

RUTGERS

Edward J. Bloustein School
of Planning and Public Policy

Sustainable Arctic Villages and Oil Development?

Planning to avoid the natural resources curse

Studio Presentation, Spring 2013

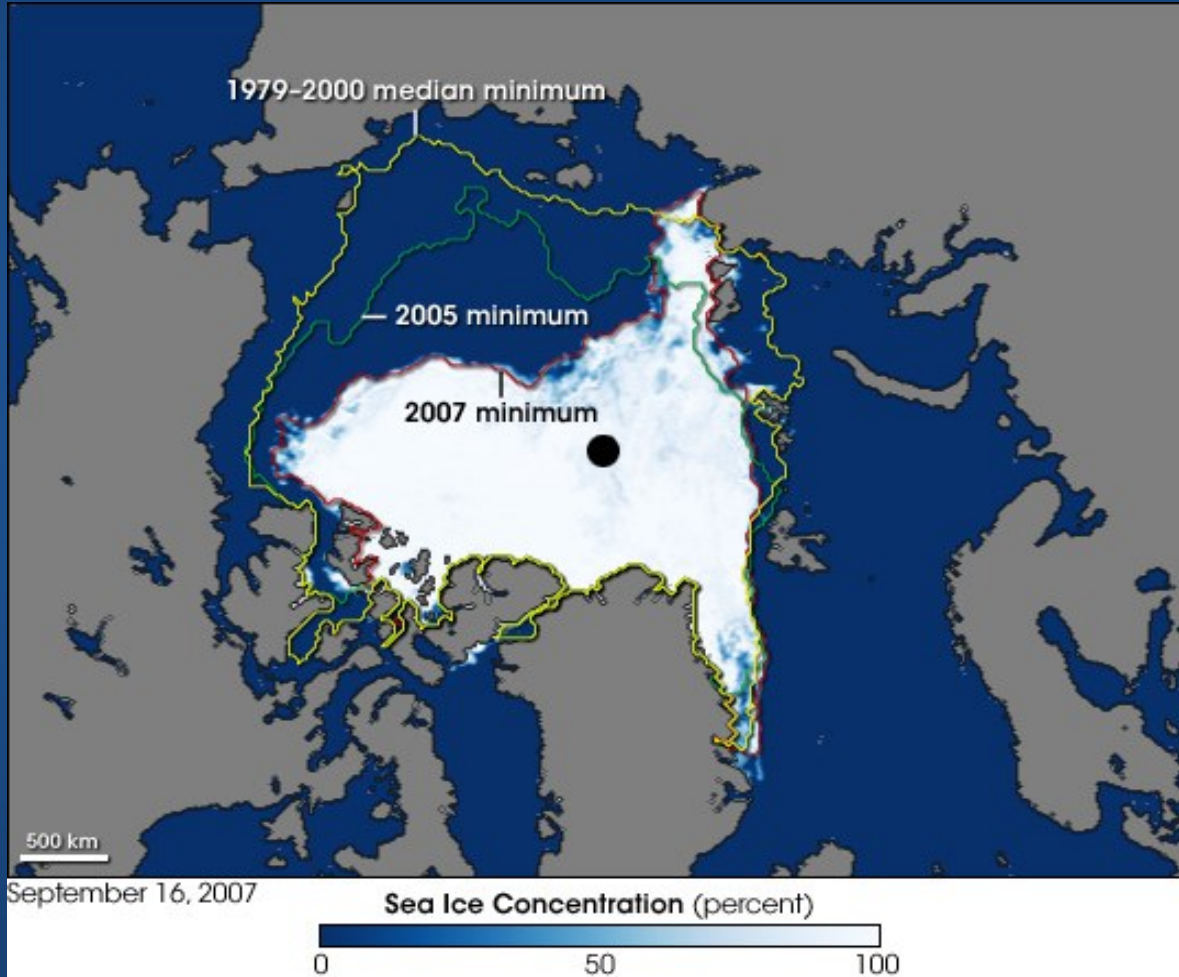
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Mary Martha Gaiennie, Sujee Jung, Kathryn McKelvey, Joshua Wilcox

Studio Advisor: Hal Salzman

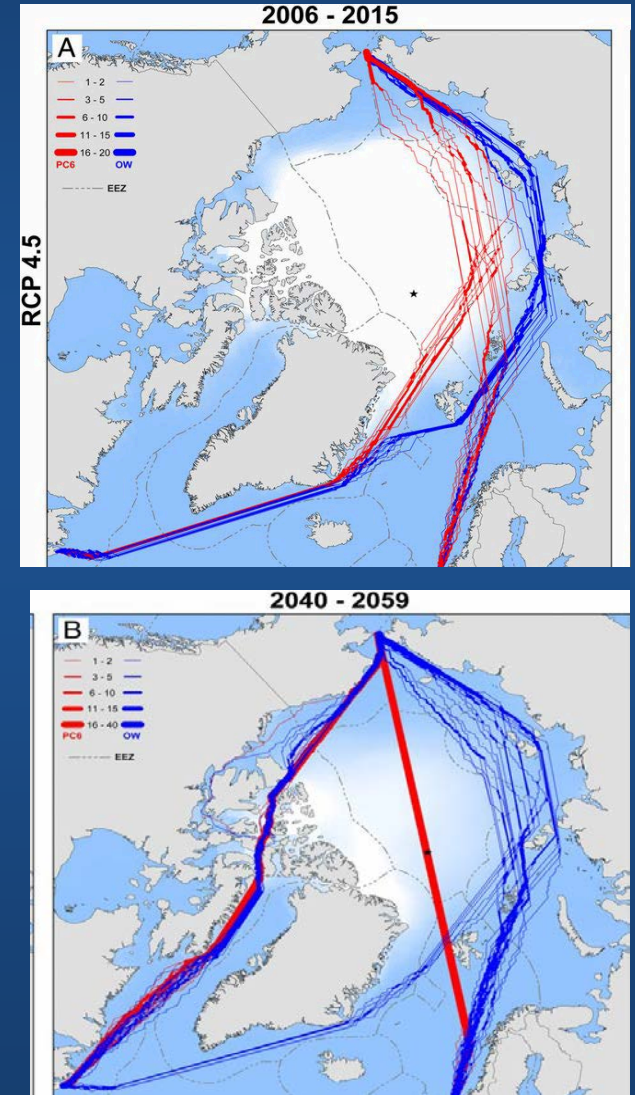


- Ocean Conservancy
- National Science Foundation, Office of Polar Programs
- Nature Conservancy
- Tony Nelessen, Rutgers University
- Michael Phipps, Millennium Group International
- Greg Purvis, Linked Strong Services
- Audubon Alaska
- Jed Drolet, Alaska Energy Authority
- Anne Henshaw, Oak Foundation
- Glenn Sheehan, Barrow Arctic Science Consortium
- Anne Jensen, Ukpeaġvik Iñupiat Corporation
- Enrique Curchitser, Marine Science, Rutgers University

