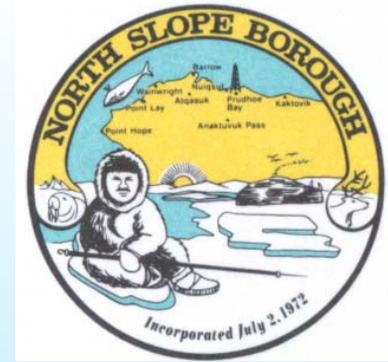




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Barrow Coastal Storm Damage Reduction Study

UAA Science-to-Engineering Workshop
January 8, 2004

Barrow Arch





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Presentation Outline

- 1. Corps of Engineers/North Slope Borough Study Team**
- 2. Overview of Corps Study Process**
- 3. What is the Problem?**
- 4. Storm Damage Reduction Feasibility Study**
- 5. Questions and Comments**



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Barrow Study Team

- **The U.S. Army Corps of Engineers (Corps) is the lead Federal agency providing 50 percent of the study cost.**
- **The Corps is responsible for the study, which includes plan formulation, coastal engineering, economics, plan formulation, environmental studies, and Feasibility Report & Environmental Impact Statement preparation.**
- **The North Slope Borough is the non-Federal sponsor. They provide the other 50 percent of the study cost in cash and in-kind services.**
- **In-kind services include such items as project management, surveying, GIS mapping, equipment and logistical support.**



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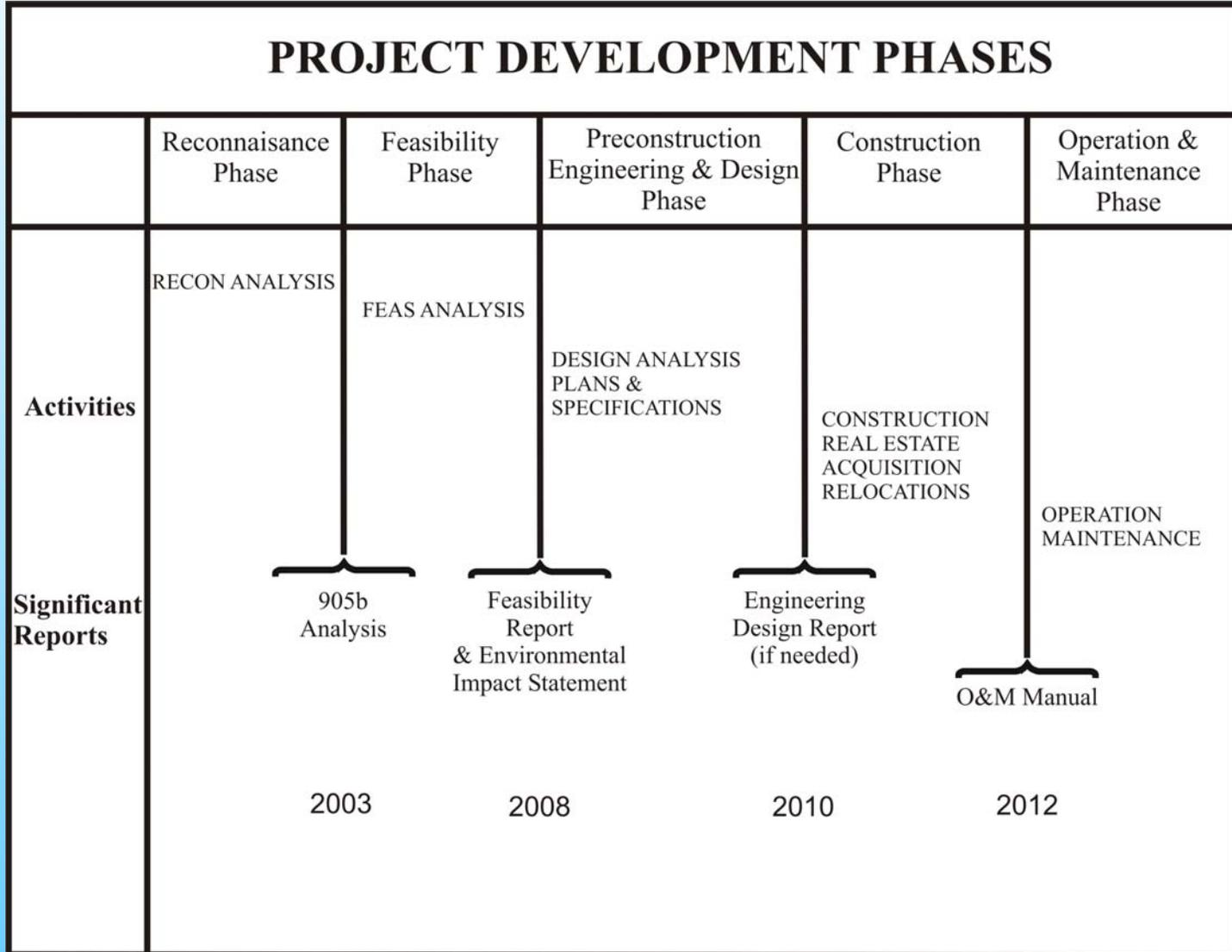
Barrow Study Team

