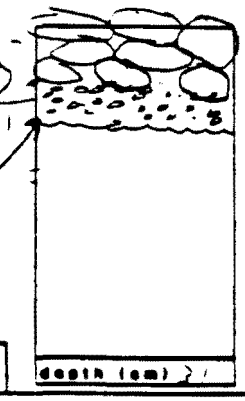
mean grain si
M S G P C

Pit 3 (m) From FS ____

A. L. cobbles s. boulders 1-2 layers

B. cobbles

photo 93JCG003-6



mean grain size
M S G P C B

mean grain si
M S G P C

Pit 4 (m) From FS ____

Signature _____

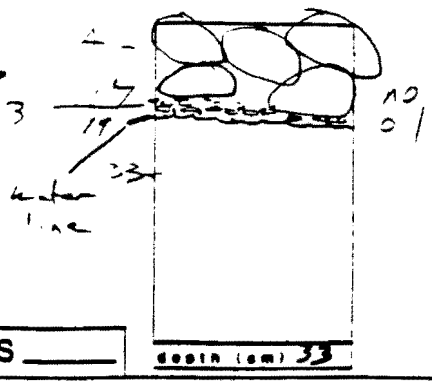
DATE 7-21-93 STATION ADEC 076 SEGMENT

Oiling description	Profile	Seds	Framework	Matri

A. same as pit 4 - Surface boulders w/ barnacles

B. - mod. unsettled w/ granule + s. pebble matrix

photo 93JC6207-7



Pit 5 (m) From FS ____

mean grain size
M S G P C B

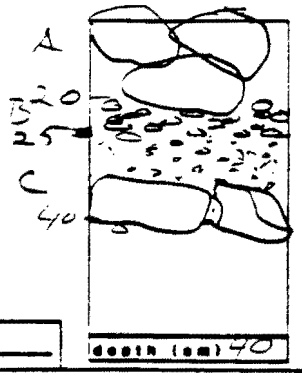
mean grain si
M S G P C

same as pit 5

B. large pebbles

C. cobbles w/ shelly sandy granular pebble matrix

no-photo

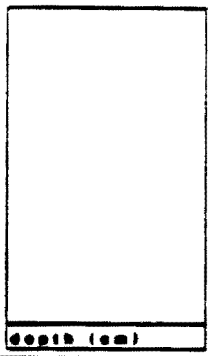


Pit 6a (m) From FS ____

mean grain size
M S G P C B

mean grain si
M S G P C

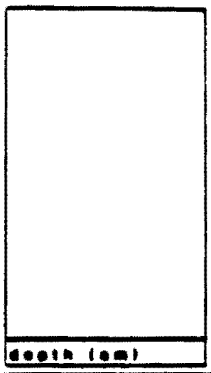
Pit ____ (m) From FS ____



mean grain size
M S G P C B

mean grain si
M S G P C

Pit ____ (m) From FS ____



mean grain size
M S G P C B

mean grain si
M S G P C

Signature _____

TRANSECT: ADEC-090*

SEGMENT: KN 136 A

LOCATION: Bay of Isles Group, western shore of South Arm.

OTHER STUDIES

1993 Shoreline Assessment ground survey.
UAF/IMS intertidal study.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This is a high-tide lagoon with a muddy, organic-rich (peaty) tidal flat. The transect crosses a grassy fringe along the upper flat and continues along a small stream bank with poorly sorted, subangular large pebbles mixed with organic rich granule, mud, and sand sediments. The lower flat is very gently sloping and contains pebbles with an organic-rich, muddy, pebbly, sand matrix. In 1993, the profile ended at the water level of the lagoon.

The profile plots for 1991 and 1992 follow very closely to each other. The 1993 profile, however, diverges from the previous profiles in the middle flat area and toward the lagoon. These data indicate that the middle and lower flat eroded by as much as 10 to 15 cm.

The flats surrounding the central lagoon contained scattered fucus, and filamentous green algae, fucus, and eel grass wrack were also present.

Environmental Sensitivity Index (ESI)

Type 9; sheltered tidal flat.

Fetches and Directions (kilometers)

0

Energy Level

Very low.

GENERAL BIOLOGICAL SETTING

OILING SUMMARY

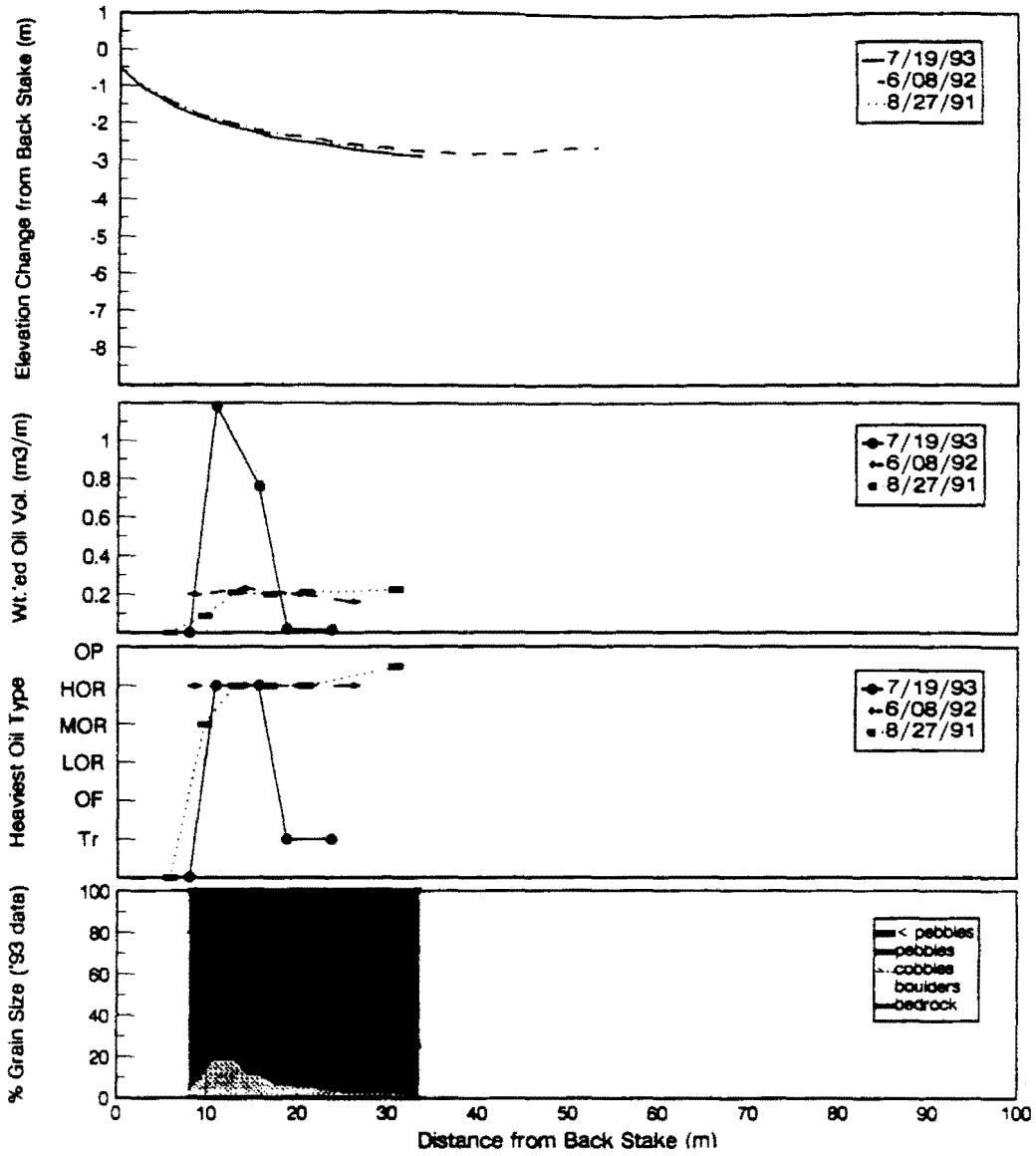
Surface oil has persisted in the form of soft AP and heavy SOR in the middle and upper flat. Surface percentage estimates are very inaccurate, but roughly 50% coverage was present along the transect in 1993 and no noticeable change has occurred since 1991.

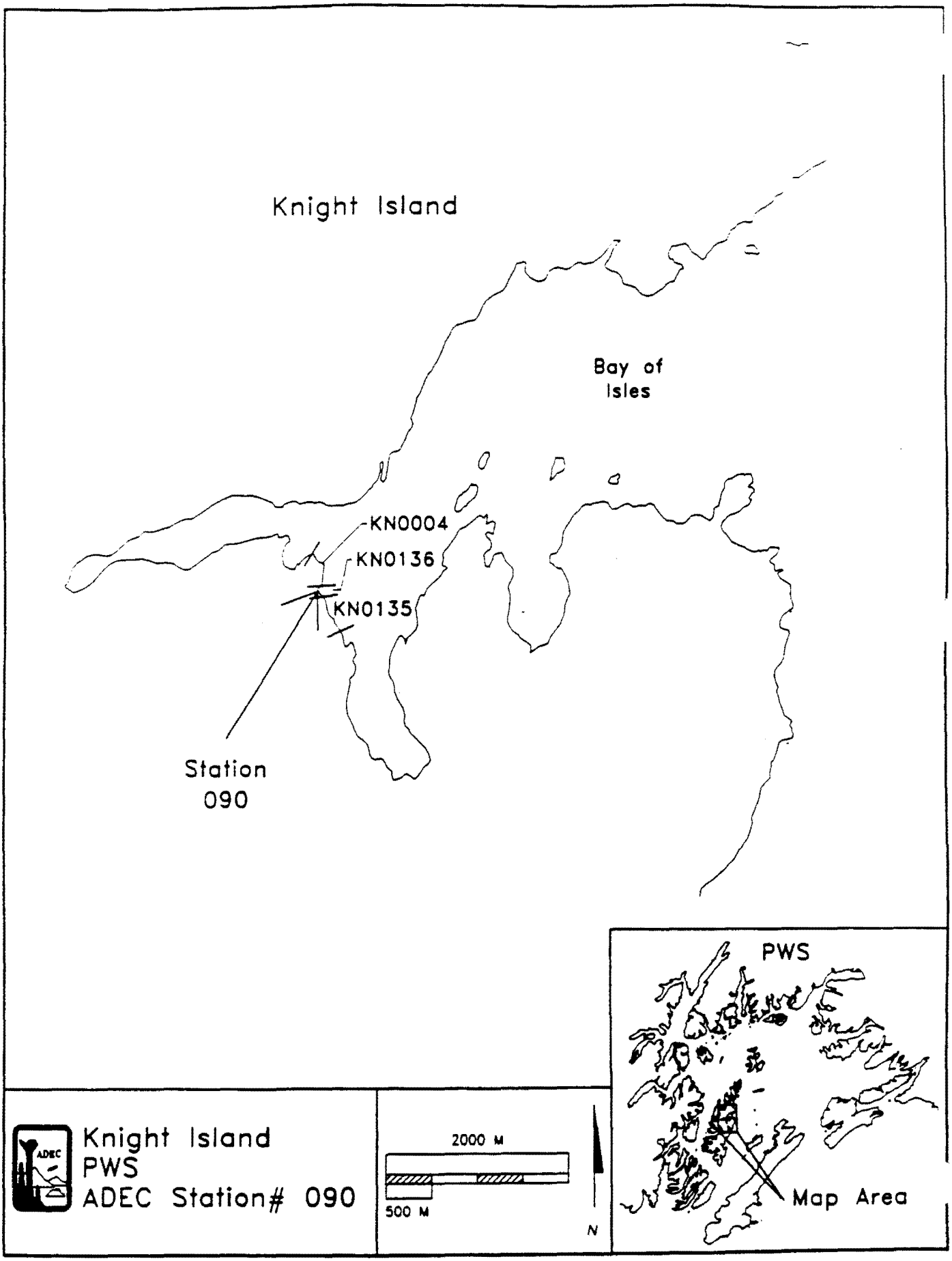
Heavy subsurface oil (HOR) is present in the middle and upper flat and extends to a depth of more than 20 cm. There has been no change in the oiling level in this area since 1991, and in fact, the measured thickness and depth was greater in 1993. This may be caused by the digging of deeper pits in 1993 than in 1991.

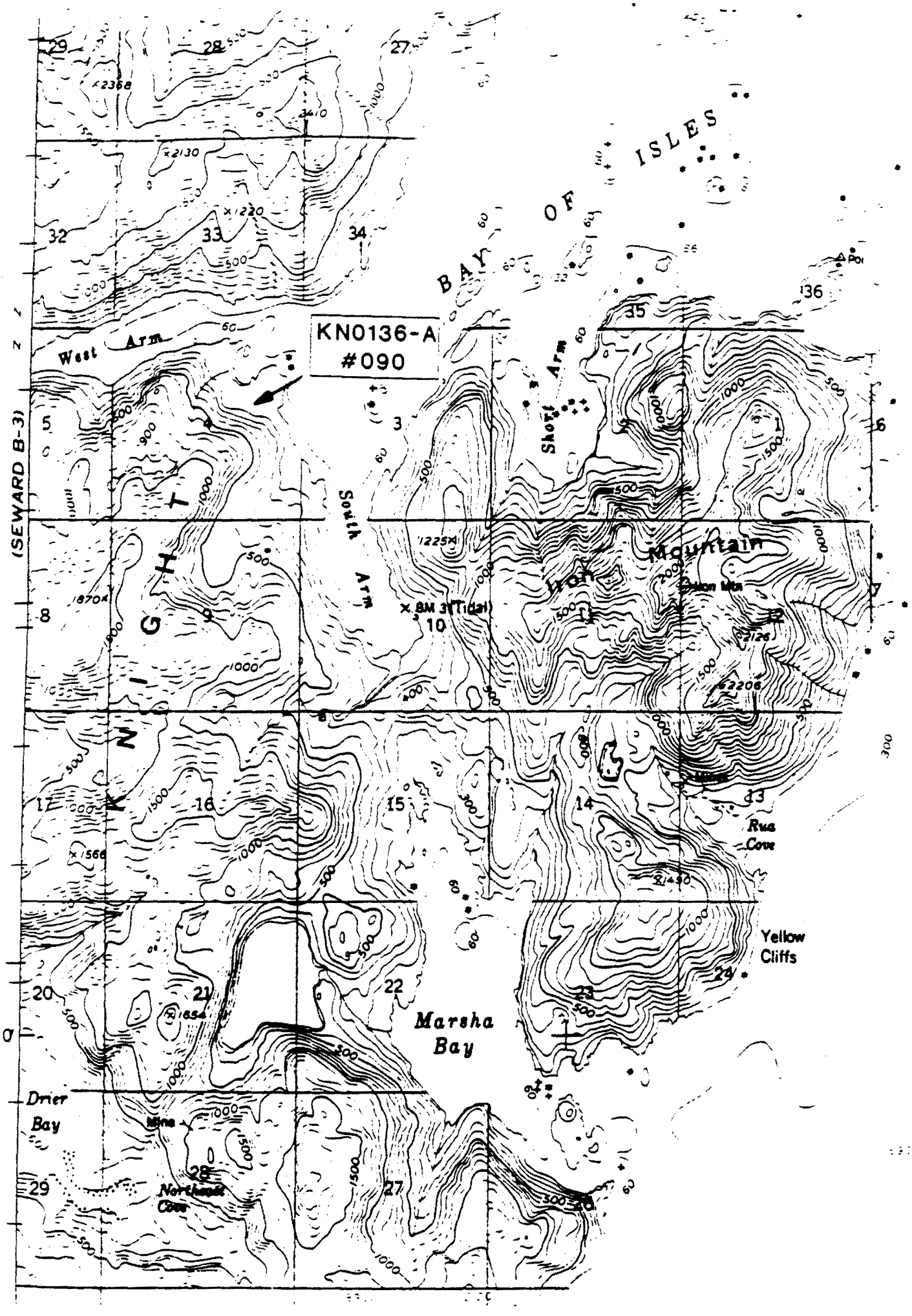
* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 2

In 1991 and 1992 the lower flat contained HOR/OP in the upper 7 cm of the sediments, but by 1993 only trace amounts were found in this area. Erosion of 10 to 15 cm in this area, as mentioned above, is the cause of the improvement.

TRANSECT STATION ADEC-090




Knight Island
Bay of
Isles
KN0004
KN0136
KN0135
Station
090
PWS
Map Area
2000 M
500 M
N
ADEC
Knight Island
PWS
ADEC Station# 090


KN0136-A
#090
BAY OF ISLES
West Arm
South Arm
Short Arm
Iron Mountain
Marsha Bay
Rua Cove
Yellow Cliffs
Drier Bay
Northeast Cove
Mine
(SEWARD B-3)

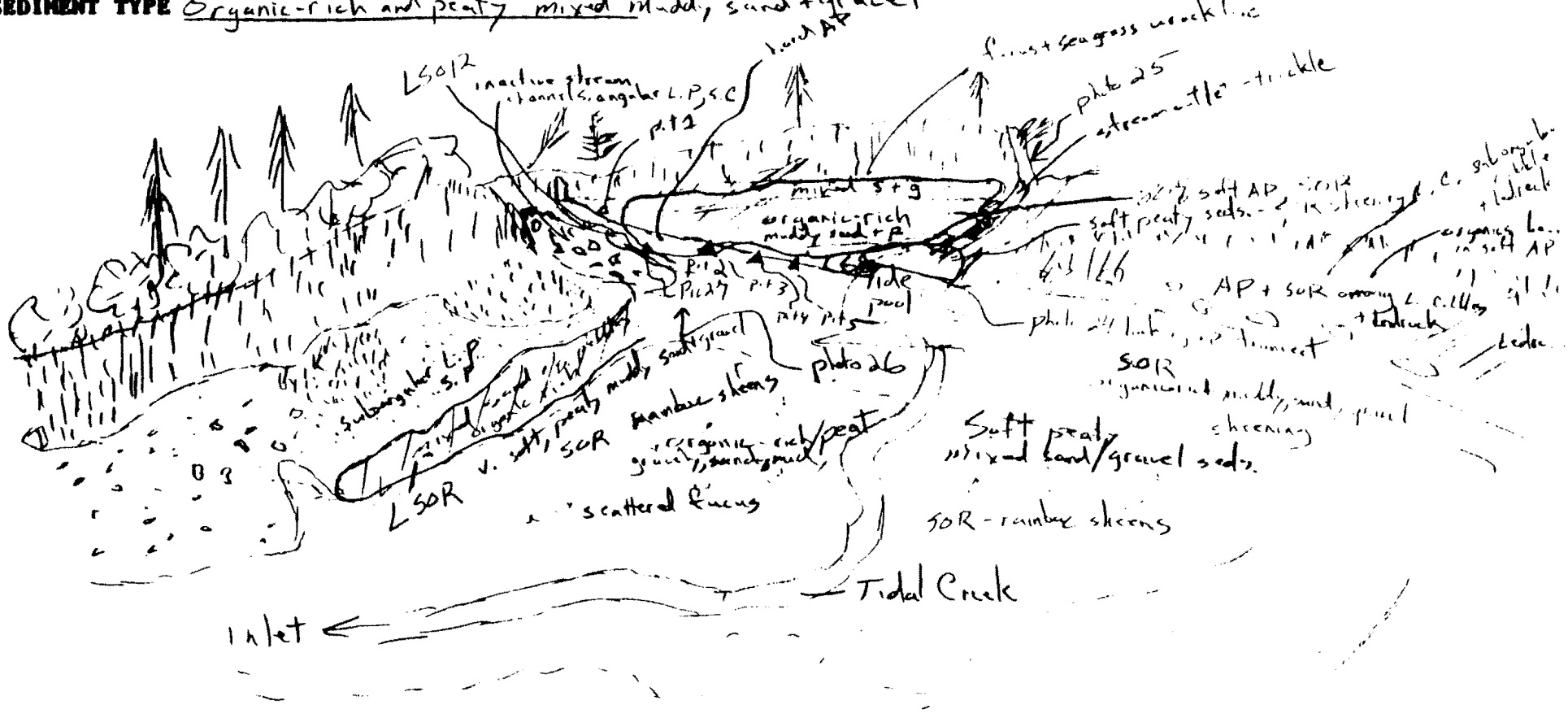
PROFILE ADEC Station 90 **LOCATION** ANLC Station 90, Bay of Isles KN01136A **DATE** 7/11/93

RECORDERS J Gibeaut **PHOTOGRAPHS** 93JCG001 **TIME** 0725

TIDE STAGE low - tide **WEATHER** overcast **WIND SPEED** 0 **WIND DIRECTION** -

PROFILE ANGLE used stakes to align **WAVE HT.** — **SAMPLES TAKEN: BIO** _____ **CHEM** _____ **SED** _____

SEDIMENT TYPE organic-rich and peaty mixed mudd, sand + gravel



Pic #27 - of AP

Pic 1

(DA)TE 1-19-93 STATION ADL C90 SEGMENT: KN0136A KODIAK K-UNIT: ______ FRONT STAKE HT-(cm): 66

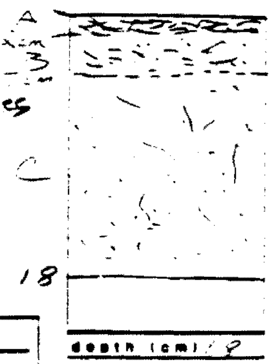
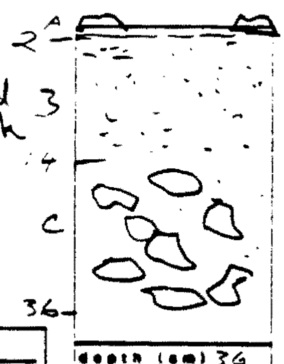
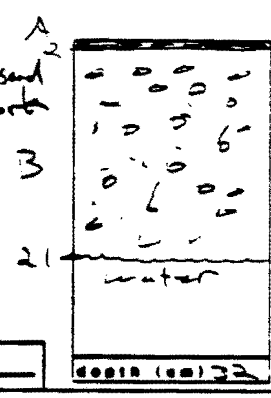
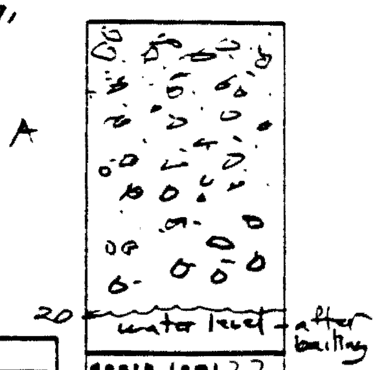
(LO)CATION Lagoon ______ TIDAL STAGE: Low BACK STAKE HT-(cm): 50

(ST)ART TIME ______ END TIME: ______ LOW TIDE: 8:03 -2.5 HIGH TIDE: ______ RecKey: ______

(HO)RIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B	C	P	G	S	SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
35	-54															vegetated [illegible]
15	-29															grass / drift logs
60	-24															edge grass + logs
0	-21					80	10	10	20%		1					silt AP, SOR edge of [illegible]
5	-23				20	70	10	10	80%		2					AP scattered veg.
5	-15				20	70	10	10	80%							AP scattered veg
10	-7				10	80	5	5	10							silt AP in fine grained organic patches
35	-10				10	80	5	5	10		3					"
15	-8				5	85	5	5	50				A			silt AP/ sols in organic rich sands scattered veg, filamentous green algae
2	-5				5	85	5	5	50		4		A			"
15	-17				2	90	3	5	2		5		A			[illegible] in patches of organic rich/pool
0	+10				1	90	6	3	2				B,F,A			"
35	-11				1	90	6	3	2				B,F,A			SOR, green algae tide pool
5	-7					25	25	50	?				B,F,A			edge [illegible] tide pool Algae [illegible] sand [illegible]

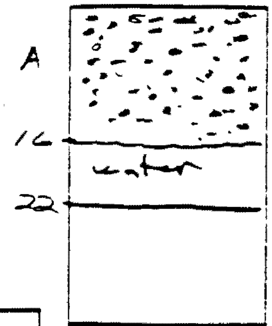
Bio Key. B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, [illegible]

DATE 7-19-93 STATION [illegible] SEGMENT [illegible]

Oiling description	Profile	Seds	Framework	Matrix
A Fucus wrack B. organic rich muddy sand, granules C organic rich but less than above, Muddy sand granules roots Pit 1 (m) From FS ____			mean grain size M S G P C B	mean grain size M S G P C B
A.-surface cobbles, pebbles, fucus wrack B. organic-rich muddy pebbly sand LOR/MOR C. organic-rich muddy, pebbly, sand matrix w/ cobble framework HOR Photos 93JCG21+22 Pit 2 (m) From FS ____			mean grain size M S G P C B	mean grain size M S G P C
A. filamentous g. algae fucus + eel grass wrack B. organic rich muddy, pebbly, sand matrix w/ pebble framework HOR photo 93JCG23 Pit 3 (m) From FS ____			mean grain size M S G P C B	mean grain size M S G P C
A. organic-rich, muddy, sandy, pebble gravel Trace oil sheen no photo Pit 4 (m) From FS ____			mean grain size M S G P C B	mean grain size M S G P C

Signature ____________________

DATE 7-19-95 STATION ADEC 90 SEGMENT KN-36A

Oiling description	Profile	Seds	Framework	Matrix
A. organic rich, muddy, sandy, s. pebble gravel Trace no photo Pit 5 (m) From FS ____	 depth (cm) 22		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B

Signature ____________________

TRANSECT: ADEC-125

SEGMENT: KN 113 A

LOCATION: Knight Island North Group,

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This site is located within a broad cove. Shoreline types vary greatly along the cove's shoreline because of varying shoreline orientation and varying exposure to wave energy. This transect runs along the northern part of the cove where the shoreline is oriented north-south, and where it is protected from northerly wave attack by the north wall of the cove. This part of the shoreline is separated from the shoreline to the south by large bedrock outcrops.

The sediments along the transect increase in size from mostly pebbles across the upper-intertidal zone to mostly cobbles and boulders in the middle and lower intertidal zones. A small high-tide berm made of pebbles was present in 1993.

Other than a surface armor, no distinct sedimentary layers were discernible in the pits. Sediments consist of a surface armor of cobbles or boulders and a sandy, granular, pebble gravel matrix in cobbles and boulders below the surface. Organic debris is present in the matrix, and in the lower intertidal zone, shell fragments are abundant. Surface boulders are subangular in the upper and intertidal zones and subrounded in the lower intertidal zone.

A break in slope occurs in the mid-intertidal zone at a distance of 30 m from the back stake. At this point, boulders form a berm-like feature on the profile. The 1991 and 1993 profiles precisely overlay each other, but the 1992 profile has an elevation about 10 to 20 cm higher at this berm-like feature. It is thought that this profile is extremely stable and that the difference in the 1992 profile is caused by a survey error.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

NW= 36; W= 12.6

Energy Level

Moderate.

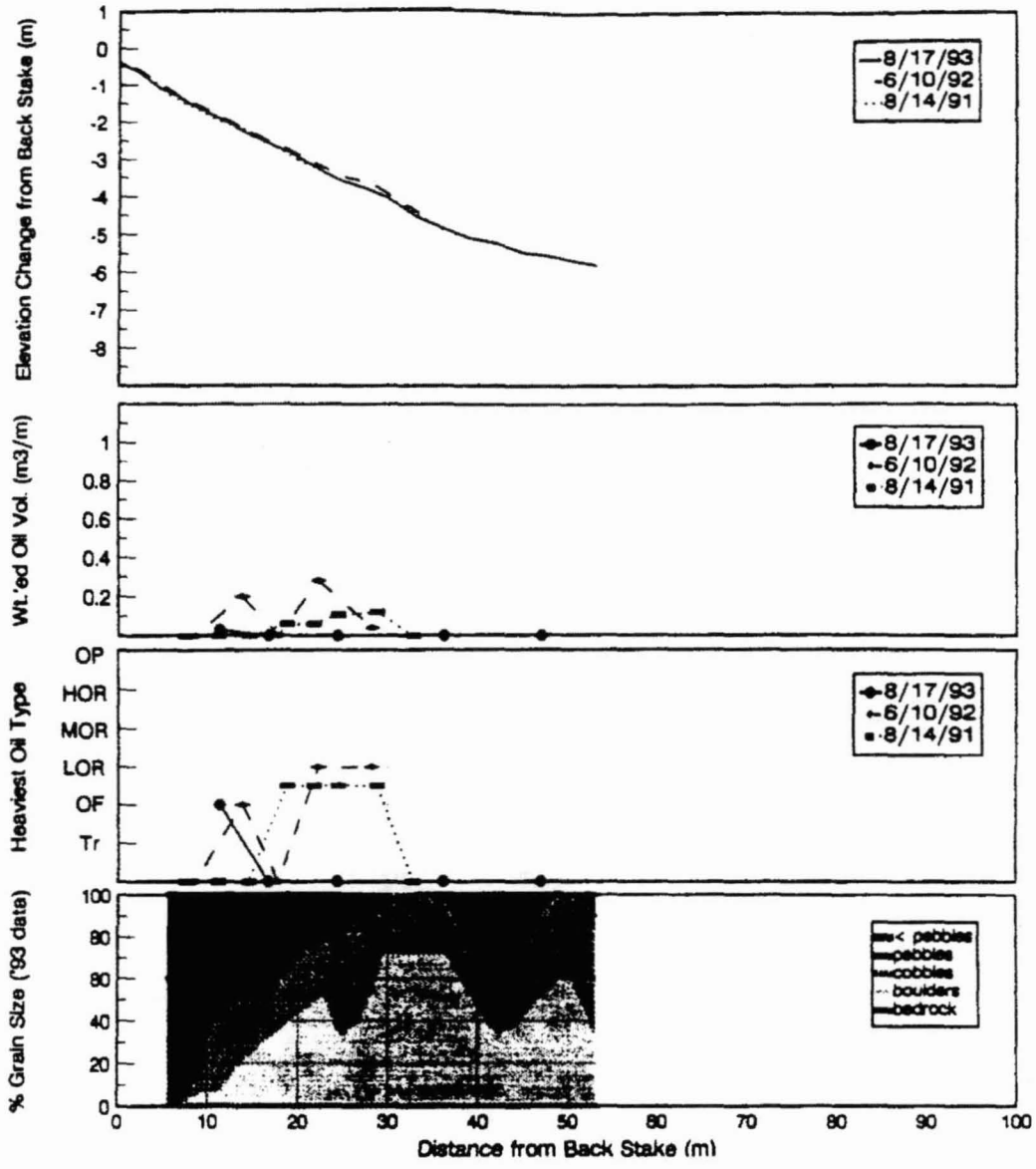
GENERAL BIOLOGICAL SETTING

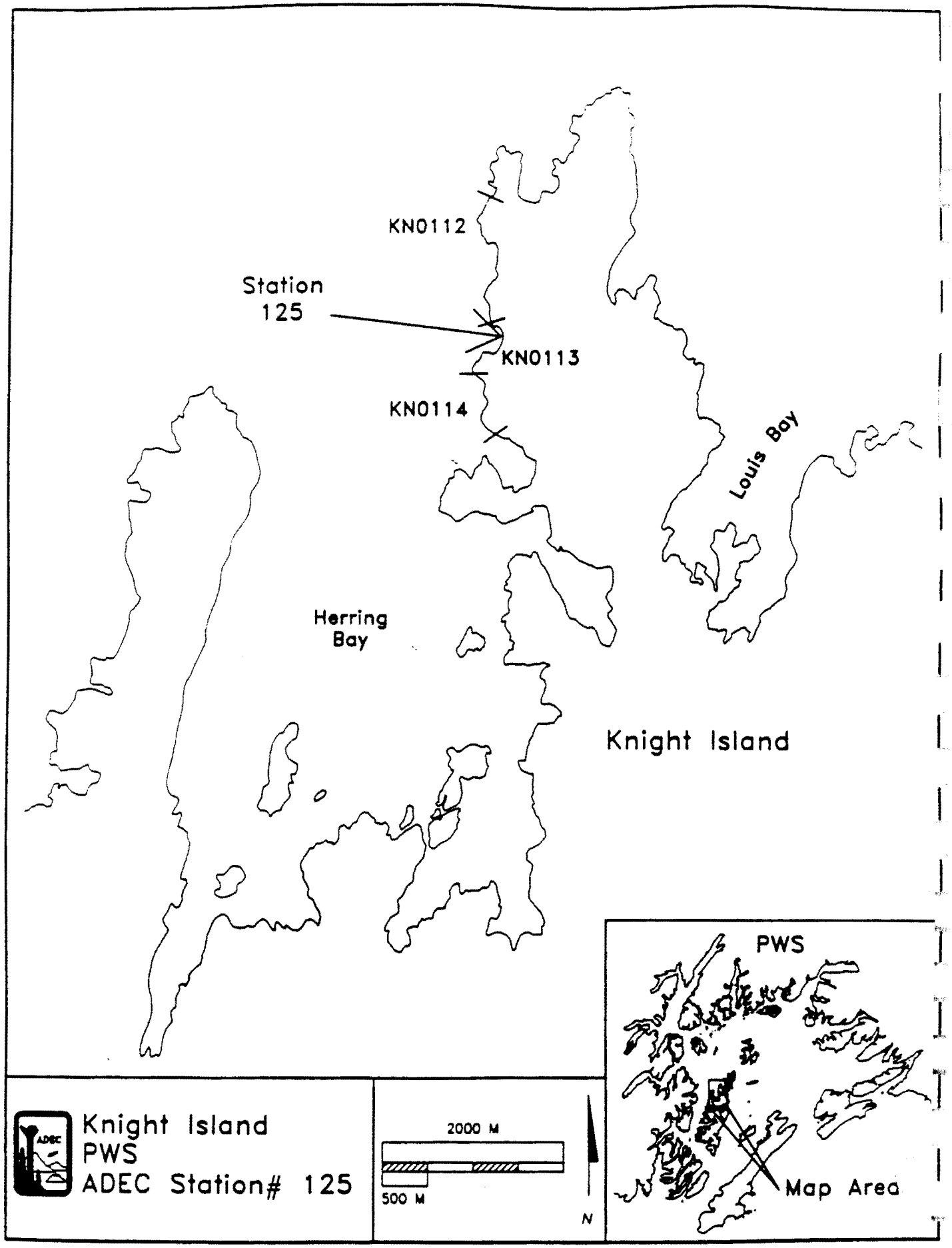
OILING SUMMARY

Only trace amounts of surface oil were noted in 1991 and 1992 and none in 1993.