Arctic Ice Loss & Vessel Traffic



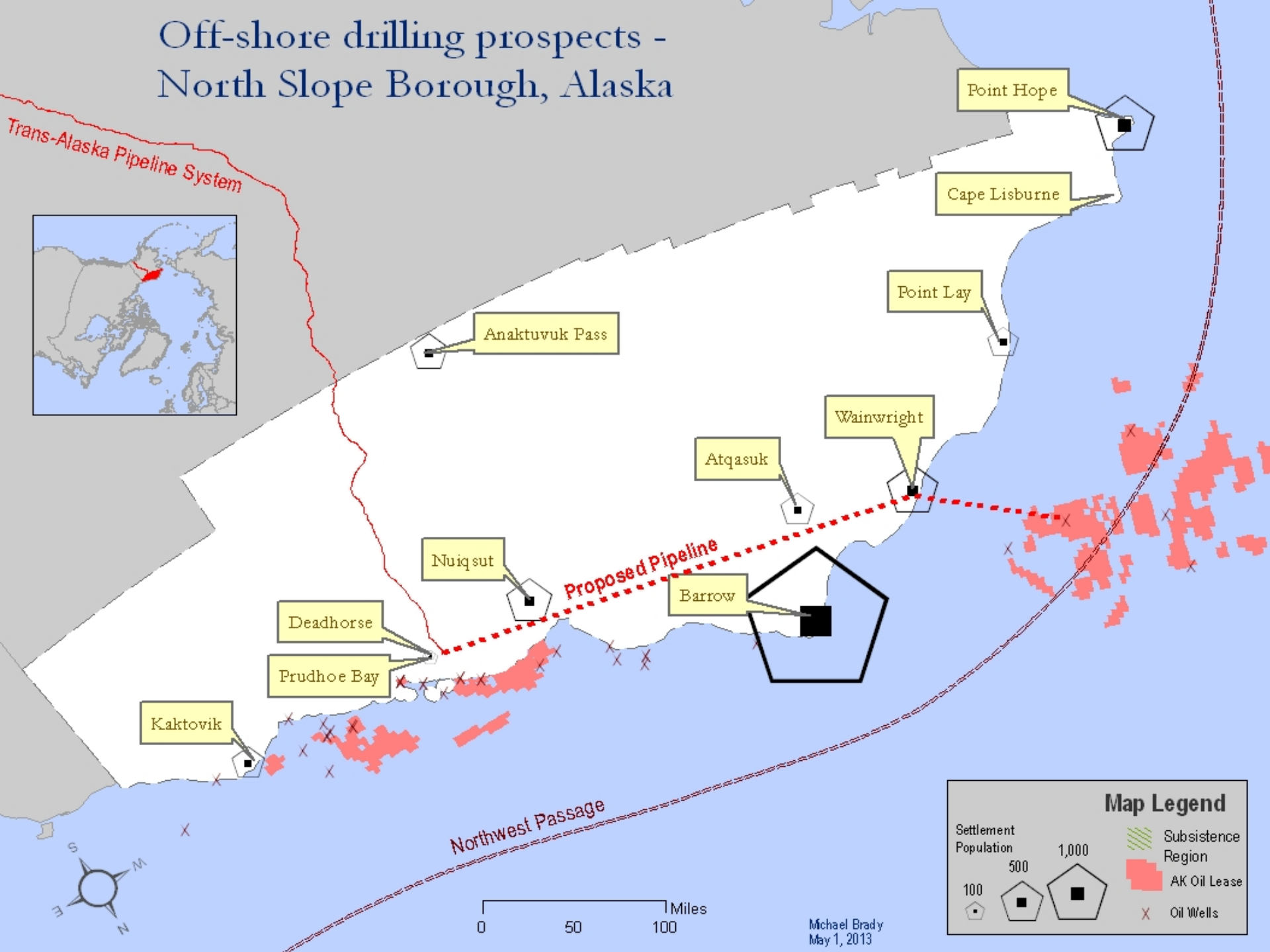
Source: NASA 2007



Source: Smith and Stephenson, 2013

Off-shore drilling prospects - North Slope Borough, Alaska

Trans-Alaska Pipeline System



Point Hope

Cape Lisburne

Point Lay

Anaktuvuk Pass

Wainwright

Atkasuk

Nuiqsut

Proposed Pipeline

Barrow

Deadhorse

Prudhoe Bay

Kaktovik

Northwest Passage

Map Legend

Settlement			
Population	500	1,000	Subsistence Region
100			
			Oil Wells

0 50 100 Miles

Michael Brady
May 1, 2013

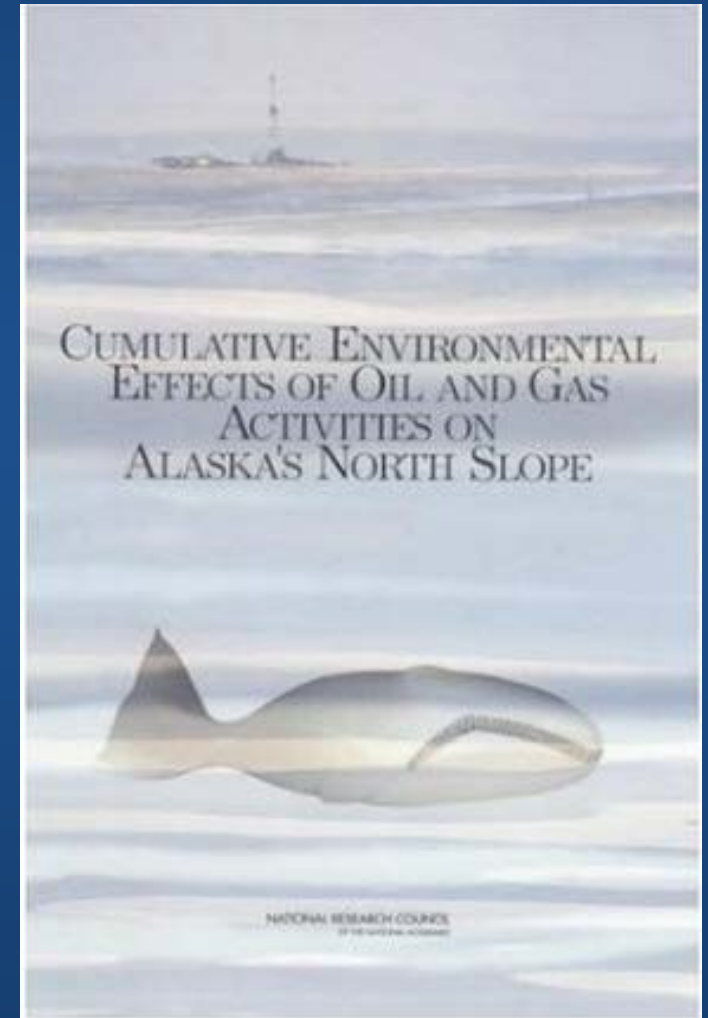


- Respond to erosion, environmental threats, climate change
- Preserve community integrity
- Leverage development for community benefit



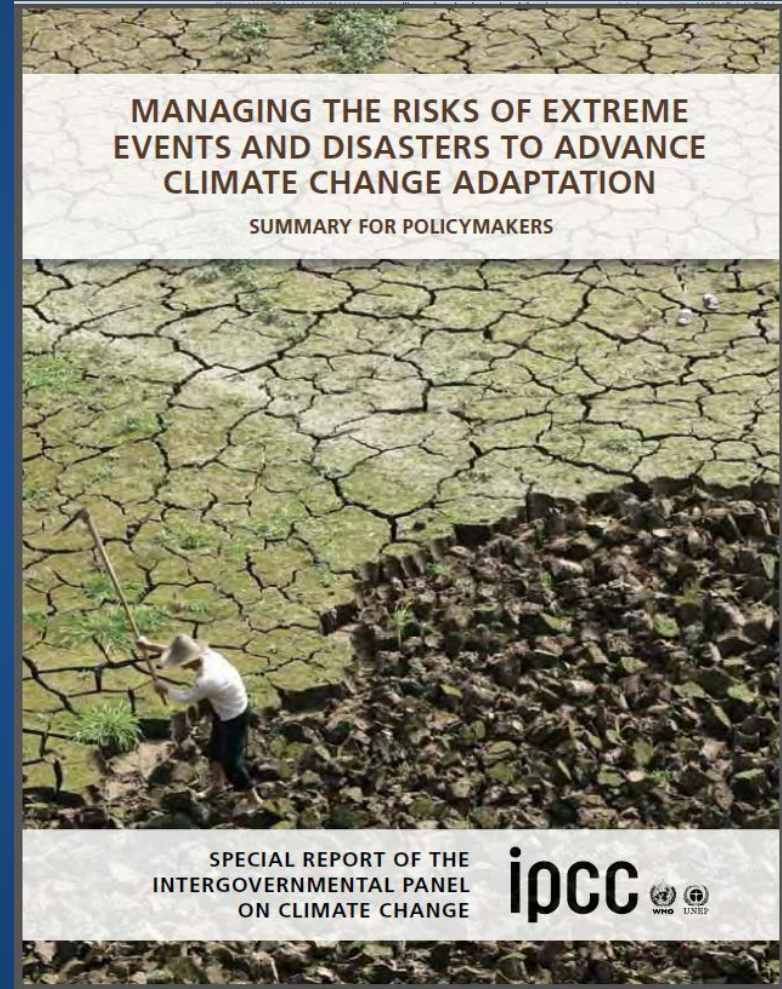
- Resource Development Background
- Wainwright Study Area
- Development Threats – coastal erosion
- Development Scenarios
- Threats and Opportunities