- **North Slope Borough**
- **Corps of Engineers (Feasibility Report & EIS)**
 - **Alaska District**
 - **Engineering Research & Development Center
(Coastal and Hydraulics Laboratory)**
- **U.S. Fish and Wildlife Service
(Fish & Wildlife Coordination Act Report)**
- **Native Village of Barrow (EIS Cooperating Agency)**



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Corps Project Process





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Feasibility Study Purpose

- Identify existing and future conditions in the study area.
- Evaluate storm damage reduction measures and determine a plan that best meets the “*Principles and Guidelines*” of the Water Resources Council and other criteria. A recommended plan generally is:
 - a. Economically justifiable
 - b. Environmentally acceptable
 - c. Meets policy criteria and engineering design standards
 - d. Supported by a local government
- Make a recommendation to Corps Headquarters and Congress on whether to spend federal funds (in partnership with a local government) to proceed with project construction.



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Feasibility Study Phases

Phase 1 – Feb. 2003 to Sep. 2005

- **Develop basic information**
- **Define existing and without-project conditions**
- **Identify potential measures and alternatives**

Phase 2 – Oct. 2005 to Jan. 2007

- **Evaluate and compare detailed alternatives**

Phase 3 – Feb. 2007 to Dec. 2008

- **Public review of draft feasibility report and draft EIS**
- **Division Engineer notice with final report and final EIS**
Washington D.C. level review



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Barrow Storm Damage

What is the Problem?

Waves



Waves



More Waves



Causing Lagoon Overflow



Flooding Main Road in Barrow



Cat in water, going to help close
the gap



Cat in the water, working near surf



Cat moving sand to reform seadike







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Preliminary Planning Objectives

- Provide relief from storm damage and shoreline erosion that threatens homes, shoreline bluffs, and critical community infrastructure.
- Reduce flood damages to critical public and private facilities.
- If incidental to gravel excavation, improve navigation for lightering barge loading and unloading. {appears unlikely}
- Protect the sensitive arctic environment and mitigate significant project impacts where reasonable.
- Identify and develop practical ecosystem restoration opportunities, as appropriate.