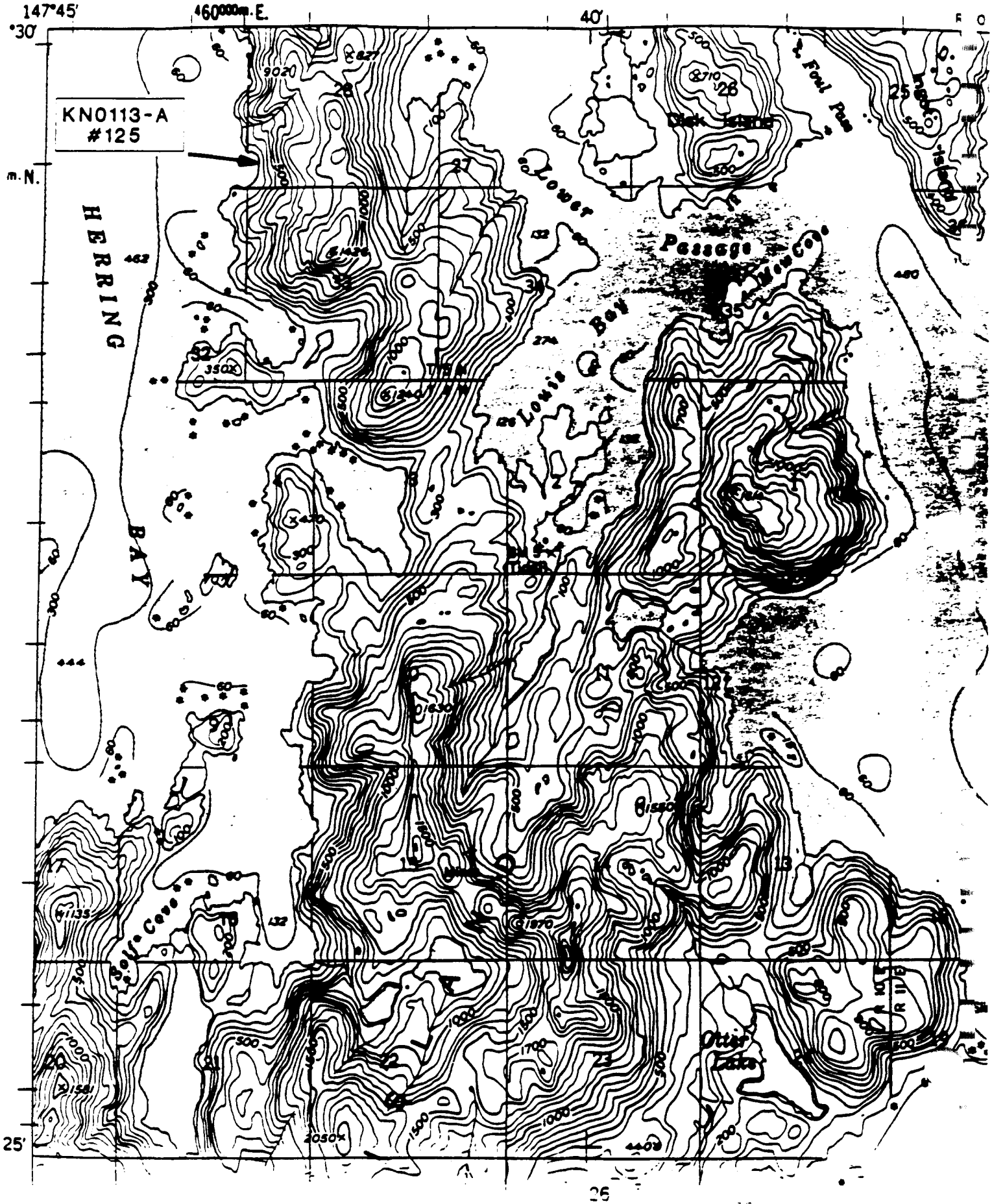
The greatest amount of oiling in 1991 occurred in the berm-like feature in the mid-intertidal zone. However, only LOR oil was detected. Subsurface oiling has shown a steady decline since 1991, and in 1993, only OF was present in the upper intertidal. The water table was very shallow (10 cm in the pits) during the 1993 survey despite there being a low tide. In 1993, a rainbow sheen was visible in the upper pit, and the pore water was flowing down the beach.

TRANSECT STATION ADEC-125




KN0112
Station
125
KN0113
KN0114
Louis Bay
Herring
Bay
Knight Island
PWS
Map Area
Knight Island
PWS
ADEC Station# 125
2000 M
500 M
N

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

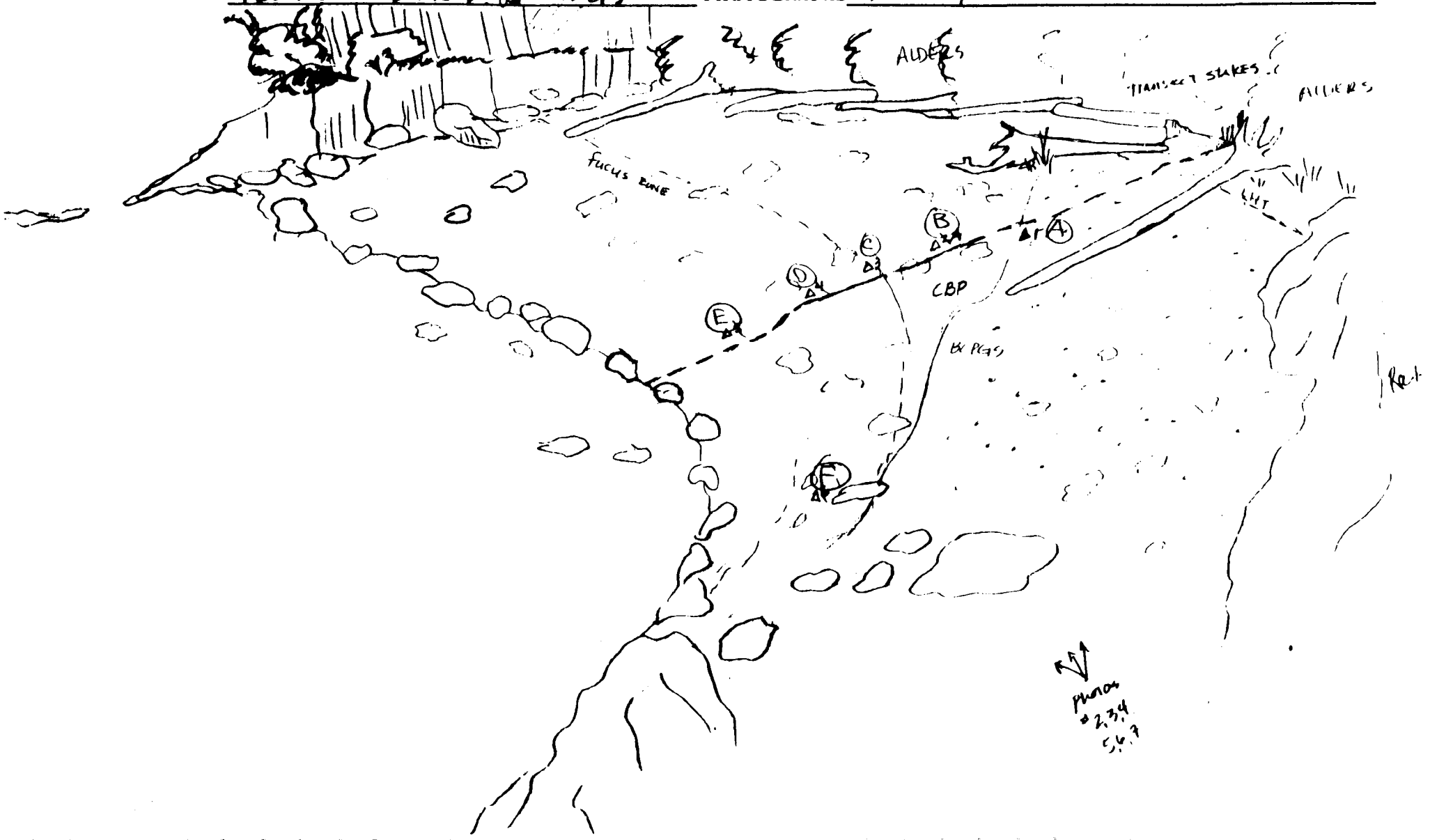


DATE 8-17-93 STATION # 125 SEGMENT KNO113A KODIAK-UNIT _____ ACCESS BOAT TIME 0700

LOCATION E HERRING BAY, KNIGHT IS. LOW-TIDE 0139 - 2.1 TEAM MEMBERS J. GIBEAULT, E PIPER, K. FARLEY, C. CROSBY

SEDIMENT TYPE B, C, P (sub-angular B/C - subrounded - PG WEATHER OVERCAST - CALM PROFILE ANGLE 220° mag

TRANSECT IDENTIFIER TWO METAL STAKES W/ TAGS PHOTOGRAPHS 93CSC001



DATE 8-17-93 STATION: *125 SEGMENT: KN113A KODIAK K-UNIT: FRONT STAKE HT-(cm): 66

LOCATION KNIGHT ISLAND, E. HERRING BAY PWS TIDAL STAGE: Low - 2.1 - .1 BACK STAKE HT-(cm): 36

START TIME 0715 END TIME: 0820 LOW TIDE: 07:39 -2.1 HIGH TIDE: 14:04 11.5 RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2.05	-28															vegetation
2.3	-44															To edge of vegetation
1.15	-12					60		40	-	-						
1.30	-14					60		40	-	-						To pebble storm berm crest. High Tide
.70	-12					80	10	10								
2.00	-26			5	10	40	10	35								
1.80	-22			5	40	50		5			A					To Center of Pit A
2.70	-36			20	30	40		10								
2.75	-30			30	20	40		10			B		P			To center of Pit B
2.9	-32			40	25	30		5					B,P			—
3.0	-42			50	30	20							B,P,M,F			
1.7	-22			30	30	40					C		B,P,M,F			TO Pit C
3.0	-22			40	60								B,P,M,F,L			
2.5	-26			70	30								B,P,M,F,L			-
3.0	-48			70	30						-		B,P,M,F,L			-
3.3	-34			70	25		5				D		B,P,M,F,L,A			TO Pit D
2.8	-24			50	20	10	20						F,L,A	-		-
3.1	-14			30	40	10	20						F,A			-

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 6-17-93 STATION: B125

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
3.0	-24			40	30	20	10				–		I, A			
2.0	-4			50	40	5	5				E		F, L, A			
2.85	-12			60	40								F, L, A			
3.20	-14			30	60	10					–		F, I, A.			

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Pe[illegible]ckles, A = Algae, L = Limpets, W = Whelks
[illegible]

SEG SUBSURFACE OIL PROFILE

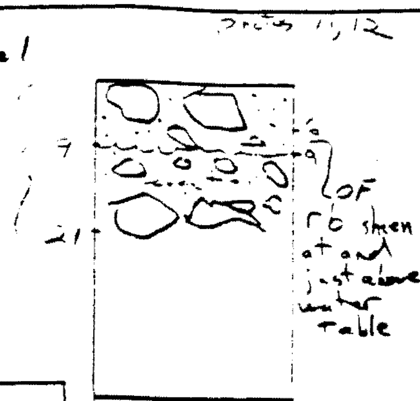
DATE 8-?-93 STATION ADEC 125 SEGMENT KNO 34

Oiling description	Profile	Seds	Framework	Matrix

Pit A (m) From FS ____

A Sandy, granular, pebble gravel / some mixed organic matter ... In [fine] pebble matrix / Clasts angular to rounded

photos 11,12



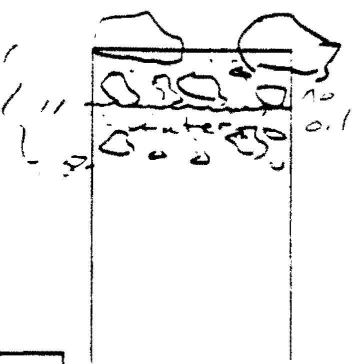
depth (cm) 21

Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit B (m) From FS ____

A - same as pit A but surface includes 30% boulder armor - subangular (and 40% L. pebb + S. cob)



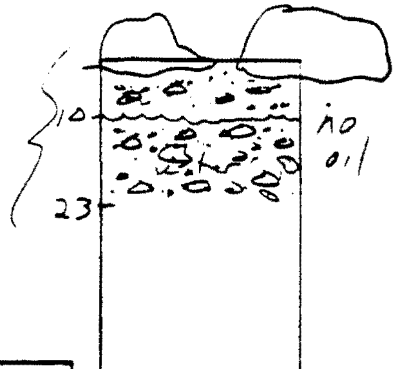
depth (cm) 18

Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit C (m) From FS ____

A - same as pit B in fucus + barnacles



depth (cm) 23

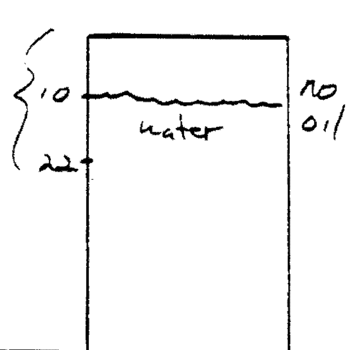
Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit D (m) From FS ____

A - same as pit C

photo 13



depth (cm) 22

Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

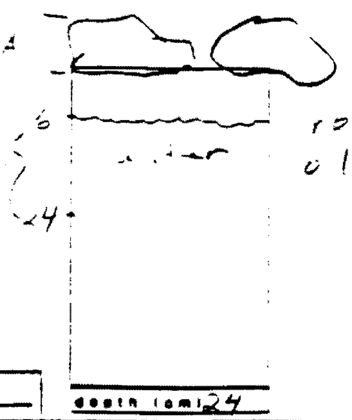
Signature ____

SUBSURFACE OIL PROFILE

DATE 9-17-93 STATION [illegible] SEGMENT [illegible]

Oiling description	Profile	Seds	Framework	Matrix

A - Boulder [illegible] armor
B - [illegible] pebble sand
[illegible]
w/ [illegible]
shell - [illegible] frags.



Framework: mean grain size M S G P C B

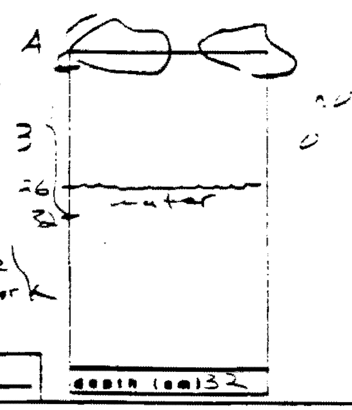
Matrix: mean grain size M S G P C B

Pit E (m) From FS ____ depth (cm) 24

F - at transect edge of boulder zone [illegible] mussel, barnacles

A - surrounded boulder armor w/ 20% interstit granular pebble gravel

B - Sandy, pebbly granule gravel matrix in cobble framework



Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit F (m) From FS ____ depth (cm) 32

Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit ____ (m) From FS ____ depth (cm)

Framework: mean grain size M S G P C B

Matrix: mean grain size M S G P C B

Pit ____ (m) From FS ____ depth (cm)

Signature ____

TRANSECT: ADEC-056*

SEGMENT: KN 209 A

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

OTHER STUDIES
1993 Shoreline Assessment Ground Survey.

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 transect line runs down the middle of the northern part of this pocket beach. The mid-intertidal along the transect consists 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 generally 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 and 1991. 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.

The subtle mid-intertidal berms are evident in the plotted profiles from 1991 and 1992 as well as 1993. The 1991 profile has an overall lower elevation than in 1992 and 1993. This may be at least partly caused by mechanical tilling that occurred just prior to the 1991 survey. Accretion occurred in the upper and lower intertidal from 1991 to 1992 and included the development of a high-tide, pebble berm. By the summer of 1993, the high-tide berm had moved up the profile and there was slight accretion in the mid-intertidal.

Profile changes and stratigraphy indicate that this coarse gravel beach is relatively active in at least its upper 50 cm. It is difficult to state, however, how much of the observed profile change is directly caused or instigated by mechanical alteration of the beach.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

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* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 3

Fetches and Directions (kilometers)
NE= 55, E= 55, SE= 31
Energy Level
High

GENERAL BIOLOGICAL SETTING
Eagle nest.

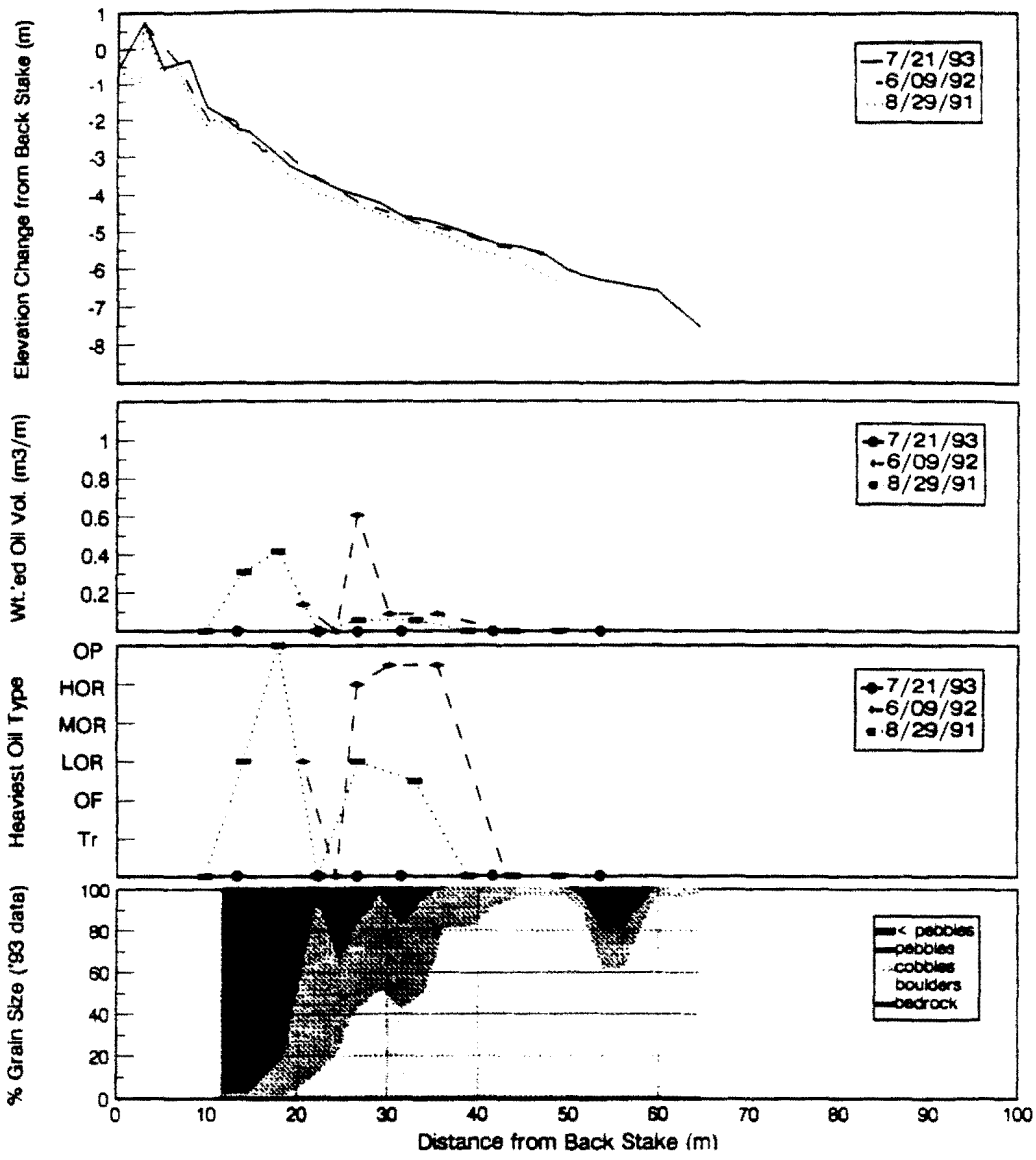
OILING SUMMARY
Coat and stain were present in the mid- and upper intertidal at concentrations of up to 10% in 1991. This surface oil presence was caused by earlier mechanical tilling in 1991. Only trace amounts of surface oil were discovered in 1992 and by 1993 essentially no surface oil was present.

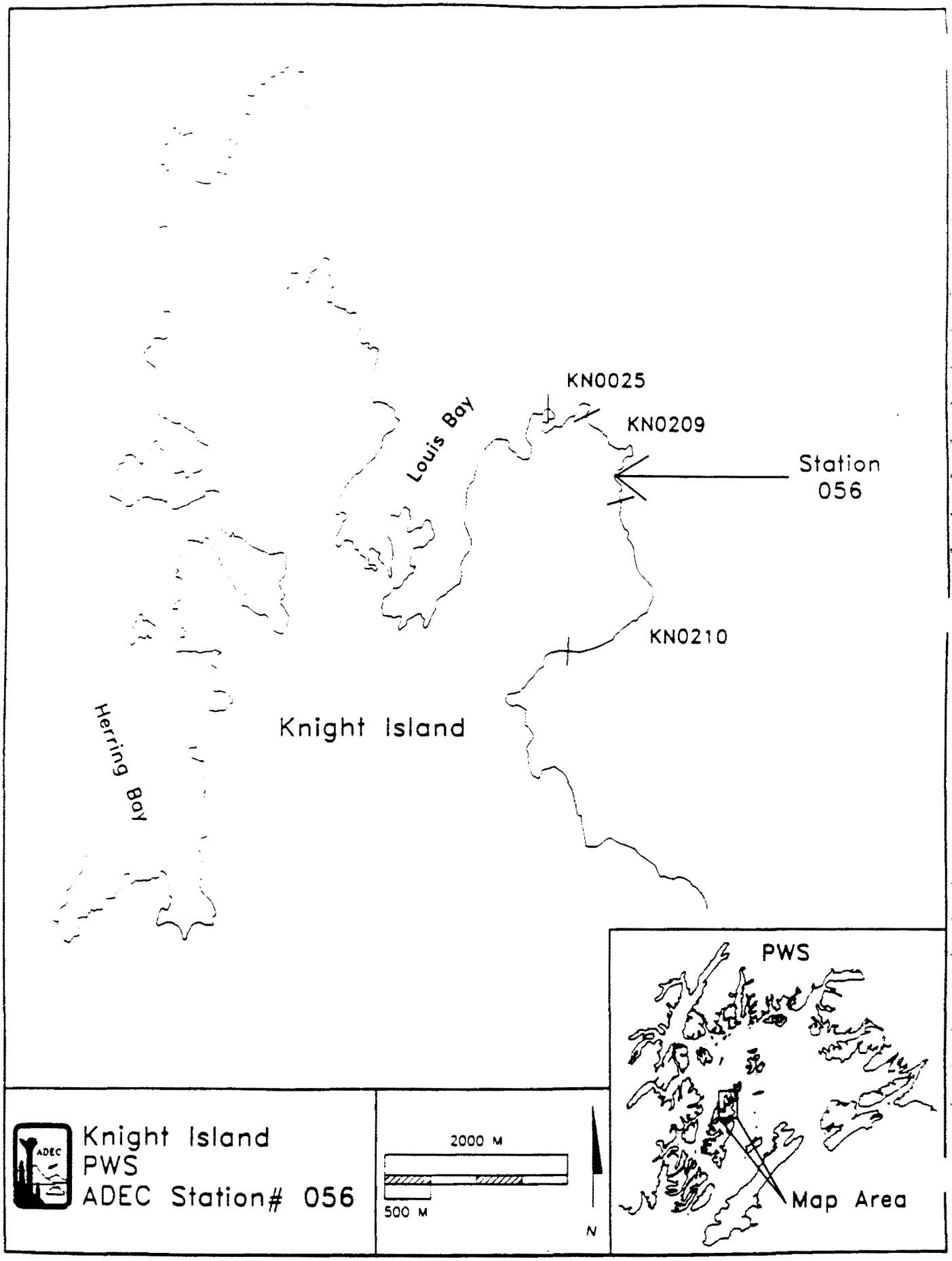
In 1991, LOR was present across the mid- to upper intertidal. The greatest amount of oil was in the upper intertidal zone where surveyors discovered a 6 cm thick lens of OP.

In 1992, surveyors discovered OP and HOR in lenses less than 10 cm thick across the mid- to upper intertidal. The lower pit, which was 35 m from the back stake, only had a discontinuous OP lens, and the pit landward of that only had a 2 cm thick OP lens. The heaviest concentration was in a pit landward of the above pits and 27 m from the back stake where a 10 cm thick HOR lens was discovered overlain by a 7 cm thick MOR lens. Subsurface oil may have been buried by high-tide berm accretion from 1991 to 1992.

The 1993 survey revealed no subsurface oil along the transect, however, heavy subsurface oil was present to the south in coarser sediments and in areas protected by small bedrock outcrops and to the north in protective boulders along the cliff. One should consult the 1993 Shoreline Assessment ground survey data for more information.

