

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Protected Resources Management Division  
Juneau, Alaska

and

U.S. Department of the Interior  
Fish and Wildlife Service  
Southeast Alaska Ecological Services  
Juneau, Alaska

Report of Field Investigations  
Thorne Island, Stevenson Island, Hassler Island, and Neets Bay  
and Traitors Cove on Revillagigedo Island

May 11-14, 1992

In response to a request from Mr. James Rhodes, Ketchikan Area, USDA Forest Service (FS), personnel from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) investigated, in concert, the intertidal/subtidal habitats of locations in Whale Passage and Kashevarof Passage (Figure 1), and Behm Canal (Figure 2), for proposed log transfer facilities (LTF). Copies of aerial photographs of the proposed LTF sites are shown in Appendix A.

Our records show that an investigation of other potential LTF sites on Thorne Island and Stevenson Island was done in September 1976. A copy of that report is enclosed for your information.

Over the years the timber industry has employed the technique of placing logs in marine waters, constructing log rafts, storing the rafts, and towing rafts to processing centers. While not always obvious, a significant bark loss results from such activities. What happens to the dislodged bark is dependent on numerous variables, but most often bark is found to accumulate in areas of high log handling activity in quantities sufficient to smother bottom dwelling organisms. The effects of such losses can be reflected through the food chain.

There are two approaches to lessening the harmful effects of concentrated bark deposits: 1) to select sites where prevailing features or conditions will facilitate bark dispersal, and 2) to select sites which display relatively low biological resource value. Our site selection techniques are designed to consider each approach, and where possible, identify sites which satisfy criteria for both.

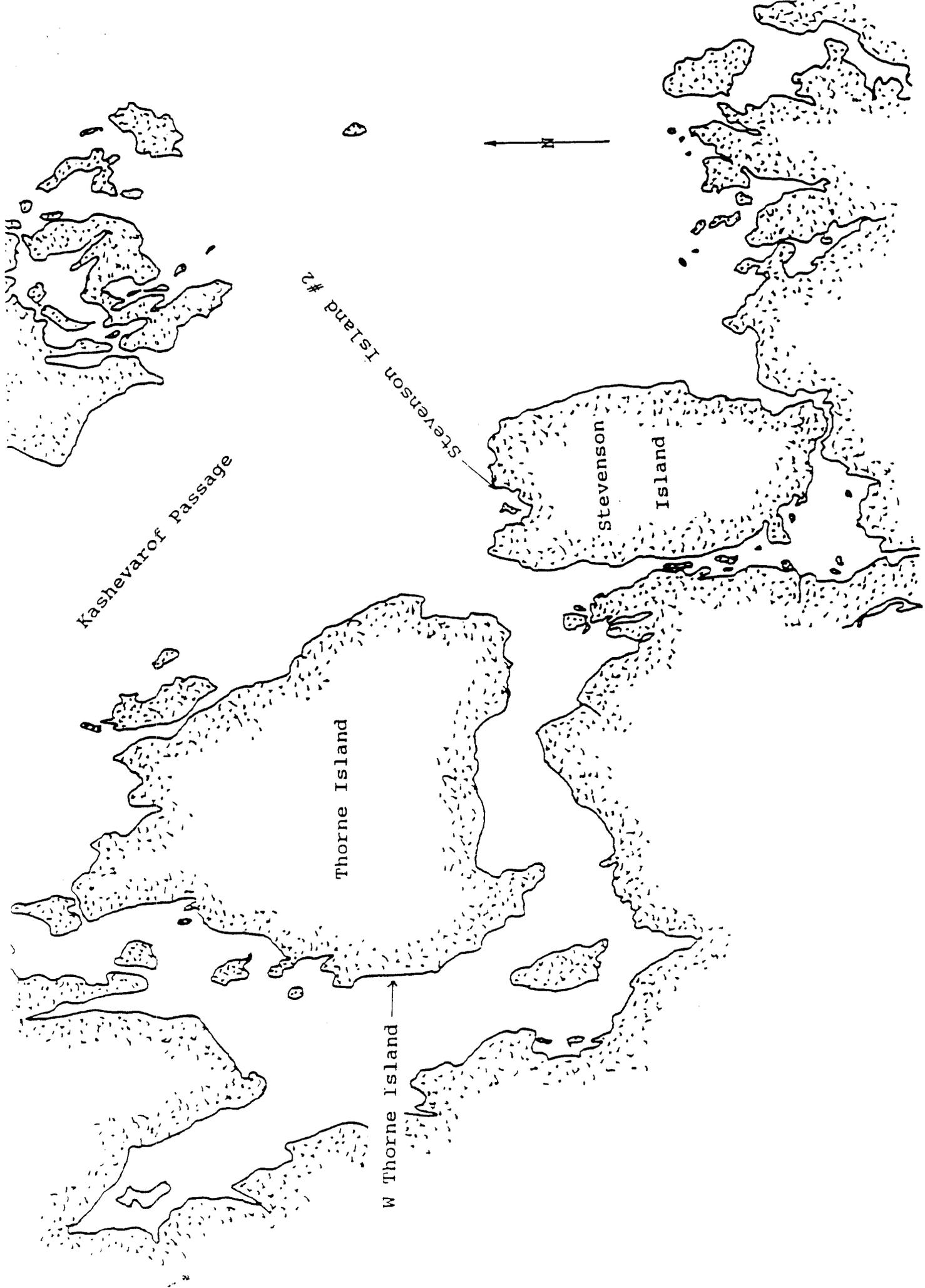


Figure 1. Proposed Log Transfer Facility Sites on Thorne Island and Stevenson Island. Underwater investigations

