



PEBBLE PROJECT

DRAFT ENVIRONMENTAL BASELINE STUDIES PROPOSED 2008 STUDY PLANS

CHAPTER 12. MARINE

DRAFT



Prepared For:
State of Alaska Large Mine Permitting Team
Department of Natural Resources

Prepared By:
 THE
pebble
PARTNERSHIP

3201 C Street, Suite 604
Anchorage, AK 99503
(907) 339-2600

September 12, 2008



TABLE OF CONTENTS

<u>Section</u>	<u>Page Number</u>
TABLE OF CONTENTS.....	i
LIST OF TABLES.....	i
LIST OF FIGURES.....	i
12. Marine.....	1
12.1 Marine Wildlife.....	1
12.2 Marine Nearshore Resources—Cook Inlet Study Area.....	1

LIST OF TABLES

Table 12.1-1, Study Summary for Marine Wildlife, 2004-2008

Table 12.2-1, Study Summary for Marine Nearshore Resources, 2004-2008

Table 12.2-2, Pebble Project Marine Field Sampling Schedule for 2008

Table 12.2-3, Summary of Marine Studies Stations and Sampling Activities in Iniskin and Iliamna Bays

LIST OF FIGURES

Figure 12.1-1, Survey Areas for Marine Wildlife Studies, Cook Inlet Marine Study Area

Figure 12.2-1, Marine Benthos and Nearshore Beach Seine, Trawl and Gill/Trammel Net Locations

12. MARINE

The 2008 studies for marine wildlife are smaller in scope than were those for the field programs in 2004 through 2007. The marine program is composed of two key elements: marine wildlife and marine nearshore resources in the Cook Inlet Study Area.

12.1 Marine Wildlife

The emphasis of the 2008 marine wildlife program will be on wintering endangered species, such as Steller's Eiders and sea otters, and on seasonal and geographic patterns of populations of harbor seals that haul out within the study area. ABR, Inc. will conduct the marine wildlife studies for Pebble Project in 2008.

The objectives, methods, and scope of work for the marine wildlife study are the same as described in Section 12.1.2 of the 2007 Study Plan, except as noted below. Table 12.1-1 summarizes work for the marine wildlife program from 2004 through 2007 and planned work for 2008. The study area in 2008 is the same study area in 2007. The study area is illustrated in Figure 12.1-1.

The 2008 study will include the following tasks:

- Winter helicopter surveys for Steller's Eider, Sea Otter, Steller's sea lion, beluga whale in the Iliamna–Iniskin–Chinitna Bay area will be conducted by the same methods we used in 2006 and 2007, with an increase in survey effort from 14 surveys in 2007 to 19 surveys in 2008.
- The number of helicopter surveys for Harbor Seals will be reduced from 10 surveys in 2007 to three surveys in 2008. These surveys will occur at critical times of the year when numbers peak at haulouts (June, late July/early August) in 2008.

12.2 Marine Nearshore Resources—Cook Inlet Study Area

The objectives for the marine nearshore resources study are the same as described in Section 12.2 of the 2006 Study Plan, except as noted below. Figure 12.2-1 shows the study area for the marine nearshore resources study for 2008. Table 12.2-1 summarizes work conducted for the marine nearshore resource studies in 2004 through 2007 and planned for 2008. Table 12.2-2 describes the sampling areas, sample type, and schedule for 2008. Detailed methods will be provided in the 2008 Marine Studies – Cook Inlet Field Sampling Plan, except as noted below.

The 2008 marine nearshore resources study will include the following tasks:

- Continue beach seining at 13 stations sampled in 2004, 2005, 2006, and 2007. These stations will be sampled beginning in March until November. The sampling season is longer than that in previous years in order to better understand winter conditions, including a better understanding of the Steller's Eider and the western race of sea otter. In addition, one or more new stations will be sampled (in May and September only) in northern Iniskin Bay in areas shown to have high spring concentrations of shore birds and seals in order to identify possible prey in the area.