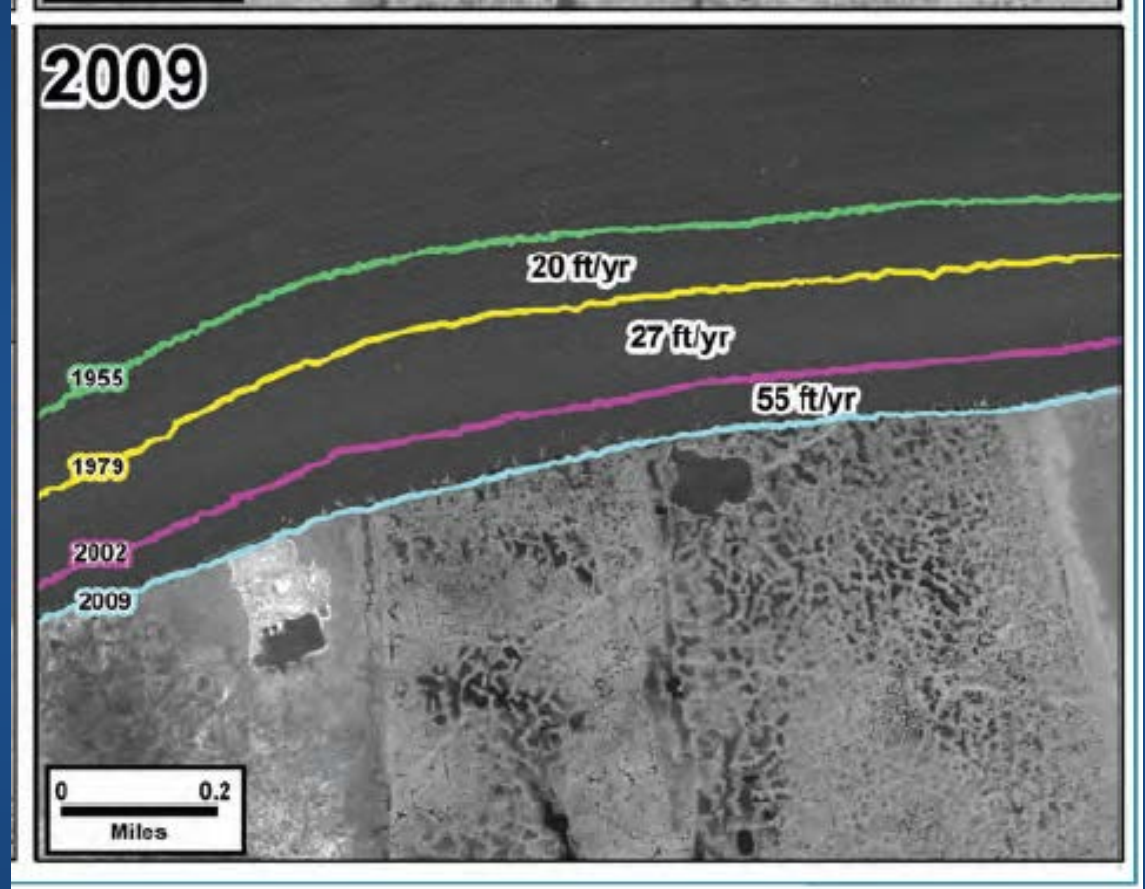
- National Research Council 2003 report outlines NSB oil development threats and opportunities.





Adaptive Capacity





- **Research Question:** How can NSB leverage off-shore oil activity to promote sustainable local development?



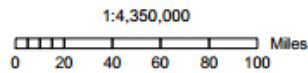
- **Protection, accommodation, retreat.**
 - 2008 storm destroyed Wainwright locally constructed sea wall; federal investment for a new sea wall.
 - **But**, sea walls have been found generally unsuccessful in Alaska, partially due to permafrost problems.
- We explore ways to support a long-term retreat strategy.
- To better understand local erosion problems, and the potential mechanisms for retreat, we focus on Wainwright.

Wainwright Study Area Geographic Location



	Incorporated	Latitude	Longitude	Distance	Population Census 2010	Low Pop. Estimate	High Pop. Estimate
Anaktuvuk Pass	1957	68° 08'	-151° 45'	248	324	349	388 (389)
Atqasuk	1983	70° 28'	-157° 24'	58	233	247	268 (268)
Barrow	1959	71° 18'	-156° 24'	---	4,212	4,709	4,869 (4974)
Kaktovik	1971	70° 08'	-143° 38'	317	239	272	300 (300)
Nuiqsut	1975	70° 13'	-150° 59'	154	402	436	474 (415)
Point Hope	1966	68° 21'	-166° 47'	315	674	774	831 (831)
Point Lay	---	69° 46'	-163° 03'	180	189	263	274 (274)
Prudhoe Bay	---	70° 20'	-148° 30'	200	2,174	---	---
Wainwright	1962	70° 38'	-160° 02'	87	556	552	552 (547)
NS Borough	1972	---	---	---	9,003	7,602	8,000 (7998)

Numbers in parentheses are the results of the independent consultant's mapping process of occupied housing units in each community.



Updated by Jeffrey Utter GISP, 11/21/11
CPD, North Slope Borough
S:\web\census2010

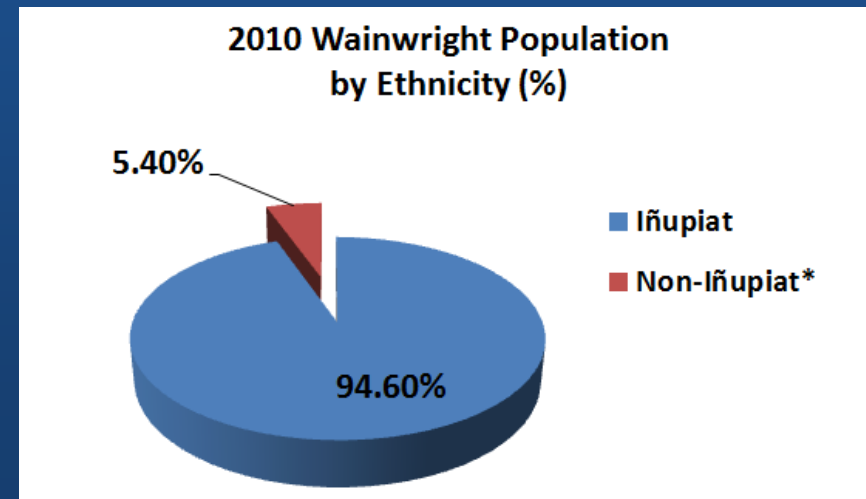
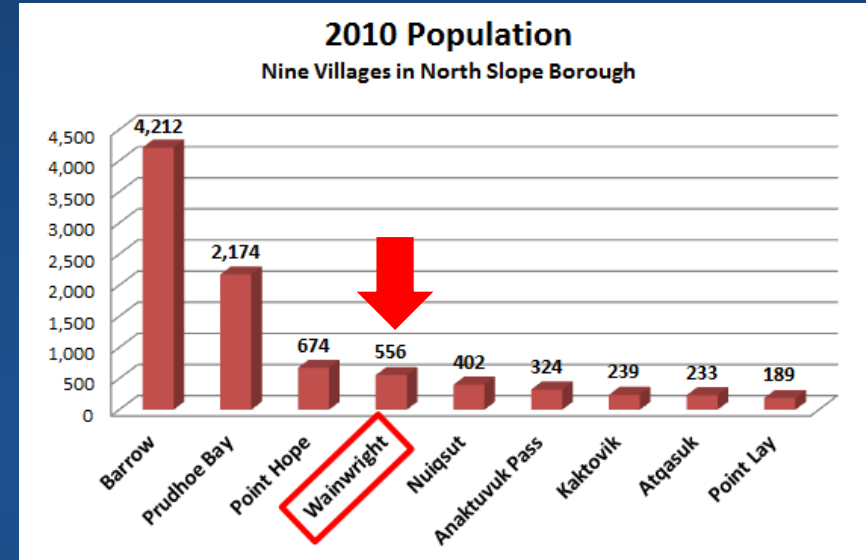
Notes and Sources

1. Village coordinates are from the 'Dictionary of Alaska Place Names.'
2. Population data is from the 'North Slope Borough 2003 Economic Profile and Census Report', North Slope Borough Planning Department, 2003.
3. All distances are relative to Barrow.
4. The North Slope Borough encompasses an area of approximately 90,000 square miles.



Wainwright Study Area Demographics

- Population : 556
 - Ranked 4th populated village in North Slope Borough
 - 15.1% of Population growth since 1998
 - low birth rates + migrants to city
- Major ethnicity
 - Iñupiat (94.6%)
 - Shareholders the Olgoonik village corporation (23.5%) or Borough School District (21.9%)





- Major Employment

About 75 % of jobs from public sector

- High Unemployment Rate

26.3% (U.S average - 9.4%)