1000

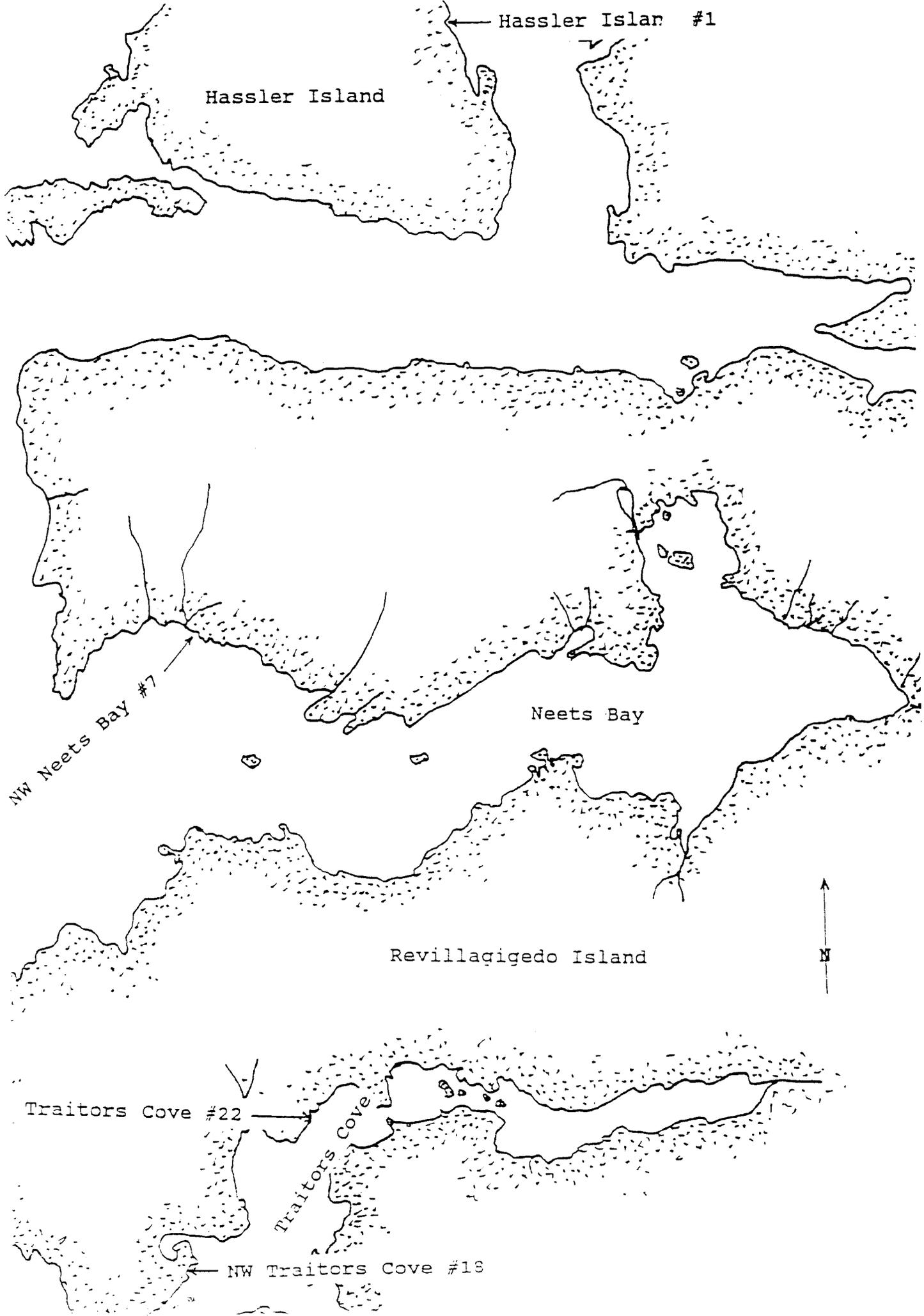


Figure 2. Proposed Log Transfer Facility Sites on Hassler Island, in Neets Bay and Traitors Cove, Revillagigedo Island. Underwater investigations conducted May 1992.

## OBJECTIVES

Investigations were directed at achieving the following study objectives:

1. Investigate subtidal habitat at potential log transfer sites to determine: a) the physical characteristics including depth, slope, substrate, and current patterns; and b) the biological characteristics of productivity and diversity.
2. Analyze information collected on each site, and compare results both with the Timber Task Force log transfer facility siting guidelines<sup>1</sup> and with results on other nearby sites.
3. Present a recommendation relative to the use of the investigated sites for log transfer activities.

## METHODS

A transect line, 100-meters long, was extended seaward from the proposed site perpendicular to the shoreline. Self Contained Underwater Breathing Apparatus (SCUBA) was employed to gather intertidal/subtidal information along the transect line as well as in the general area of potential impact. Observations of physical and biological characteristics were made at 5-meter intervals along the transect line. Observations included water depth, substratum composition, plant species, animal species, and obvious changes in zonation. In addition, the general characteristics of the area, and evidence of current flow patterns, or the lack thereof, were noted subjectively.

## RESULTS AND RECOMMENDATIONS

A discussion for each area investigated follows. Species observed in each area are listed in Table 1.

### W. Thorne Island

The investigation occurred on the west side of Thorne Island. A bottom profile of the underwater transect is shown in Figure 3. The physical attributes of the site are characterized as being shallow, 11.1-meters deep at the end of the transect. Substratum is composed of bedrock/cobble from the extreme high water line to 40 meters from shore giving way to a silt/cobble bottom to the end to the transect. Flushing potential is low as evidenced by the presence of silt within the bottom composition.

---

<sup>1</sup>1985, Log Transfer Facility Siting, Construction, Operation and Monitoring/Reporting Guidelines, Governor's Timber Task Force.

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL

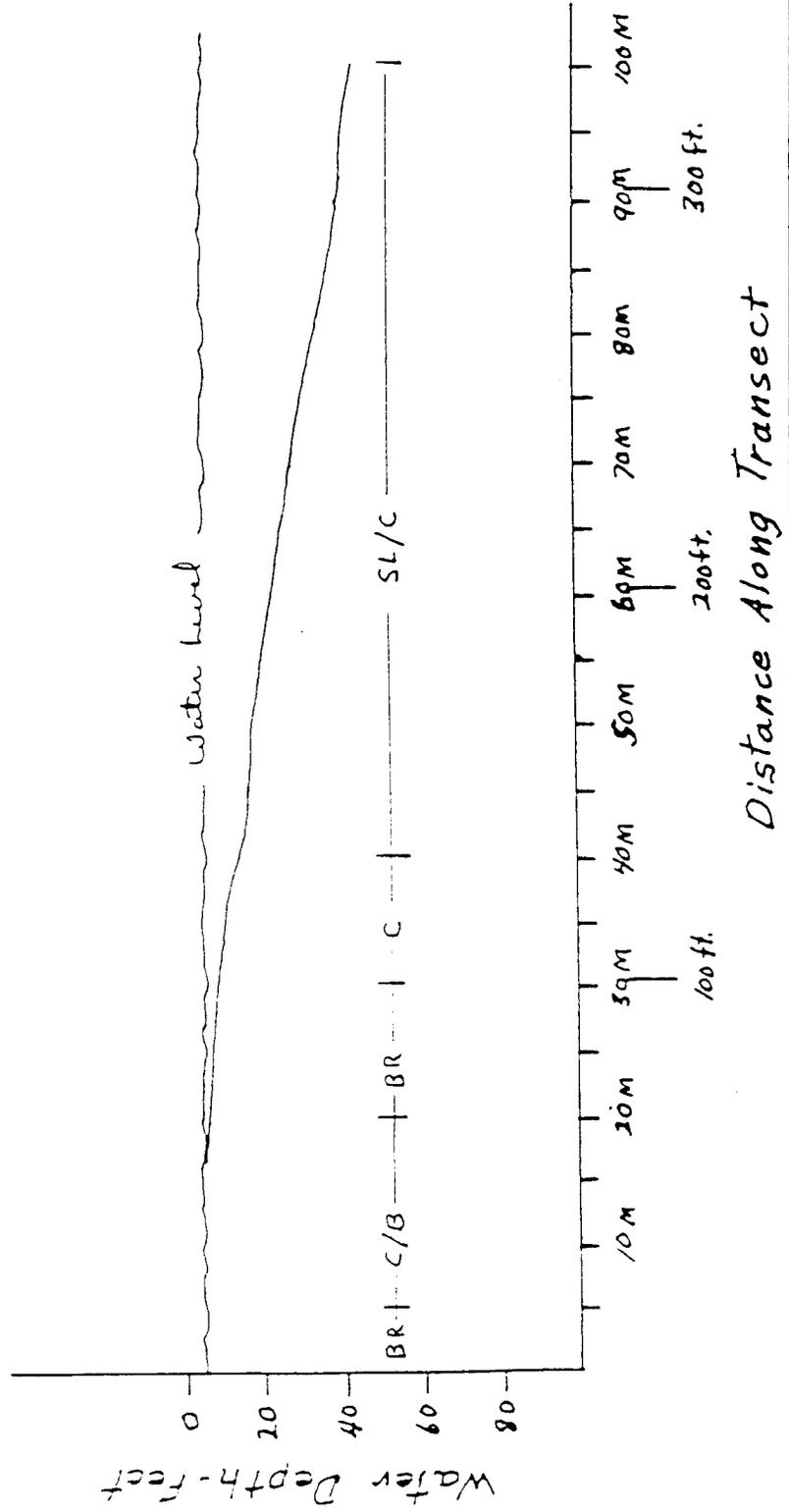


Figure 3. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at W Thorne Island #1, May 11, 1992.

Table 1. List of plant and animal species observed along underwater transects at Thorne Island (A), Stevenson Island (B), Hassler Island (C), N.W. Neets Bay (D), N.W. Traitors Cove (E), and N. Traitors Cove (F), May 11-14, 1992.