TRANSECT STATION ADEC-056




KN0025
KN0209
Louis Bay
Station
056
KN0210
Knight Island
Herring Bay
PWS
Map Area
Knight Island
PWS
ADEC Station# 056
2000 M
500 M
N

DATE 7/21/93 STATION: ADEC 056 Page 2 of 2

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S	SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
240	-14			95 / 5	0				B, M			—
255	-44			95 / 5	0				B			—
150	-13			90 / 5 / 5	0				B			—
225	-15			60 / 20 / 20	0		6		B, P, L, W			No subsurface oil in pit #6
210	-13			60 / 20 / 20	0				B, F			Begin dense fucus
375	-17			95 / 5	0				F, A			—
460	-98			95 / 5	0		-		F, A,			Time 8 35am Waterline

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Pe[illegible]ckles, A = Algae, L = Limpets, W = Whelks
[illegible]

DATE 7-21-93 STATION: ADEC056 SEGMENT: KN204A KODIAK K-UNIT: FRONT STAKE HT-(cm): [illegible]

LOCATION Knight Island TIDAL STAGE: BACK STAKE HT-(cm): [illegible]

START TIME [illegible] END TIME: 0835 LOW TIDE: HIGH TIDE: RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B	C	P	G	S	SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2.10	+137															To the [illegible] stake
2.10	-129								<1							[illegible], drift logs, cobble [illegible] moved
1.85	+21								"							"
2.10	-132								"							" (+ Base of altered berm)
1.70	-27					100			Ø							Drift logs
1.70	-34				1	99			Ø		1					—
1.36	-7				1	99			Ø							Drift logs; berm crest
4.27	-90				20	80			Ø							Drift logs, seaward edge fucus rack line
3.32	-40			10	80	10			Ø		2					—
2.27	-25			20	40	40			<1							Surface stain [illegible] cobble cracks
2.05	-15			40	40	20			"		3					"
2.60	-22			50	45	5			"		—					"
2.25	-32			40	40	20			Ø		4					
2.90	-13			50	45	5			Ø							—
2.15	-15			80	20				<1				B			—
2.95	-26			80	20				Ø				B			—
2.15	-20			90	10				Ø		5		B,M			—
3.20	-11			95	5				Ø				B,M			-

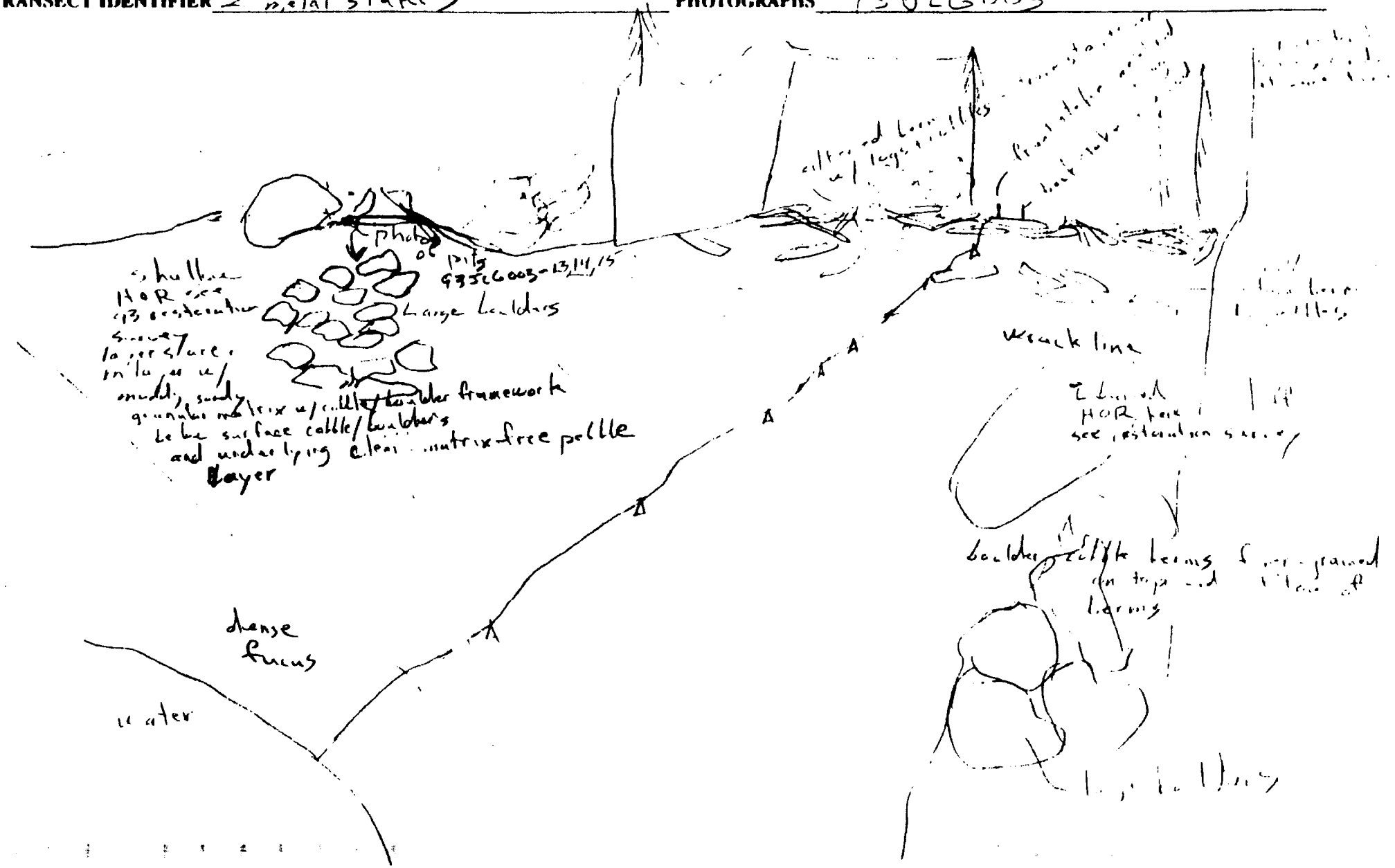
[illegible]logy Key: B = Barnacles, M = Mussels, F = Fucus, P = P[illegible]inkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness [illegible]: [illegible] Stain [illegible] .1 [illegible] to [illegible] mm Coat [illegible] 1.0 [illegible]

DATE 7-21-93 STATION ADFG056 SEGMENT KN 2091 A KODIAK-UNIT _____ ACCESS _____ TIME _____

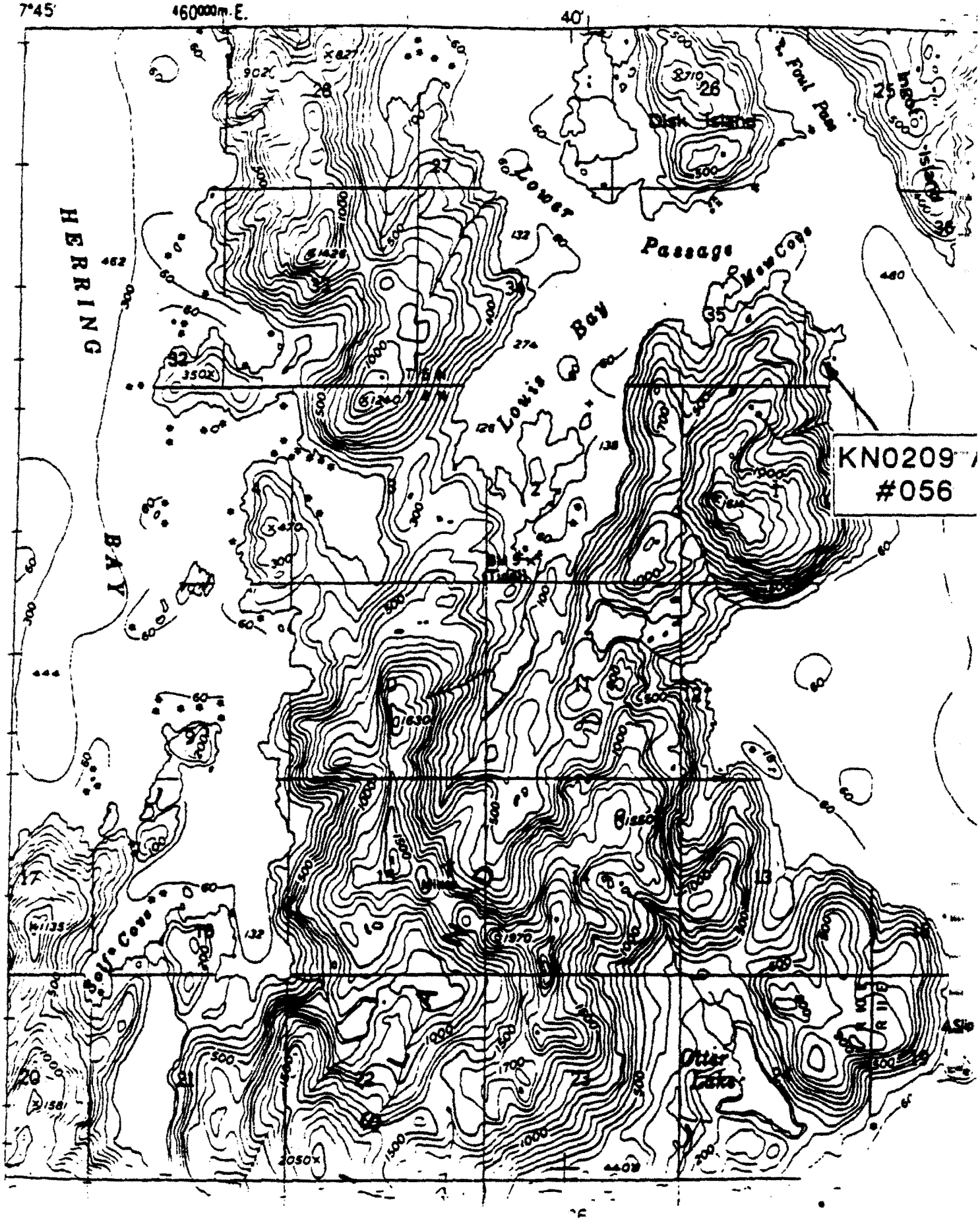
LOCATION Knight Island LOW-TIDE _____ TEAM MEMBERS J. Calvert, [illegible]

SEDIMENT TYPE boulders/cobbles WEATHER overcast PROFILE ANGLE _____

TRANSECT IDENTIFIER 2 metal stakes PHOTOGRAPHS 93JC6003



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



STOCK# PPV840-000

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0700

SEGMENT#: KN0113 STATION#: 125
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Overview of beach and station #125.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #: 93CSC001 FRAME #: 4 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0700

SEGMENT#: KN0113 STATION#: 125
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Overview of beach and station #125.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #: 93CSC001 FRAME #: 3 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0700

SEGMENT#: KN0113 STATION#: 125
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan overview of beach and transect.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #: 93CSC001 FRAME #: 7 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0700

SEGMENT#: KN0113 STATION#: 125
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan overview (shots 5 & 6) of beach and transect. Transect stake is on profile line.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #: 93CSC001 FRAME #: 5 EVIDENCE ID#:

TRANSECT: ADEC-138*

SEGMENT: KN 135 B

LOCATION: Bay of Isles Group, western shore of South Arm

OTHER STUDIES
1993 Shoreline Assessment ground survey.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect crosses a beach in a shallow indentation along a straight stretch of shoreline. Sediment size grades alongshore from boulders and cobbles on the north to pebbles in the south in the vicinity of an intermittent stream. Multiple pebble swash bars are present on the south end of the segment near the poorly defined stream channel. High-tide pebble berms and drift logs are also present in the indentation.

Sediment size increases rapidly from high-tide pebble berms to 70% cobbles and 30% boulders in the mid-intertidal zone. Size abruptly decreases from the mid-intertidal zone to the lower intertidal where there is 50% pebbles and few boulders. Thus the mid-intertidal zone stands out as being relatively coarse compared to higher and lower sediments.

Pebbles in the high-tide berms are subrounded and overlie a slightly muddy, sandy, granular gravel matrix in a framework of angular large pebbles and small cobbles at 4 cm depth. In the upper to mid-intertidal zone the angular cobble and boulder surface armor overlies sediments that increase in the size of the framework grains with depth (pebbles and cobbles) and have increasing amounts of mud in the matrix sediments with depth. Surface armor is several grain layers thick.

On the border of the mid- and upper intertidal, two berm-like features are present. Sediments in the vicinity of these features include a 4 cm, clean (no matrix), platy, angular pebble layer below the cobble and boulder surface armor and above a layer with a sandy, granular matrix and cobble framework. The matrix here also becomes muddier with depth.

Profile data indicate that net deposition occurred from 1991 to 1992. The entire profile below the storm berm aggraded by to 30 to 60 cm. During this time, the mid-intertidal berms, which were described above, formed. From 1992 to 1993, the lower intertidal zone lowered by 40 cm seaward of the berms, and the high-tide berm was cut back a small amount. The area of the profile just below the high-tide berms showed no net change during the 3-year period.

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* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 2

Aggressive oiled sediment removal occurred at this site in 1991 and to a lesser degree in 1992. The lower elevations measured in 1991 may have been partly caused by the cleanup activity. The disturbed profile recovered by 1992. Active swash bars were observed in 1993 adjacent to the profile and to the south. These swash bars along with the alongshore gradient in grain size, and clean pebble layers below the surface armor indicate that this profile undergoes significant erosional and depositional periods.

Barnacles, fucus, and mussels are present on this profile.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

NE= 5

Energy Level

Low to moderate.

GENERAL BIOLOGICAL SETTING

OILING SUMMARY

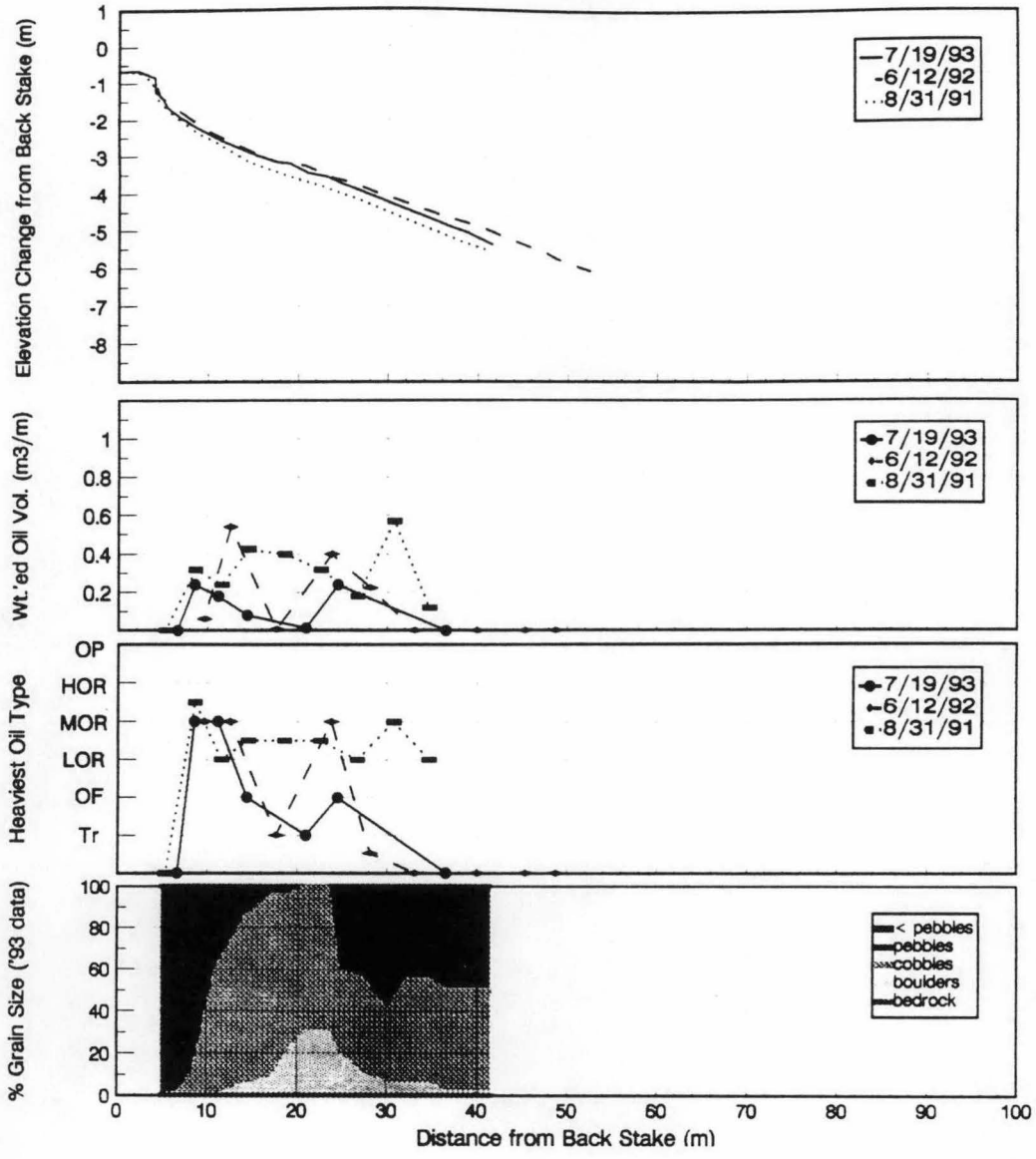
In 1993, very hard AP covered 5% of the upper intertidal below the high-tide berms. This is about the same amount of surface oil reported in 1992, but less than in 1991 when there was a 20% coverage across a wider area. The surface oil was reported as soft AP and SOR in 1991 and 1992, thus some weathering has occurred.

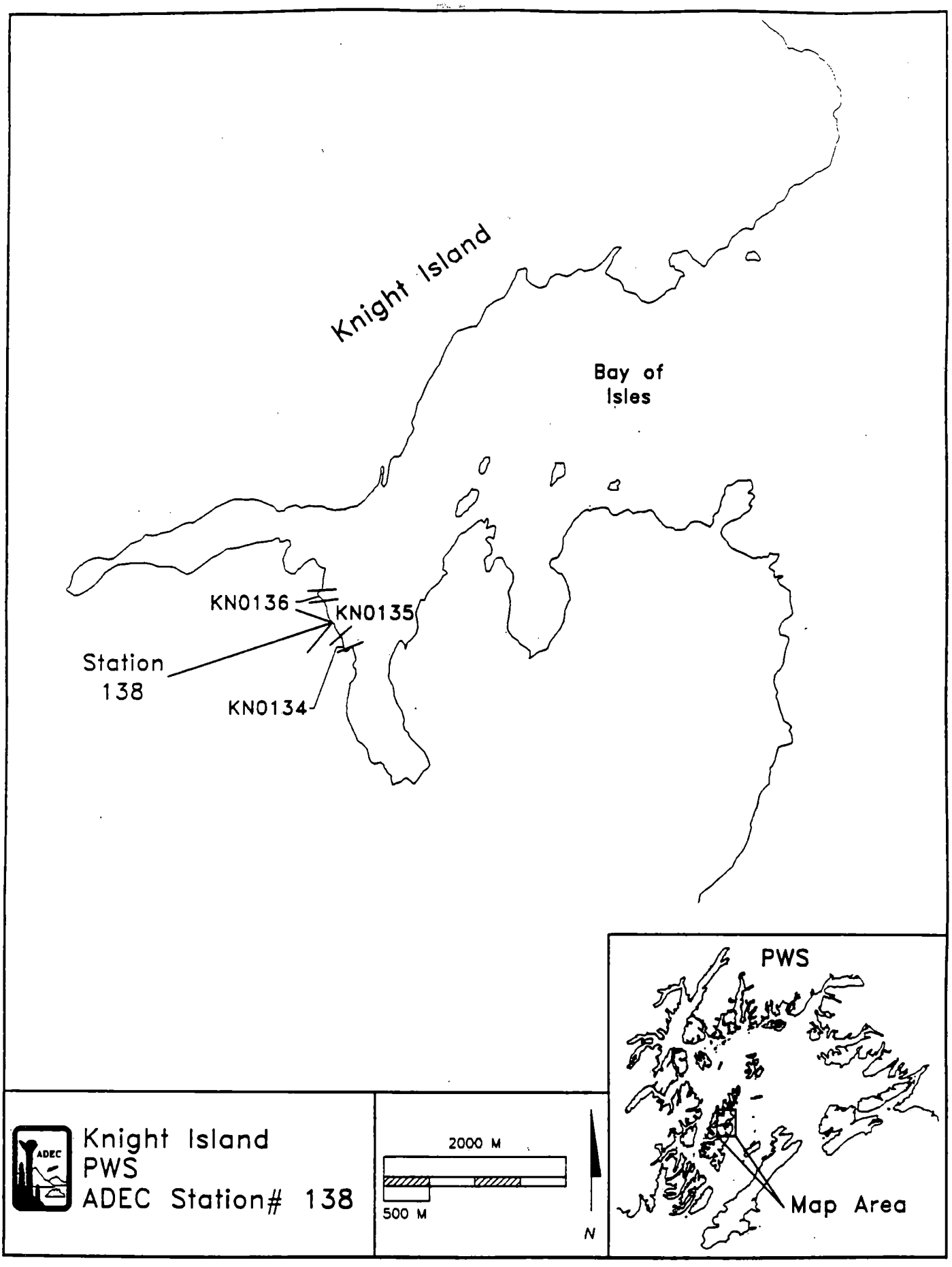
In 1991, subsurface oil was at or just below the surface across the upper and mid-intertidal zones and extended to as much as 25 cm below the surface. Oiling level was mostly between LOR and MOR, but MOR/HOR was found in the upper portion of the upper intertidal.

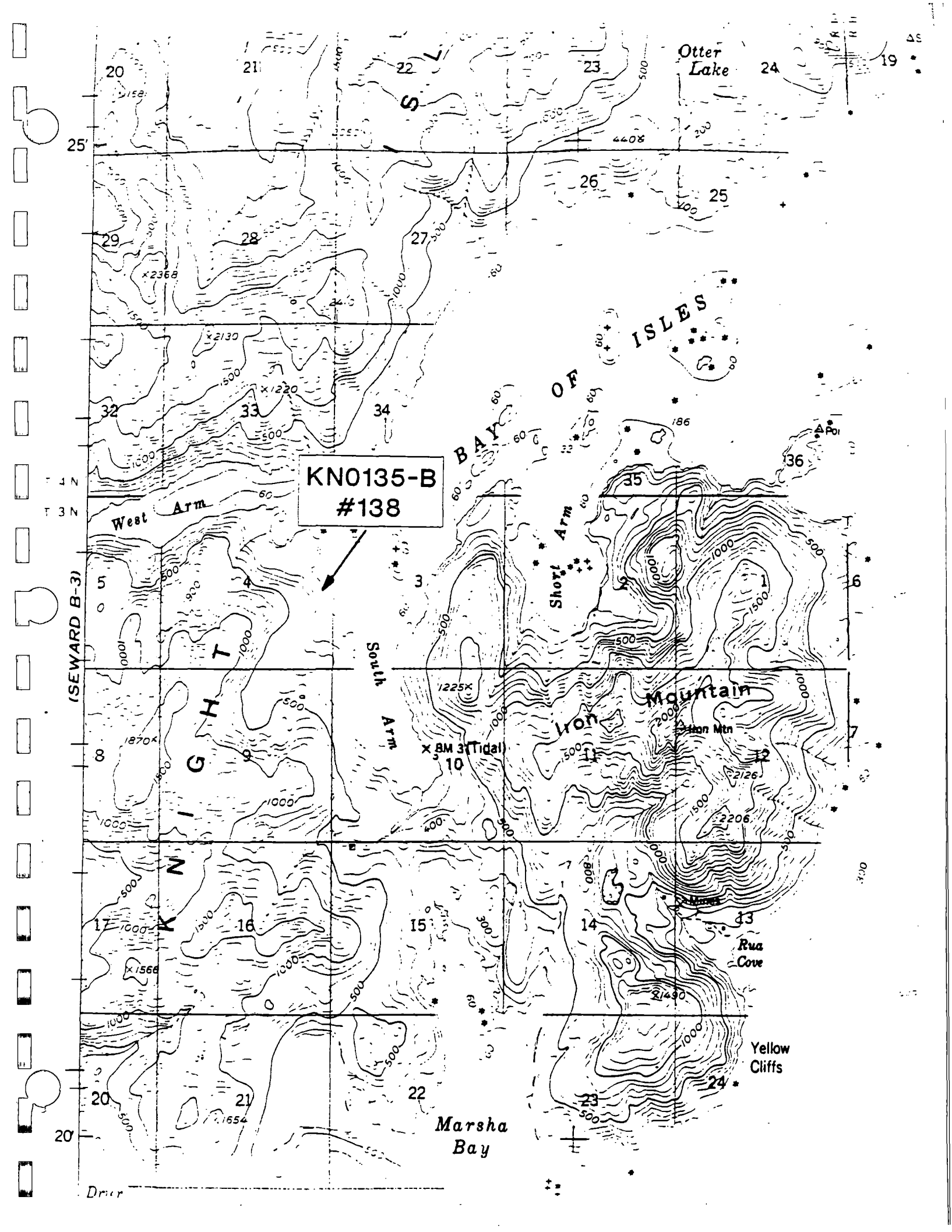
Oiling levels and the overall amount of oil (weighted oiled-sediment volumes) decreased since 1991 except in the upper portion of the upper intertidal where 8 cm of black MOR remains. Only OF and Tr remain across the rest of the profile.

Aggressive treatment including oiled-sediment removal in 1991 and 1992 enhanced the improvement at this site.

TRANSECT STATION ADEC-138




Knight Island
Bay of
Isles
KN0136
KN0135
Station
138
KN0134
PWS
Map Area
Knight Island
PWS
ADEC Station# 138
2000 M
500 M
N


KN0135-B
#138
Otter Lake
BAY OF ISLES
West Arm
South Arm
Short Arm
Iron Mountain
Iron Mtn
Rua Cove
Yellow Cliffs
Marsha Bay
(SEWARD B-3)
T 4 N
T 3 N
BM 3 (Tidal)

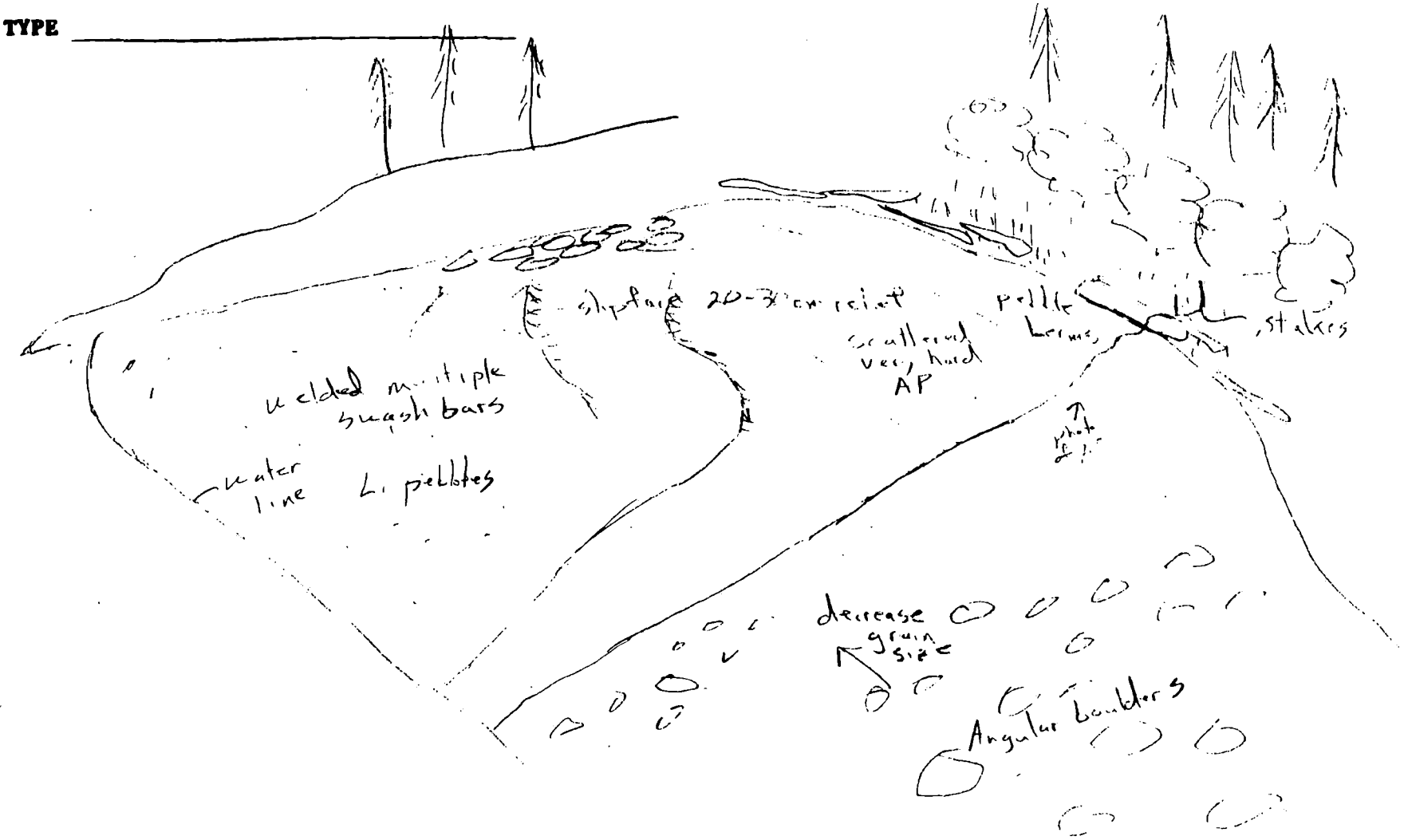
PROFILE ADEC Station **LOCATION** KN 1355 13 **DATE** 5-19-93

RECORDERS J. Gibeaut **PHOTOGRAPHS** 93SC6001 **TIME** 19:30

TIDE STAGE _____ **WEATHER** broken overcast **WIND SPEED** _____ **WIND DIRECTION** _____

PROFILE ANGLE 21°M **WAVE HT.** _____ **SAMPLES TAKEN: BIO** _____ **CHEM** _____ **SED** _____

SEDIMENT TYPE _____



DATE 7-19-93 STATION: ADEC 138 SEGMENT: KN135B KODIAK K-UNIT: _____ FRONT STAKE HT-(cm): -52

LOCATION Bay of Isles TIDAL STAGE: _____ BACK STAKE HT-(cm): -67

START TIME 1930 END TIME: 2000 LOW TIDE: _____ HIGH TIDE: _____ RecKey: _____

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
205	+2															to front stake
2.00	-19															start berm edge of grass
0	-38															base start berm
0.85	-19					100										to berm crest
0.50	-24					100										wrack
1.25	-25				1	99					1					wrack
1.95	-29				10	90			5		2					AP - very hard
2.60	-37				60	40			5		3					AP - very hard
3.20	-31			5	80	15			1		4					AP - very hard CHTS
3.02	-27			10	90	5			5							AP very hard
1.70	-5			20	55	5										
1.85	-23			30	70						5					
2.3	-13			30	70											
1.25	-13			20	40	40					6					
2.75	-26			10	45	45										
2.10	-27			5	35	60										
2.50	-25			5	50	45							B			
2.23	-20												M, B			

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

p 2.12

DATE 7-19-93 STATION: ADEC 138

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.80	-18			1	49	49					7		B, M			
2.40	-22			1	49	49							B, M			
2.60	-30			1	49	49							B, M			

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

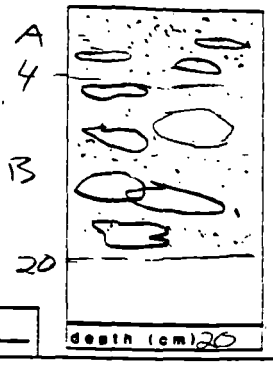
DATE 7-19-93 STATION ADER 138 SEGMENT KN135B

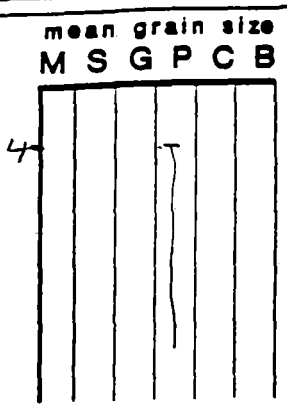
Oiling description	Profile	Seds	Framework	Matrix

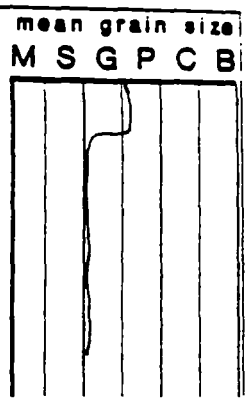
Pit 1 (m) From FS ____

A Subrounded S. pebble gravel spring/erm top

B slightly muddy, sandy granular gravel. Framework is L. pebbles + S. cobbles angular





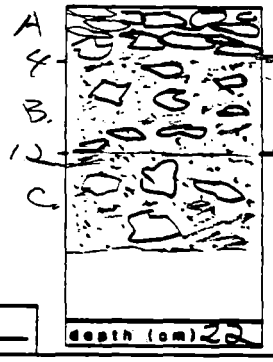


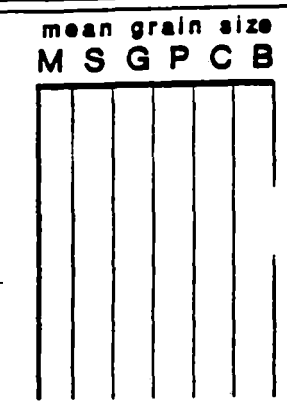
Pit 2 (m) From FS ____

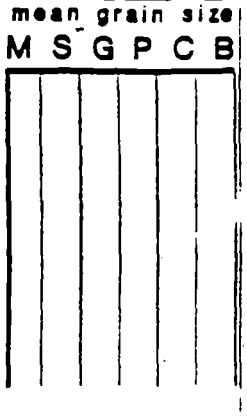
A. Angular L. pebbles S. cobbles fucus wrack