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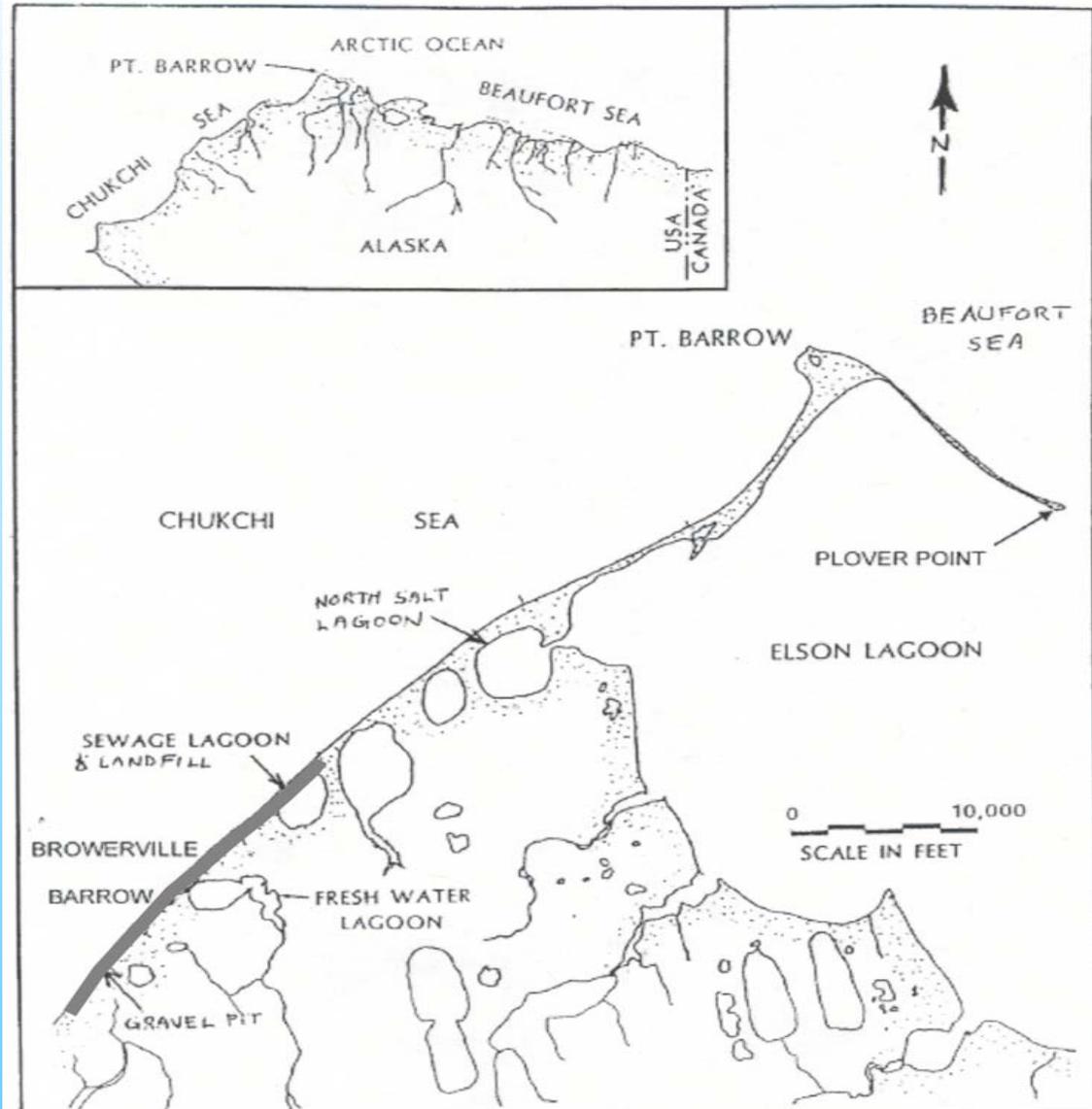


FIGURE 1. LOCATION MAP



Looking southwest from Barrow. Note the black sacks lining the shore and the fill material added above them.



Home located in downtown Barrow. Sacks are approximately 25 meters from the water level.



Shore in downtown Barrow. Above the sand mound is a road and power lines. Sacks are ~20m from waters edge.



Photo is looking southwest from downtown Barrow. A road and power line are located beyond the mound to the left.



6.17.2002

Looking southwest from downtown Barrow. Wells Fargo bank is located in large brown building on left.



Looking northeast from Browerville. Home located ~50m from water. Brower's Café is next to the house.



Looking northeast at sewage lagoon. Note sand piles placed between road and beach.



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Preliminary Alternatives

Beach Nourishment Alone

- Add 100 feet of width to the beach southwest of Barrow to a point about 500 feet northeast of the Barrow landfill.
- Roadway along the shore would be raised by 6.5 feet to +16 feet.
- Initial fill requirement: 2 million cubic yards (cy) for beach, 500,000 cy for road.
- Annual beach nourishment requirement: 10,000 cy/yr.