Aquatic Plants	Common Name	A	B	C	D	E	F
<u>Agarum cribrosum</u>	Brown algae			x		x	x
<u>Alaria marginata</u>	Brown algae	x	x				
<u>Constantinea simplex</u>	Red algae						x
<u>Desmarestia spp</u>	Brown algae	x	x	x		x	x
<u>Enteromorpha intestinalis</u>	Green algae				x	x	
Filamentous Brown	Brown algae			x		x	x
Filamentous Green	Green algae			x			
<u>Fucus spp</u>	Brown algae	x	x	x	x	x	x
<u>Halosaccion glandiforme</u>	Red algae	x					
<u>Laminaria spp</u>	Brown algae	x	x	x		x	x
<u>Lithothamniom spp</u>	Encrusting algae					x	x
<u>Odonthalia spp</u>	Red algae	x	x	x			x
<u>Palmeria spp</u>	Red algae	x				x	x
<u>Ralfsia pacifica</u>	Brown algae			x			x
<u>Ulva/Monostroma spp</u>	Green algae	x	x	x		x	x
<u>Zostera marina</u>	Eelgrass				x	x	

Aquatic Invertebrates	Common Name	A	B	C	D	E	F
<u>Archidoris ohdeneri</u>	White doris						x
<u>Balanus spp</u>	Barnacle	x	x	x	x	x	x
<u>Cancer productus</u>	Red rock crab				x		
<u>Ceratostoma foliatum</u>	Foliated Thorn Purpura		x	x			x
<u>Chlamys spp</u>	Pink scallop					x	x
<u>Cnemidocarpa finmarkiensis</u>	Smooth red tunicate						x
<u>Collisella pelta</u>	Shield limpet	x	x	x		x	x
<u>Corella willmeriana</u>	Glass tunicate				x		
<u>Coryphella spp</u>	Small eolis						x
<u>Cucumaria miniata</u>	Orange sea cucumber			x		x	x
<u>Dendronotus dalli</u>	Dall's fron eolis						x
<u>Dermasterias imbricata</u>	Leather star					x	x
<u>Elassochirus tenuimanus</u>	Big-clawed hermit crab				x	x	x
<u>Evasterias troschelii</u>	Molted star	x	x			x	
<u>Fusitriton oregonensis</u>	Oregon triton						x
<u>Halocynthia aurantium</u>	Sea peach						x
<u>Hyas lyratus</u>	Lyre crab			x		x	x
Limpet	Limpet	x	x			x	x
<u>Mediaster aequalis</u>	Vermillion star						x
<u>Metridium senile</u>	Fine-tentacled anemone	x				x	
<u>Mytilus edulis</u>	Blue mussel	x	x	x		x	x
<u>Ophiura spp</u>	Serpent stars			x			
<u>Oregonia gracilis</u>	Decorator crab			x		x	x
<u>Orthasterias koehlerii</u>	Spiney star				x	x	x
<u>Pachycerianthus fimbriatus</u>	Tube anemone				x		x

Table 1. (Continued) List of plant and animal species observed along underwater transects at Thorne Island (A), Stevenson Island (B), Hassler Island (C), N.W. Neets Bay (D), N.W. Traitors Cove (E), and N. Traitors Cove (F), May 11-14, 1992.

<u>Aquatic Invertebrates</u>	<u>Common Name</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
<u>Pagurus spp</u>	Hermit crab	x	x	x	x	x	x
<u>Pandalus danae</u>	Dock shrimp	x	x				x
<u>Pandalus platyceros</u>	Spot shrimp			x			
<u>Parastichopus californicus</u>	Mop sea cucumber	x	x	x		x	x
<u>Pisaster brevispinus</u>	Pink short-spined star				x		x
<u>Ptilosarcus gurneyi</u>	Sea pen						x
<u>Pteraster tessellatus</u>	Slime star						x
<u>Pycnopodia helianthoides</u>	Sunflower star	x	x			x	x
<u>Serpula vermicularis</u>	Common serpulid	x	x	x		x	x
Snail	Snail	x	x	x	x	x	x
<u>Strongylocentrotus d.</u>	Green sea urchin			x			
<u>Telmessus cheiragonus</u>	Horse crab	x				x	x
<u>Thais spp</u>	Snail	x	x				
<u>Tonicella spp</u>	Chiton					x	x

<u>Marine Fish</u>	<u>Common Name</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
<u>Lumpenus sagitta</u>	Snake prickleback	x					
<u>Pholis laeta</u>	Crescent Gunnel	x					
<u>Hexagrammos spp</u>	Greenling					x	x
<u>Sebastes spp</u>	Rockfish						x
<u>Lepidopsetta bilineata</u>	Rock sole					x	

Animal and plant species observed were those common to this type of habitat. Species variety was low with barnacles (Balanus spp), mussels (Mytilus edulis) being most abundant. The most abundant algae species noted was the brown algae Laminaria spp.

This site does not meet the Timber Task Force LTF siting guidelines for water depth and potential bark accumulation. However, the site is low in overall productivity and we would not have any objection to the construction and operation of a LTF at this location.

#### Stevenson Island, Site #2

The site is exposed to the north. A bottom profile of the underwater transect is shown in Figure 4. The physical attributes of the site are characterized as a shallow slope of cobble and bedrock to 60 meters (water depth of 8.4 meters) from the extreme high tide line. From 60 meters to the end of the transect the bottom is composed of silt with a mix of cobble. Water depth at the end of the transect was 16.5 meters. Flushing potential is low at the end of the transect as evidenced by the silty bottom. Flushing along the first 60 meters should be good because of exposure to the north and rock bottom.

Animal and plant species observed were those common to this type of habitat with one exception, the spot shrimp (Pandalus platyceros). Overall species abundance and variety was low with barnacles (Balanus spp), and the sea mop cucumber (Parastichopus californicus) being most abundant. The two most abundant algae species noted were Fucus spp and Laminaria spp.

This site does not meet the Timber Task Force LTF siting guidelines for water depth because of the shallow sloping bottom and for the potential for bark accumulation along the last 40 meters of the transect. However, biological productivity is low and this location is appropriate for the construction and operation of a LTF.