- Continue trawl sampling at seven stations sampled in previous years, from February or March through November, where the sampling season will be longer than in previous years. In addition, trawl sampling will be attempted at one or more new stations (in May and September only).
- Continue skiff based and walking herring spawn surveys during low tides in mid-May, early June, and mid-June along shorelines in the Iniskin/Iliamna Estuary (IIE). Surveys will focus on areas where Alaska Department of Fish and Game has reported recent spawning.
- Continue sampling biological tissues for laboratory analysis. Previous sampling efforts were conducted opportunistically. Samples will be collected in a systematic manner in 2008 to establish adequate baseline for post-project comparisons.
- Continue intertidal rocky epibiota sampling nearest to Port Site 1 in July 2008. Sampling took place previously in July 2005.
- Continue marine water quality sampling for analysis of naturally occurring constituents (NOCs). While sampling took place in July 2004, most analyses for these samples were compromised in the laboratory.
- Continue intertidal sediment and infauna sampling at five locations to complete two years of data collection. The 2008 program aims to improve data around AC Point and inner Iliamna Bay.
- Continue subtidal benthos and sediment surveys. In previous years, information has only been collected in July 2004 for subtidal benthos. The following surveys will be conducted in 2008:
 - Subtidal infauna will be collected at 2 stations sampled in 2004 near Port Site 1.
 - Diver transects will be set up and marked at Port Site 1, Port Site 4, and White Gull Island (reference) to document epibiota.
 - Sediment levels and trace element analysis in the vicinity of the loading facility will be conducted in mid-summer 2008. Surface sediment was sampled in 2004, but 2008 sampling for analysis will take both surface and subsurface sediments at Port Site 1 and Port Site 4.

**TABLE 12.1-1
Pebble Project Environmental Studies
Study Summary for Marine Wildlife, 2004-2008
Consultant: ABR, Inc.**

Discipline	2004 Data Collected or Tasks	2005 Data Collected or Tasks	2006 Data Collected or Tasks	2007 Data Collected or Tasks	2008 Tasks to be Completed
Marine Wildlife	Port/Cook Inlet				
	Information Gathering / Literature Search	Information Gathering / Literature Search & Review	Information Gathering / Literature Search & Review	Information Gathering / Literature Search & Review	Information Gathering / Literature Search & Review
	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan
	2004 Study Plan	2005 Study Plan	2006 Study Plan Summary	2007 Study Plan Summary	
	Marine Wildlife Surveys by Ship (June, November)	Marine Wildlife Surveys by Ship (March, May, June, November)	Marine Wildlife Surveys by Ship (March, May)		
		Aerial Photography Surveys for Harbor Seals (May to December)		Continue Aerial Surveys for Harbor Seals (June, late July/early August). Search for appropriate Control Study Sites for BACI study design	Continue Aerial Surveys for Harbor Seals (June, late July/early August).
			Marine Surveys by Helicopter for Steller's Eiders and Sea Otters (February, March, April)	Marine Surveys by Helicopter for Steller's Eiders and Sea Otters (February, March, April, May, August, September, October, November, December)	Marine Surveys by Helicopter for Steller's Eiders, Sea Otters, and Beluga (late July/early July and August)
	Data Entry and Analysis	Data Entry and Analysis	Data Entry and Analysis	Data Entry and Analysis	Data Entry and Analysis
	Communication and Data Management	Communication and Data Management	Communication and Data Management	Communication and Data Management	Communication and Data Management
	Coordination with NDM, Agency Meetings	Coordination with NDM, Agency Meetings, and Monthly Reporting	Coordination with NDM, Agency Meetings, and Monthly Reporting	Coordination with PLP Agency Meetings, and Monthly Reporting	Coordination with PLP Agency Meetings, and Monthly Reporting
	2004 Progress Report	Draft Environmental Baseline Document	Finalize Draft Environmental Baseline Document	Finalize Draft Comprehensive Environmental Baseline Document	

**TABLE 12.2-1
Pebble Project Environmental Studies
Study Summary for Marine Nearshore Resources, 2004-2008
Consultant: Pentec Environmental/Hart Crowser, Inc.**