- Median Income

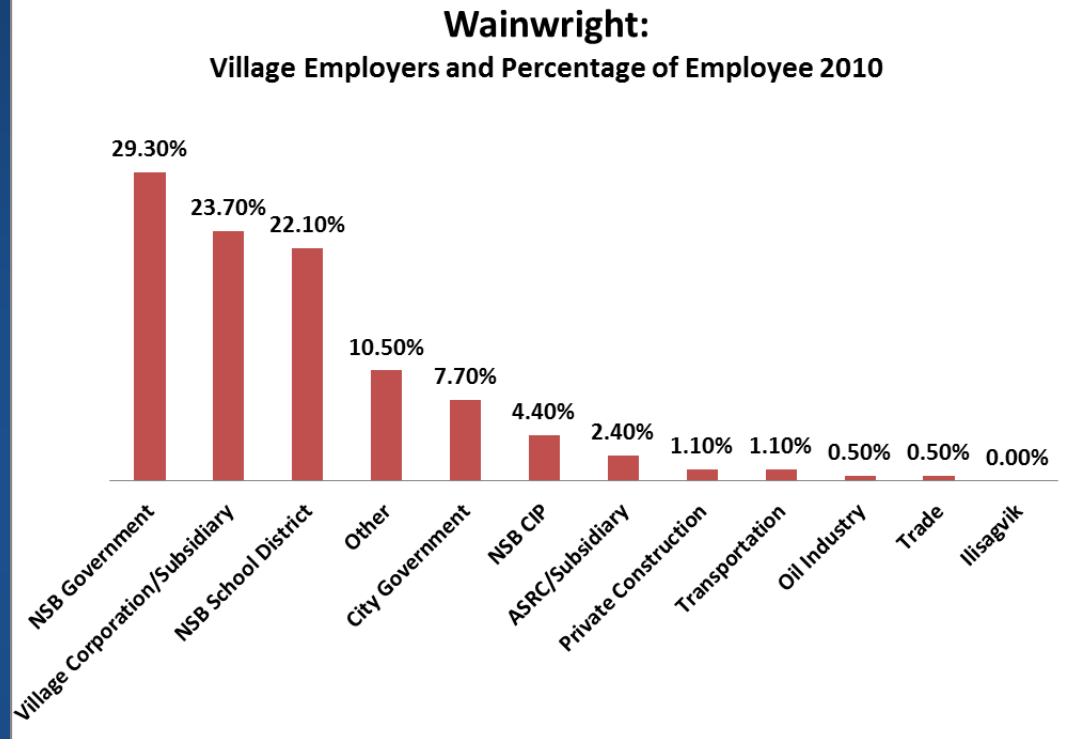
- High income disparities by ethnicity

- Wainwright < Alaska

Per capita Income : \$28,000 < \$29,382

Household Income : \$ 54,200 < \$66,712

- Major Source of Income : dividends (median total \$ 23,226)



Area	Per capita Income	Median Household Income
Wainwright	\$28,000	\$54,200
Inupiat	\$25,200	\$50,000
Non-Inupiat	\$72,000	\$101,500
Alaska	\$29,382	\$66,712



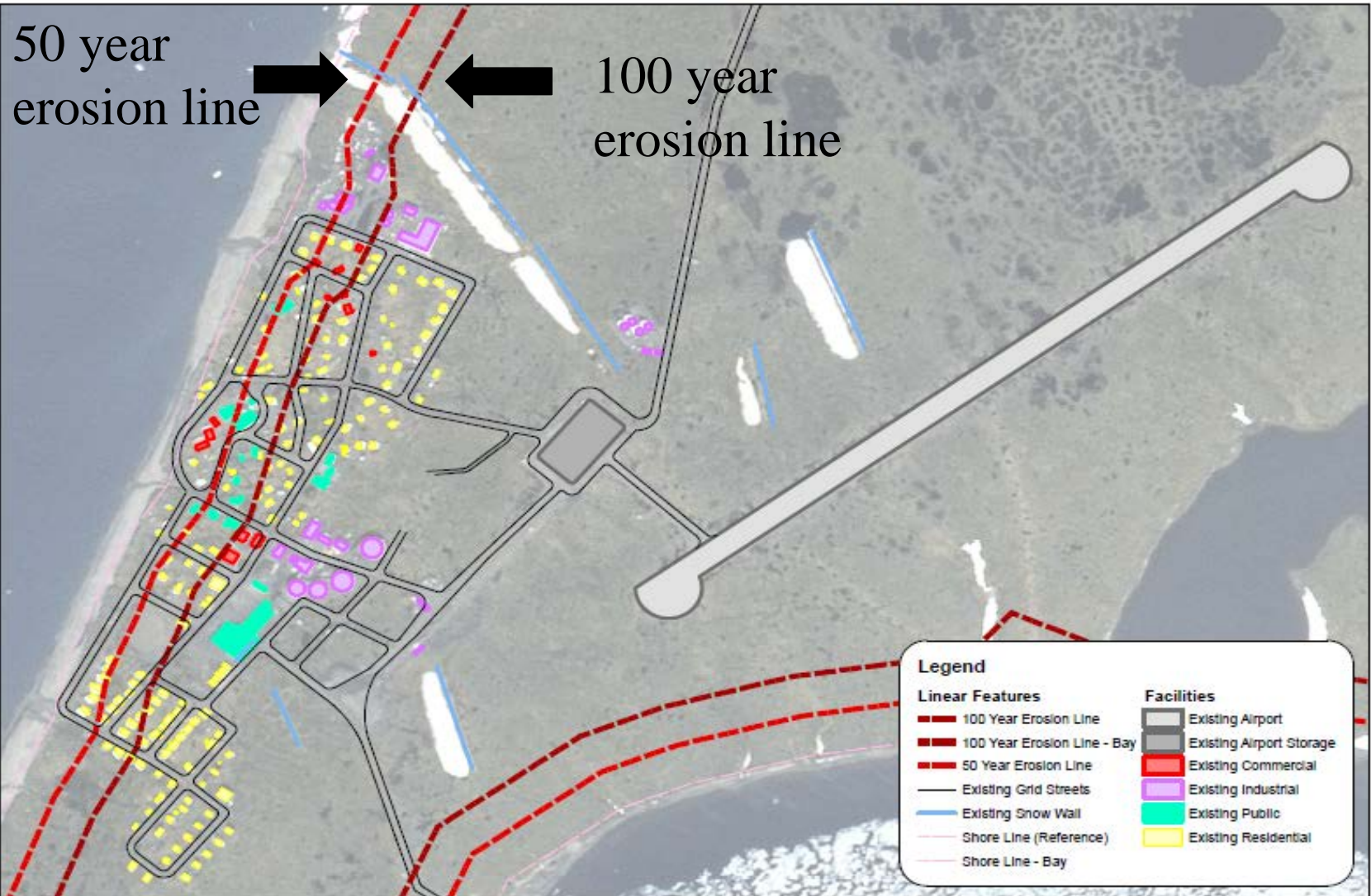
- Alaska Native Claims Settlement Act
 - Tribal revenues
 - Dividends or investment in Corporation
- Commercial Opportunities
 - Olgoonik Oilfield Services
 - Olgoonik Logistics
 - Olgoonik Specialized Contractors
 - Olgoonik Technical Services



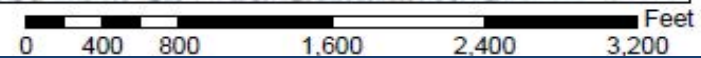
Land Use	
	Commercial
	Public
	Industrial
	Residential