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Preliminary Alternatives

Beach Nourishment with Concrete Mattress Revetment

- Add 50 feet of width to the beach southwest of Barrow to a point about 500 feet northeast of the Barrow landfill.
- Revetment added to the seaward slope of roadway and bluffs.
- Revetment underlain with filter cloth; will extend from +16 feet to mean sea level.
- Initial fill requirements: 1 million cy for beach; 500,000 cy for road.
- Annual beach nourishment requirement: 10,000 cy/yr



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Purpose: Identify gravel source locations in Barrow area.

Sites: (1) BIA Prospect—running south from the gravel pits west of Barrow for about 15 miles.

(2) Cooper Island—located on north side of Elson Lagoon, about 38 miles east of Barrow.

(3) Submerged Old Pt. Barrow—located 4 to 7 miles northeast of current Pt. Barrow at depth of about 180 feet.

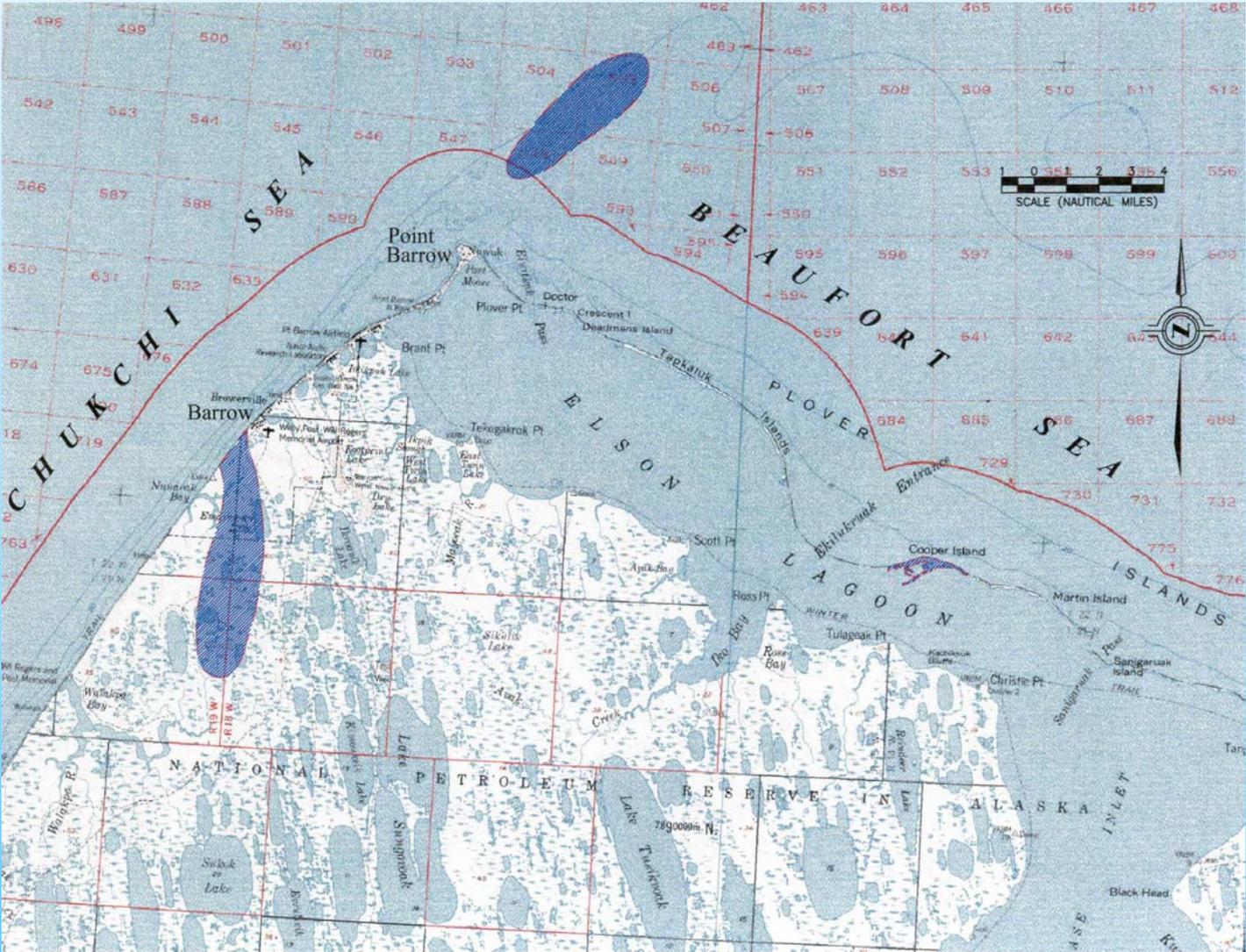
Program: April 2004—Drill holes to define BIA site and deposits on/near Cooper Island from the ice.