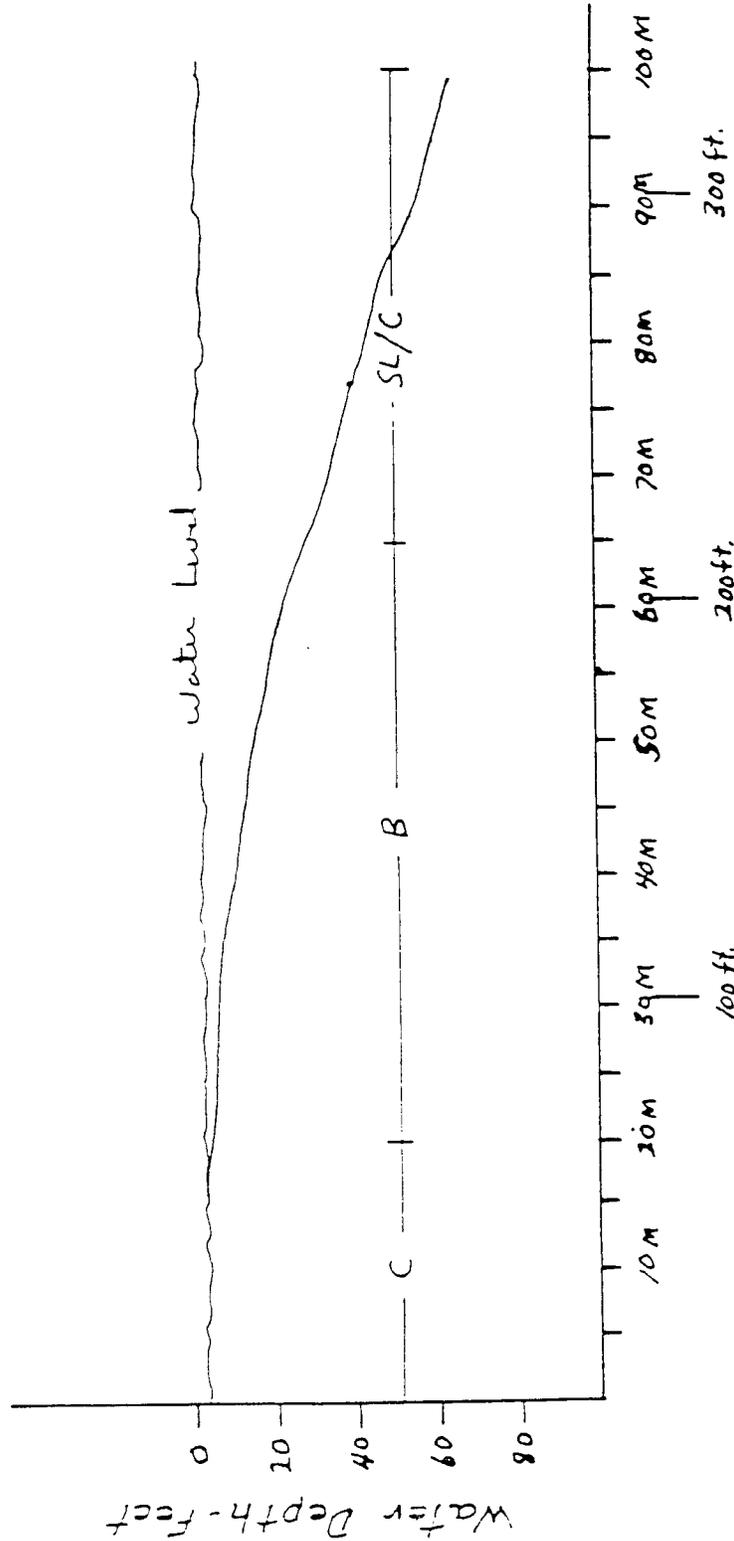
#### Hassler Island, Site # 1

The underwater investigation occurred about 945 meters northwest of the existing LTF. A bottom profile of the transect is shown in Figure 5. The physical attributes of the site are characterized as a very shallow slope (5.1 meters deep at the end of the transect). The bottom is comprised of bedrock and a cobble/pebble mixture to 35 meters from the extreme high water line. From 35 meters to the end of the transect, the bottom was composed of sand with a few pebbles. Flushing potential would be moderate as evidenced by the presence of clean sand.

Animal and plant species observed were common to this type of habitat. Species variety was low with barnacles (Balanus spp) and snails being most abundant. The most abundant algae was Laminaria spp. Eelgrass (Zostera marina) occurred in a dense

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL



*Distance Along Transect*

Figure 4. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at Stevenson Island #2, May 12,

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL

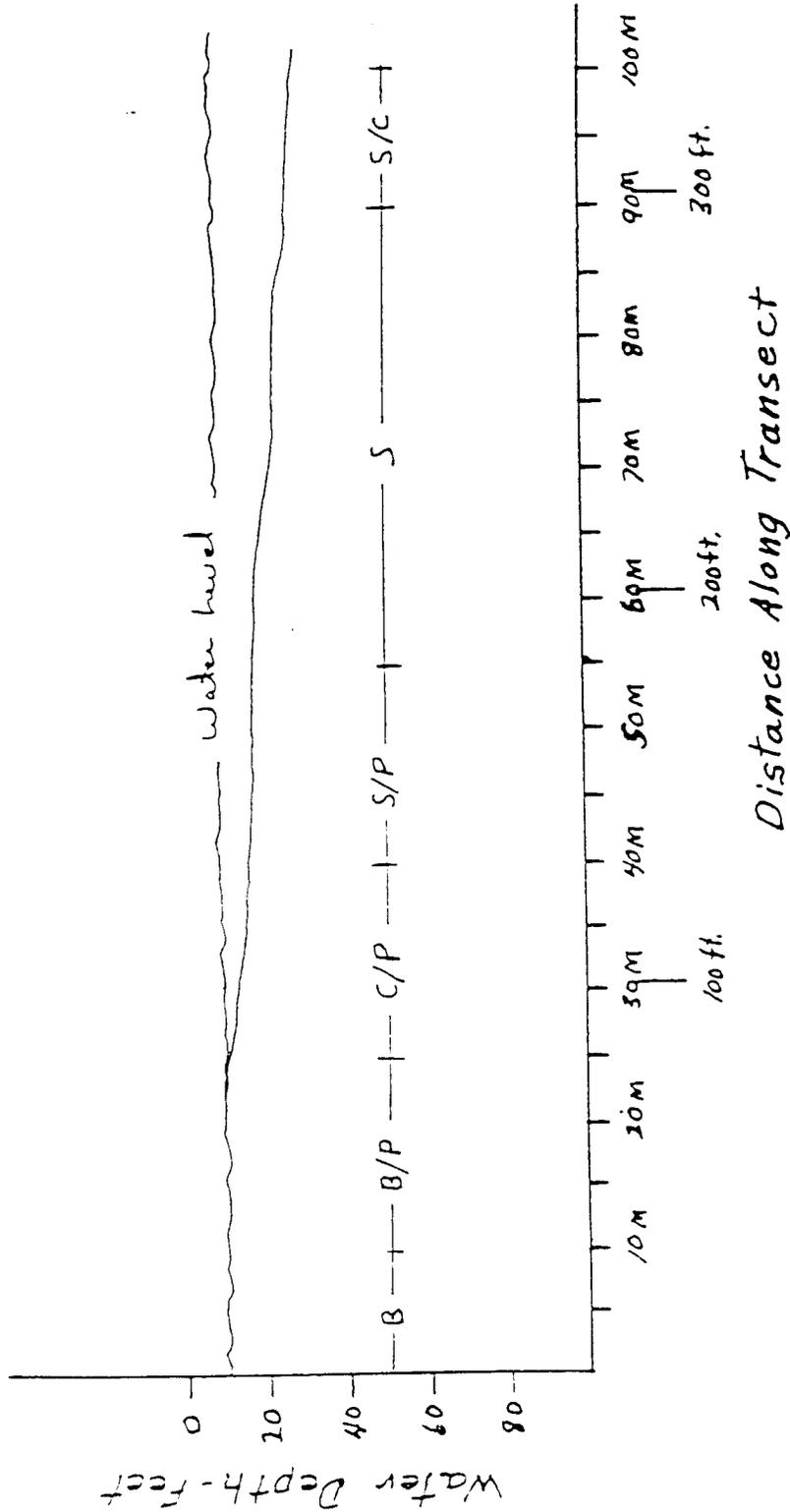


Figure 5. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at Hassler Island #1, May 12, 1992.

band from 42 meters from the extreme high tide line to 93 meters along the transect.

This site does not meet the Timber Task Force LTF siting guidelines, including the criteria for water depth and site productivity. We recommend this site not be used for the transfer of timber. Use of the existing facility is preferred.

#### N.W. Neets Bay, Site #7

The previously used LTF, N.W. Neets Bay #6 is on a cataloged anadromous fish stream, therefore, we conducted an underwater investigation of this alternative location. The transect began at the extreme high tide line. Physical attributes of the site are characterized as a cobble substratum to 40 meters grading into sand to the end of the transect. The slope is shallow with a water depth of 5.1 meters at 80 meters along the transect tape. Beyond 80 meters the slope increased rapidly with a depth of 13.5 meters at the end of the 100-meter long transect tape and beyond. The last 10 meters of the transect was covered with logging debris. It was evident that log storage occurred in this area in the past. With exposure to the south, flushing potential is good to the drop-off, about 85 meters from shore, as evidenced by the lack of silt within the bottom material. A bottom profile is shown in Figure 6.

Animal and plant species observed were few. Abundance was low in both animal and plant species. A sparse band of eelgrass occurred from the 75 meter mark to the 87 meter mark of the transect line. The most abundant animal species noted were snails and barnacles in the intertidal zone.

This site meets the Timber Task Force Guidelines for siting of a LTF except for the shallow slope. However, with little biological productivity noted in the area we find this site suitable for the construction and operation of a log transfer facility.