Discipline	2004 Data Collected or Tasks	2005 Data Collected or Tasks	2006 Data Collected or Tasks	2007 Data Collected or Tasks	2008 Tasks to be Completed
Nearshore Fish and Demersal Invertebrates	Port/Cook Inlet				
	Information Gathering/Literature Sythesis	Information Gathering/Literature Sythesis			
	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan
	2004 Study Plan	2005 Study Plan	2006 Study Plan	2007 Study Plan	
	On-site Reconaissance and Station/Transect Selection	On-site Expansion of Station/Transects Reflecting Current Design Alternatives			
	Year 1 initial Nearshore Beach Seining at Proposed Port Sites	Year 2 Spring/Summer Nearshore Beach Seining at Proposed Port Sites (May through August)	Year 3 Early Spring Nearshore Beach Seining at Proposed Port Sites	Year 4 Early Spring Nearshore Beach Seining at Proposed Port Sites	Year 5 Early Spring Nearshore Beach Seining at Proposed Port Sites
	Year 1 Initial Otter Trawling Offshore Demersal Areas in Iniskin and Iliamna Bays	Year 2 Spring/Summer Otter Trawling Offshore Demersal Areas in Iniskin and Iliamna Bays (May through August)	Year 3 Early Spring Otter Trawling Offshore Demersal Areas in Iniskin and Iliamna Bays	Year 4 Early Spring Otter Trawling Offshore Demersal Areas in Iniskin and Iliamna Bays	Year 5 Early Spring Otter Trawling Offshore Demersal Areas in Iniskin and Iliamna Bays
	Fish Tissue Collection for Baseline Chemical Analysis	Fish Tissue Collection for Baseline Chemical Analysis			Fish Tissue Collection for Baseline Chemical Analysis
			Iniskin/Iliamna Bay Herring Spawn Survey		
			ADFG Herring Data Analysis		
		Fish Collection for Stomach Content Analysis	Fish Collection for Stomach Content Analysis		
	Year 1 Data Management and QA/QC	Year 2 Data Management and QA/QC	Year 3 Data Management and QA/QC	Year 4 Data Management and QA/QC	Year 5 Data Management and QA/QC
	Year 1 Data Analysis	Year 2 Data Analysis	Year 3 Data Analysis	Year 4 Data Analysis	Year 5 Data Analysis
	2004 Progress Report on Marine Studies	Preparation of Draft Environmental Baseline Document	Preparation of Draft Environmental Baseline Document	Preparation of Draft Environmental Baseline Document	

**TABLE 12.2-1
Pebble Project Environmental Studies
Study Summary for Marine Nearshore Resources, 2004-2008
Consultant: Pentec Environmental/Hart Crowser, Inc.**

Discipline	2004 Data Collected or Tasks	2005 Data Collected or Tasks	2006 Data Collected or Tasks	2007 Data Collected or Tasks	2008 Tasks to be Completed
Marine/Benthos Habitat	Coordination with NDM & Agencies	Coordination with NDM & Agencies	Coordination with NDM & Agencies	Coordination with PLP & Agencies	Coordination with PLP & Agencies
	Information Gathering/Literature Synthesis	Information Gathering/Literature Synthesis			
	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan	Scope, Schedule, Field Sampling Plan
	2004 Study Plan	2005 Study Plan	2006 Study Plan		
	On-site Reconnaissance and Station/Transect Selection	On-site Expansion of Station/Transects Reflecting Current Design Alternatives			
	Year 1 Intertidal sampling of epibenthos on rocky habitats (late summer)	Year 2 Intertidal sampling of epibenthos on rocky habitats (mid summer)	Year 3 Intertidal sampling of epibenthos on rocky habitats (early spring)		Year 4 Intertidal sampling of epibenthos on rocky habitats (early spring)
	Year 1 Intertidal sampling for sediment chemistry on sand/mud habitats (late summer)	Year 2 Intertidal sampling for sediment chemistry on sand/mud habitats (mid summer)			
	Year 1 Subtidal sampling for sediment chemistry on sand/mud habitats (late summer)				
	Year 1 Intertidal sampling of infauna on sand/mud habitats (late summer)	Year 2 Intertidal sampling of infauna on sand/mud habitats (mid summer)			Year 3 Intertidal sampling of infauna on sand/mud habitats (mid summer)
	Year 1 Subtidal sampling of infauna on sand/mud habitats (late summer)	Analysis of Subtidal sampling of infauna on sand/mud habitats (late summer)			Year 2 Subtidal sampling of infauna on sand/mud habitats (late summer)
	Year 1 Diver subtidal epibenthos surveys				
	Year 1 Marine water quality sampling for trace metals	Analysis of Marine water quality samples for trace elements		Year 2 Marine water quality sampling for trace elements	Year 3 Marine water quality sampling for trace elements
	Invertebrate Tissue Collection for Baseline Chemical Analysis (late summer)	Invertebrate Tissue Collection for Baseline Chemical Analysis (mid summer)			
	Shoreline habitat verification	Shoreline habitat detailed survey	Shoreline habitat detailed survey		
	Year 1 Data Management and QA/QC	Year 2 Data Management and QA/QC	Year 3 Data Management and QA/QC	Year 4 Data Management and QA/QC	Year 5 Data Management and QA/QC
	Year 1 Data Analysis	Year 2 Data Analysis	Year 3 Data Analysis	Year 4 Data Analysis	Year 5 Data Analysis
	Coordination with NDM & Agencies	Coordination with NDM & Agencies	Coordination with NDM & Agencies	Coordination with PLP & Agencies	Coordination with PLP & Agencies
	2004 Progress Report on Marine Studies	Preparation of Draft Environmental Baseline Document	Preparation of Draft Environmental Baseline Document	Preparation of Draft Environmental Baseline Document	