Erosion Hazard Exposure

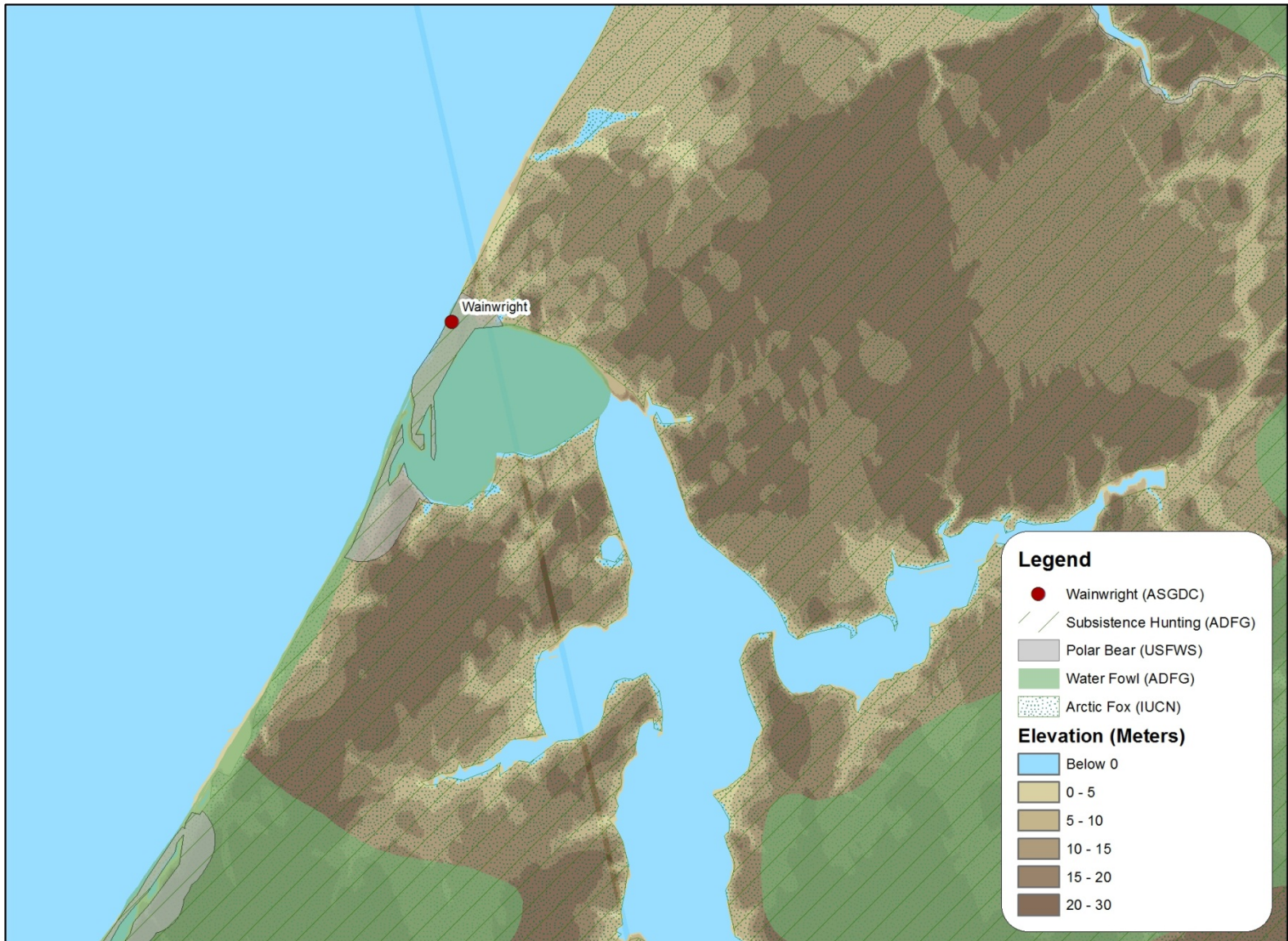
Wainwright Today



Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS, Observations via Google Earth / Bing Aerial & Digitizing



Subsistence Economy Exposure



Data Sources: ASGDC, ADFG, USFWS, ADFG, IUCN, USGS



0 2 4 8 Miles

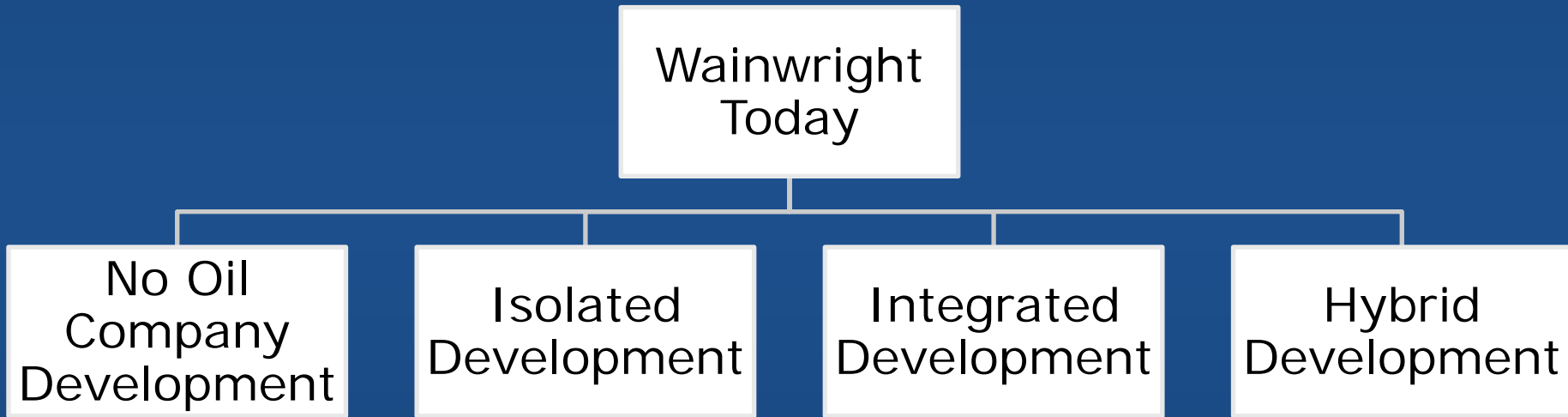


- Alaska Climate Change Strategy
 - 31 villages in imminent danger
- Roadblocks
 - Cost of delayed action
 - Locating suitable land
 - Financial cost (on the order of \$100 million per village)
- Critical Cases
 - Shishmaref
 - Newtok



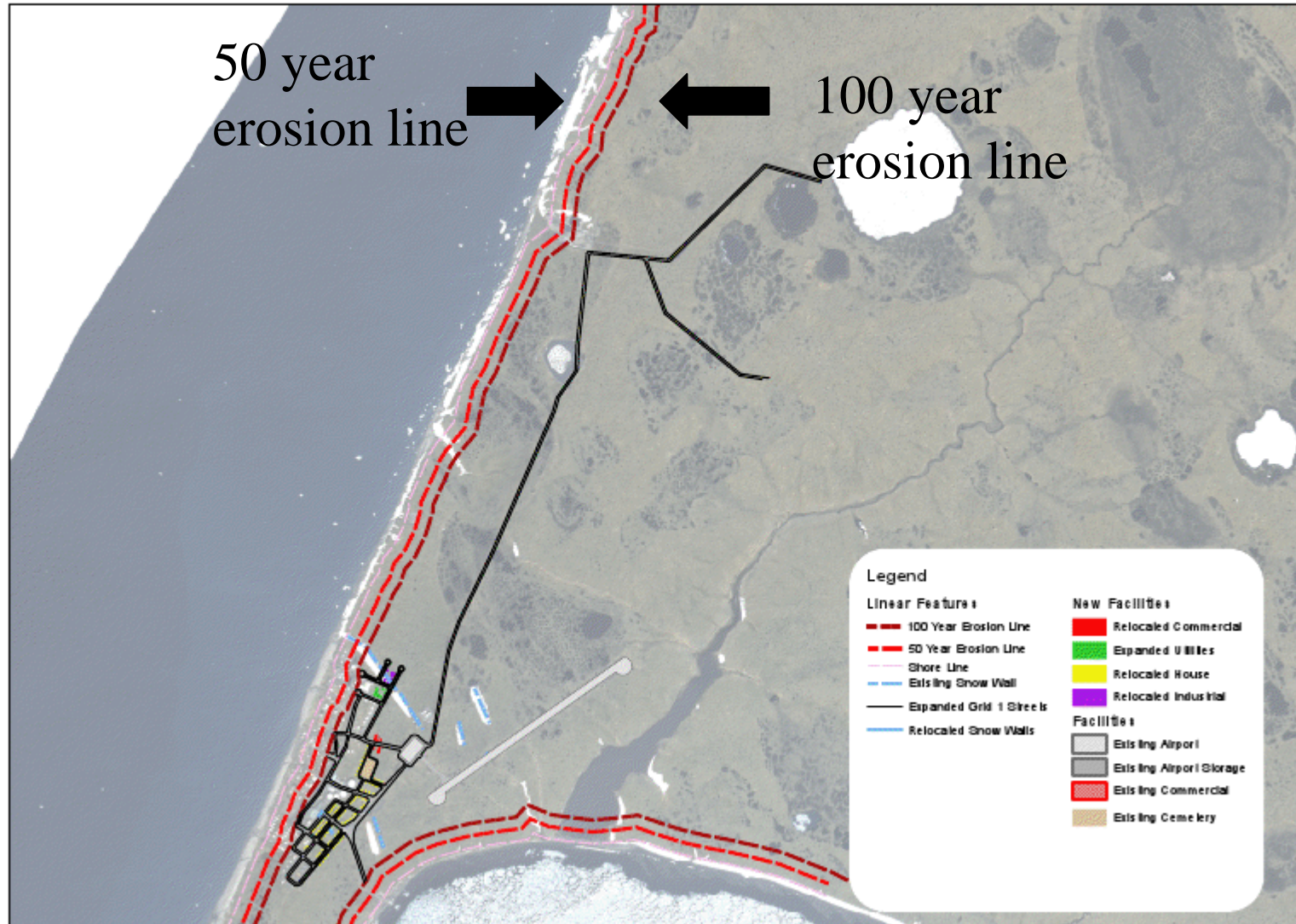
Let's not wait, lets PLAN— *defined as the application of foresight to action*