#### N.W. Traitors Cove, Site #18

This site was the most productive of the sites visited on the trip. Extensive beds of blue mussels (Mytilus edulis) and barnacles (Balanus spp) inhabited to intertidal and shallow subtidal. Commercial quantities of sea cucumbers (Parastichopus californicus) were noted in the area. The large macrophytes Laminaria spp and Agarum cribrosum covered the rocky bottom. A bottom profile of the transect is shown in Figure 7. Physical attributes of the site are characterized as being moderately sloping with a water depth of 14.1 meters at the end of the transect. The substratum is composed of cobble/pebble/bedrock to the 50 meter mark on the transect line which graded in a sand/boulder/cobble to the end of the transect. No current was noted during the investigation and logging debris is not expected to disperse.

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL

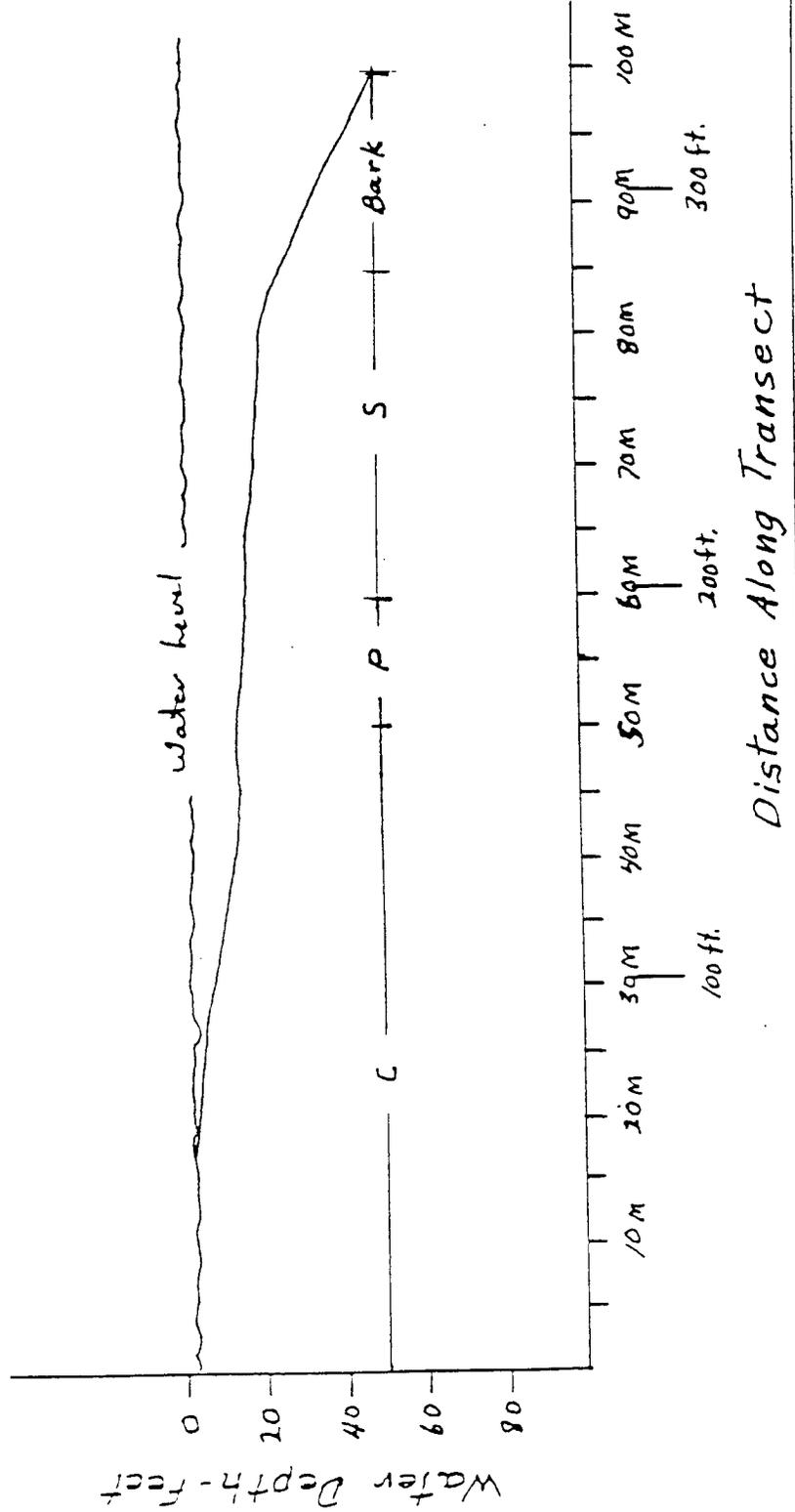
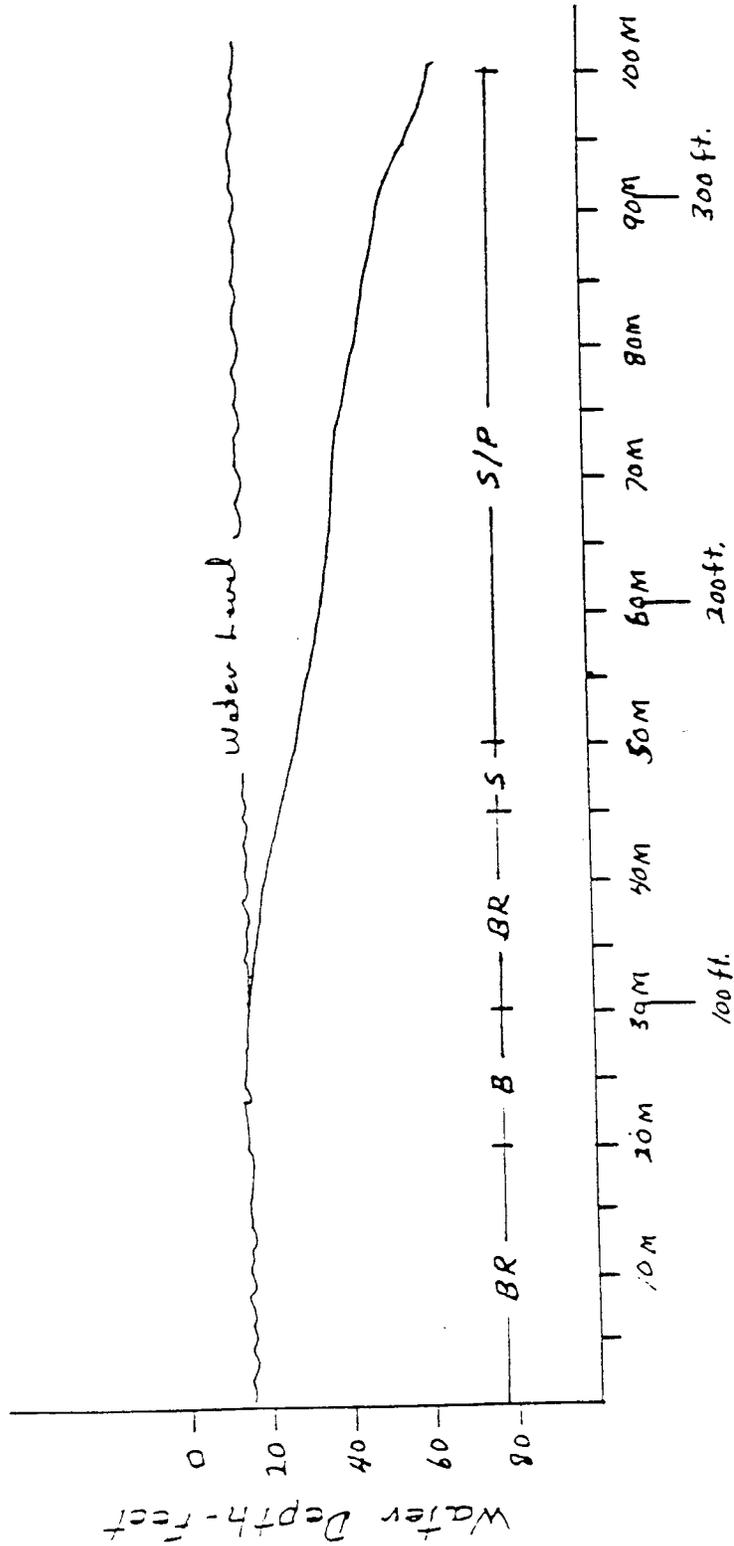


Figure 6. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at NW Neets Bay #7, May 13, 1992.