Table 12.2-2

Pebble Project Marine Field Sampling Schedule for 2008

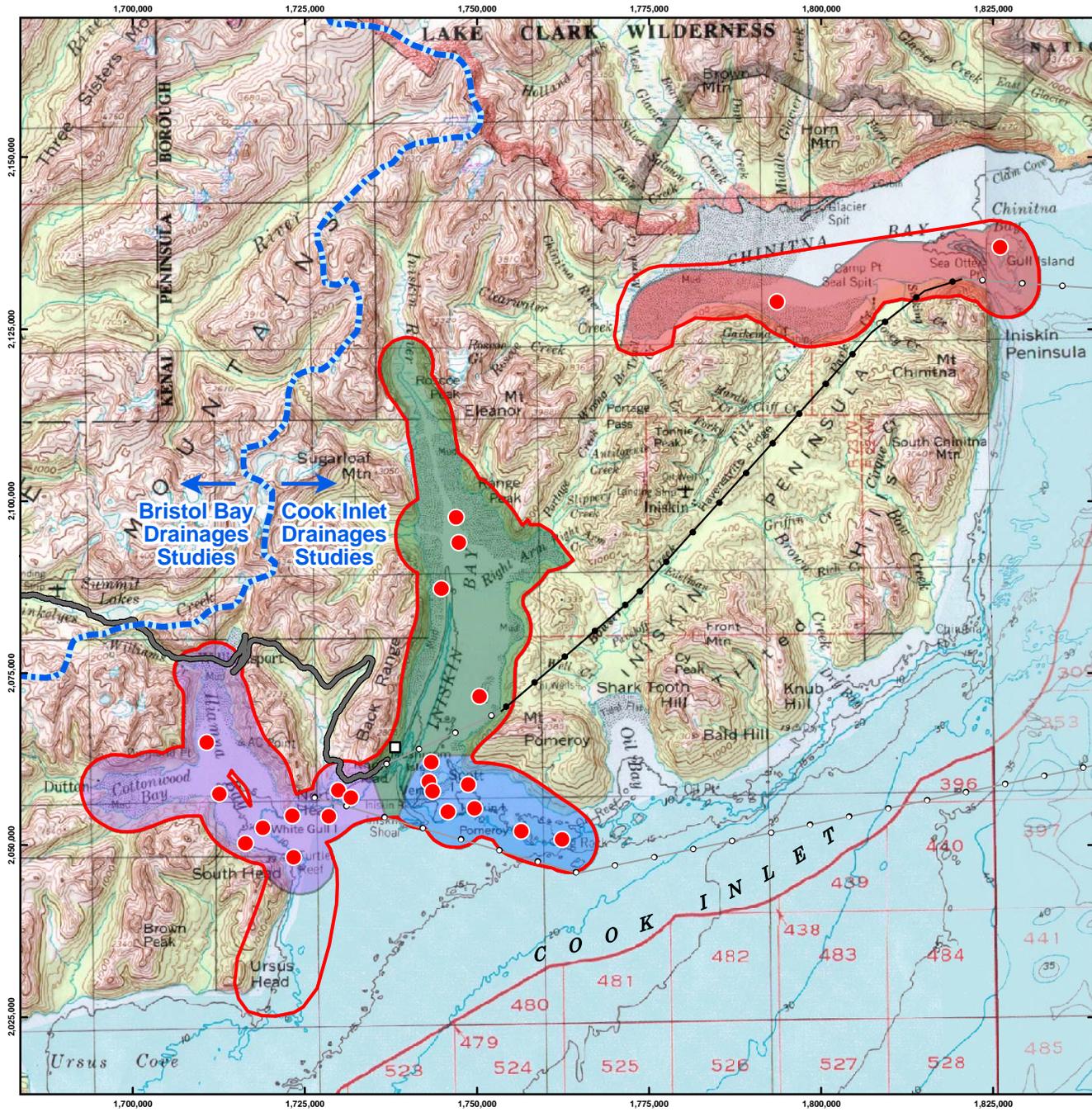
Area	Media	Analysis	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov
Pelagic	Water (bottle)	Chemical			X		X		X X		
Subtidal	Sediment (grab)	Chemical					X				
Subtidal	Sediment Infauna (grab)	Taxonomic					X				
Intertidal	Sediment (core)	Chemical					X				
Intertidal	Plant/Fish/Invert Tissues (net)	Chemical			X	X	X	X	X		
Intertidal	Sediment Infauna (core)	Taxonomic					X				
Intertidal	Rocky Intertidal (quadrat)	Taxonomic					X				
Intertidal	Rocky Intertidal (visual)	Herring spawn			X	X X					
Subtidal	Rocky/mixed (dive transect)	Taxonomic					X				
Inter/subtidal	Rock/boulder (gill/trammel net)	Taxonomic		X		X		X		X	
Inter/subtidal	Sand/mud (seine / trawl)	Taxonomic	X	X	X	X	X	X	X	X	X
Inter/subtidal	Fish stomachs	Taxonomic			X	X	X	X	X		