B slightly muddy, sandy granular gravel Framework is m. pebbles

C. slightly muddier than above sandy granular gravel Framework is L. pebbles





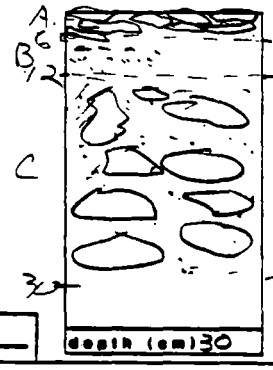


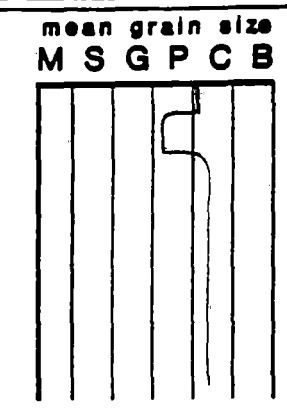
Pit 3 (m) From FS ____

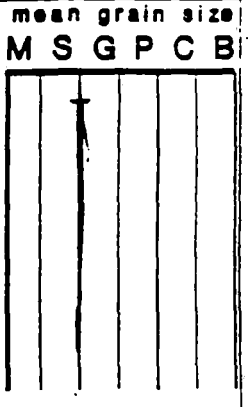
A. Angular L. pebbles, S. cobbles

B. sandy pebble gravel slightly muddy

C. same matrix as B larger framework





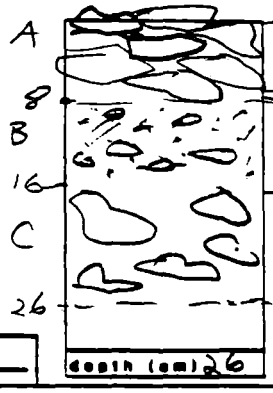


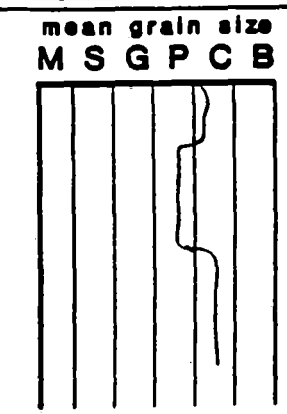
Pit 4 (m) From FS ____

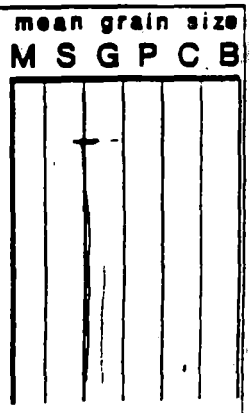
A. Armor of angular cobbles

B. Same as B above

C. same as C above







Signature _____

SUBSURFACE OIL PROFILE

DATE 7-19-93 STATION ADEC 138 SEGMENT KN 1353

Oiling description	Profile	Seds	Framework	Matrix

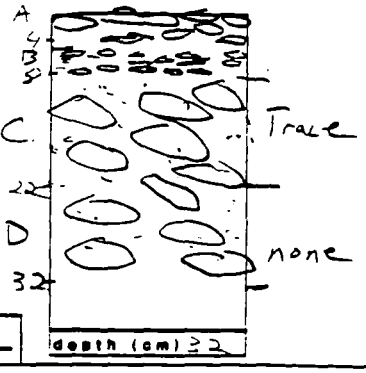
Pit 5 (m) From FS ____

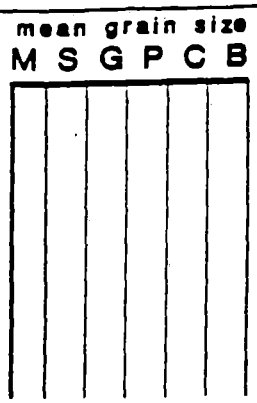
+ Surface armor, angular cobbles

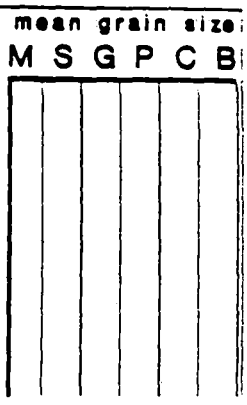
B. clean + oily, angular pebble layer

C. sandy, granular matrix w/ cobble framework

D. same as C. but slightly muddier

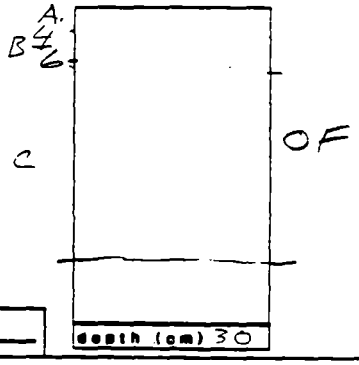


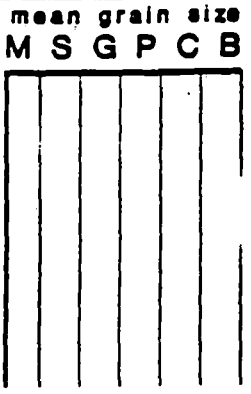


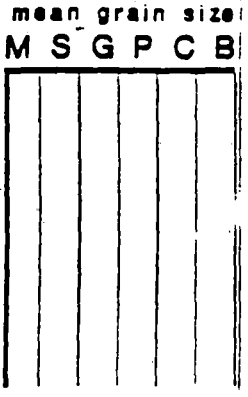


Pit 6 (m) From FS ____

A, B, C same as above



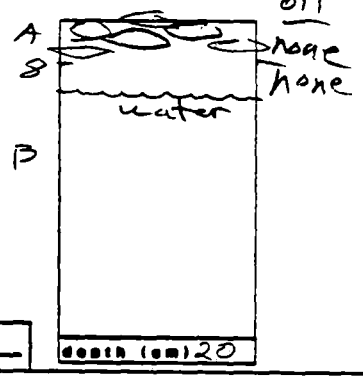


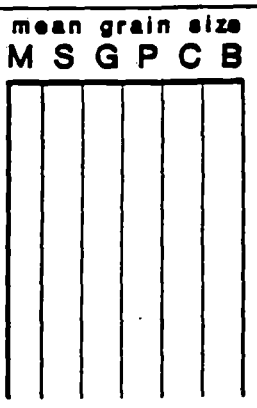


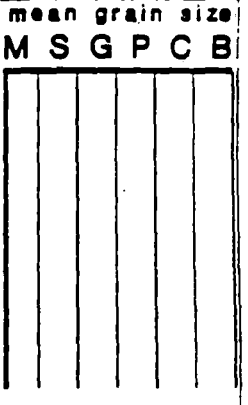
Pit 7 (m) From FS ____

A Cobbles w/ barnacles + fucus and mussels

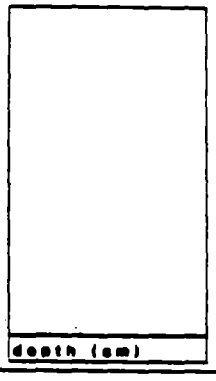
B. Small granule pebble matrix in large pebble small cobble matrix

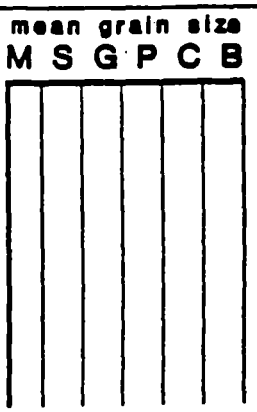


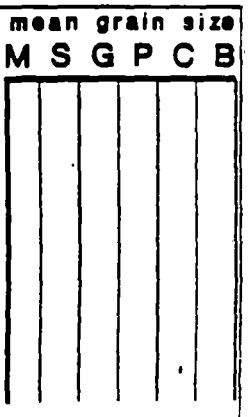




Pit ___ (m) From FS ____







Signature _____

ADEC - 145

TRANSECT: ADEC-145

SEGMENT: KN 113 A

LOCATION: Knight Island North Group, along the northeastern shore of Herring Bay.

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This site is in a broad embayment. The section of shoreline where the transect is located faces to the north. Grain size decreases along the shore from cobbles and boulders to the east of the profile to pebbles at the profile location. There is also a shore-normal gradient in grain size at the profile location. Pebbles in the upper intertidal become mixed with sand and granules in the lower portion of the upper intertidal and mid-intertidal. This band of finer-grained sediments gives way to predominantly pebbles with 30% cobbles and some boulders in the lower portion of the mid-intertidal and the low intertidal zones. The band of relatively fine-grained sediments was present in 1993 but is probably not a constant feature of this beach.

Pebbles and cobbles are well rounded and well sorted. Surface layers are without matrix material and are reverse graded. The reverse graded unit is about 5 to 7 cm thick. Layering is evident in the pits with matrix free pebble layers interspersed with slightly muddy, sandy pebble gravel layers. At 20 to 25 m from the back stake and at 25 to 45 cm depth a muddy, very coarse sandy, granular, pebble gravel was present and formed a distinct contact from the coarser overlying sediments.

The profiles measured in 1991, 1992, and 1993 had a linear to slightly concave configuration with high-tide berms. The 1991 and 1993 profiles show no net change, but the 1992 profile is about 20 cm higher in elevation across the mid and lower portions indicating deposition from 1991 to 1992 and erosion from 1992 to 1993. Also in 1992, a prominent berm formed lower on the profile than where the 1993 high-tide berm was. The stratigraphy of this beach indicates that this profile undergoes periods of significant sediment transport.

An intermittent stream cuts across and greatly modifies the beach about 100 m to the west.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

N= 38; NW= 36

Energy Level

Moderate to high.

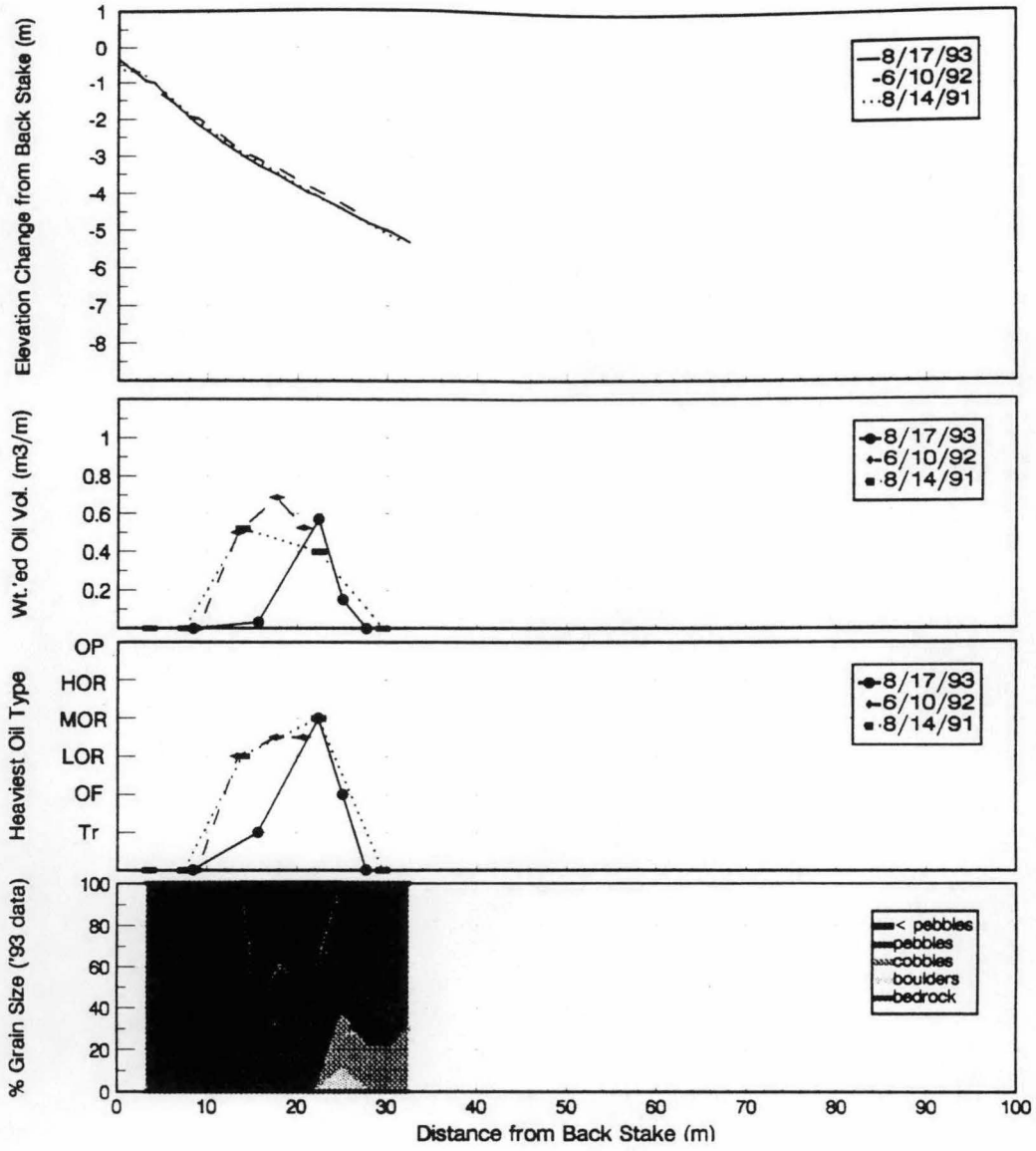
GENERAL BIOLOGICAL SETTING

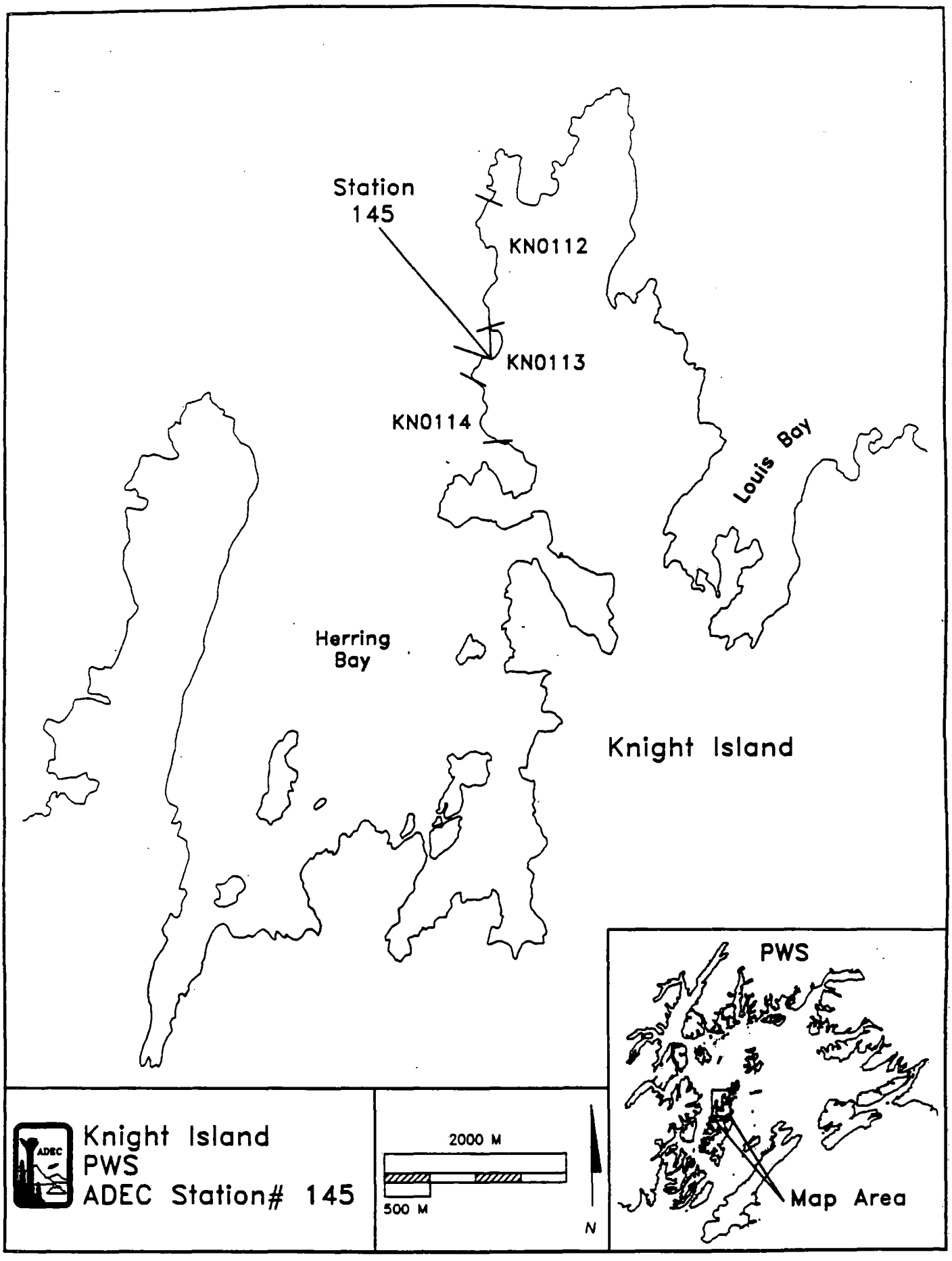
OILING SUMMARY

No surface oil has been detected here since before 1991.

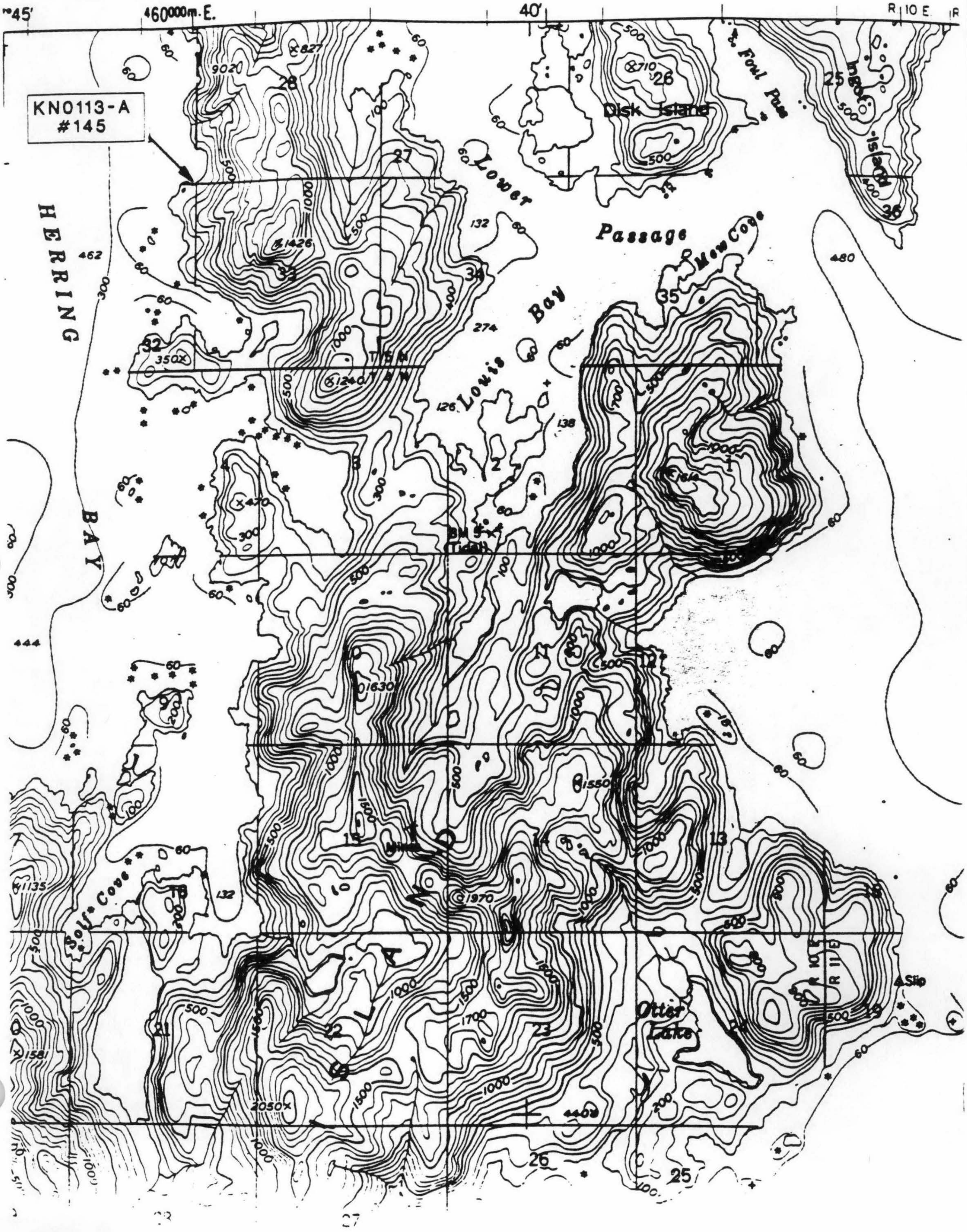
LOR to MOR has persisted in intervals from 25 to more than 50 cm depth across the mid-intertidal. Black fragrant MOR was present in 1993 from 26 to 45 cm. Penetration to deeper depths is hindered by muddy sediments. The band of heavy subsurface oiling has decreased in width from about 10 m to 5 m. Thus, natural improvement has occurred.

TRANSECT STATION ADEC-145




Station
145
KN0112
KN0113
KN0114
Louis Bay
Herring
Bay
Knight Island
PWS
Map Area
Knight Island
PWS
ADEC Station# 145
2000 M
500 M
N

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

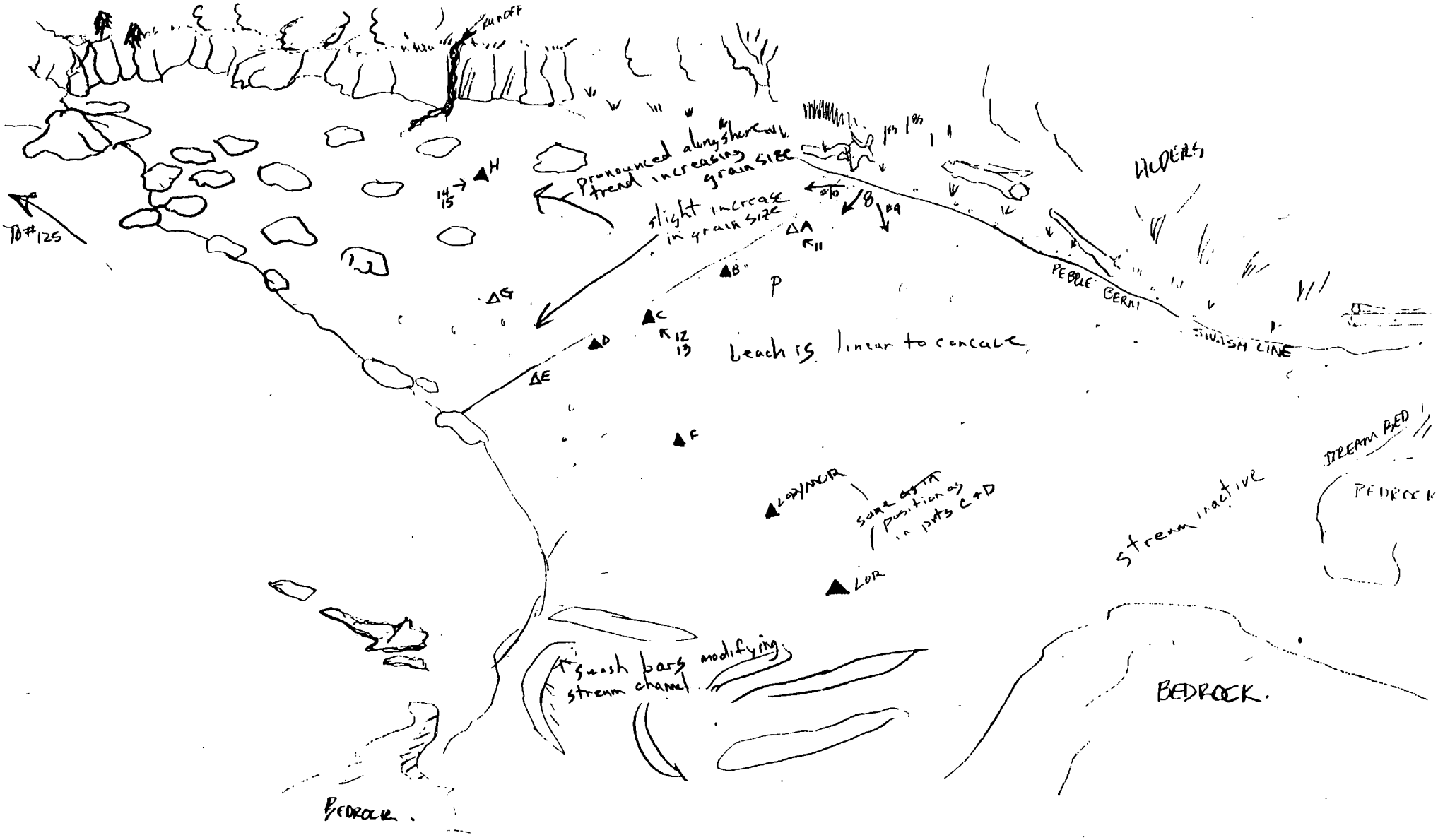


DATE 8-17-93 STATION # 145 SEGMENT KN0113A KODIAK-UNIT _____ ACCESS BOAT TIME 0850

LOCATION KNIGHT ISLAND, PWS. LOW-TIDE 0739 -2.1 TEAM MEMBERS J. GILBERT, E. PIPER, K. FARLEY, C. CLOSPY

SEDIMENT TYPE BCP WEATHER OVERCAST. PROFILE ANGLE ~77° NW

TRANSECT IDENTIFIER TWO METAL STAKES W/ TAGS PHOTOGRAPHS 93CSC001 #8-15



DATE 8-17-93 STATION: 145 SEGMENT: KN 113A KODIAK K-UNIT: FRONT STAKE HT-(cm): 14

LOCATION KNIGHT ISLAND, E. HERRING BAY, PWS. TIDAL STAGE: -2.1 TO -1 BACK STAKE HT-(cm): 32

START TIME 8:50 AM END TIME: 9:06 AM LOW TIDE: 0739 -2.1 HIGH TIDE: 1404 11.5 RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
0.90	-18															
1.70	-36															To edge of vegetation
.65	-9					100										Peak berm crest
.80	-4					100										—
1.35	-38					100										—
3.0	-68					100					A	NO OIL				To Pit A
3.0	-54					100										—
2.2	-34					100					-					—
2.05	-32					40	30	30			B	TRACE				Pit B
2.45	-30					60	30	10			-					—
3.0	-42					50	40	10			-					—
1.3	-12					60	30	10			C	MOR IN TOP OF MUD	B			To Pit C
2.7	-34			10	30	70					D	OF	BP			To Pit D
2.6	-34				20	80					E	NO OIL	BP			To Pit E
2.9	-30				20	80					—		BP			—
1.9	-26				30	70							BP			To waterline

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

ADEC SUBSURFACE OIL PROFILE

DATE 8-17-93 **STATION** ADEC #145 **SEGMENT** KN0113A

Oiling description	Profile	Seds	Framework	Matrix
A - surface layer of clean pebble gravel B - Interlayered clean pebble gravel and slightly muddy, sandy pebble gravel Pit A (m) From FS ____	A 15 B depth (cm) 71	no oil	mean grain size M S G P C B	mean grain size M S G P C B
A - clean pebble gravel reverse graded B - pebbly sand C - muddy, sandy w/ pebble matrix Pit B (m) From FS ____	A 5 B 28 C 62 depth (cm) 62	no oil trace - odor present	mean grain size M S G P C B	mean grain size M S G P C B
A - surface clean pebble gravel reverse graded B - v.c. sand, granular pebble gravel C - muddy, v.c. sand granular pebbles Pit C (m) From FS ____	photo 21 A 5 B 45 C depth (cm) 61	26 MOR black smells 45 ? on top of muddy unit	mean grain size M S G P C B	mean grain size M S G P C B
A. L. pebble reverse graded to clean small pebbles B. Same as pit C C. - Same as pit C Pit D (m) From FS ____	A 7 B 22 C 45 depth (cm) 45	no oil 7 OF-r.b sheen 22 no oil	mean grain size M S G P C B	mean grain size M S G P C B

Signature ____________

ADEC SUBSURFACE OIL PROFILE

DATE 8-17-93 STATION ADEC #145 SEGMENT KN 0113A

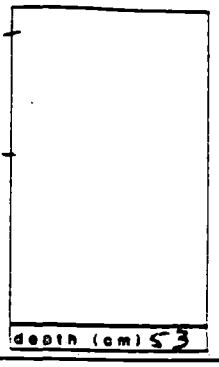
Oiling description	Profile	Seds	Framework	Matrix

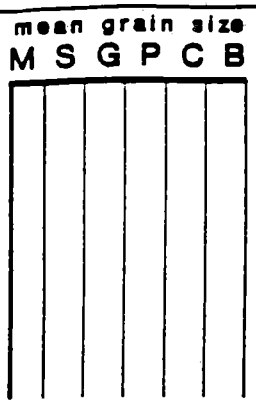
Pit E (m) From FS ____

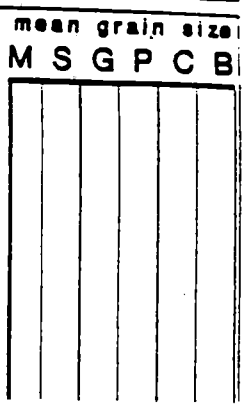
A - S. cobble L. Pebble

B - sandy matrix w/ S. cobble, L. pebble framework

C - muddy, v.f. sand, granular pellets





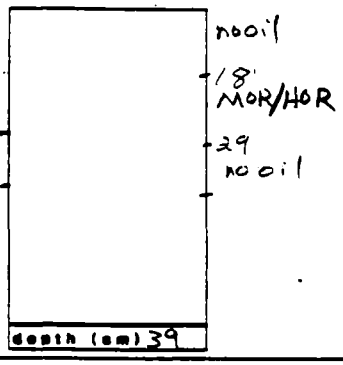


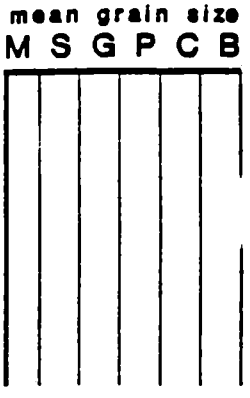
Pit E (m) From FS ____

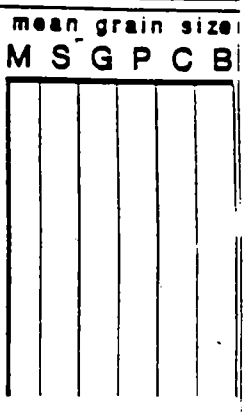
A - ~~Sandy~~ pebbly sand in L pebble S. Cobble matrix