Scenario: No Oil Company Development

Scenario 1: No Development, Erosion Exposure Mitigation



Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing



0 1,300 2,600 5,200 7,800 10,400 Feet

Scenario 1: No Development, Erosion Exposure Mitigation



Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing

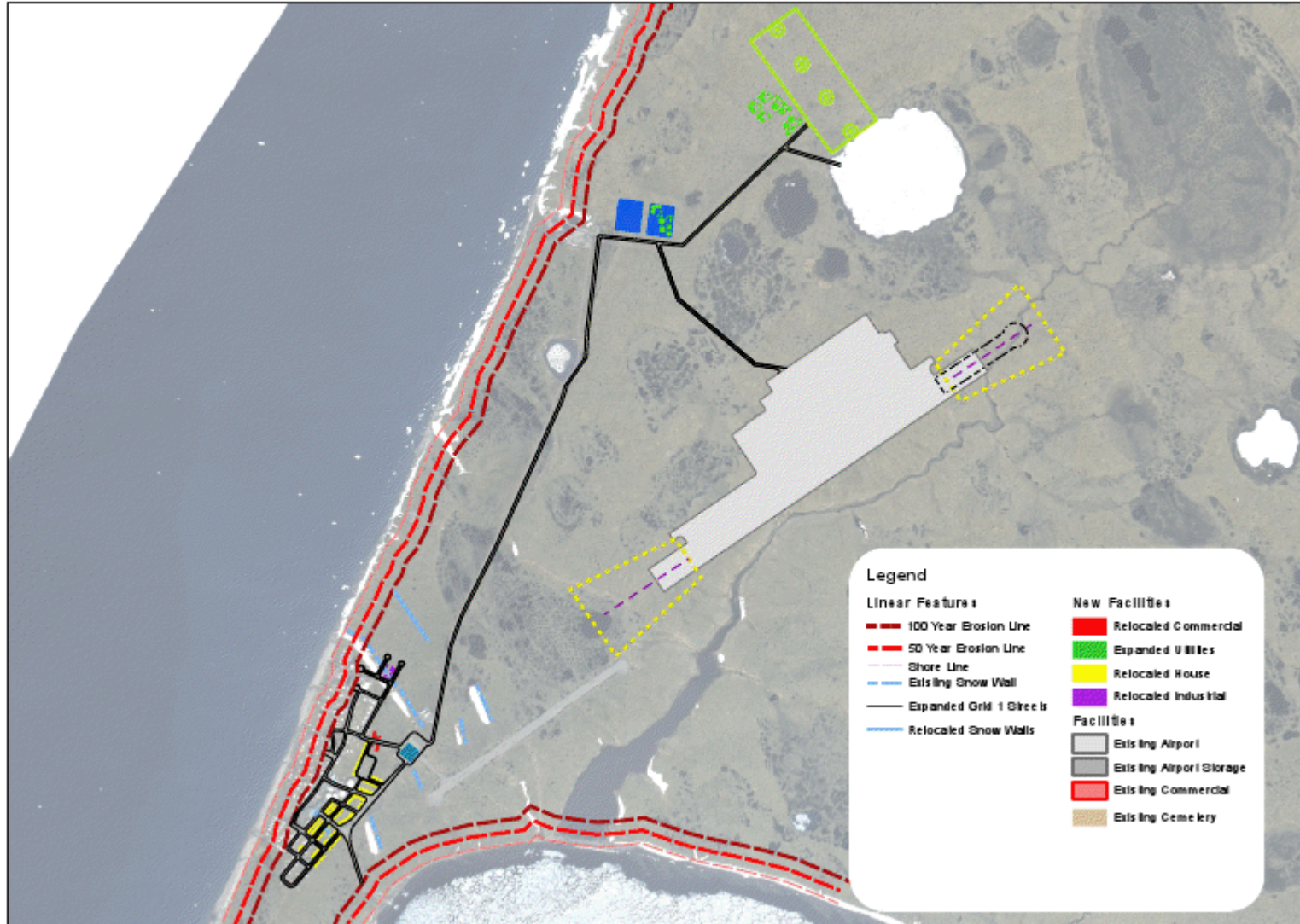


0 400 800 1,600 2,400 3,200 Feet

Scenario: Isolated Development



Scenario 2: Isolated



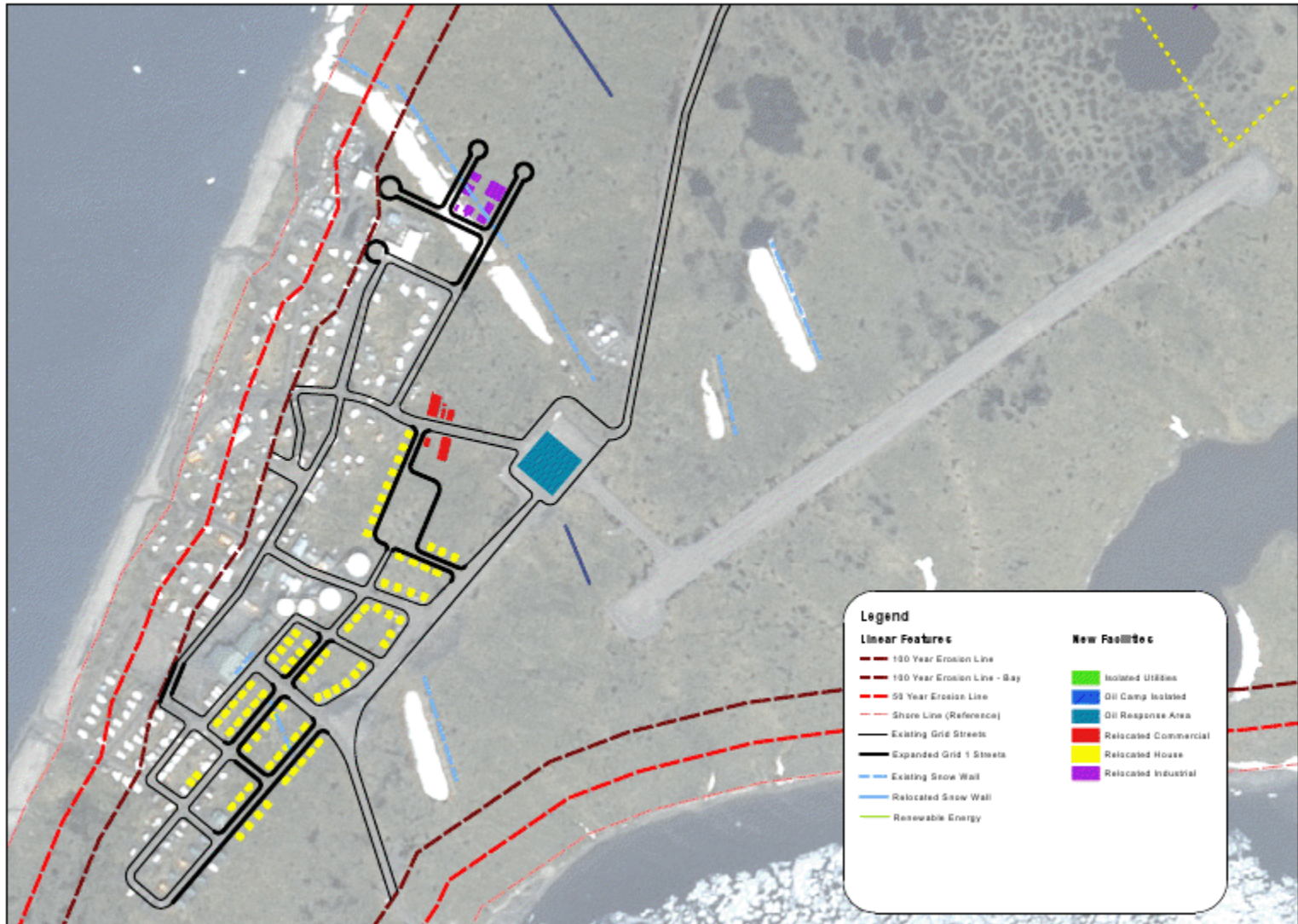
Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing



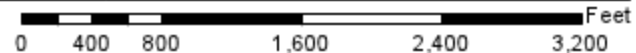
0 1,300 2,600 5,200 7,800 10,400 Feet



Scenario 2: Isolated

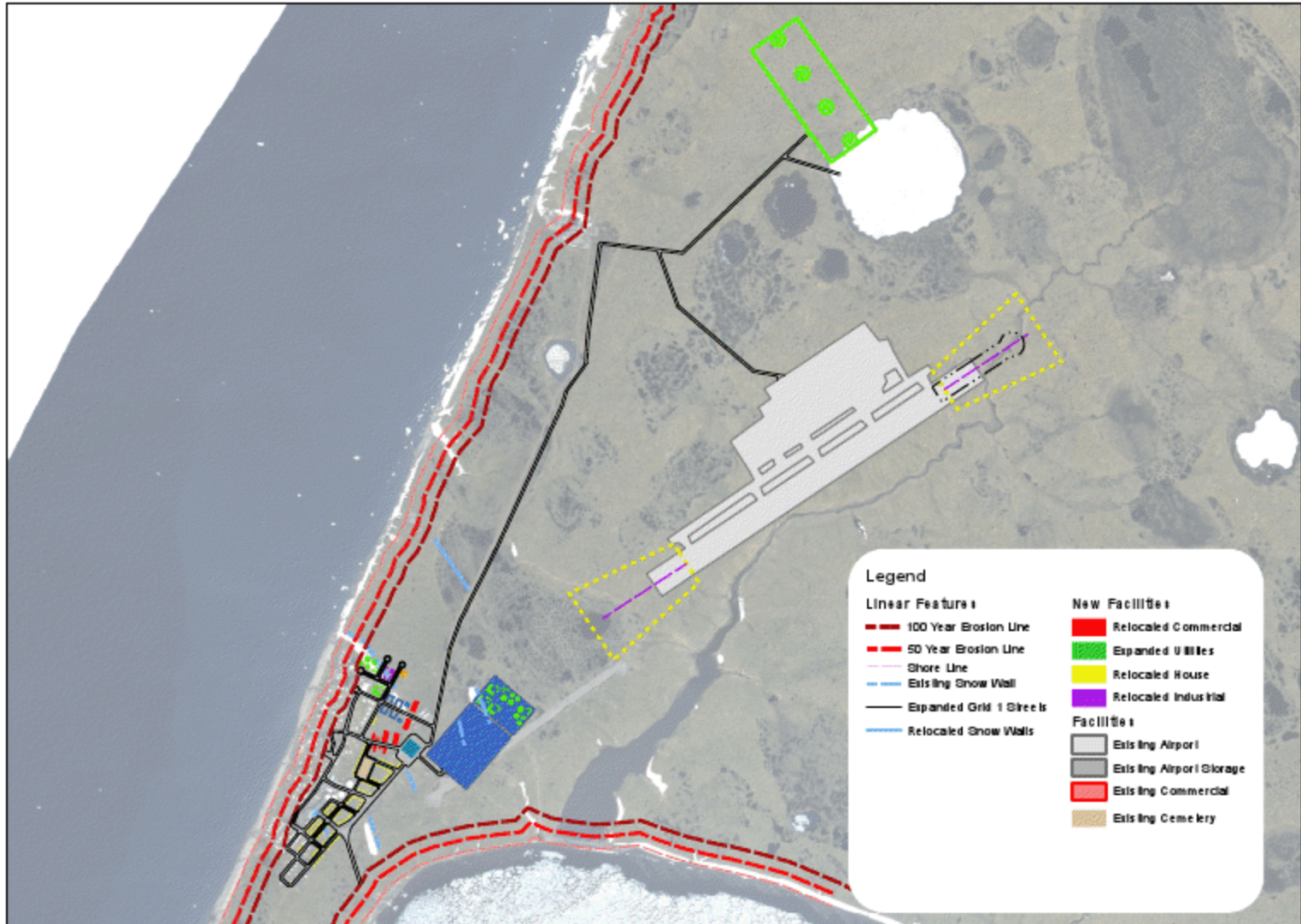


Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing





Scenario 3: Integrated Development



Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing



0 1,300 2,600 5,200 7,800 10,400 Feet

Scenario: Integrated Development

Scenario 3: Integrated



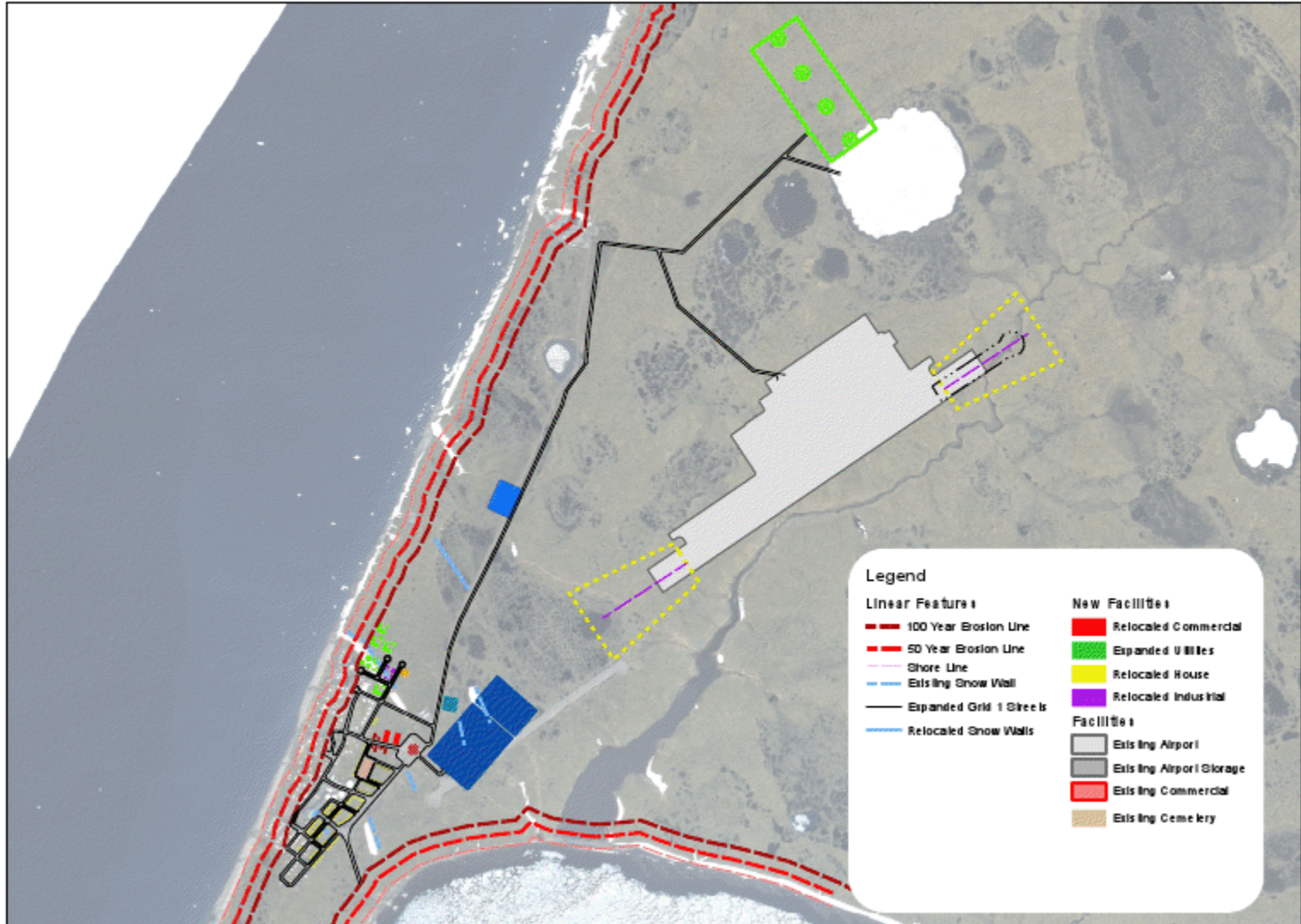
Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
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0 400 800 1,600 2,400 3,200 Feet