August 2004—Drill holes from barge to define deposits of submerged Old Pt. Barrow.

Soils and Geology



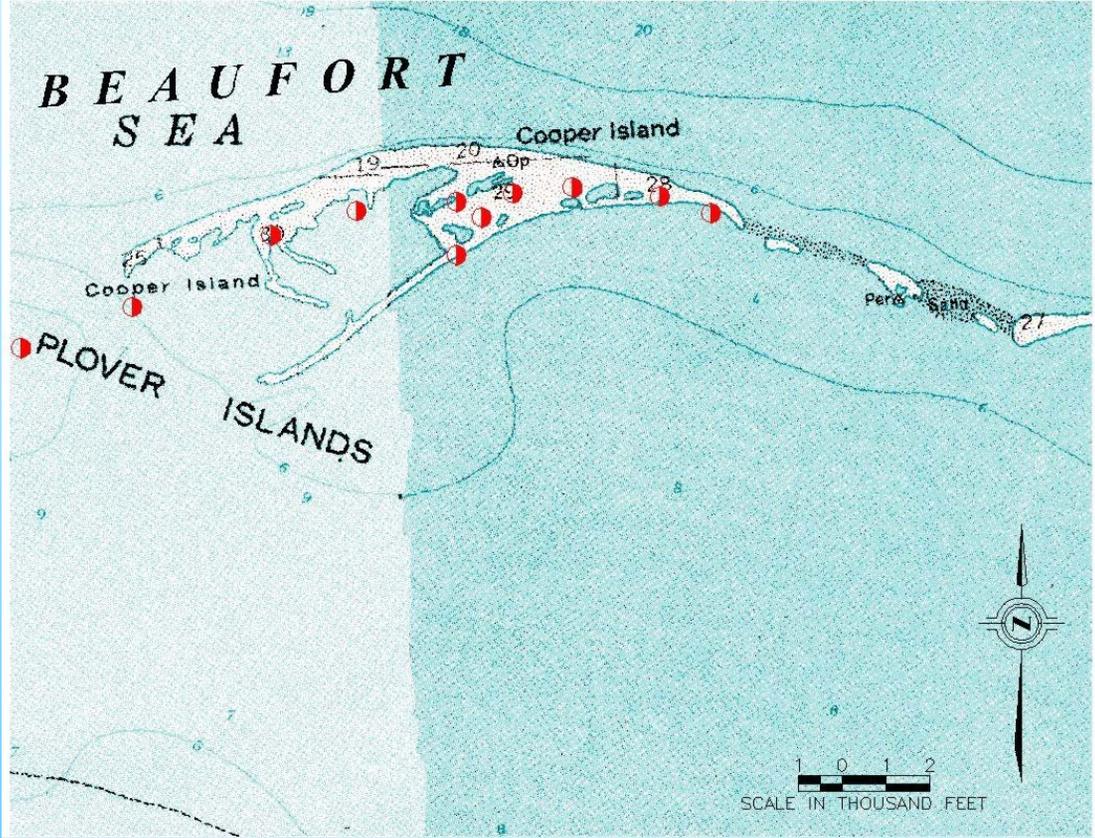
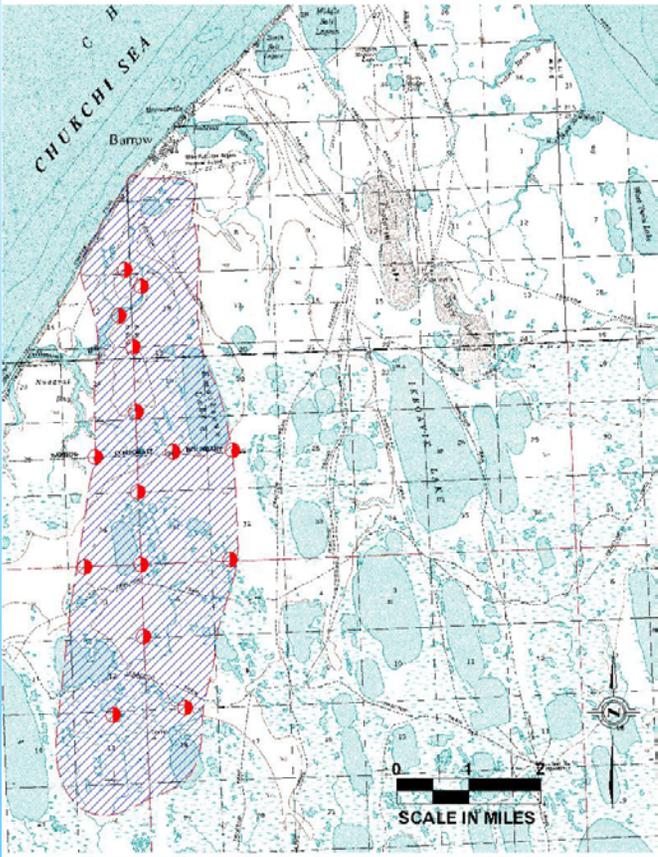
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Soils and Geology