B - muddy unit same as unit C in pit E

photo 22





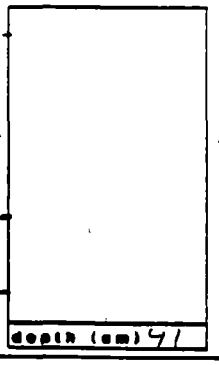


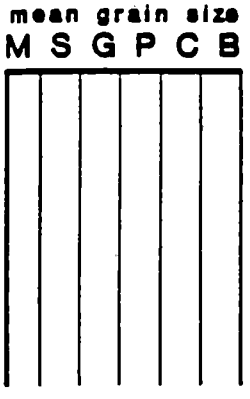
Pit G (m) From FS ____

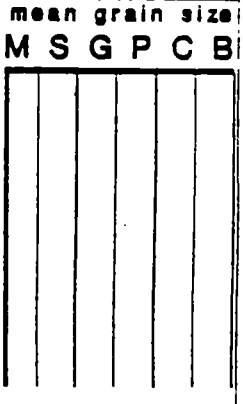
A - reverse graded well rounded L. pebbles to small pebbles - clean

B - v.c. sand granular matrix in L pebble, S. cobble gravel

C - same as unit B in pit F







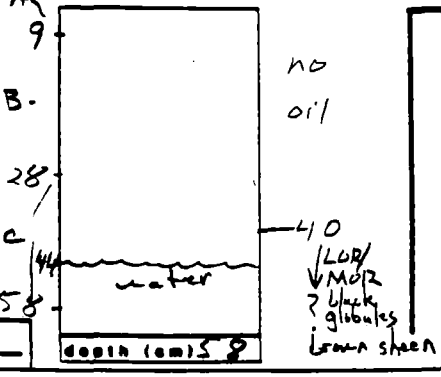
Pit H (m) From FS ____

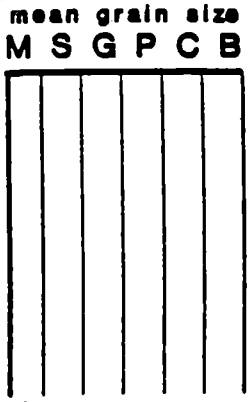
A - reverse graded L. pebble to S. pebble well rounded clean

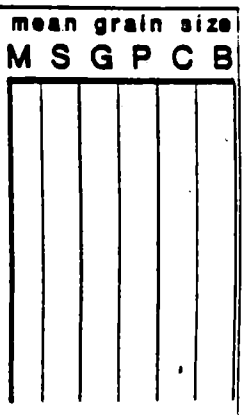
B - v.c. sand, granular matrix in L. pebble, S. cobble framework

C - slightly muddy matrix framework as above

photo 23

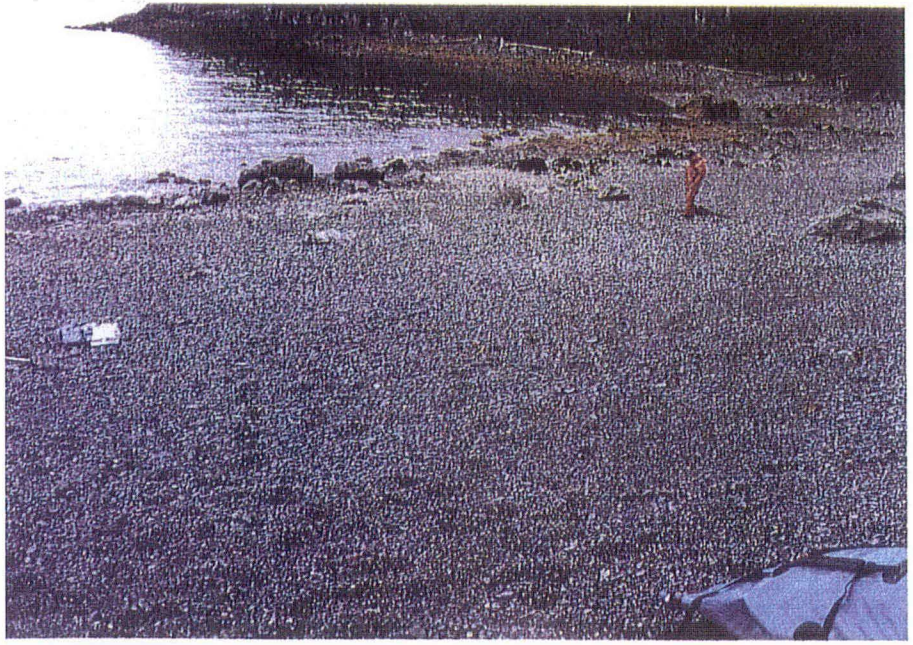






Signature _____

ADEC-145 1/2



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:View from transect to the southwest end of sub-segment.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 10 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:View is to the west, down transect showing pit location.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 9 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:View from transect #145 to the northeast end of sub-segment. Station #125 is located on the beach in the upper portion of the photo.

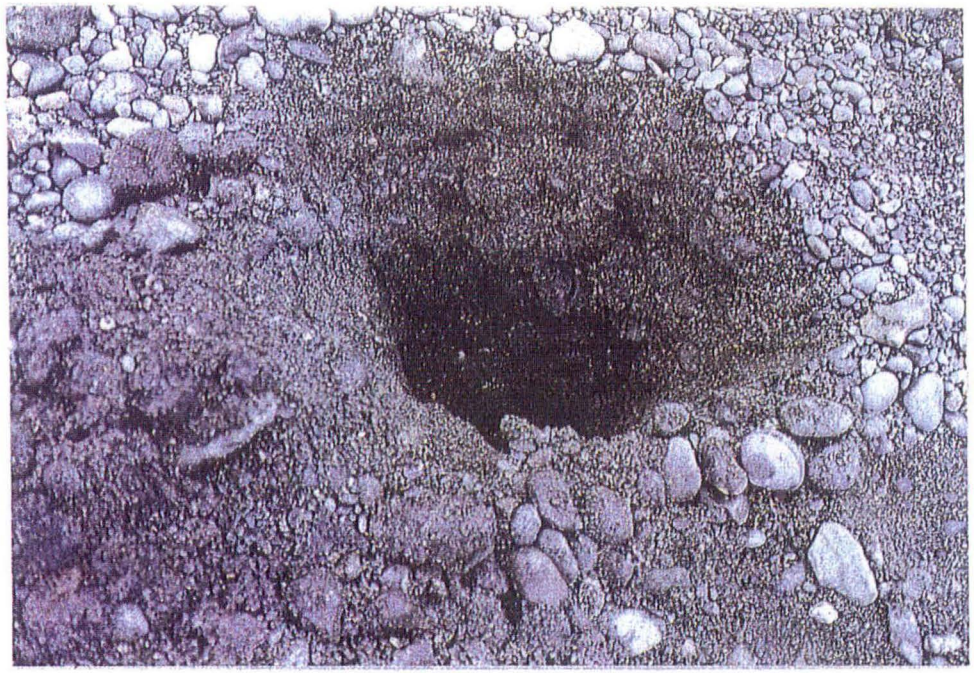
TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 11 EVIDENCE ID#:_____

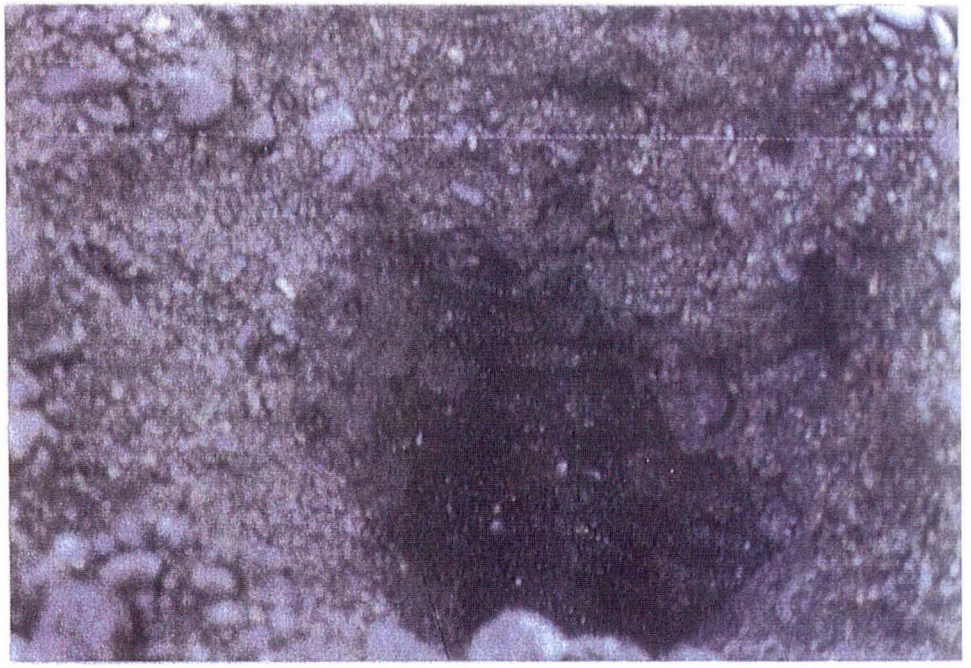
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

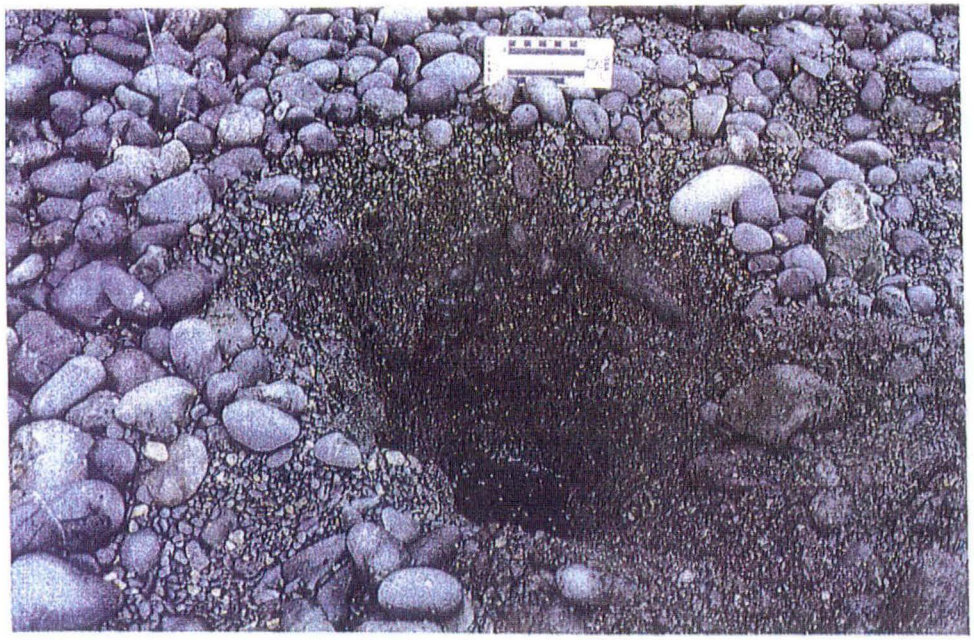
OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

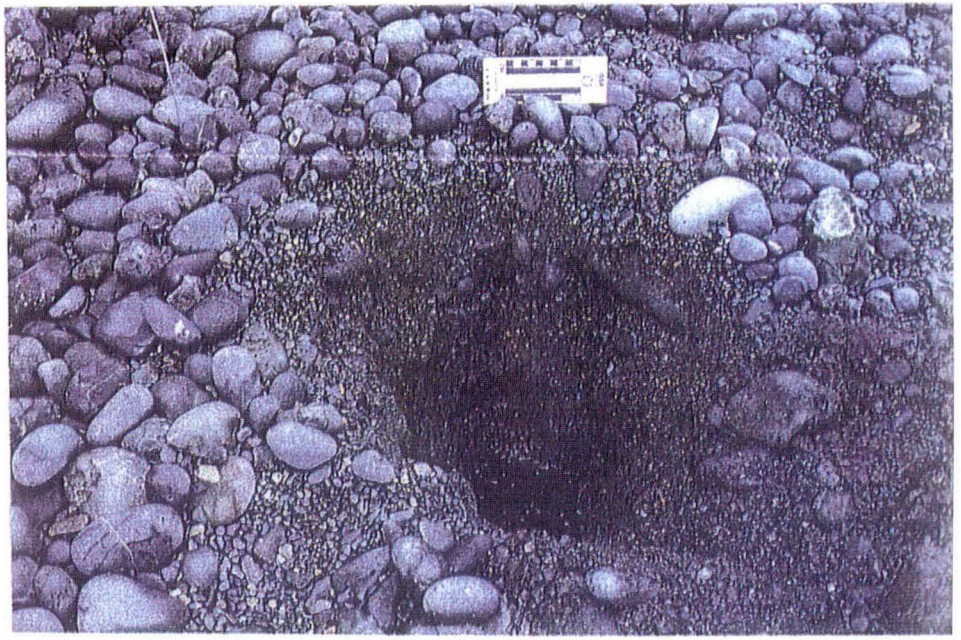
SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pit "A"; no oil.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 12 EVIDENCE ID#:_____









OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pit "H"; LOR/MOR at -40cm.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 15 EVIDENCE ID#:________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pit "H"; LOR/MOR at -40cm.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 16 EVIDENCE ID#:________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pit "C"; MOR at -26 to -45.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 13 EVIDENCE ID#:________

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/17/93 TIME: 0850

SEGMENT: KN0113 STATION: 145
LOCATION: East Herring Bay, Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:Pit "C"; MOR at -26 to -45.

TAKEN BY: Clara Crosby INITIALS: CSC
ROLL #:93CSC001 FRAME #: 14 EVIDENCE ID#:________

TRANSECT: NOAA-3

SEGMENT: SM 006 B

LOCATION: Outer Islands Group, northwest shore of Smith Island.

OTHER STUDIES

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect occurs along a very coarse-grained beach with scattered bedrock outcrops and a well-developed storm berm. In 1993, the storm berm had a double crest and a prominent pebble, high-tide berm welded to its face. Grain size rapidly increases down the beach to well-rounded large cobbles and boulders. A distinct berm-like feature was present just above the fucus line on the top of which slightly finer-grained sediments were present.

The stratigraphy in the central part of the profile includes a surface armor of cobbles and boulders 2 to 3 layers thick underlain by a clean (matrix free) pebble layer several cm thick. Below the pebbles is a boulder and large cobble framework filled with a sandy, pebble matrix. Higher on the profile the deeper sediments are slightly muddy, and in the lower intertidal, the clean pebble layer just below the surface armor is absent.

Profile data show net deposition from 1992 to 1993. A high-tide berm was deposited and a lower ridge widened 4 m in a seaward direction. The central portion experienced about 30 cm of deposition and a smoothing of the profile. In the summer of 1992, the central portion of the profile had two distinct berm-like ridges. In 1993, however, the profile was only slightly wavy in this area.

Significant sediment transport occurs across the central portion of this beach but the depth of erosion and deposition appears to be limited to about 30 cm. The upper and lower portions of the profile, however, experience much large amounts of erosion and deposition.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

NNE= 54

Energy Level

High.

GENERAL BIOLOGICAL SETTING

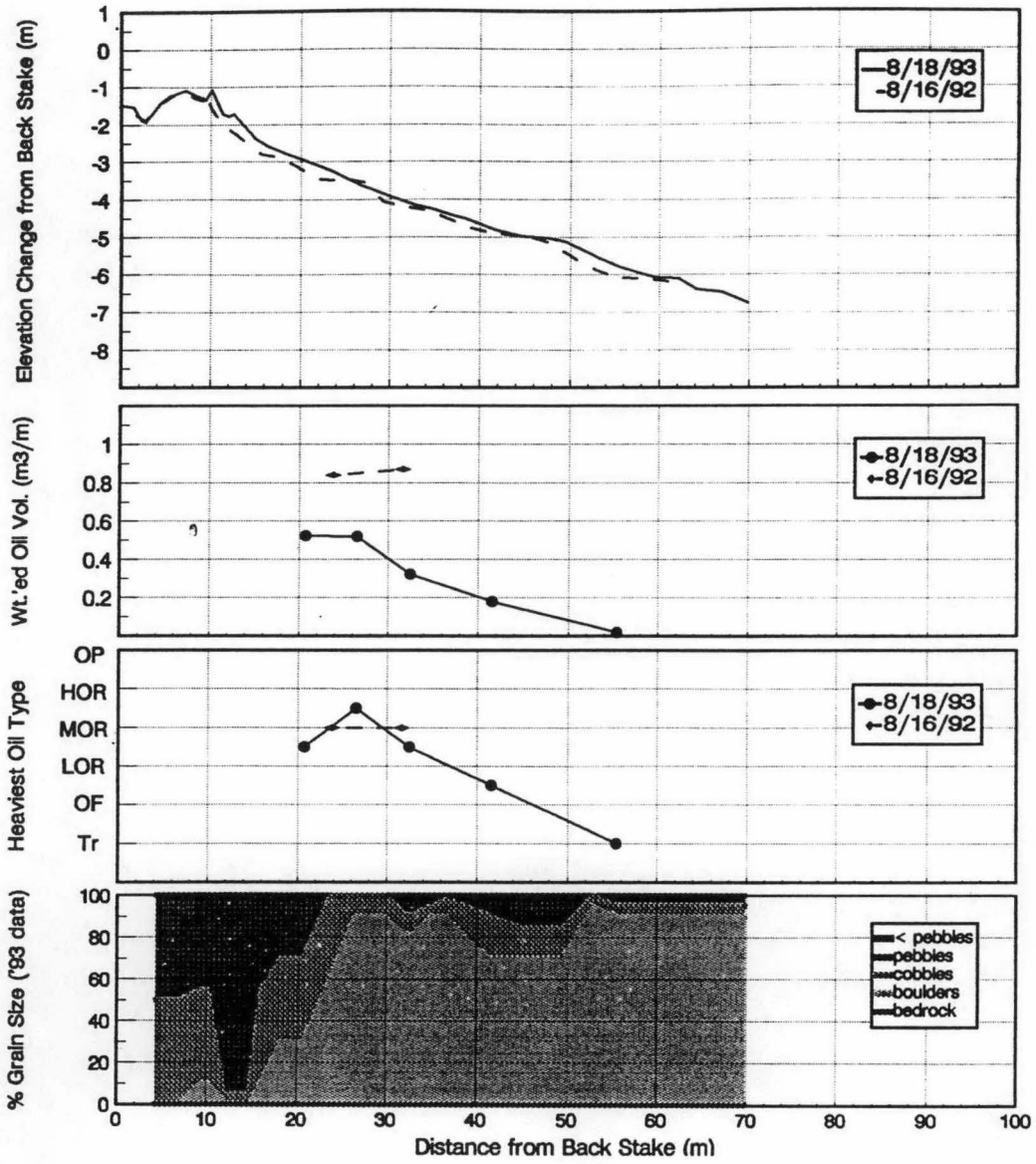
OILING SUMMARY

No surface oil was noted in 1992 or 1993.

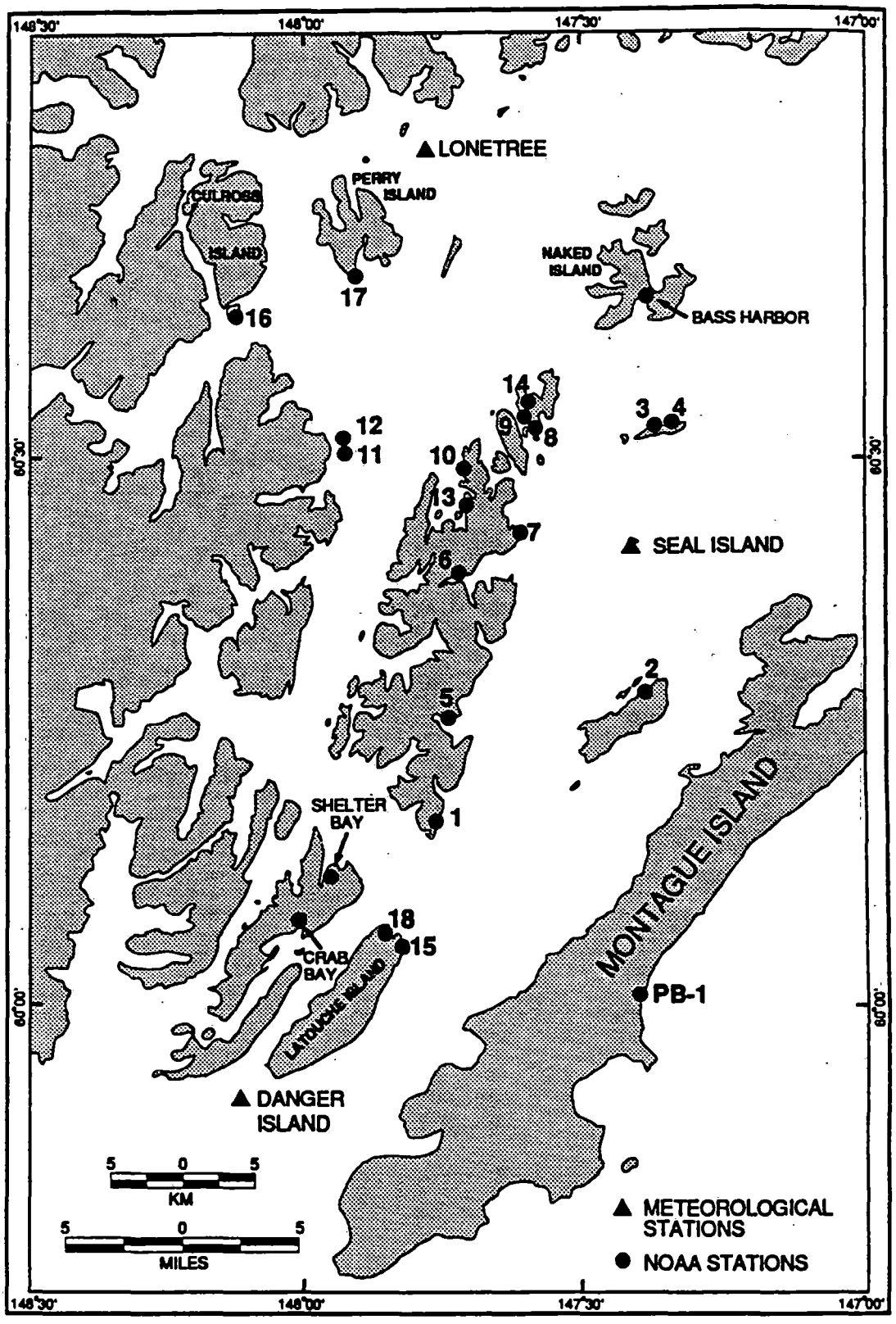
Subsurface oil was present in the middle portion of the beach. Lighter oiling graded to heavier oiling with depth. Subsurface oiling started at 10 to 25 cm depth, and MOR/HOR was discovered as deep as 43 cm in the beach.

No detectable improvement has occurred since 1992. Thicker oiled intervals were measured in 1992, but this is probably because the 1993 pits did not reach the bottom of the oil. The oil was deeper than in 1992 because of sedimentation.

TRANSECT STATION NOAA-003



NOAA transect sites from Michel and Hayes (1991)

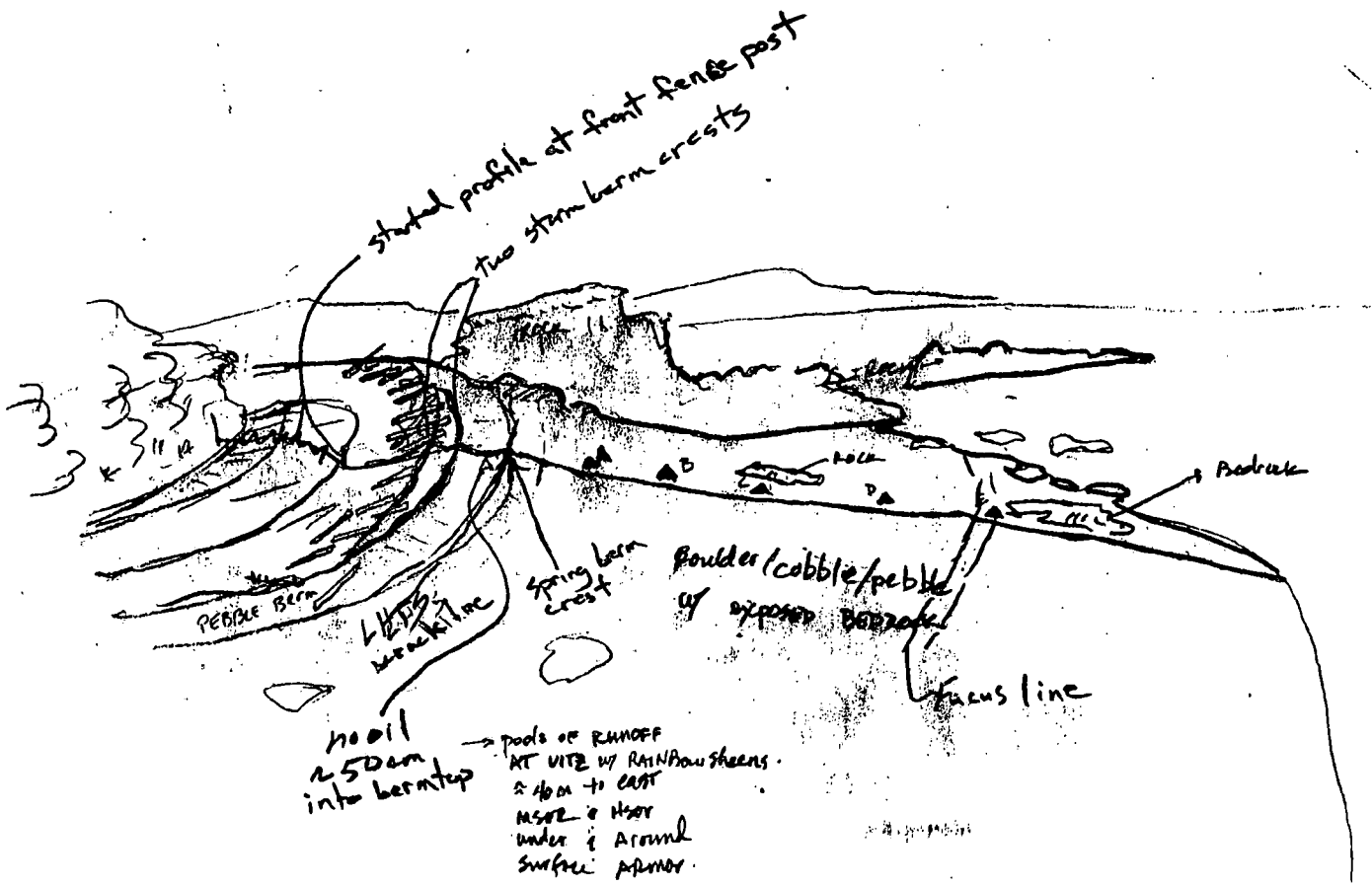


DATE 8-18-93 STATION N-3 SEGMENT Smooth B KODIAK-UNIT 14a ACCESS Boat TIME

LOCATION Smith Island PWS LOW-TIDE TEAM MEMBERS J. Gibeaut, E Piper, K *DNR Farley, C Crosby

SEDIMENT TYPE B/C/P/Rock WEATHER partly cloudy, sun. PROFILE ANGLE ⊥ to shoreline

TRANSECT IDENTIFIER fence post PHOTOGRAPHS 93ESC002 14-25



DATE 8-18-93 STATION: N-3 SEGMENT: Smooth B. KODIAK K-UNIT: FRONT STAKE HT-(cm): 148

LOCATION Smith Island PWS. TIDAL STAGE: BACK STAKE HT-(cm):

START TIME 0630 END TIME: 0700 LOW TIDE: HIGH TIDE: RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B	C	P	G	S	SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
1.40	-4															Drift logs; grass START - FRONT STAKE = (Fence post)
0.85	-35															" "
0.52	-7															Back storm berm edge grass
1.52	+49				50	50										drift logs
1.10	+21				50	50										" " platy cobbles
1.85	+16				50	50										—
2.20	-26			10	45	45										storm berm crest
0.65	+27			10	45	45										drift logs.
1.25	-65			5	15	80										Another storm berm crest.
0.65	-7				5	95										—
0.55	+7				5	95										—
2.30	-62				5	95										Upper berm crest platy; LHTS
1.25	-21			10	45	45										—
2.15	-22			30	40	30										—
2.50	-23			30	40	30					A	OF LOR-MOR @ 18cm				Well-rounded
3.05	-27			60	40											Tar traces
2.70	-32			90	10						B	MOR-HOR @ 27cm				—
3.15	-30			90	10								P, L, B			Rod-shaped boulders

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 8-18-93 STATION: N-3

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2.85	-24			80	10	10					C	LOR/MOR @ 12cm	B,P,L			Rod-shaped boulders
2.67	-15			90	5	5							B,P,L			—
1.53	-13			90	8	2							B,P,L			—
1.95	-12			80	15	5							B,P,L			—
2.93	-27			70	20	10					D	OF/LOR @ 17cm	B,P,L			—
2.95	-16			70	15	15					—		B			—
2.95	-5			70	15	15							B			—
2.05	-11			70	15	15					—		B			—
3.42	-40			95	5						—		B			EDGE FUCUS
2.50	-25			90	5	5					E	TRACE @ 10cm	B,F			
3.90	-29			90	5	5							B,F			—
2.80	-4			90	5	5							B,F,A			Bedrock
2.0	-28			90	5	5							B,F,A			—
2.90	-8			90	5	5							F,A			—
2.80	-28			90	5	5							F,A			Waterline 0700

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 5-18-93 STATION NOAA #3 SEGMENT SM006B

93JCG003 #3-

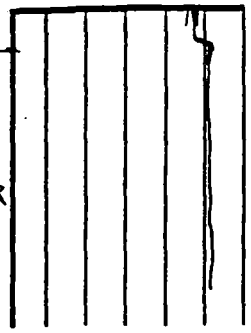
Oiling description	Profile	Seds	Framework	Matrix