Table 12.2-3

Summary of Marine Studies Stations and Sampling Activities in Iniskin and Iliamna Bays

Station Name	Station ID	WQ, Subtidal Sediment & Infauna	Dive Survey	Intertidal Sediment & Infauna	Inter-tidal Epi-biota	Off-shore Trawls ¹	Beach Seine	Tissue Samples	Gill/ Trammel Net
Beach Seine Site 1	MBS1						X		
Beach Seine Site A1	MBSA1			X	X		X	X	X
Beach Seine Site 3	MBS3						X		
Beach Seine Site 4 (Williamsport)	MBS4						X		
Port Site 1	MPS1	X			X		X	X	
Port Site 1 Seine Site A	MPS1A		X		X		X		X
Port Site 1 Seine Site B	MPS1B		X				X		X
Port Site 1 Seine Site C	MPS1 C						X		
Port Site 1 Trawl Site	MPS1T					X			
Port Site 2	MPS2			X	X			X	
Port Site 2 Trawl Site	MPS2T					X			
Port Site 2 Trawl Site A	MPS2T A					X			
Port Site 2 Trawl Site B	MPS2T B					X			
Port Site 3	MPS3			X	X		X	X	
Port Site 4	MPS4	X	X	X	X		X	X	X
Port Site Existing	MPSE						X		
Port Site Existing Seine Site 1	MPSE1			X			X		
Scott Island	MSI				X				
Blackie Beach	MBB			X			X		
Trawl Site 1	MTR1					X			
Trawl Site 2	MTR2					X			
Trawl Site 3	MTR3					X			
Trawl Site 4	MTR4					X			
Trawl Site 5	MTR5					X			
Sugarloaf Flats	MSLF						X		
AC Point Lagoon	MACL						X		
White Gull Island	MWGI		X						
Black Reef	MBR								X
Offshore Reference	MOPP 1	X							

¹ Note: Trawling will only occur in soft bottom areas without rocky substrates to prevent damage to gear; if unknown, the status of bottom type will first be determined by inspection during low tides or vessel instrumentation.



1,700,000 1,725,000 1,750,000 1,775,000 1,800,000 1,825,000

2,150,000
2,125,000
2,100,000
2,075,000
2,050,000
2,025,000

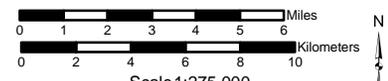
1,700,000 1,725,000 1,750,000 1,775,000 1,800,000 1,825,000



Figure 12.1-1.
2008 Study Plan,
Survey Areas for
Marine Wildlife Studies,
Cook Inlet Marine Study Area
DRAFT