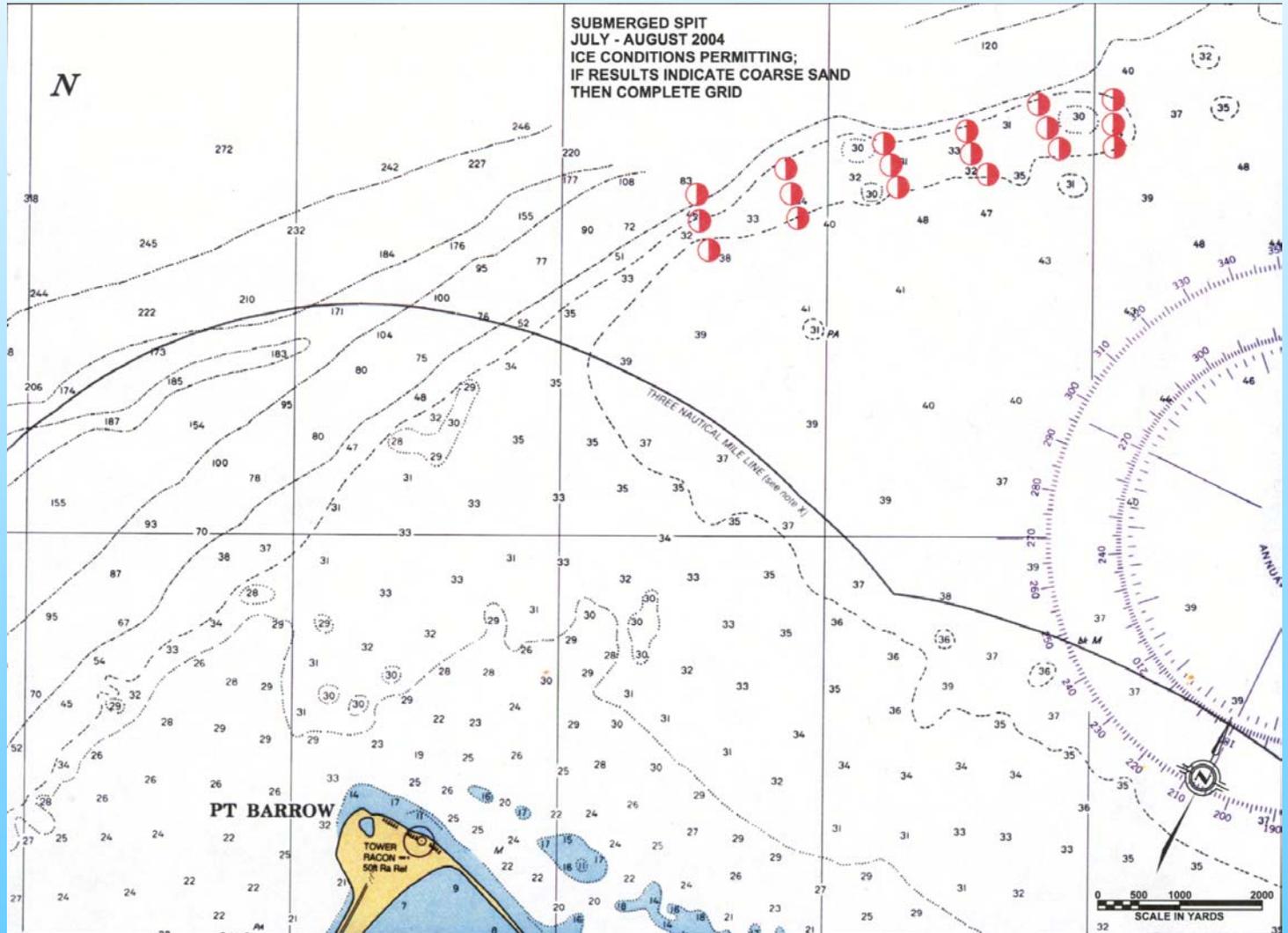
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Soils and Geology