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL



*Distance Along Transect*

Figure 7. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at NW Traitors Cove #18, May 13,

This site is very productive in terms of biomass. Plant and animal species are diverse and numerous. This site does not meet the Timber Task Force LTF siting guidelines, including the criteria for water depth, site productivity, and potential bark accumulation. We do not recommend construction of a LTF at this site. However, if the LTF is moved to the southwest shore of the bight the footprint of the LTF would be significantly smaller. This would reduce the bottom area covered which will reduce the effects of LTF construction on the aquatic environment. The exact location of the preferred site along with its alignment was coordinated with Jim Rhodes, USDA Forest Service.

#### N. Traitors Cove, Site #22

A bottom profile of the underwater transect is shown in Figure 8. The physical attributes of the site are characterized as being with a fairly constant slope. Water depth was 19.5 meters at the end of the transect. Substratum is composed of bedrock from the extreme high water line to 40 meters giving way to a sand/pebble bottom to the end of the transect. Flushing potential is moderate as evidenced by the presence of a sandy bottom.

Animal and plant species observed were those common to this type of habitat. Commercial quantities of the sea cucumber (Parastichopus californicus) were noted in the area. Species variety was normal with the sea cucumber and the tube anemone (Pachycerianthus fimbriatus) being most abundant. The most abundant algae species noted were the brown algae Agarum cribrosum and Laminaria spp. The encrusting algae Lithothamnion spp covered much of the exposed bed rock surface.

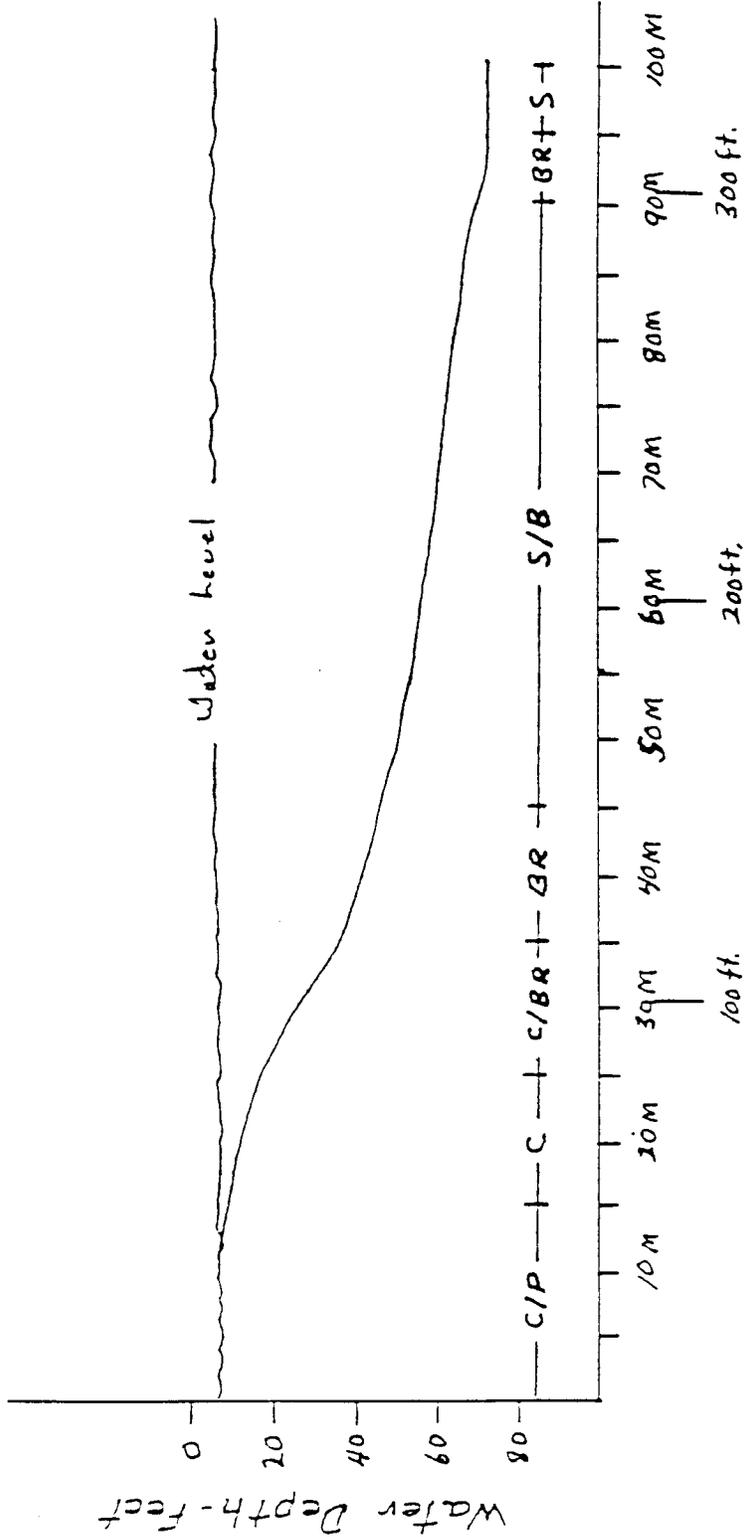
Biologically, this site is quite productive and does not meet the Timber Task Force LTF siting guidelines because of the large number of sea cucumbers. However, we believe with the amount of timber proposed to be transferred, this site is appropriate for the construction and operation of a LTF.

#### CAVEAT

The recommendations of the proposed sites indicated as suitable for LTFs are based upon observations of estuarine habitat made during a limited time period. It should be noted the observations over time were not made and as a result, seasonal changes in habitat use, including fish and shellfish spawning occurrences were not observed. Further, recommendations offered relate to aquatic observations only. Use of adjacent uplands by animals or birds, including bald eagles, was not considered.

Substrate Types

- Bedrock - BR
- Boulder - B
- Cobble - C
- Pebble - P
- Sand - S
- Silt - SL



Distance Along Transect

Figure 8. Dive Transect Depth-Distance Profile at Proposed Log Transfer Facility at N Traitors Cove #22, May 14, 1992.

## ACKNOWLEDGEMENTS

Duane Petersen, NMFS Juneau, Alaska, Chuck Osborn, FWS Ketchikan, and Ed Grossman, FWS Juneau, Alaska, were the principle investigators for these field investigations and were responsible for preparation of this report.

Jim Rhodes, FS Ketchikan, Alaska, represented the FS. Richard Guhl, FS Ketchikan, Alaska, served as skipper aboard the FS vessel M/V Tongass Ranger.