A- Surface layer V.W. rounded L. cobbles small boulders interstitial L. pebbles

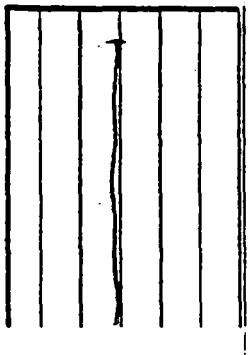
B- L. cobble and boulder framework w/ sandy pebble gravel

photo # 1 - #2

mean grain size M S G P C B



mean grain size M S G P C B



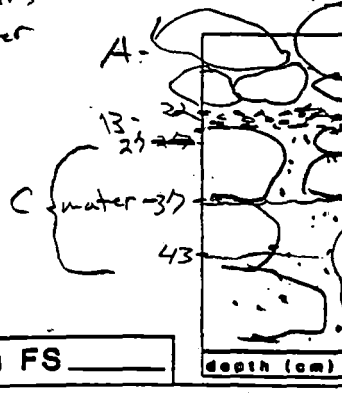
Pit A (m) From FS ____

A- Surface boulders + L. cobbles 2-3 layers

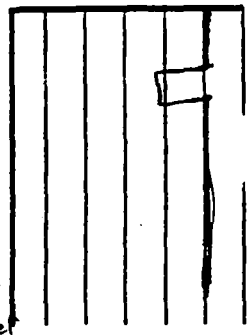
B- clean pebble layer

C. boulder / L. cobble framework w/ sandy pebble matrix

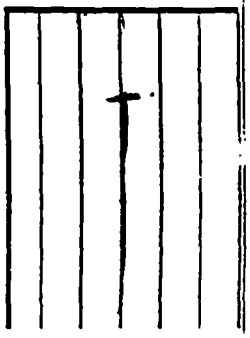
photo # 4 & 5



mean grain size M S G P C B



mean grain size M S G P C B



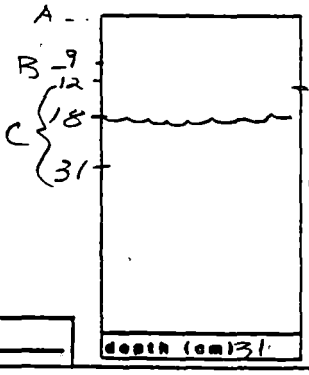
Pit B (m) From FS ____

A —

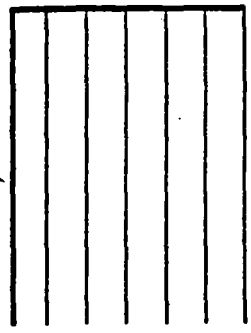
B — stratigraphy same as above

C —

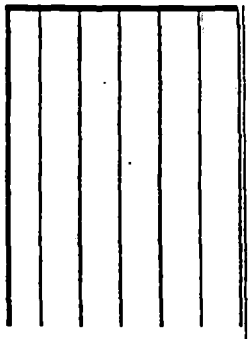
photo # 6 ?



mean grain size M S G P C B



mean grain size M S G P C B



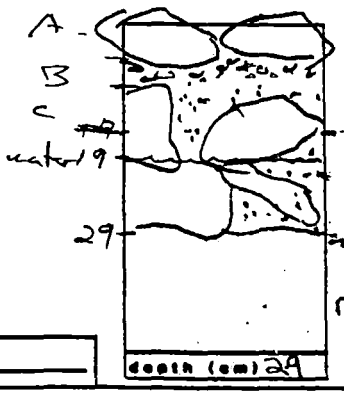
Pit C (m) From FS ____

A

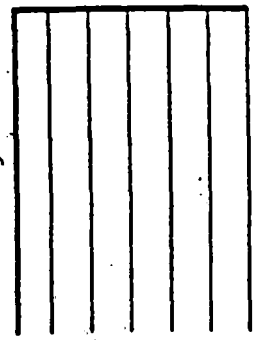
B — start same as C

C —

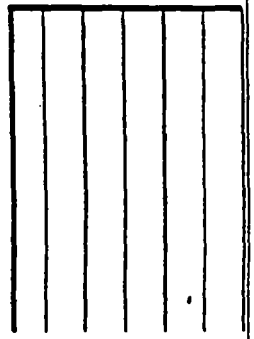
photo # 7



mean grain size M S G P C B



mean grain size M S G P C B

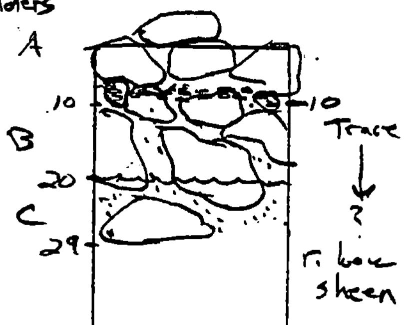


Pit D (m) From FS ____

gnature ____

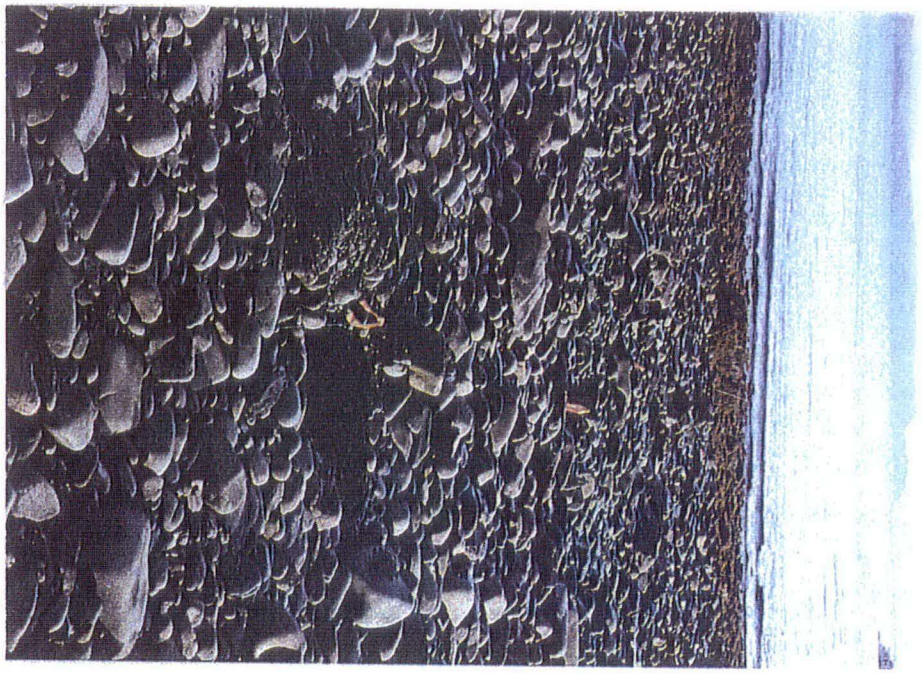
2/2

DATE 8-18-93 STATION NOAA #3 SEGMENT SM006B

Oiling description	Profile	Seds	Framework	Matrix
A - Surface w/ rounded boulders fucus B - boulder framework w/ sandy, granular pebble matrix - no clean pebble layer underlying surface layer as in above pits Pit E (m) From FS ____	 depth (cm) 29		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ____ (m) From FS ____	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B

Signature ____________________

NOAA-3 2/2



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:View down transect NOAA #3. Pit locations are marked with orange flagging.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 26 EVIDENCE ID#:_____

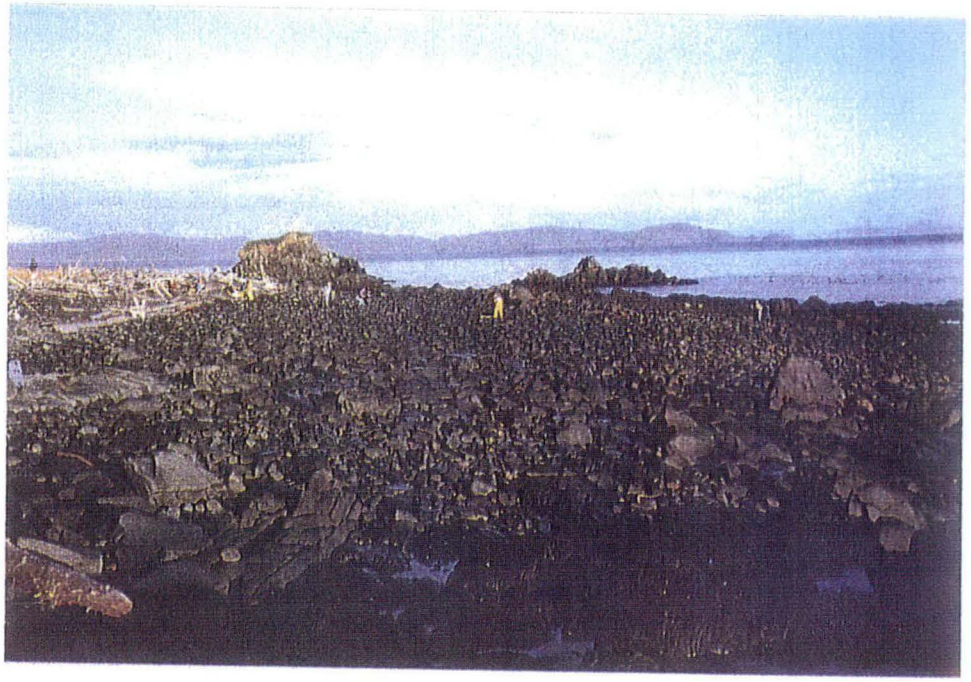
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:View down transect NOAA #3. Pit locations are marked with orange flagging.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 25 EVIDENCE ID#:_____

NOAA-3 1/2



OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan (13-24) from eastern end of sub-segment to north and west. The survey crew is located along transect profile.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 14 EVIDENCE ID#:_____

14

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan (13-24) from eastern end of sub-segment to north and west. The survey crew is located along transect profile.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 13 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan (13-24) from eastern end of sub-segment to north and west. The survey crew is located along transect profile.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 16 EVIDENCE ID#:_____

16

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1000

SEGMENT#: SM006 STATION#: NOAA #3
LOCATION: Smith Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:Pan (13-24) from eastern end of sub-segment to north and west. The survey crew is located along transect profile.

TAKEN BY: Clara S. Crosby INITIALS:_____
ROLL #: 93CSC002 FRAME #: 15 EVIDENCE ID#:_____

15

NOAA - 006

TRANSECT: NOAA-6

SEGMENT: KN 007 A

LOCATION: Bay of Isles Group, West Arm.

OTHER STUDIES
Set-aside site.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect runs across a low and narrow, bedrock protuberance. The upper surface is a platform with angular pebbles, cobbles, and boulders between outcrops. The subsurface sediment is muddy. Sediments are best described as a rubble derived from the weathering of the bedrock. Pits can only be dug in selected locations and to depths of only 20 cm. The narrow platform rapidly drops off and angular boulders and fractured bedrock occur on the steep seaward slope.

The discrepancy in the plotted profiles for 1992 and 1993 is due to the surveys taking a slightly different path across the shore. The profile is very stable.

Environmental Sensitivity Index (ESI)

Type 8; sheltered rocky.

Fetches and Directions (kilometers)

E= 10

Energy Level

Low.

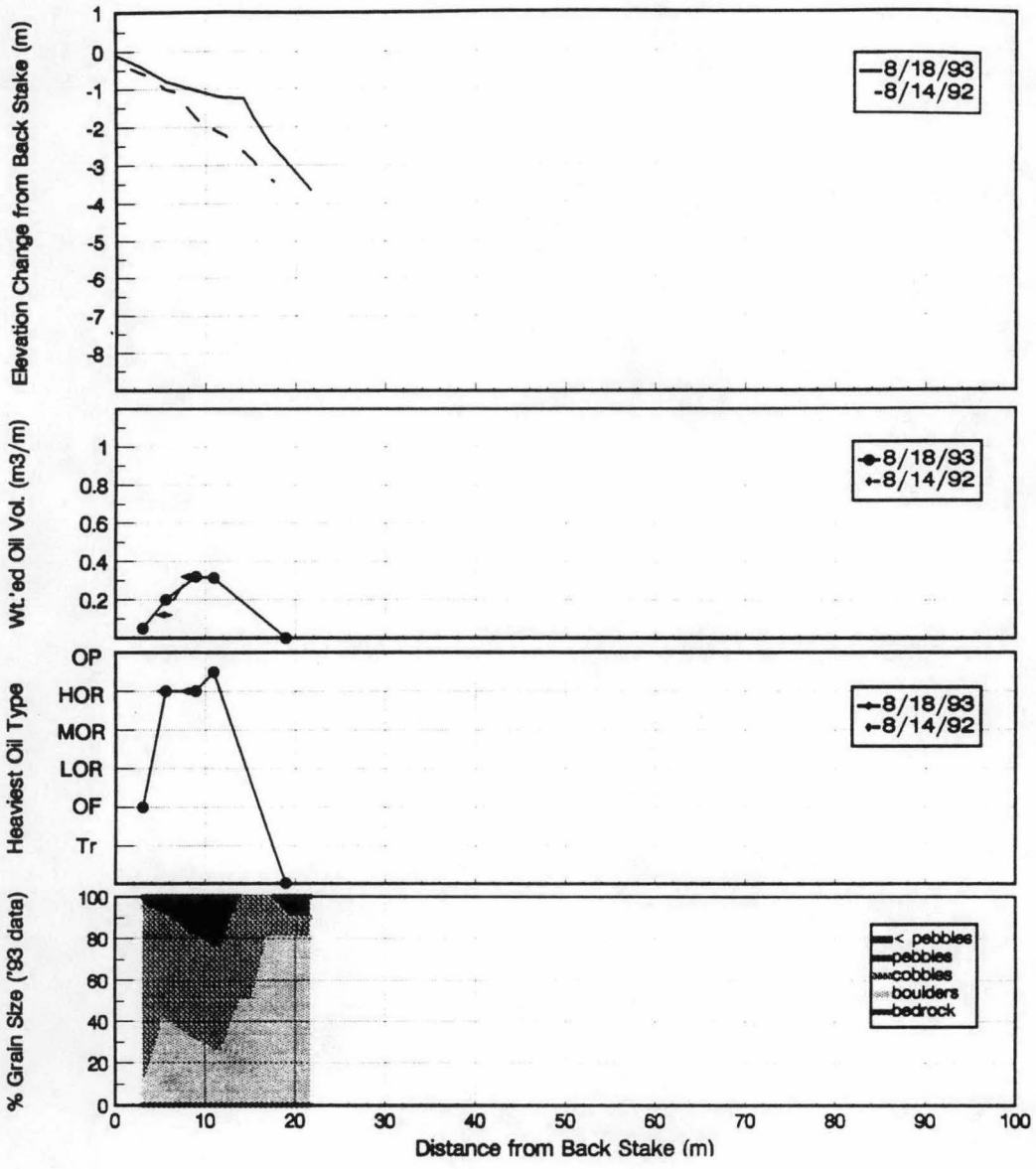
GENERAL BIOLOGICAL SETTING

OILING SUMMARY

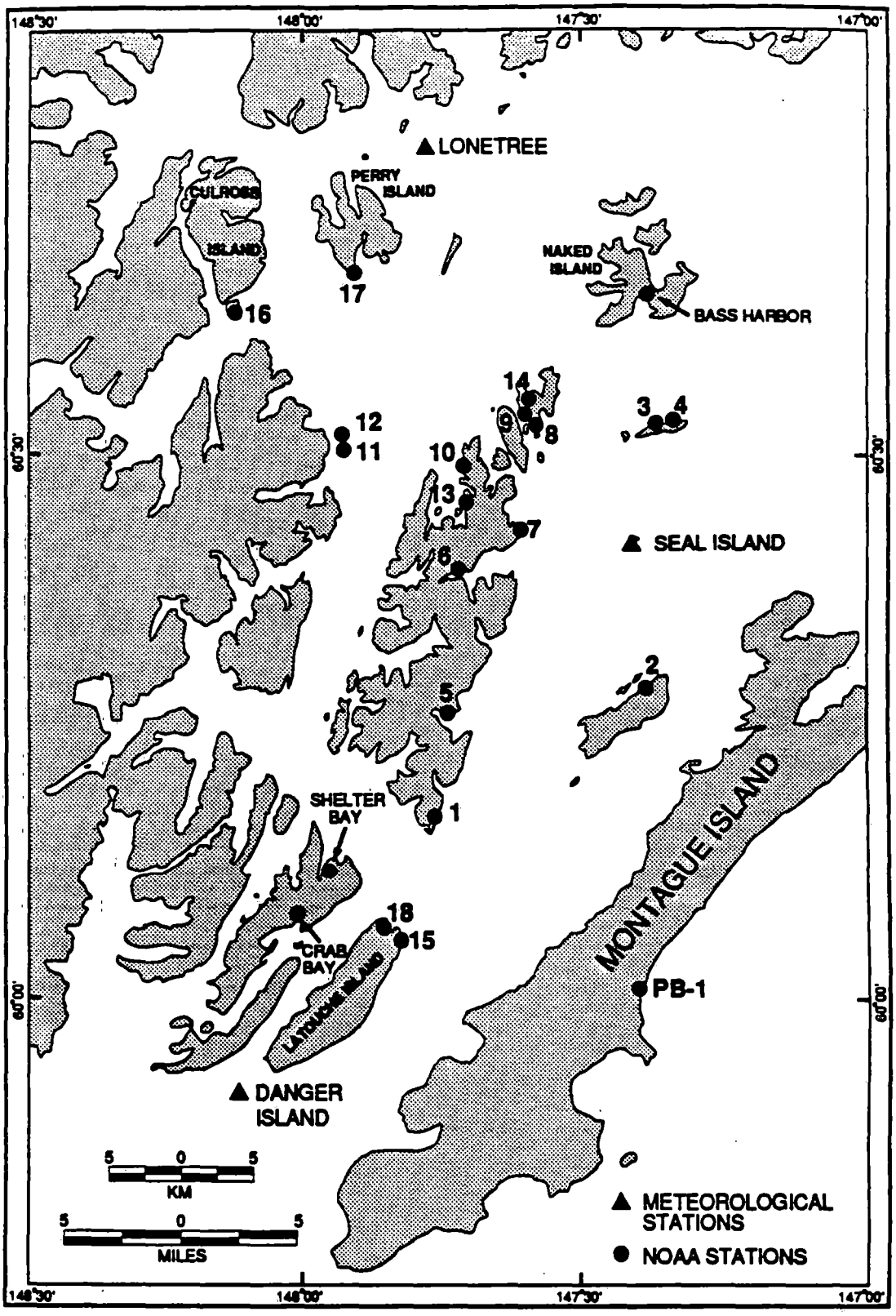
Surface AP, CT, and ST cover about 10% of the upper platform, and there has been no improvement since 1992. Areas of significant surface oil also occur to the east and west of the transect.

Pits revealed tarmats just below an "open" surface layer. Typically, the tarmats are dry on top and shiny black or dark brown below. Oil below the mats is classified as HOR or OP and extends from 5 to 13 cm depth. Deeper oil penetration is prevented by a mud layer. The mats may be hard or "loose". No detectable improvement or change in oiling character has occurred at this site since the summer of 1992.

TRANSECT STATION NOAA-006



NOAA transect sites from Michel and Hayes (1991)

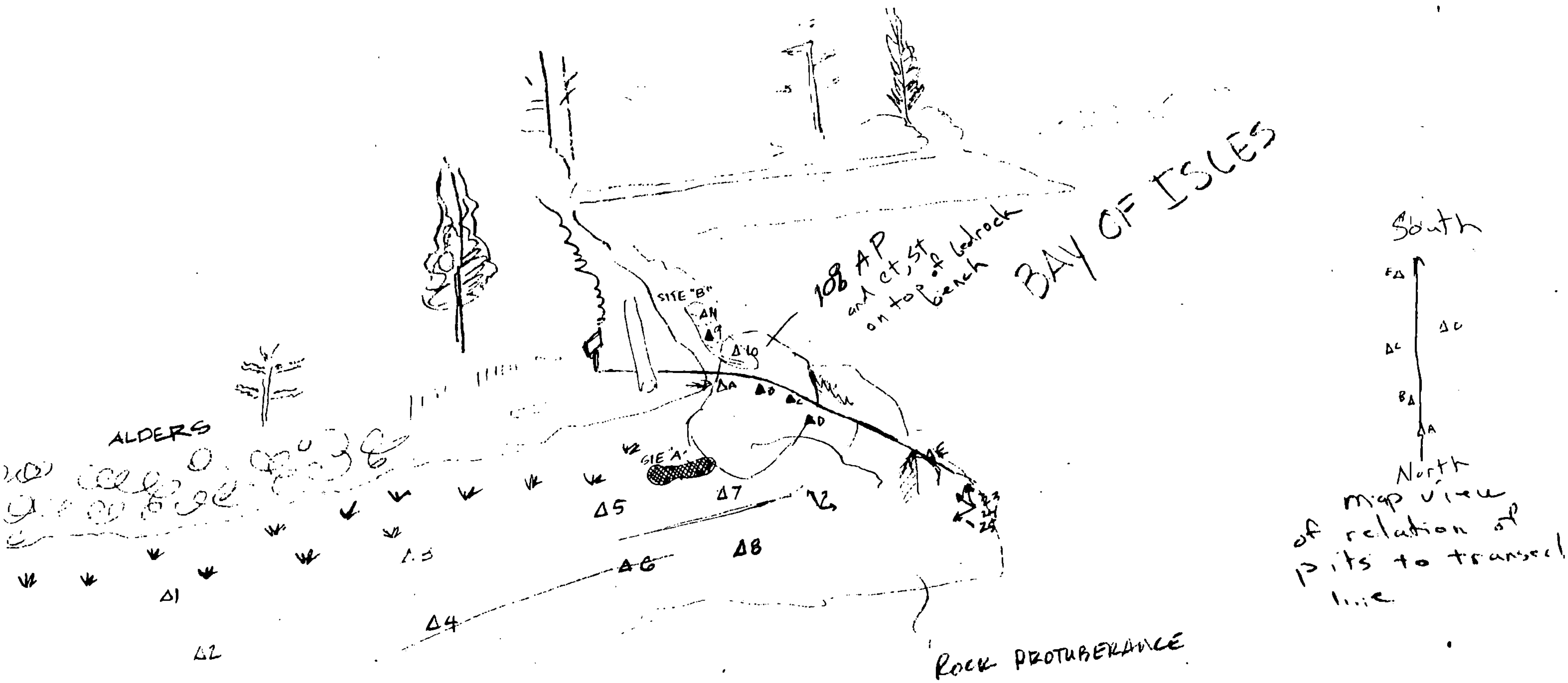


DATE 8-18- STATION N-6 SEGMENT KN007 A K[illegible]AK-UNIT N/A ACCESS BOAT TIME

LOCATION BAY OF ISLES, KNIGHT ISLAND, PWS LOW-TIDE 2032 TEAM MEMBERS J. GIBEAUT, DAVIDSON, J. MATTHEWS, C. KOSKI

SEDIMENT TYPE R/B/C WEATHER OVERCAST PROFILE ANGLE

TRANSECT IDENTIFIER Rebar PHOTOGRAPHS 93CSC003 16-25



See notes on back

DATE 8-1 93 STATION: NOAA 6 SEGMENT: KN007A KODIAK K-UNIT: N/a FRONT STAKE HT-(cm): 1-9

LOCATION West Arm Bay of Isles TIDAL STAGE: EBB +4 BACK STAKE HT-(cm): NOIE

START TIME 1825 END TIME: 1840 LOW TIDE: 2032 -0.4 HIGH TIDE: 0243 13.4 RecKey:

HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
3.05	-35			5	90	5			1	AP	A	No -				GRASS
2.55	-35			40	50	10			20	AP	B	MOR				
1.65	-12								1	CT,ST						
1.65	-12			30	50	20			1 40	CT,ST AP	C	HOR 6 to 13				Bedrock
2.0	-14			25	50	25			40	CT,ST AP	D	7 - 11 HOR/OP				
1.05	-5			25	50	25			2 40	CT,ST AP						Bedrock
2.25	-1			50	50				<1	CT,ST						Bedrock
1.27	-57			50	50				—				L			
1.65	-62			80	20				<1	Tar			B,L			Bedrock
1.95	-48			80	10	10					E	No -	B,M,L,F			No oil sparse fucus
2.70	-75			80	10	10							B,M,L,F			waterline 1840 Bedrock, sparse fucus

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

H_2O table

Δ1 | 13cm | NO | 8-13 | CPG/PG | UITZ

Δ2 | 17cm | NO | 12-17 | CPG/PG | MITZ

Δ3 | 19cm | NO | 13-19 | CPG/PG | UITZ

Δ4 | 18cm | NO | 4-18 | CPG/PG | MITZ

Δ5 | 14cm | NO | 12-14 | CPG/PG | UITZ

Δ6 | 15cm | NO | 9-15 | CPG/PGS | MITZ

Δ7 | 17cm | NO | 11-17 | CPG/TGS | UITZ

Δ8 | 14cm | NO | 9-14 | CPG/TGS | UITZ

No subsurface noted West of transect line

▲9 | 10cm | oiled zone 0-5cm | Clean below Y | BCP/PG | UITZ | surface AP to subsurface HOR

Δ10 | 17cm | NO | BCP/PGS | MITZ

Δ11 | 14cm | NO | BCP/PGMR | UITZ

SITE "A"

* West of transect line - surface oil as AP/SOR at grassline in UITZ/SUPRA - sporadic in a 2m x 7m area *

SITE "B" East of transect line 3m x 10m... Patchy 2 16% AP/SOR in UITZ interstially among boulders and on R-CT/CV/TB

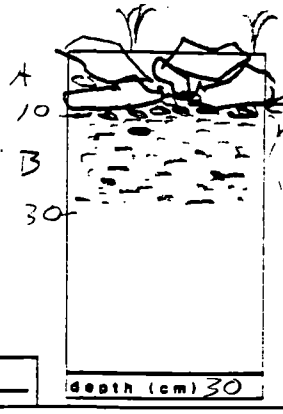
DATE 2-18-93 STATION NCAA #6 SEGMENT KNOCK A

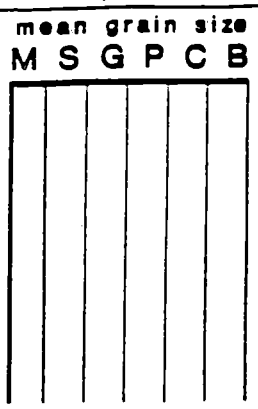
#12

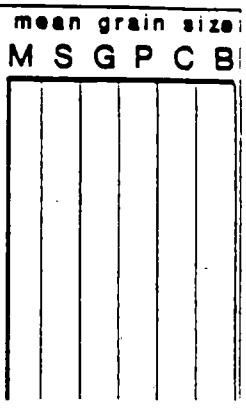
Oiling description	Profile	Seds	Framework	Matrix

A - Angular cobbles, small boulders w/ interstitial and underlying pebble layer

B - pebbly, sandy mud roots







Pit A (m) From FS ____

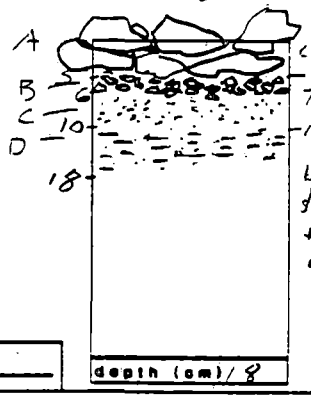
A - ~~Sa~~ Angular cobble + boulders

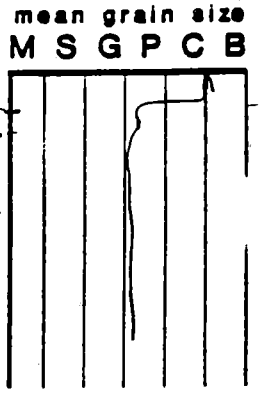
B - Angular pebble layer

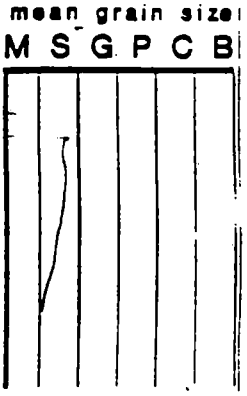
C - Sandy, granular small pebble gravel

D - pebbly, muddy sand

photo #13



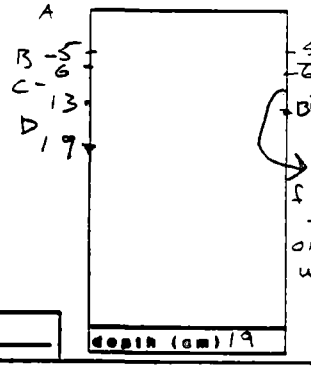


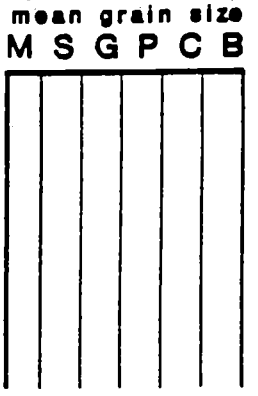


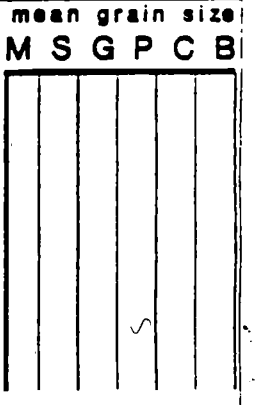
Pit B (m) From FS ____

A
B
C
D
same stratigraphy as pit B

photo #14







Pit C (m) From FS ____

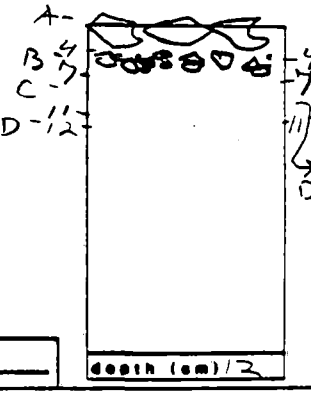
A - Angular cobbles, pebbles + bedrock

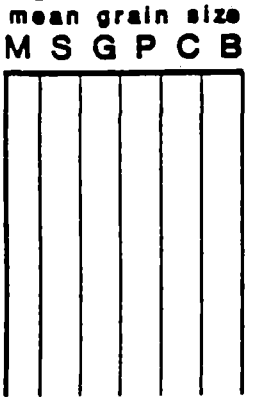
B - Angular pebble layer

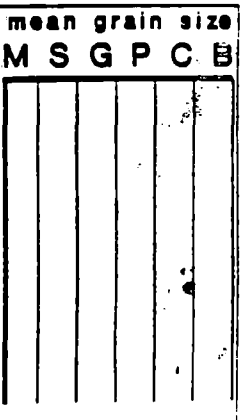
C - Sandy, granular, small pebble gravel

D - pebbly, sandy mud

photo #15







Pit D (m) From FS ____

photo #16 <1m seaward of pit #D

Signature _____

STOCK# PPV840-000

18

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT: KN007 STATION: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is from western side of transect and of location of pit "D".