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Economic Evaluation

Economic Evaluation Process

Compare conditions without the project to conditions with the project.

Assumption: The project will produce benefits by reducing damages from storms.

Requirement: Project benefits must exceed project costs.



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Economic Evaluation

Project Benefits

Examples of Project Benefits Include:

- **Reduced storm damages to homes and businesses.**
- **Reduced erosion damages to roads and sewage lagoon.**
- **Increased use of the beach for subsistence activities, tourism and recreation.**
- **Reduced emergency response costs.**

Benefits do not include increased jobs and income in local economy.



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Economic Evaluation

Economic Data Collection

Team economists will be working with the Borough and the community to collect information about damages from previous storms.

Questions for consideration:

- What damage have storms caused to homes or property?
- How has road and beach damage affected residents?
 - Lost subsistence opportunities
 - Impacts to tourism and recreation activities
 - Reduced boat access/usage
- What other impacts have been noticed because of water related problems?



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Hydraulics and Hydrology

Instrumentation/Data Collection by the Coastal and Hydraulics Laboratory

- Two current meters/wave gages were deployed from August through October 2003
- The current meters/wave gages will be deployed again next summer
- Deployment depths are at approximately 16 feet and 33 feet



Coastal Hydraulics Lab & Alaska District

- **Analyze typical wind and wave climate from records.**
- **Analyze extreme storm events from records.**
- **Perform circulation study to simulate currents.**
- **Study the transport of beach material**
- **Evaluate the most stable beach profile for the wave climate.**
- **Analyze the rate of beach loss.**
- **Evaluate erosion and flood potential.**
- **Develop and evaluate measures and alternatives.**
- **Evaluate beach maintenance options.**



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Environmental Impact Statement

The EIS will assess, analyze and compare the environmental effects of project alternatives, including effects on natural resources, social values, and cultural resources.

- **Direct effects—caused by action.**
- **Indirect effects—occurring as a result of the action, but in another place or at a later time, such as changes in land use.**
- **Action can require significant mitigation.**



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Significant Environmental Resources

Significant Resources Recognized by Law

- **Cultural Resources**
- **Endangered Species**
- **Wetlands**
- **Essential Fish Habitat**
- **Marine Mammals**
- **Migrating Birds**



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Environmental Questions to Consider

- **Impact of beach nourishment on:**
 - a. Beach access, boat launching.
 - b. Beach ecology—invertebrate and plant life, shorebird feeding, near shore fish-capelin spawning.
 - c. Archaeological sites, historic sites, and traditional land use areas.