---

### NATIONAL MARINE FISHERIES SERVICE

---



Duane H. Petersen, Diver/Biologist



Steven T. Zimmerman, Ph.D., Chief  
Protected Resources Management Division

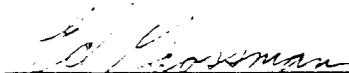
---

### U.S. FISH AND WILDLIFE SERVICE

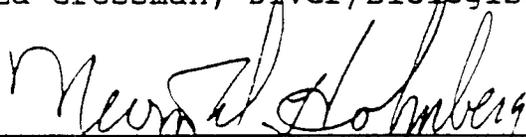
---

---

Chuck Osborn, Diver/Biologist



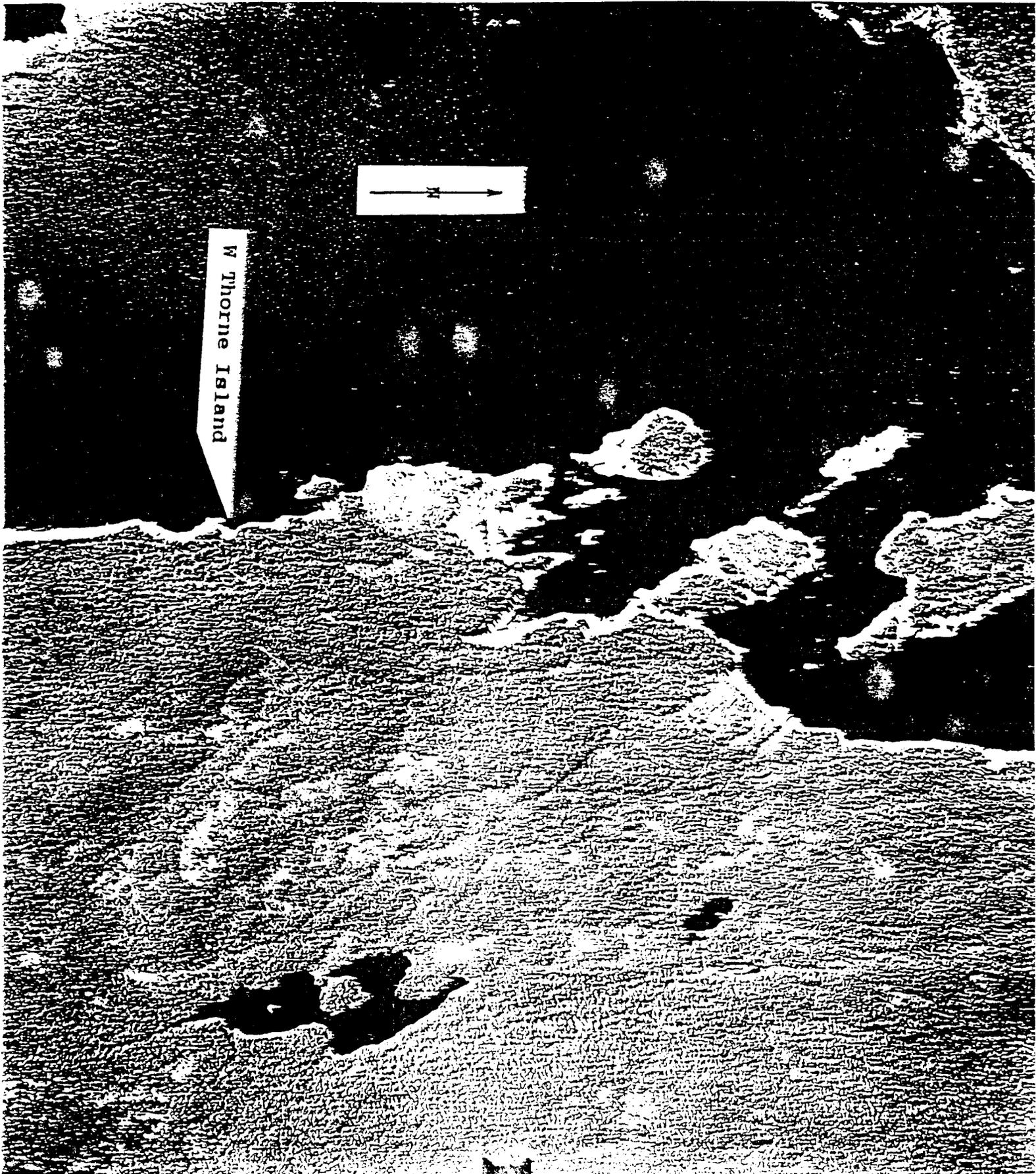
Ed Grossman, Diver/Biologist



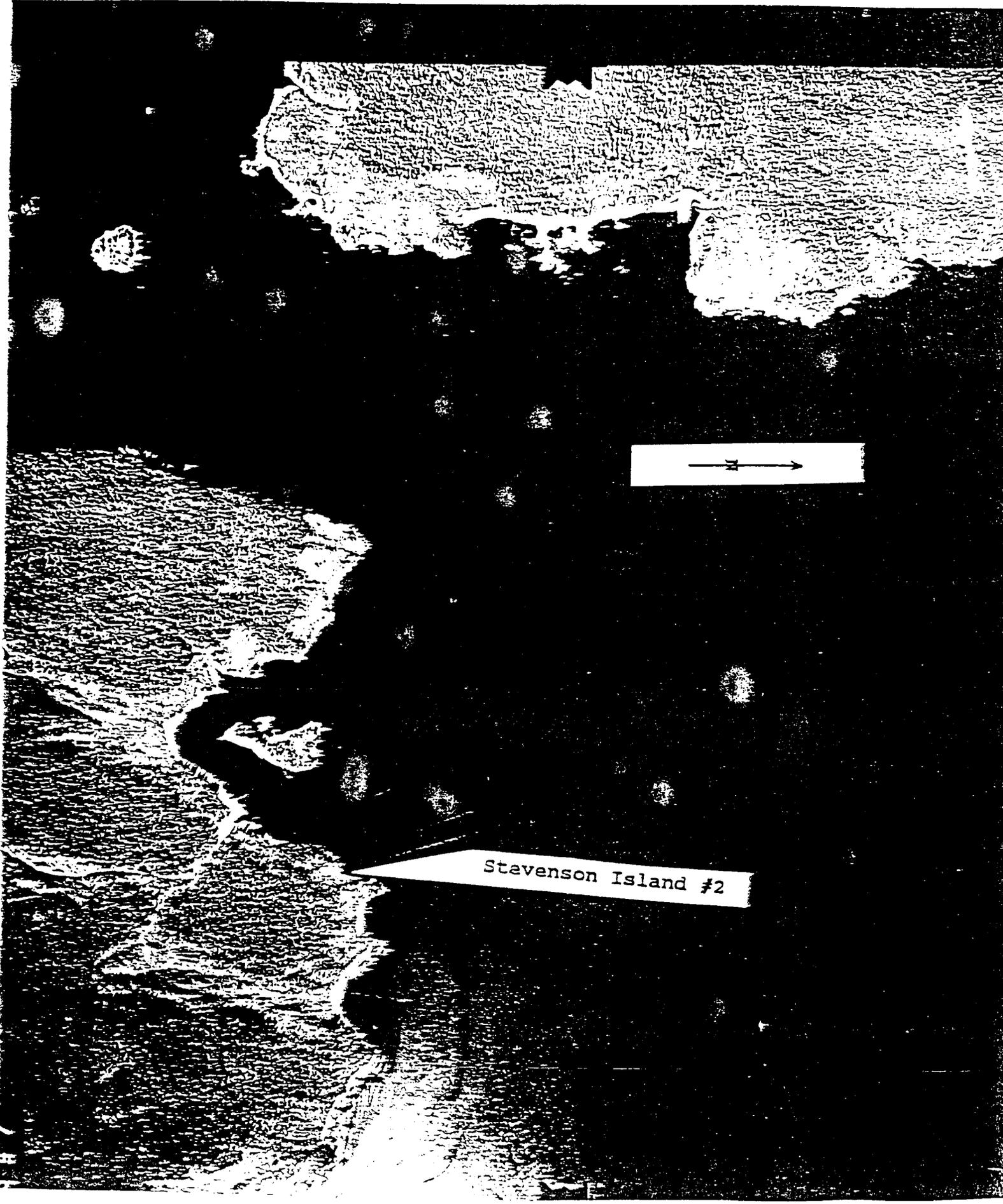
Nevin D. Holmberg, Field Supervisor  
Ecological Services, Juneau, Alaska

APPENDIX A

Aerial Photographs of Proposed Log Transfer Facility Sites



Appendix A-1. W Thorne Island proposed LTF location.