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 18 EVIDENCE ID#:_____

17

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT: KN007 STATION: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is of western side of transect. Angular boulder/cobble overlying shallow bedrock.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 17 EVIDENCE ID#:_____

20

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT: KN007 STATION: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is down transect and pit locations. Gibeaut logging pits (pit "B"). Pit locations marked by orange survey flagging.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 20 EVIDENCE ID#:_____

19

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT: KN007 STATION: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is from western side of transect and of location of pit "D" (orange flagging)

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 19 EVIDENCE ID#:_____

NOAA-6 2/3

22

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is from west side of transect showing limited fetch, pit locations, and surface sediment.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 22 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is down transect and pit locations. Gibeaut logging pits (pit "B"). Pit locations marked by orange surveyflagging.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #:93CSC003 FRAME #: 21 EVIDENCE ID#:_____

21

23

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is from UITZ showing limited fetch, pit locations, and surface sediment.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 23 EVIDENCE ID#:_____

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

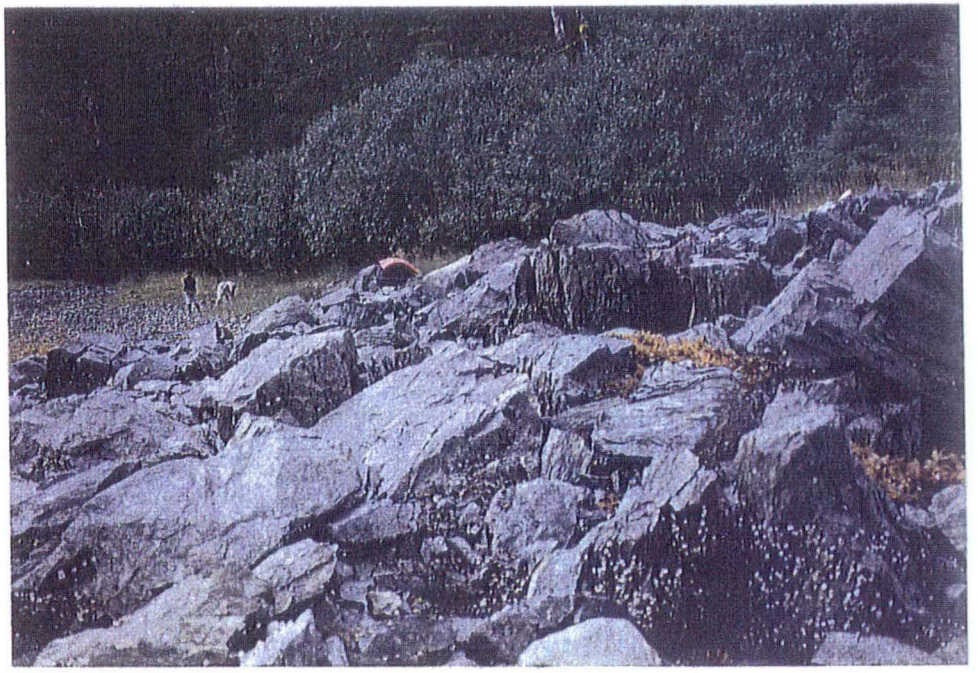
SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is from LITZ up transect. Shows "protective" bedrock outcrop in MITZ and large angular surface sediment.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 24 EVIDENCE ID#:_____

24

20th Century Plastics
1-800-767-0777
STOCK# PPV840-000

NOAA-6 3/3



26

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; view is of beach to west side of transect.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 26 EVIDENCE ID#:_____

25

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 08/18/93 TIME: 1825

SEGMENT#: KN007 STATION#: NOAA #6
LOCATION: Knight Island, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:NOAA station #6; LITZ view of the beach on the eastern side of transect showing Lg surface seds and bedrock.

TAKEN BY: Clara Crosby INITIALS:_____
ROLL #: 93CSC003 FRAME #: 25 EVIDENCE ID#:_____

TRANSECT: NOAA-13

SEGMENT: KN 5000

LOCATION: Knight Island North Group, southeastern Herring Bay.

OTHER STUDIES
Set-aside site.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect crosses a steep, 25 m wide beach. A bedrock protuberance is 30 m to the east, and to the west, the beach narrows to an even steeper rubble shore. The upper intertidal is mostly angular boulders. Boulders become interspersed with cobbles and pebbles in the middle intertidal, and the lower intertidal consists of mixed sand and gravel. Thus, the down-beach fining of grain size is pronounced.

Pits in the beach reveal that surface boulder and cobble armor in the upper portion of the upper intertidal is underlain by a boulder and cobble framework with a pebble and granule matrix that fines with depth to slightly muddy, sandy, pebbly, granules. The matrix at depth is also slightly organic. Lower on the beach where surface boulders become mixed with cobbles and pebbles, the sediment immediately below the surface armor is small to large pebbles. Below this 10 cm pebble layer is a muddy, organic sand. In the lower intertidal, cobbly, pebbly sand becomes slightly muddy (organic and brown) at about 5 cm below the surface.

There was no net change in the profiles from 1992 to 1993. The profile has a concave shape with a break in slope in the upper intertidal where boulders give way to more cobbles and pebbles lower on the beach.

Environmental Sensitivity Index (ESI)

Type 8; sheltered rocky.
Type 6; mixed sand and gravel.
The oiled part of the beach is sheltered rocky.

Fetches and Directions (kilometers)

S= 0.5; SW= 2.5

Energy Level

Low.

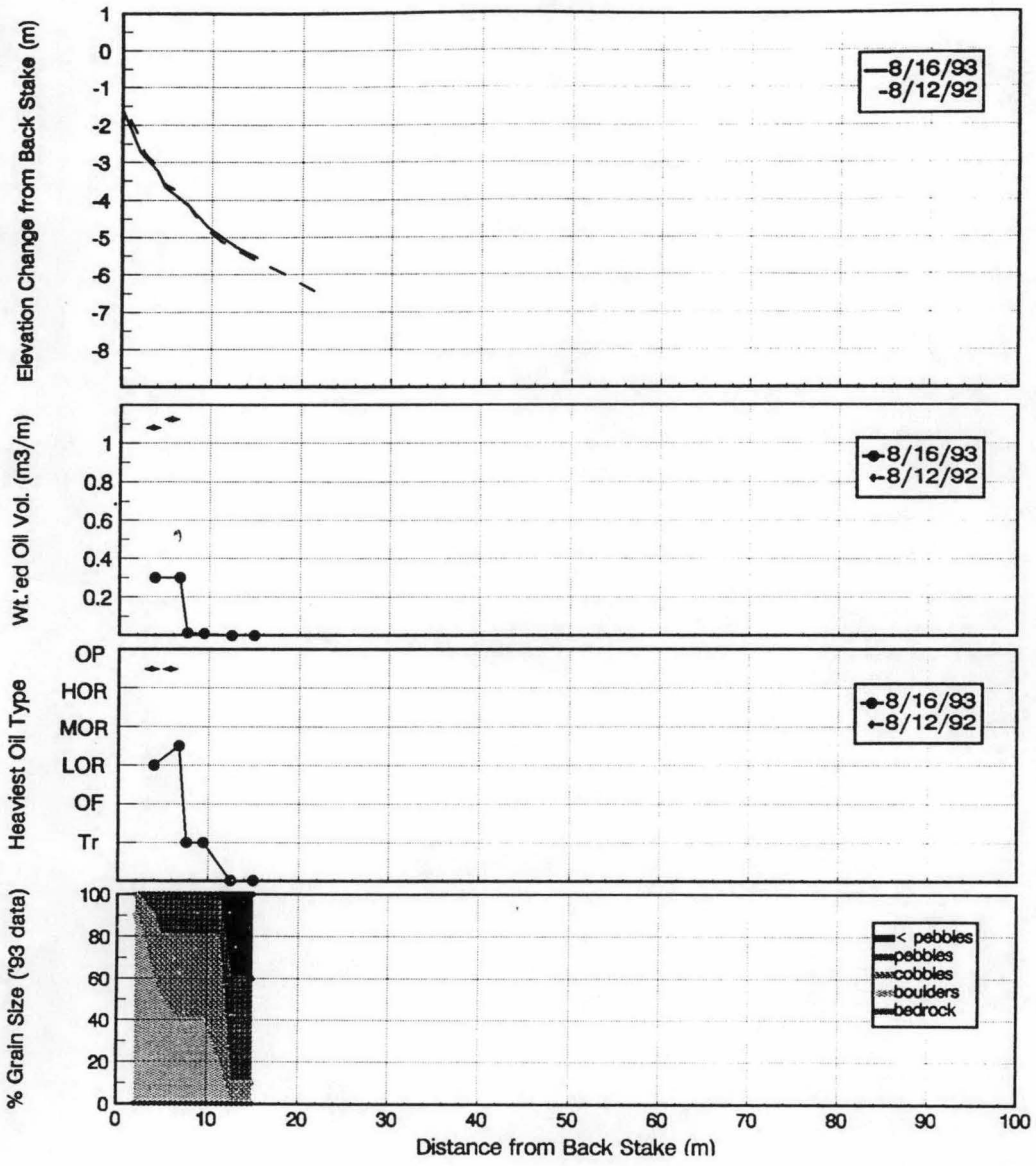
GENERAL BIOLOGICAL SETTING

OILING SUMMARY

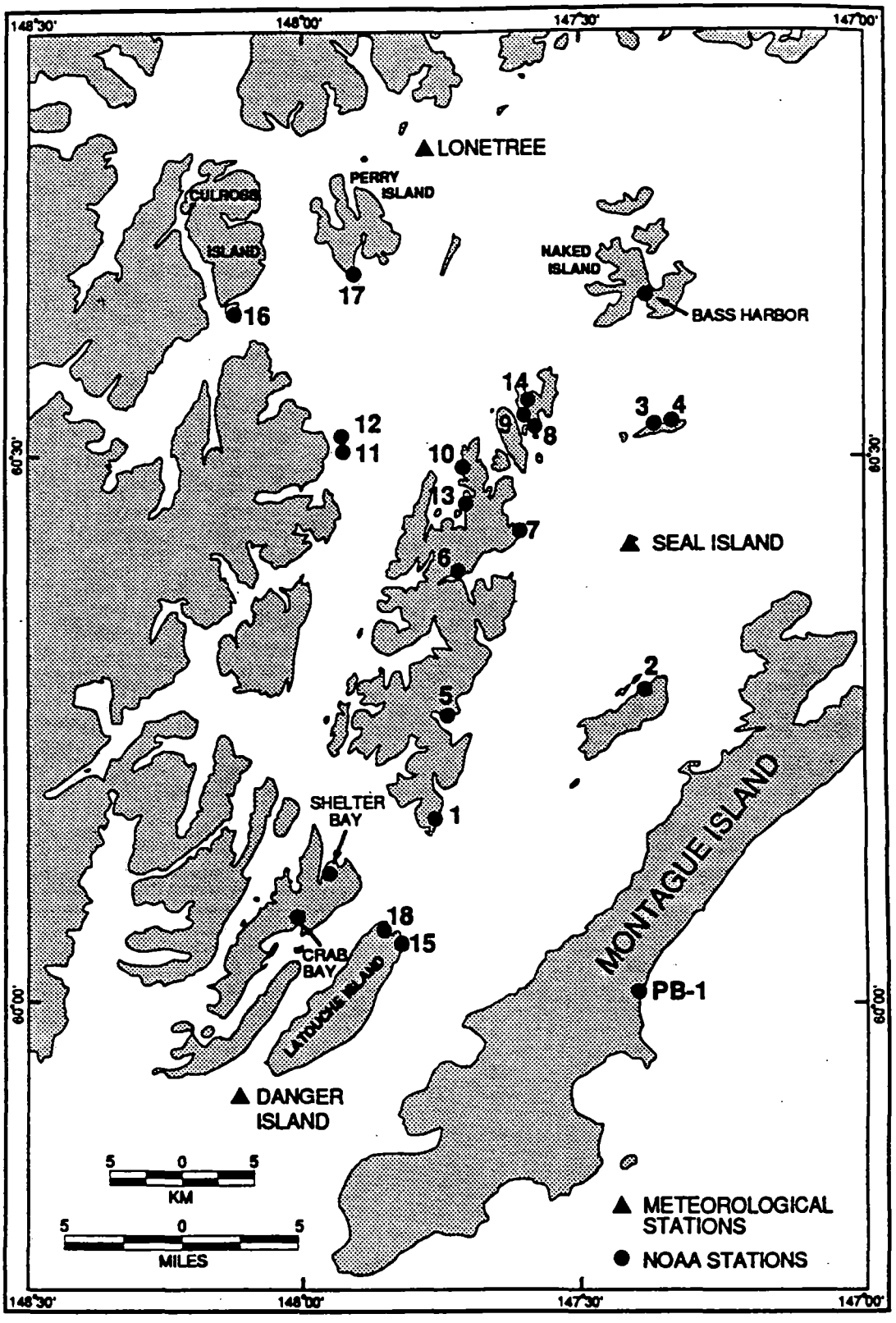
Surface oil was not detected in 1993, and only trace amounts of stain were present in 1992.

Subsurface oil in 1993 included LOR to MOR oil in the upper intertidal. The subsurface oil began at a level more than 15 cm below the surface and in a layer 12 to 15 cm thick. Oil penetration was limited by a muddy sand horizon. In 1992, the subsurface oil started at the surface and extended to 25 cm depth. The oil was also heavier in 1992, and interpreted to be HOR to OP. Thus, a significant reduction in oiling occurred at this site from 1992 to 1993. Oil removal appears to be occurring more rapidly nearer the surface.

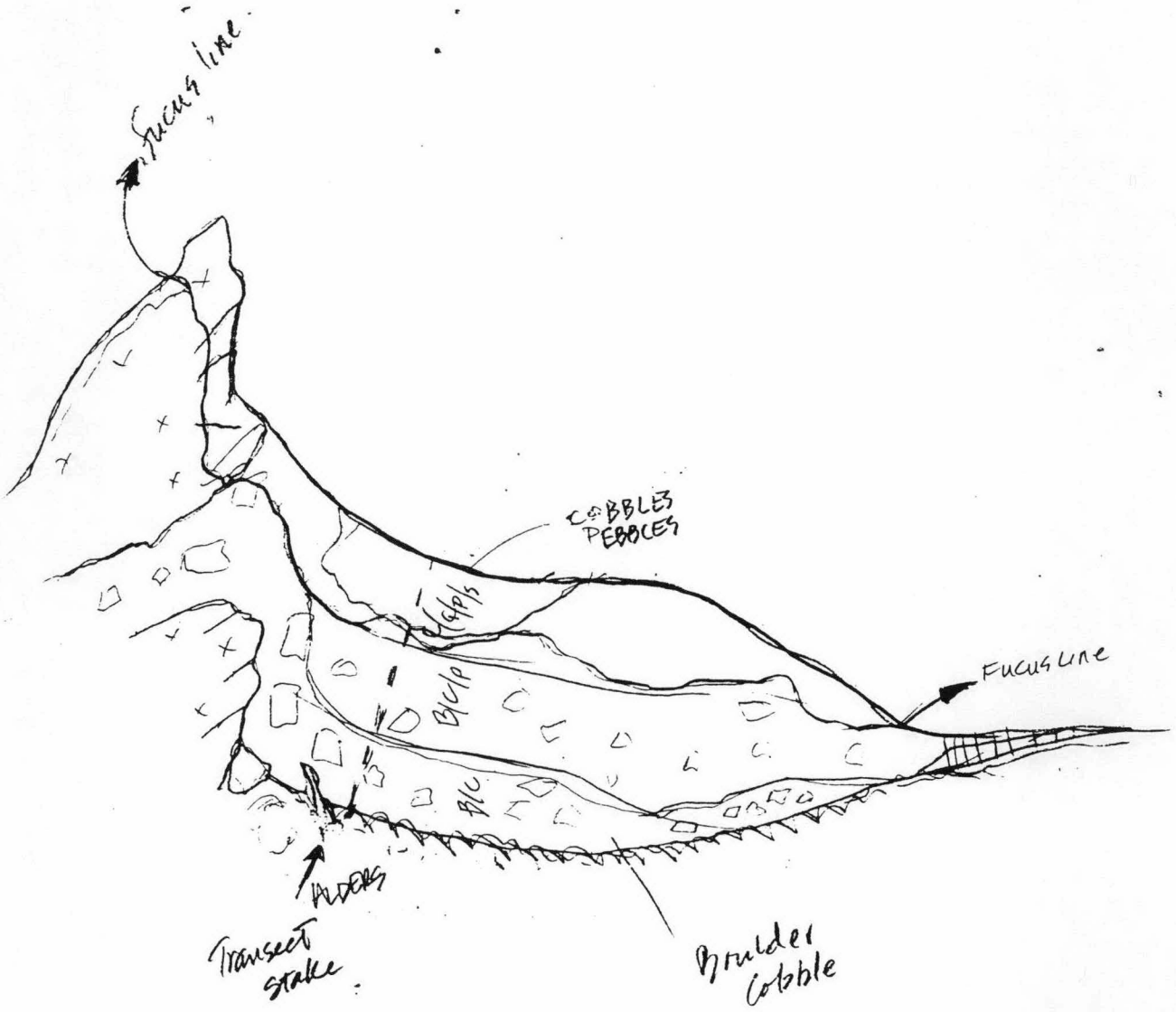
TRANSECT STATION NOAA-013



NOAA transect sites from Michel and Hayes (1991)



DATE: 08/16/93 STATION: NOAA #13
LOCATION: KNIGHT ISLAND, HERRING BAY
START: 1900 END TIME: 19:45



N-13 .

General overview —

DATE 8-16-93 STATION: N-13 SEGMENT: KNO KODIAK K-UNIT: FRONT STAKE HT-(cm): 158

LOCATION KNIGHT ISLAND, PWS TIDAL STAGE: LOW 1900 -1.8 BACK STAKE HT-(cm): NO BACK STAKE

START TIME 1900 END TIME: 19.45 pm LOW TIDE: 1900 +1.8 HIGH TIDE: 13:26 10.5 RecKey:

HORIZ m	VERT cm	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S	SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2m	1:4			90 10	—	—		—	-			FROM FRONT STAKE TO
1.95	-54 -54			60 30 10	—	—	A	—	-			TO PIT "A"
.20	-39			50 30 20	—	—		—	-			
1.95 1.95	-38			40 40 20	—	—	B	—	B			TO PIT B
.86	-16			40 40 20	—	—	C	—	BPLM			TO PIT C
1.90	-51 -51			40 40 20	—	—	D	—	BPLM			TO PIT D
1.60	-28			20 60 20					BPLMF			START OF FUCUS LINE
1.45	-24			10 50 40			E		BPLMF			TO START OF PEBBLE, G.C.
2.45	-32			10 50 40			F		BMF			TO WATERLINE AT 7.45 pm.

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

photo #1 - Pit Data Sheet

DATE 8-16-93 STATION VGAA #13 SEGMENT KN5000

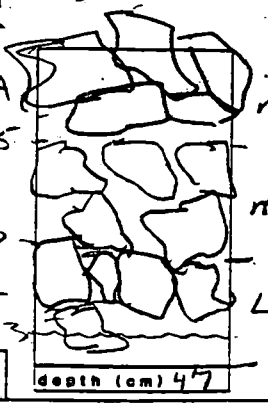
Oiling description	Profile	Seds	Framework	Matrix

A - Angular cobbles small boulders no matrix, armor

B - Angular cobble framework w/ pebble + granule matrix.

C - Same framework as above, matrix is slightly muddy sandy pebble, granular slightly organic

PHOTO #2



mean grain size M S G P C B

mean grain size M S G P C B

Pit 1A (m) From FS ____

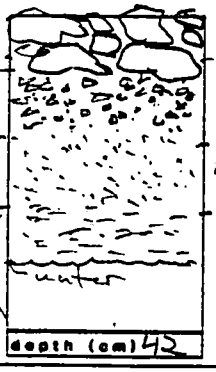
A - Surface small boulders. small to large cobbles no matrix

B - Small pebbles w/ sandy matrix

C - muddy, sandy small pebble gravel

D muddy sand

PHOTO #3



mean grain size M S G P C B

mean grain size M S G P C B

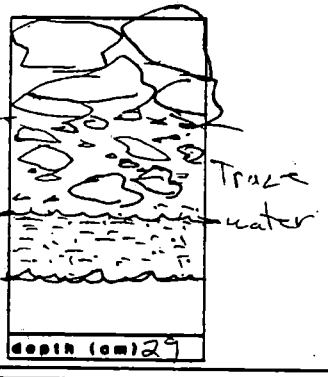
Pit B (m) From FS ____

A - Surface as above

B - pebbles small to large

C - muddy (organic) brown sand

PHOTO #4



mean grain size M S G P C B

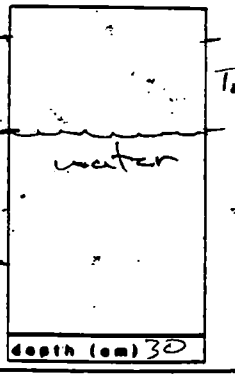
mean grain size M S G P C B

Pit C (m) From FS ____

A - Surface cobbles lather armor

B - organic muddy sandy pebble gravel

PHOTO #5



mean grain size M S G P C B

mean grain size M S G P C B

Pit D (m) From FS ____

Signature _____

ADEC SUBSURFACE OIL PROFILE /2

DATE 8-16-93 STATION NCAA13 SEGMENT KN5000

Oiling description	Profile	Seds	Framework	Matrix
A - Fucus, laminaria, mussel boulder armor B - Sandy matrix Pit E (m) From FS ___	photo # 6 A - 0 B - 8 (water) 21 depth (cm) 21	no oil	mean grain size M S G P C B	mean grain size M S G P C B
A - Scattered cobbles in sandy pebbles B - shelly sand slightly muddy (organic brown) Pit E (m) From FS ___	photo # 7 A - 4 B - 5 21 depth (cm) 21	no oil	mean grain size M S G P C B	mean grain size M S G P C B
Pit ___ (m) From FS ___	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B
Pit ___ (m) From FS ___	depth (cm)		mean grain size M S G P C B	mean grain size M S G P C B

Signature ______________________

TRANSECT: NOAA-15*

SEGMENT: LA 015 C

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

OTHER STUDIES
1992 Shoreline Assessment ground survey.

PHYSICAL SETTING

Coastal Morphology and Sedimentology

This transect is in the middle of an asymmetric pocket beach with an anadromous stream along the eastern end. A boulder area occurs along the eastern limb to the east of the stream. The western limb is a straight boulder beach more than 400 m long. The central part of the site is a rounded cobble and boulder gravel beach with well-developed high-tide berms. Pebbles form a new storm/high-tide berm, but the rest of the beach is composed of 80% boulders and 20% cobbles. The storm berm, upper, and mid-intertidal zones were significantly altered in 1990 and 1991 by a storm berm relocation operation and tilling.

Stratigraphy generally consist of a surface layer of rounded cobbles and boulders several layers thick. Below this surface armor is a matrix free pebble layer about 5 cm thick. The pebble layer overlies cobbles and boulders with a sandy, pebbly, granule matrix. Organic debris and slightly muddy sediments may occur as matrix at depth.

A prominent, old, vegetated drift log storm berm is present at the transect. Below this berm is a much smaller and newer partially vegetated storm berm that is composed of pebbles and contains drift wood and wrack. In 1993, a broad low-relief berm made of well-rounded cobbles and boulders was present seaward of the new storm berm. This feature is clearly visible in photos taken looking down the transect. In 1992, the profile had what was described as a neap berm in this location, and it was smaller than the 1993 feature. The 1992 profile displayed three berm-like, boulder ridges across the middle and lower intertidal, but by 1993, these features were smoothed and the profile was linear and only slightly wavy with no pronounced breaks in slope except in the lower intertidal. In 1993, the lower intertidal had a distinct berm with slightly finer grained sediments (fewer boulders and more cobbles) on the berm top.

From 1992 to 1993, the profile aggraded across the entire beach below the new storm berm. The amount of aggradation increased down beach from 20 cm in the upper intertidal to 50 cm in the lower intertidal zone.

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* For more information on this site see the 1993 Shoreline Assessment Data Report: Volume 3

Comparing the 1992 and 1993 data demonstrates that this beach has been very active. It would be instructive to analyze monthly profiles measured during the winter of 1989/90 and profiles taken before and immediately after the berm relocation and tilling operations in 1990 and 1991. This analysis would help in deciphering natural and unnatural sediment dynamics at this site.

Environmental Sensitivity Index (ESI)

Type 7; gravel beach.

Fetches and Directions (kilometers)

NE= 110

Energy Level

High.

GENERAL BIOLOGICAL SETTING

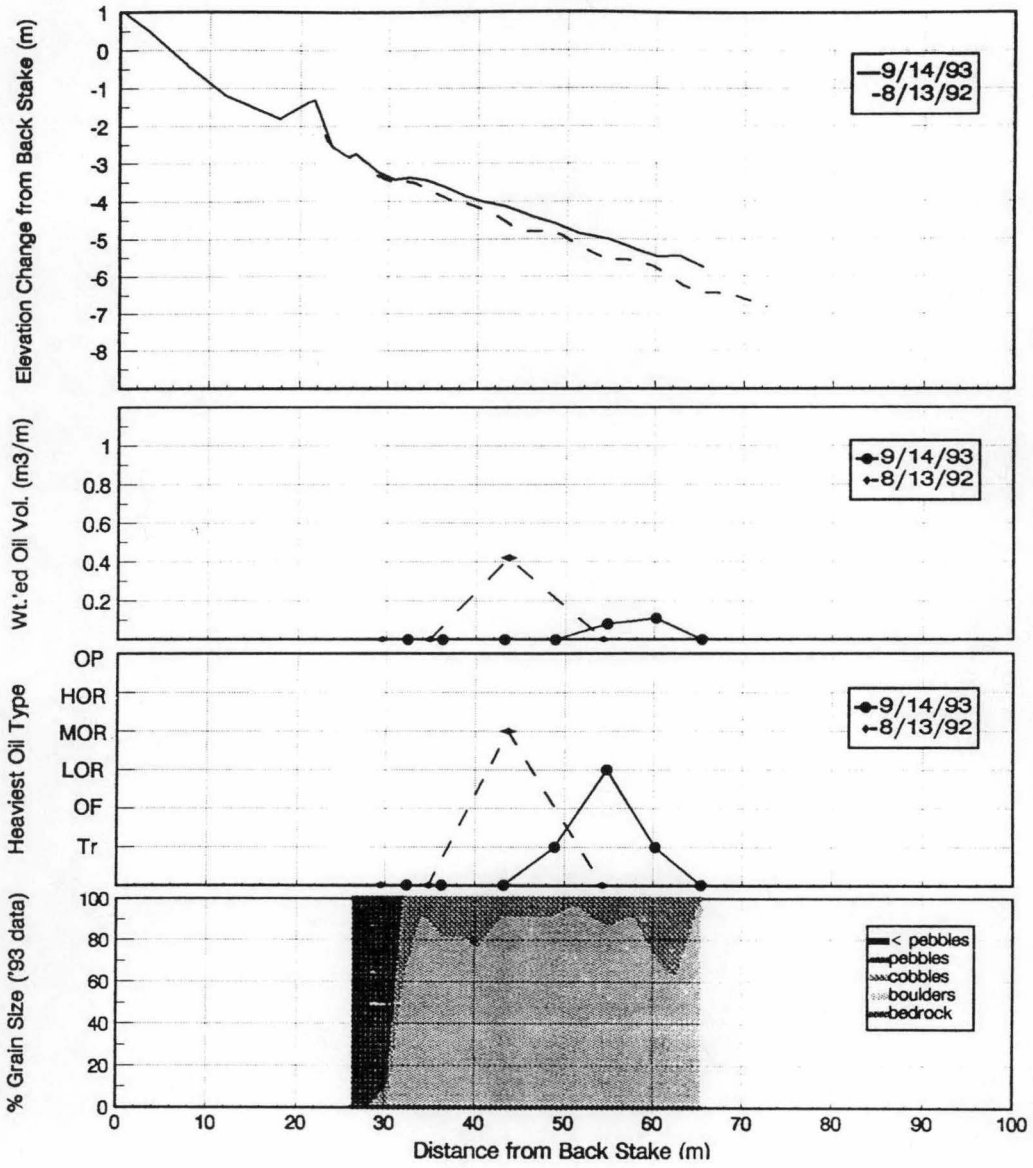
Anadromous stream.
Eagle nest.
Deer harvesting.

OILING SUMMARY

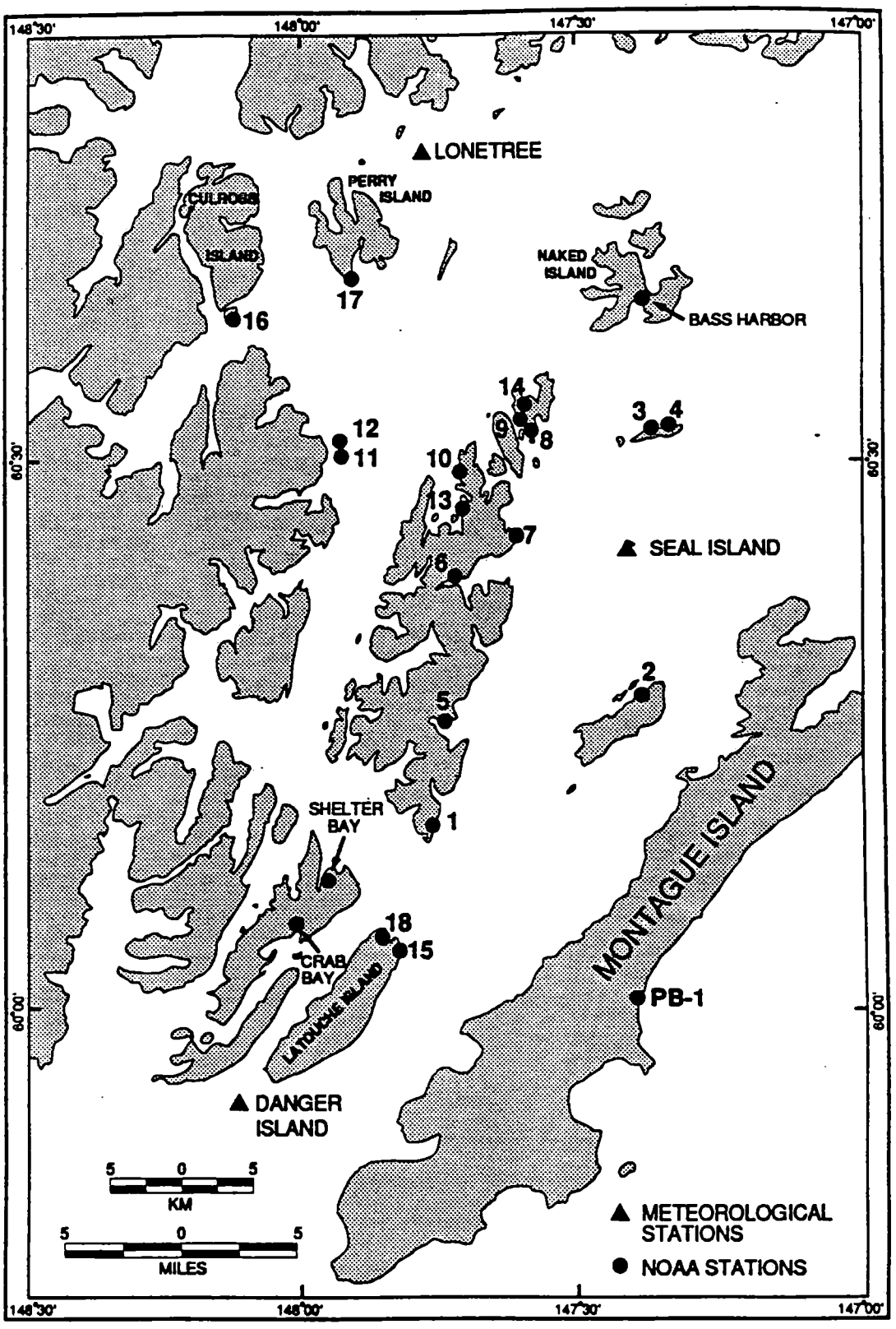
Only trace amounts of surface stain were noted in 1992 and 1993.