- **Borrow source impacts:**
 - a. Barrier Islands—impacts to nesting sea birds, sediment stability, protection of lagoon, haul out for marine mammals.
 - b. Old Pt. Barrow—bowhead whale feeding, fish habitat.
 - c. Tundra—damage to tundra vegetation, permafrost, and impacts to tundra ponds, nesting waterfowl, songbirds, snowy owls, threatened Steller's eider, and polar bear denning sites.
 - d. Archaeological sites, historic sites, and traditional land use areas.

Study Cost Estimate by Year

Fiscal Year	Federal Cash (\$)	Sponsor Cash (\$)	Sponsor In-Kind (\$)	Total Study (\$)
2003	900,000	550,000	350,000	1,800,000
2004	850,000	550,000	300,000	1,700,000
2005	650,000	350,000	300,000	1,300,000
2006	500,000	250,000	250,000	1,000,000
2007	500,000	250,000	250,000	1,000,000
2008	215,941	59,225	156,716	431,882
Total	3,615,941	2,009,225	1,606,716	7,231,882

Study Cost Categories

Breakout by Organization	Total Cash (\$)	Sponsor In-Kind (\$)
Environmental	660,498	0
Economics	779,496	400,000
Engineering Services	744,273	150,000
Hydraulics & Hydrology	1,562,276	291,000
Project Management	500,482	521,700
Project Formulation	894,466	0
Real Estate	47,396	125,000
Construction	10,000	0
Contracting	9,600	0

Barrow Study Web Site Address

The Corps has set up a Web site for the Barrow Coastal Storm Damage Reduction Study. As developments occur during the study we will post updated information. This powerpoint presentation is on the Web site.

The site may be accessed through the Alaska District, U.S. Army Corps of Engineers Web site at:

www.poa.usace.army.mil

Move curser to “Civil Works” tab at the top of the screen on the home page; then click on “Civil Works” in the drop-down menu and then select “Barrow Storm Damage Reduction” from the Civil Works Branch home page.



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Barrow Study Web Page

Barrow Alaska Storm Damage Reduction - Microsoft Internet Explorer

File Edit View Favorites Tools Help Back Forward Stop Home Search Favorites Media Print Mail News RSS

Address http://www.poa.usace.army.mil/en/cw/barrowSDR/barrow.htm

Coastal Storm Damage Reduction Barrow, Alaska

A photograph showing a wide, dark, sandy beach in Barrow, Alaska. In the background, there are utility poles and a small building. The ocean is visible on the right side of the image, with waves breaking against a rocky shore.

The North Slope Borough asked the Alaska District U.S. Army Corps of Engineers to conduct a study to determine whether there was a Federal interest in constructing projects that would reduce storm damage, flood damage, and improve navigation in Barrow. The results of that 905(b) reconnaissance study, completed in February 2003, indicated that a project to reduce storm damage appeared to be technically and economically feasible and environmentally acceptable. The study results also showed that storm damage reduction measures might also incidentally improve navigation.

The next phase is the feasibility study, which will further evaluate project alternatives, including those identified in the 905(b) study. The feasibility report and environmental impact statement will provide a detailed analysis of the alternatives and identify a recommended plan for construction. The recommended plan must be feasible from an engineering and economic standpoint, have acceptable environmental impacts, and be supported by the local sponsor.

During the next few years, the Corps will be conducting studies to evaluate the wind and wave climate and sediment transport at Barrow, looking at gravel sources to include drilling at Cooper Island and the Bureau of Indian Affairs (BIA) discovery site (south of Barrow) in spring 2004, and conducting environmental studies.

A draft feasibility report and environmental impact statement is scheduled to be completed and ready for public review in early 2007, with the final reports completed by December 2008.

This web site will be updated periodically to include information from our ongoing studies. Please feel free to comment on this project by calling Lizette Boyer at (907) 753-2637 or by clicking on the e-mail link below.

A scoping meeting on the proposed project was held in Barrow on June 12, 2003. [Click here](#) for the meeting notes.

To see the PowerPoint presentation from the scoping meeting, [click here](#). If you need Acrobat Reader, please [click here](#).

To read the 905(b) reconnaissance study, [click here](#). If you need Acrobat Reader, please [click here](#).

Done Local intranet



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Any Questions?



Thank You

Forest Brooks (907) 753-2627

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