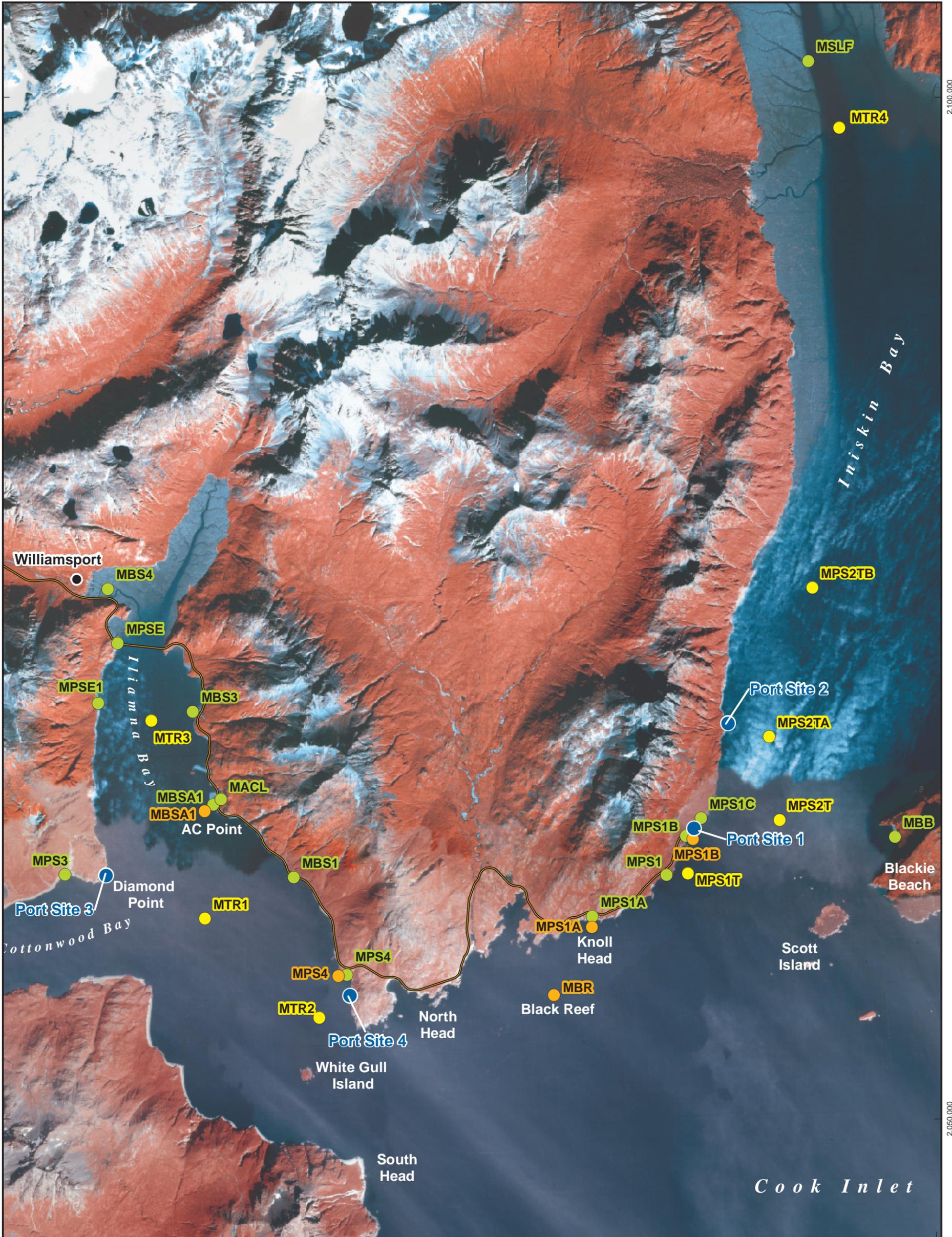
Legend

- Marine Wildlife Survey Area
- Harbor Seal Survey Areas**
- Chinitna Bay Count Area
- Iliamna Bay Count Area
- Iniskin Bay Count Area
- Iniskin Islands Count Area
- Harbor Seal Haul-out Location
- Possible Road Alignment
- Possible Powerline
- Possible Submarine Powerline
- Possible Port Site



Scale 1:275,000
Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: Marine_Wildlife_StudyPlan2008_v01.mxd	Date: May 6, 2008
Version: 1	Author: ABR-AZC



Scale 1:55,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

Legend

- Beach seine
- Trawl
- Gill/Trammel Net
- Port Site
- Proposed Road Corridor



Figure 12.2-1
Marine Benthos and Nearshore
Beach Seine, Trawl and
Gill/Trammel Net Locations
DRAFT

File: RDI_Pen_Seine_Trawl_Fig_Pen-2008_11X17P_1of1_D03.mxd

Date: April 25, 2008

Version 3

Author: RDI - LS