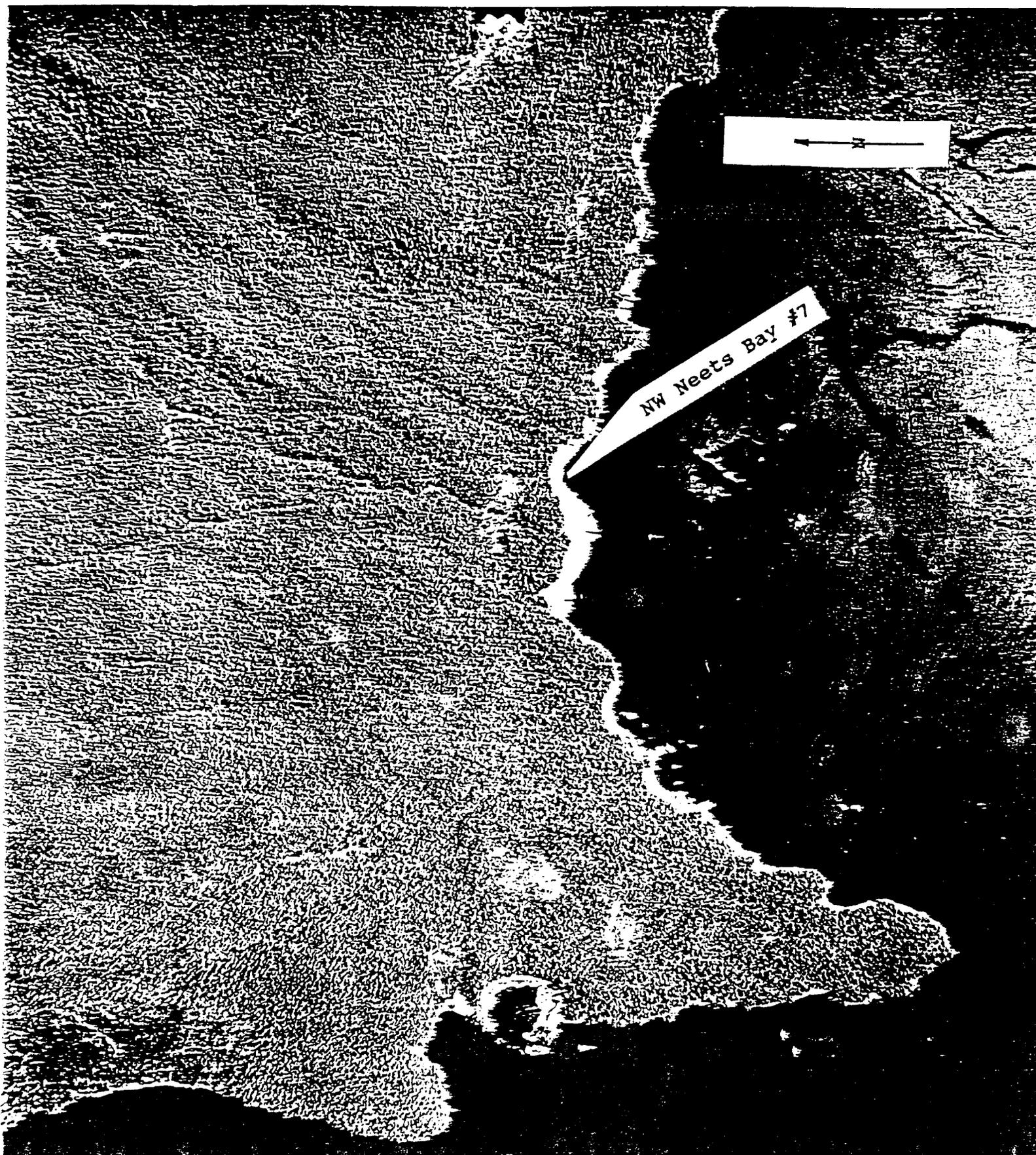


Stevenson Island #2

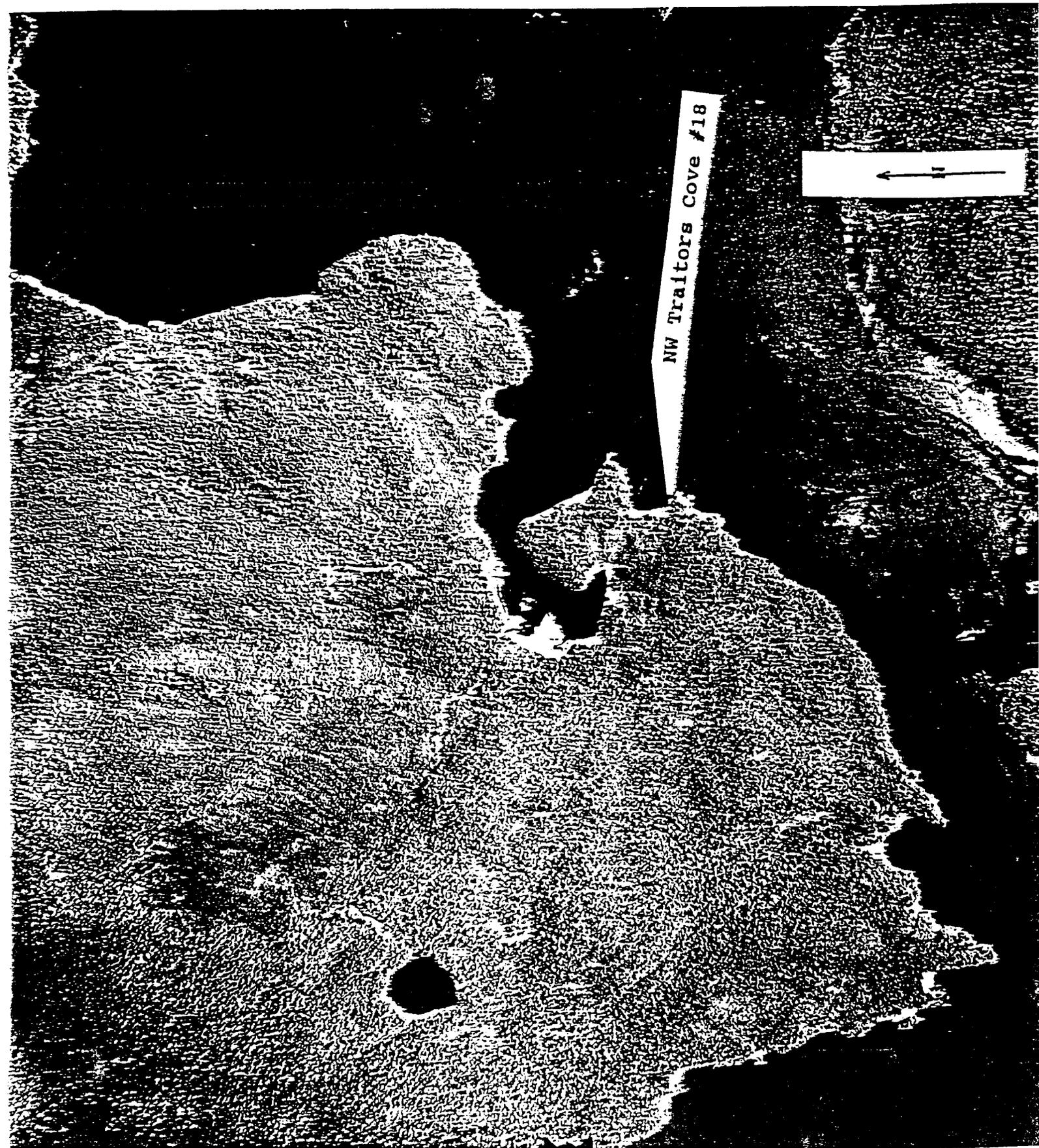




Appendix A-3. Hassler Island #1 proposed MTF location.



Apendix A-4. NW Neets Bay #7 proposed LTF location.



Appendix A-5. NW Traitors Cove #18 proposed LTF location.

02190 473 2

N Traitors Cove #22