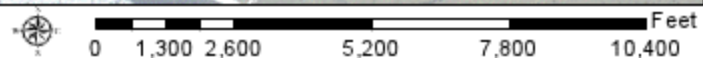
Scenario 4: Hybrid



Legend

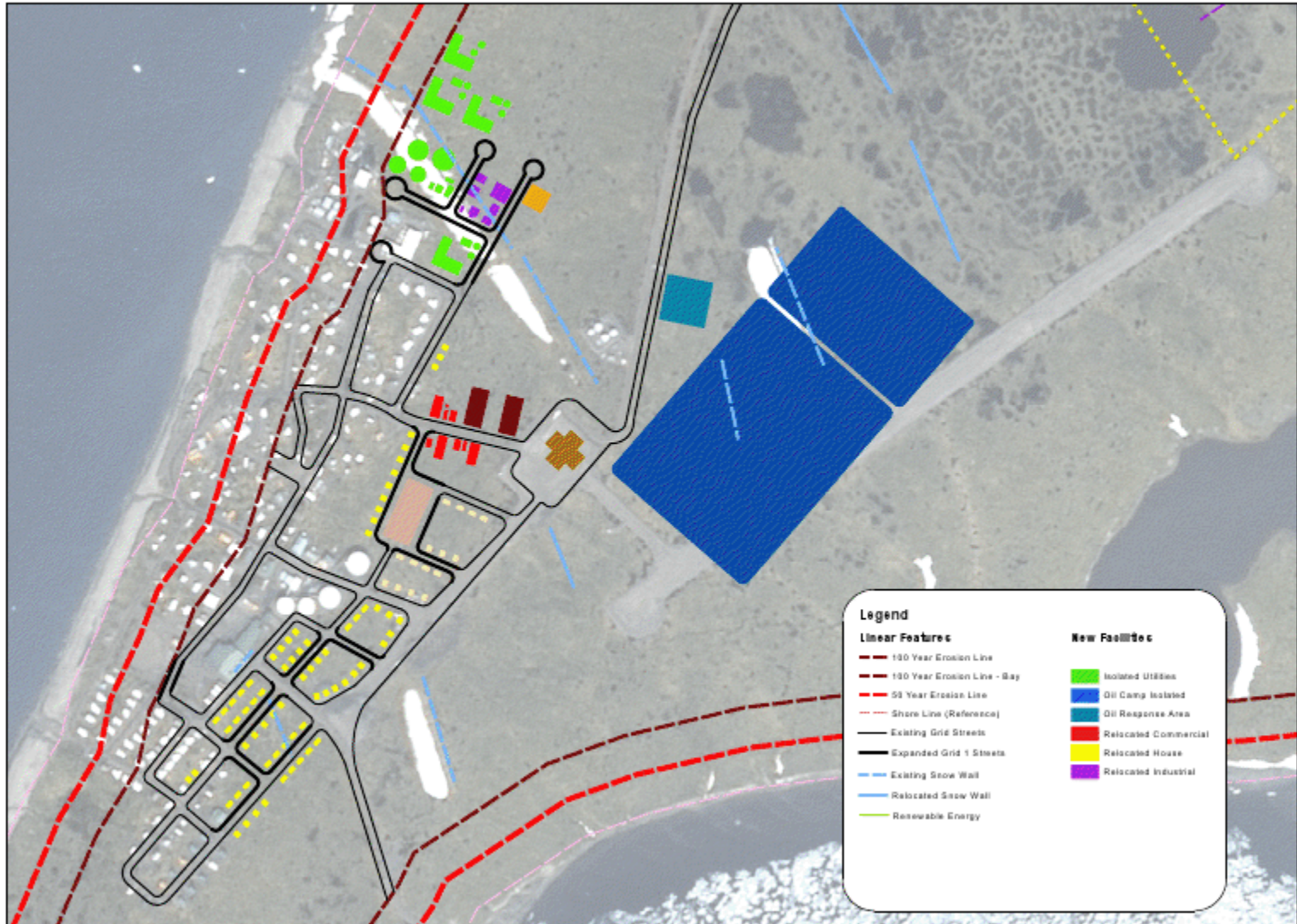
Linear Features	New Facilities
100 Year Erosion Line	Relocated Commercial
50 Year Erosion Line	Expanded Utilities
Shore Line	Relocated House
Existing Snow Wall	Relocated Industrial
Expanded Grid Streets	Facilities
Relocated Snow Walls	Existing Airport
	Existing Airport Storage
	Existing Commercial
	Existing Cemetery

Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS, Observations via Google Earth / Bing Aerial & Digitizing





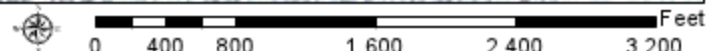
Scenario 4: Hybrid



Legend

Linear Features	New Facilities
100 Year Erosion Line	Isolated Utilities
100 Year Erosion Line - Bay	Oil Camp Isolated
50 Year Erosion Line	Oil Response Area
Shore Line (Reference)	Relocated Commercial
Existing Grid Streets	Relocated House
Expanded Grid 1 Streets	Relocated Industrial
Existing Snow Wall	
Relocated Snow Wall	
Renewable Energy	

Data Sources: Alaska Mapped Data Portal, North Slope Borough GIS,
Observations via Google Earth / Bing Aerial & Digitizing





- Impact of erosion
- Sea level rise
- Impact on infrastructure
- Energy infrastructure
- Airport
- Port/dock
- Spill response capacity
- Subsistence hunting
- Welfare of community
- Economic multiplier effect

Threats-Opportunities Analysis



	Scenario 4- No Oil Development in Wainwright		Scenario 1- Isolated		Scenario 2- Integrated		Scenario 3- Hybrid Scenario	
Attributes	Threat	Opportunities	Threat	Opportunities	Threat	Opportunities	Threat	Opportunities
Impact of Erosion	Medium	Move houses outside of the build-to line.	Medium	Move those houses that are outside our new build-to line.	High	Move houses outside the build-to line, but request new types of buildings and materials.	High	Have the construction camp created to last so the community can move into it when it is no longer in use.
Sea Level Rise	High	Town has to move.	High	Town has to move.	High	Town has to move, but receives financial assistance from oil development.	High	Town moves into construction camp.
Impact on Infrastructure	Low/None	The town will have to shift infrastructure as the town shifts to accommodate erosion and sea level rise.	Low	Request new roads.	High	Ask for new roads, updated water and sewer treatment plants, and a new landfill	High	Ask for new roads and updated or new utilities; request a new or expanded landfill.
Energy Infrastructure	None	This will have to be moved to accommodate erosion and sea level rise.	Low	Expanded airport will run off existing power plant, could request new energy sources.	High	Ask for new types of sources for the power plant: Natural Gas, Solar, and Wind to supplement or replace current energy sources. Still need back up diesel power.	High	Ask for new types of sources for the power plant: Natural Gas, Solar, and Wind to supplement or replace current energy sources. Need back up diesel power.
Airport	Low	Should update the existing facilities, but do not need to expand greatly.	Medium	Develop a larger airport, with access to the man camp	High	Build to support in town for personnel and equipment.	Medium/high	Upgrade for spill and emergency response, possibly ask for the airport to be located further apart from the town.
Port/dock	Low	The dock will be slightly expanded, for the spill response.	Medium	The dock will have to be expanded	High	The dock will have to be expanded.	Medium/high	The dock will be expanded, and moved out of the waterfowl habitat.
Spill Response Capacity	Low	Some spill response will be located here.	Medium	Need to plan for personnel and facilities.	High	Capacity built as part of town.	Medium	Capacity built as part of construction camp.
Subsistence Hunting	Medium	Require that oil companies avoid hunting grounds when building man camp.	High	Require that oil companies avoid hunting grounds and species habitats when building man camp.	High	Require that oil companies avoid hunting grounds when building man camp.	High	Require that oil companies avoid hunting grounds when building man camp.
Welfare of Community	Low/None	There will be some influx of people to the area, so the town will need to increase security, but there will be a minimal impact on the community.	Low	Request additional security for the town.	High	Ask for a community center to be built, one that can be used by both local residents and residents of the man camp. Request additional security and new medical facilities for both mental and physical illnesses.	High	Ask for community amenities like a permanent recreation center to be included in the construction/man camp where the residents would move to.
Economic Multiplier Effect	Low/None	Some services will need to expand to support researchers and spill response. Ex: hotel, restaurants, etc.	Low	Create new businesses to support the natural growth that will occur from oil development occurring here, as well as the construction of the man camp. Ex: expanded hotel	High	Create local businesses to supply the man camp with amenities such as laundry and food (greenhouses). Have these businesses be owned and operated by locals. Apply for Alaska Growth Capital seed money to start new businesses.	Medium	Additional local businesses could be created, but not as intense in the long term as the integrated scenario.

Threats-Opportunities Analysis



- Threats range from none to high
- Opportunities suggest community benefits from development
- This is a starting point for community-driven planning



	Scenario 2- Integrated		Scenario 3- Hybrid Scenario	
Attributes	Threat	Opportunities	Threat	Opportunities
Impact of Erosion	High	Move houses outside the build-to line, but request new types of buildings and materials.	High	Have the construction camp created to last so the community can move into it when it is no longer in use.
Sea Level Rise	High	Town has to move, but receives financial assistance from oil development.	High	Town moves into construction camp.
Impact on Infrastructure	High	Ask for new roads, updated water and sewer treatment plants, and a new landfill	High	Ask for new roads and updated or new utilities; request a new or expanded landfill.
Energy Infrastructure	High	Ask for new types of sources for the power plant: Natural Gas, Solar, and Wind to supplement or replace current energy sources. Still need back up diesel power.	High	Ask for new types of sources for the power plant: Natural Gas, Solar, and Wind to supplement or replace current energy sources. Need back up diesel power.
Airport	High	Build to support in town for personnel and equipment.	Medium/high	Upgrade for spill and emergency response, possibly ask for the airport to be located further apart from the town.
Port/dock	High	The dock will have to be expanded.	Medium/high	The dock will be expanded, and moved out of the waterfowl habitat.
Spill Response Capacity	High	Capacity built as part of town.	Medium	Capacity built as part of construction camp.
Subsistence Hunting	High	Require that oil companies avoid hunting grounds when building man camp.	High	Require that oil companies avoid hunting grounds when building man camp.
Welfare of Community	High	Ask for a community center to be built, one that can be used by both local residents and residents of the man camp. Request additional security and new medical facilities for both mental and physical illnesses.	High	Ask for community amenities like a permanent recreation center to be included in the construction/man camp where the residents would move to.
Economic Multiplier Effect	High	Create local businesses to supply the man camp with amenities such as laundry and food (greenhouses). Have these businesses be owned and operated by locals. Apply for Alaska Growth Capital seed money to start new businesses.	Medium	Additional local businesses could be created, but not as intense in the long term as the integrated scenario.



- Patterns of Development
- Community Values and Needs
- Opportunities for planning and funding

Questions?