Discontinuous lenses of LOR were found in one pit and Tr in two pits in 1993. These pits were in the mid-intertidal zone. In 1992, only one pit with MOR was discovered in the upper intertidal zone. This beach continues to improve and in 1993 had minimal oiling.

TRANSECT STATION NOAA-015



NOAA transect sites from Michel and Hayes (1991)

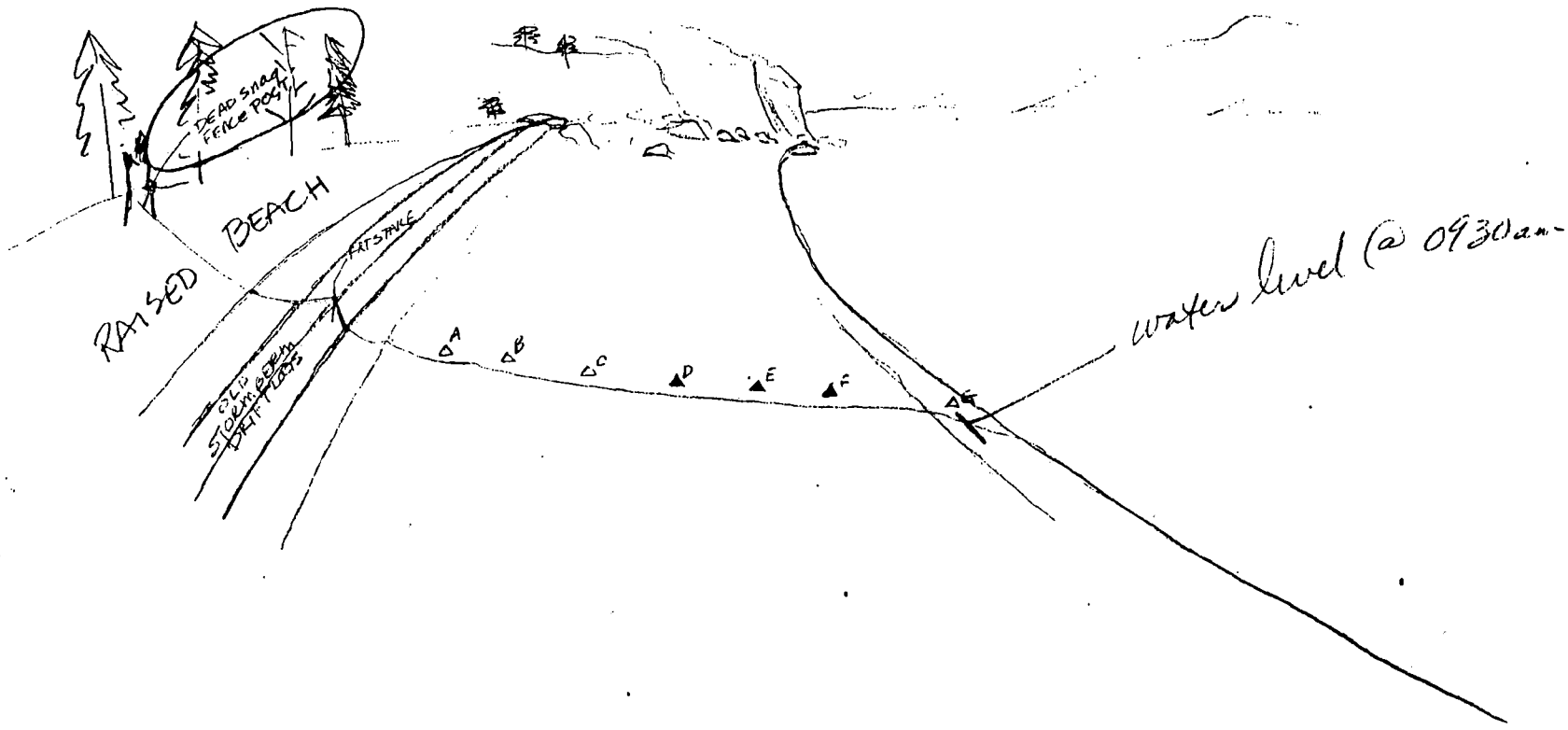


DATE 9-14-93 STATION NOAA #15 SEGMENT LA015C KODIAK-UNIT _____ ACCESS Helo - TIME 0830

LOCATION Katouche Is. PWS. LOW-TIDE 0632 -0.6 TEAM MEMBERS D. Munson, E. Piper, C. Crowley

SEDIMENT TYPE B/C/P WEATHER clear → light fog PROFILE ANGLE _____

TRANSECT IDENTIFIER two fence post PHOTOGRAPHS 93CSC008



DATE 9-14-93 STATION: NOAA #15 SEGMENT: LA015C KODIAK K-UNIT: — FRONT STAKE HT-(cm): _____

LOCATION LATOUCHE ISLAND TIDAL STAGE: FLOOD BACK STAKE HT-(cm): _____

START TIME 0830 END TIME: 0930 LOW TIDE: 0632 -0.6 HIGH TIDE: 1250 11.6 RecKey: _____

HORIZ m	VERT cm	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S	SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
3.5	-63											FROM BACK STAKE AT BASE OF DEAD SNAG - EDGE OF WOODS/GRASS
4.04	-84											GRASS
4.1	-77											COBBLES/ GRASS
2.88	-31											COBBLES/GRASS small spruce
3.19	-33											TO BACKSHORE OF STORMBERM DRIFT -
3.06	+44				<1%	1mm						STORM BERM - DRIFTLOGS - TARBALL/CT/CV on logs.
* .80	+7											TO FRONT STAKE (FENCE POST) - READING TAKEN FROM TOP OF DRIFTWOOD PILE AT STAKE.
2	-1.23											DRIFTLOGS - BERM FACE -
1.93	-31				<1%							SPLATTERED DRIFT - COBBLE
.80	+11			P 100								TO TOP OF BERM
2.31	-47			P 100								BERM FACE TO WRACK
2	-23			C 10 P 90								TO EDGE OF WRACK
1.8	+6			C 60 / C 40			A	NO OIL				TO PIT "A"
1.89	-8			C 90 / C 10								
2	-16			C 80 / C 20			B	NO OIL				TO PIT "B" JUST ABOVE LHTL
2.2	-25			C 80 / C 20								
2	-15			C 75 / C 25								
2.7	-14			C 90 / C 10			C	NO OIL				TO PIT "C"

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks

Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 9-14-93 STATION: NOAA site #15

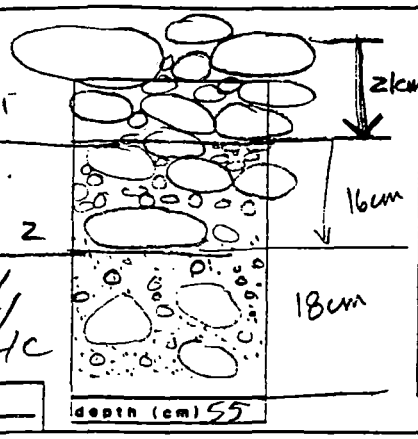
HORIZ	VERT	HORIZ CUM	VERT CUM	GRAIN SIZE (%) B / C / P / G / S					SURFACE OIL (%)	SURFACE OIL Thick	PIT#	SUBSURFACE OIL	BIOLOGY B,M,F,P,W,A,L	SAMPLE#	SAMPLE DEPTH	COMMENTS
2.7	-23			90	10											
3	-22			90	10						"D"	undefined T/sheen				To Pit "D"
2.4	-25			95	5								B			
3.45	-15			85	15						"E"	LOR.	BLP			To Pit "E"
2.9	-25			90	10								BLP			
2.54	-21			70	30						"F"	UNDEFINED TRACE	BLP			TO PIT "F"
2.55	+1			60	40								BLP			
2.65	-31			95	5						"G"	under H_2O @ 9:30 am - no sheen or oil noted -	BLP			TO PIT "G" WATERLINE @ 0930

Biology Key: B = Barnacles, M = Mussels, F = Fucus, P = Periwinkles, A = Algae, L = Limpets, W = Whelks
Oil Thickness Scale: [<.10 mm = Stain] [.10 mm to 1.0 mm = Coat] [>1.0 mm = Cover]

DATE 9-14-93 STATION NOAA #15 SEGMENT LA015C

Oiling description	Profile	Seds	Framework	Matrix

B/C/P
– SECTION 1
NO OIL
P/C
– SECTION 2
Photos
Roll 93CSC007 #28
Roll 93CSC008 #10-13
mud/org/granular/pebble/C
– SECTION 3

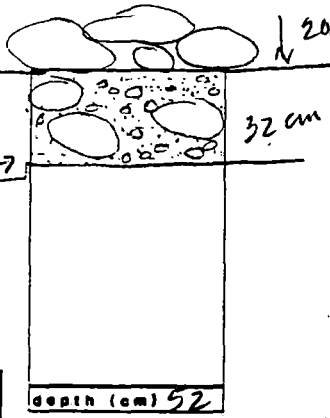


mean grain size M S G P C B

mean grain size M S G P C B

Pit A (m) From FS

Section 1 C/P
Section 2 mud/org peb/gran w/ C →
Photos
Roll 93CSC007
24-27

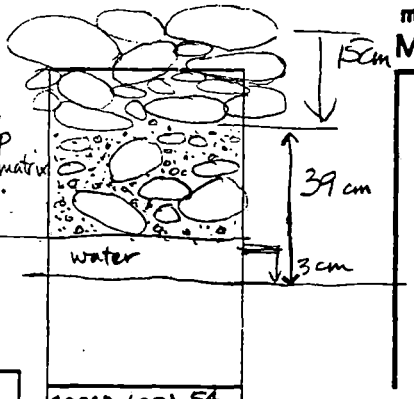


mean grain size M S G P C B

mean grain size M S G P C B

Pit B (m) From FS

B/C/P
Section 1
NO OIL
Roll
93CSC008
1-3
C w/ Sand/G/P matrix
Section 2.
no sheen

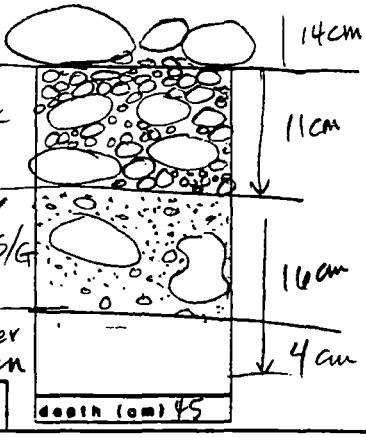


mean grain size M S G P C B

mean grain size M S G P C B

Pit C (m) From FS

Roll 93CSC008
photo – 4+6
B/C
C w/ P matrix
organics/muddy/S/G w/ C
water lt. silver sheen



mean grain size M S G P C B

mean grain size M S G P C B

Pit D (m) From FS

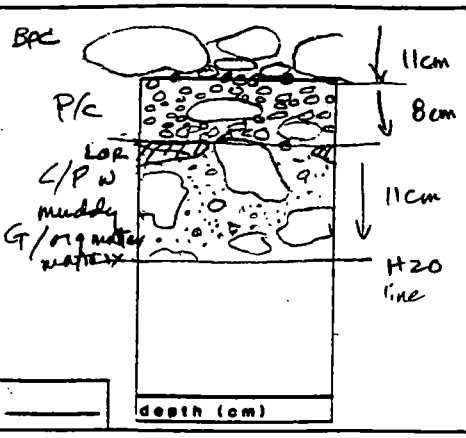
Signature _____

DATE 9-14-93 STATION NOAA #15 SEGMENT GA015C

Oiling description	Profile	Seds	Framework	Matrix

Photo 93CSC008 #10
7-9 - looking up transect.

LOR
oiling is discont in pit @ 19cm
Brown globules/silver sheen on pit H_2O.

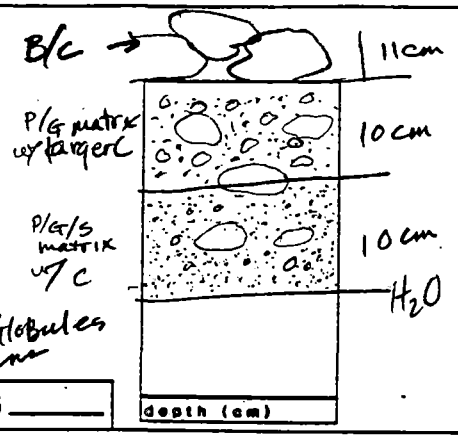


mean grain size M S G P C B

mean grain size M S G P C B

Pit E (m) From FS ____

oil sheen undefined



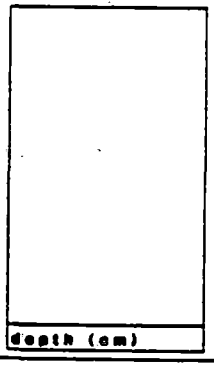
Sil / Brn Globules Sheens

mean grain size M S G P C B

mean grain size M S G P C B

Pit E (m) From FS ____

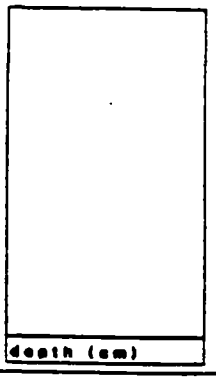
No sheens or oil noted tide (flood) unable to collect data.



mean grain size M S G P C B

mean grain size M S G P C B

Pit G (m) From FS ____



mean grain size M S G P C B

mean grain size M S G P C B

Pit ___ (m) From FS ____

Signature _____

NOAA-15 1/5

25

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT A SHOWING SEDIMENT

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC007 FRAME #: 25 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT A ALONG TRANSECT LINE SHOWING OILING AND SEDIMENT.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC007 FRAME #: 24 EVIDENCE ID#:

25

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT B, SEDIMENT

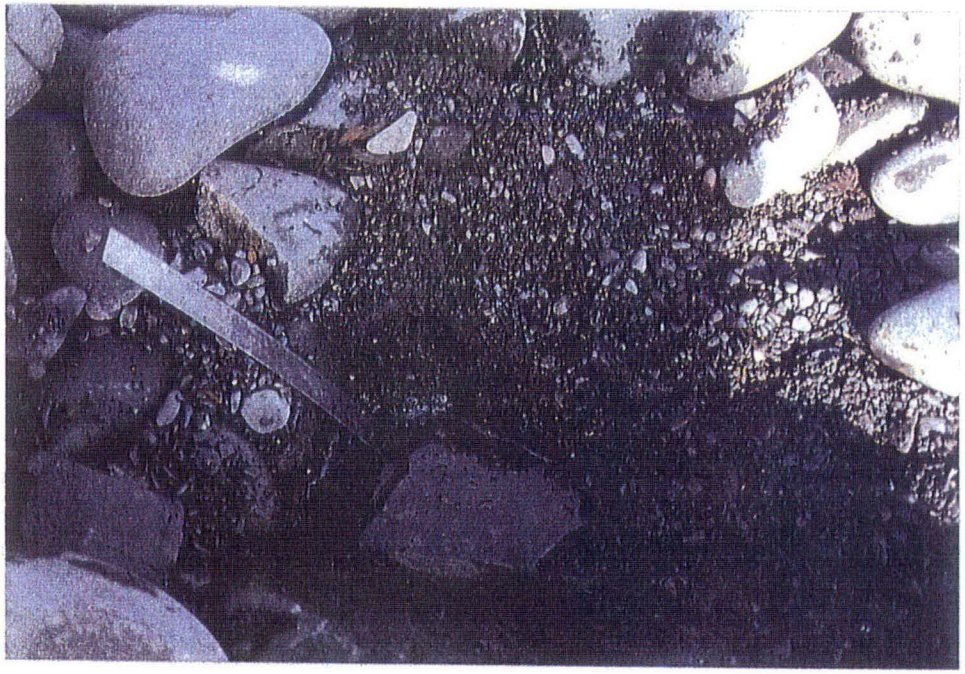
TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC007 FRAME #: 28 EVIDENCE ID#:

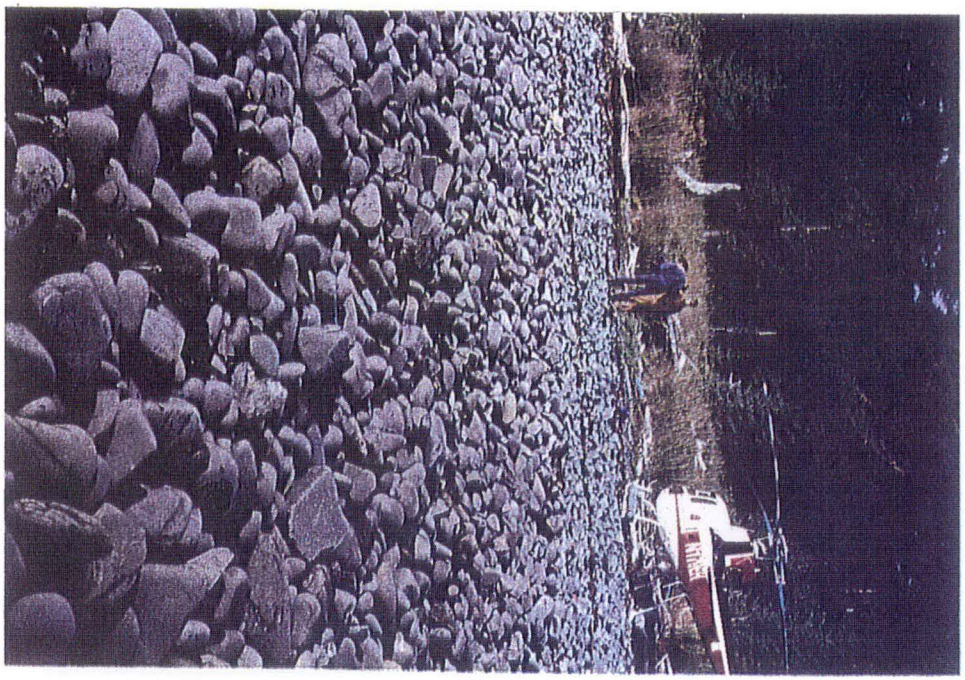
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT A, SEDIMENT

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC007 FRAME #: 26 EVIDENCE ID#:





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:PIT D, CROSS-SECTION OF PIT BY RULER SHOWING SEDIMENT AND LIGHT SILVER SHEEN ON PIT WATER.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 4 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:PIT C, SHOWING SEDIMENT, NO OIL

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 1 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:UP TRANSECT FROM PIT E SHOWING TRANSECT STAKES (JUST TO THE RIGHT OF ERNIE PIPER AND PILOT).

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 9 EVIDENCE ID#:

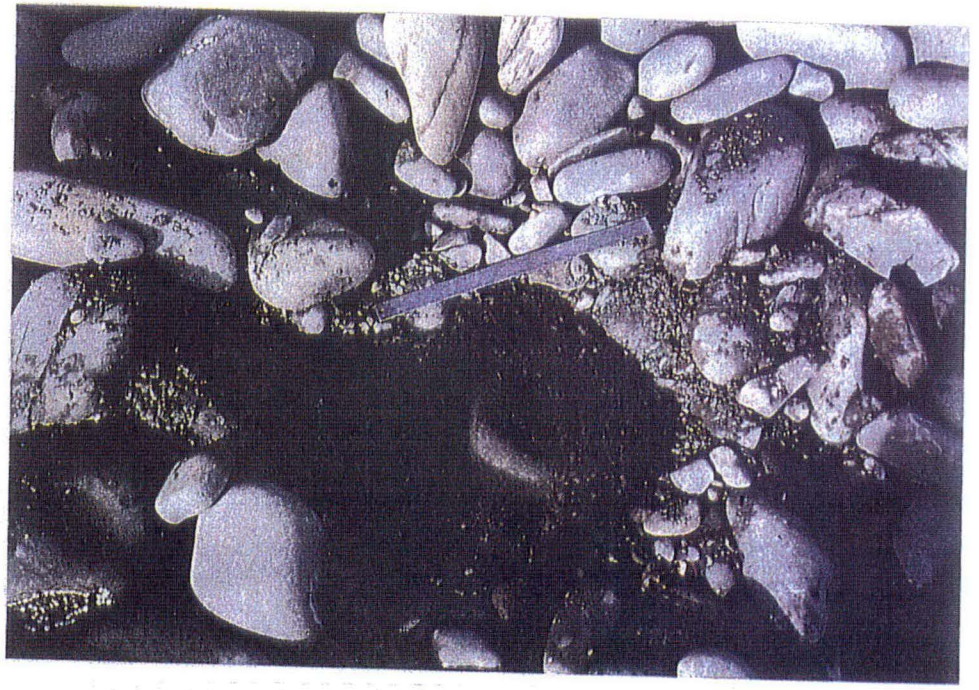
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

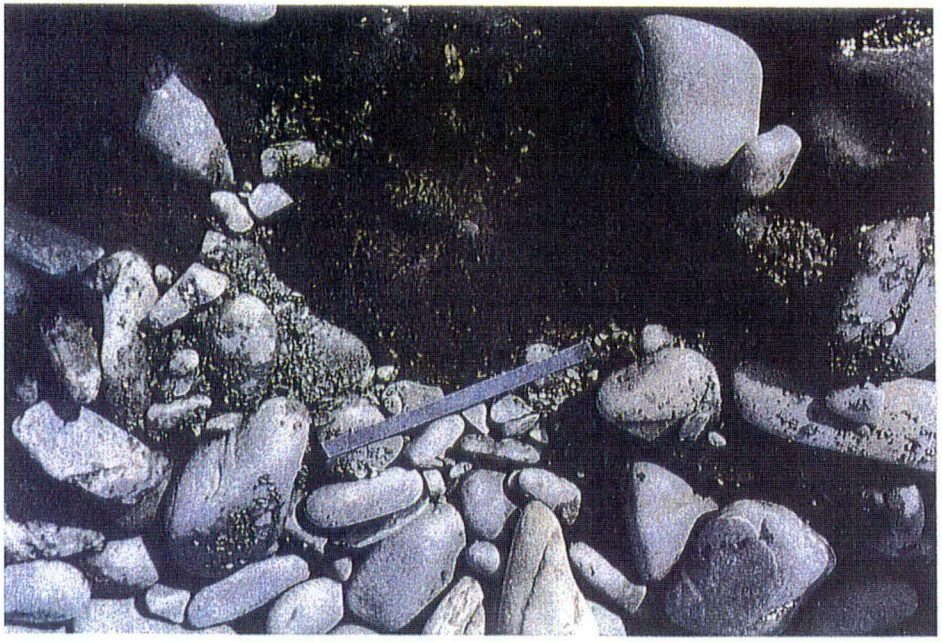
OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

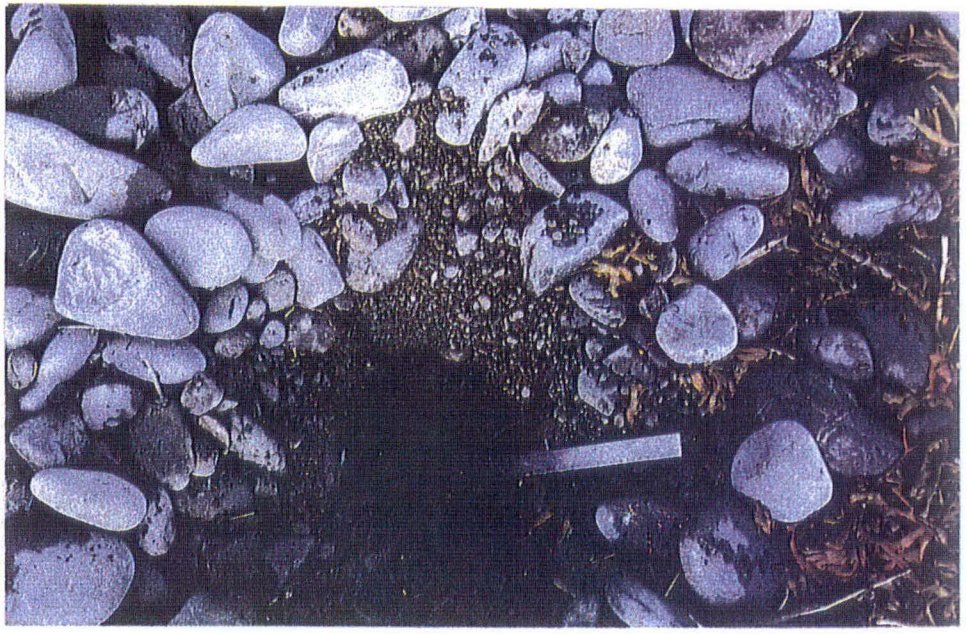
SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:LOOKING UP TRANSECT FROM PIT E. BACK STAKE AT BASE OF DEAD SNAG AT EDGE OF WOODS.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 7 EVIDENCE ID#:

NOAA-15 3/5







OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT G

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 10 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:PIT E

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 8 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:PIT B.

TAKEN BY: CLARA CROSBY
ROLL #:93CSC008 FRAME #: 12 INITIALS: CSC
EVIDENCE ID#:

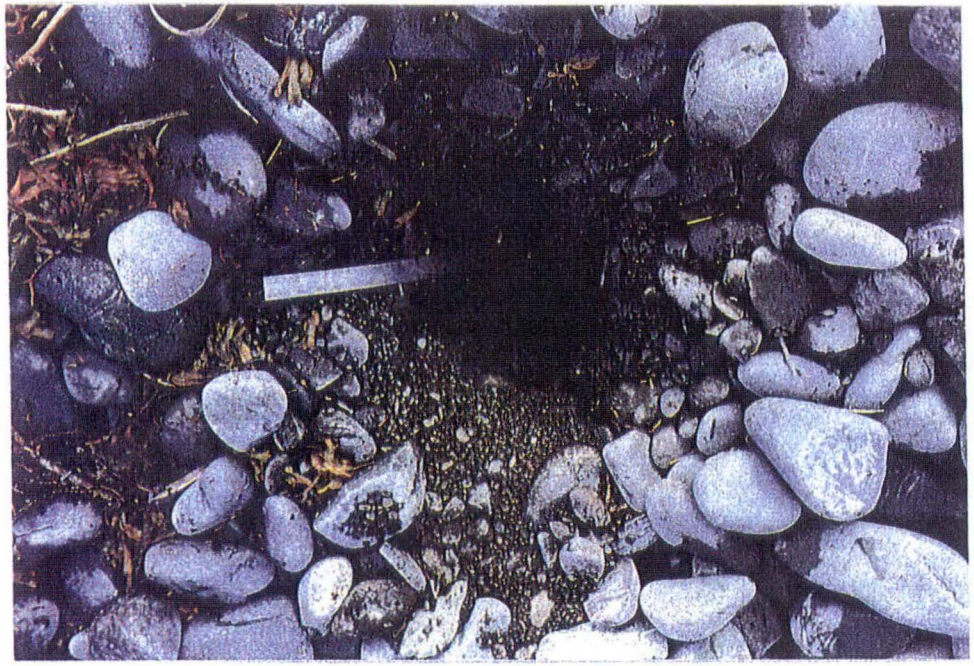
OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

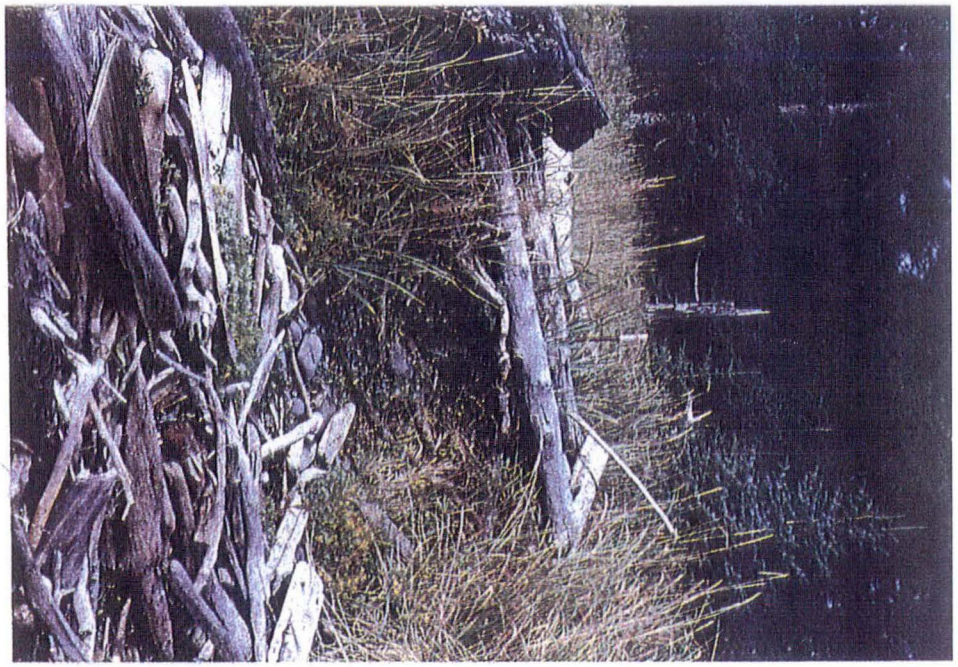
OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:PIT G

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 11 EVIDENCE ID#:

NOAA-15 4/5





OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:BACKSHORE AT TRANSECT SHOWING STAKES. FRONT STAKE IN STORM BERM WITH BACK STAKE AT BASE OF SNAG AT EDGE OF WOODS.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 15 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:PIT B.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 13 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:TOWARD THE NORTHERN END OF LA015 C.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 18 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:DOWN TRANSECT SHOWING BERMS, INCOMING TIDE.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 17 EVIDENCE ID#:

20th Century Plastics
1-800-767-0777
STOCK# PPV840-000

NOAA-#15 5/5

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:DOWN TRANSECT, PROJECT MANAGER ERNIE PIPER WITH DIANNE MUNSON, AND THE HELICOPTER PILOT.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 21 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT#: LA015 STATION#: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORDS: -0-
REASON FOR TAKING PHOTO:TOWARD THE SOUTHERN END OF LA015 C.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #: 93CSC008 FRAME #: 20 EVIDENCE ID#:

OFFICIAL PHOTOGRAPH ADEC EXXON VALDEZ OIL SPILL

OFFICE: ANCHORAGE DATE: 09/14/93 TIME: 0930

SEGMENT: LA015 STATION: NOAA #15
LOCATION: LATOUCHE ISLAND, P.W.S.
KEYWORD: -0-
REASON FOR TAKING PHOTO:OVERVIEW OF THE NORTHERN END OF THE SEGMENT.

TAKEN BY: CLARA CROSBY INITIALS: CSC
ROLL #:93CSC008 FRAME #: 22 EVIDENCE ID#: