

Energy (Oil and Gas) Exploration (and Development) on the U.S. Arctic Continental Shelf

Jeff Walker
Regional Supervisor, Field Operations
Minerals Management Service, Alaska Region
Jeffrey.walker@mms.gov

3rd Symposium:
Impact of an Ice-Diminishing Arctic on
Naval and Maritime Operations
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Impacts of an Ice-Diminishing Arctic on Exploratory Activities

- Arctic nations will pursue oil and gas.
- Offshore, current cold weather technology is probably well-adapted to warming conditions.
- Onshore operations will change.
- Nearshore operations would be affected.
- Will ice “be reliable”?

Operational Implications

- Extended open water operating season.
- Shortened winter solid-ice operating season in near shore shallow water areas.
- Expanded opportunity for existing and evolving technology.
- Evolving design criteria for ice and sea state (wave) conditions.

How to meet Challenges posed by Ice-Diminished Conditions

- Management based on high quality science coupled with engineering.
- Adaptive management of resources and activities.
- Research and incentives for new technology
- Monitoring and evaluating changes.

In the near term, the level and rate of exploratory activity will continue to be controlled by:

- Existing regulatory structure
- Permitting processes
- Litigation
- Availability of drilling equipment
- Competing opportunities
- Economics

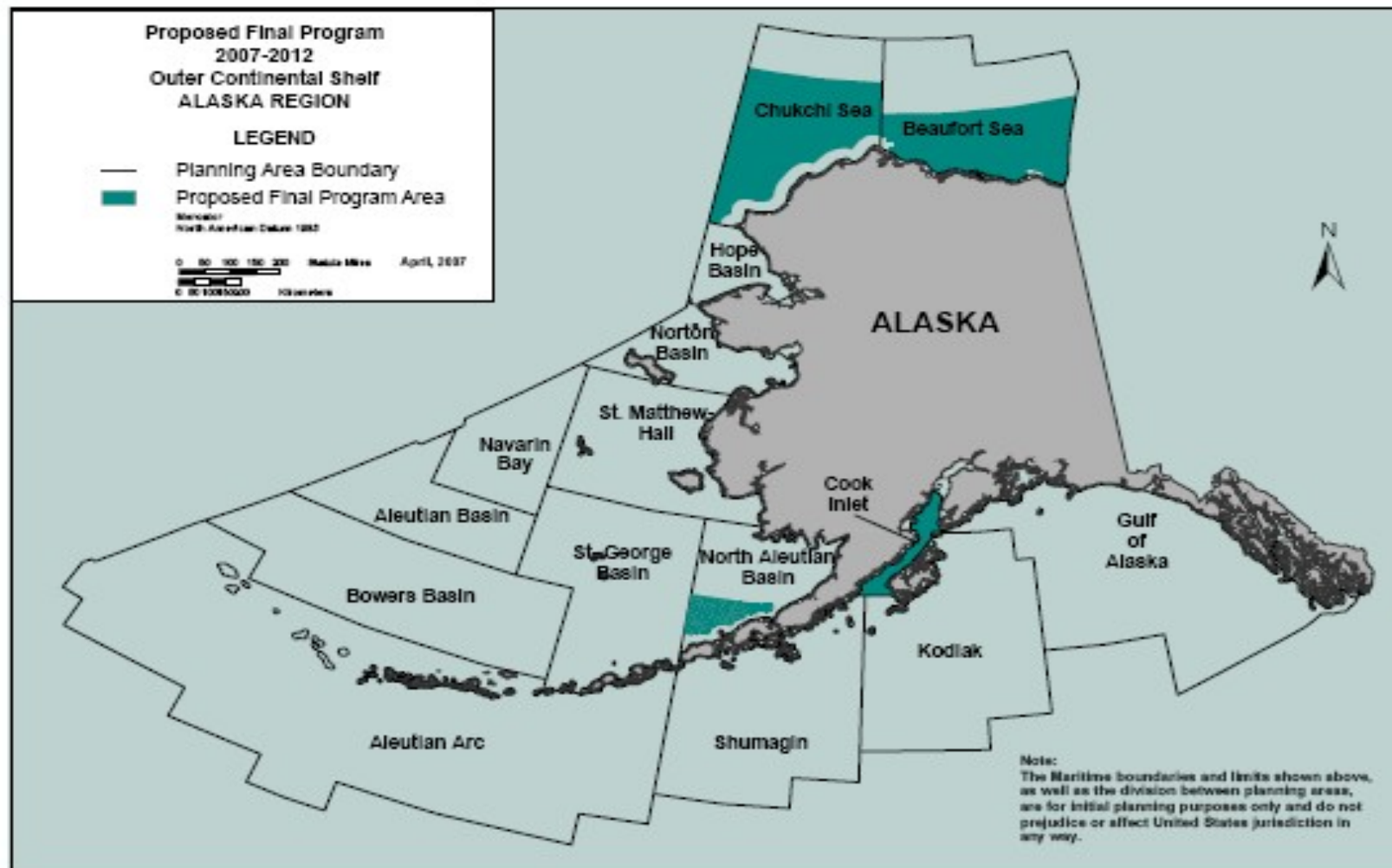
Proposed Final Program
2007-2012
Outer Continental Shelf
ALASKA REGION

LEGEND

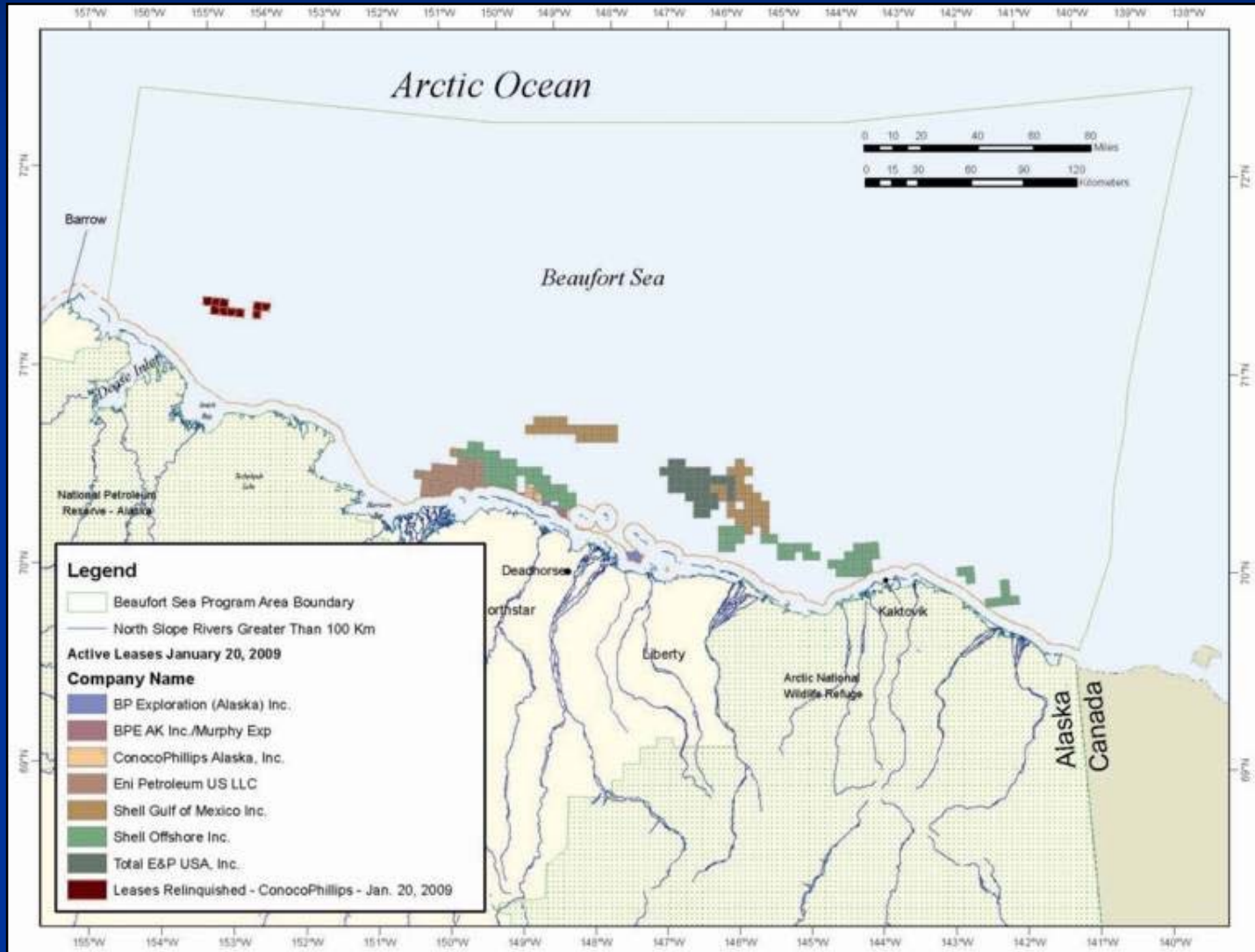
- Planning Area Boundary
- Proposed Final Program Area

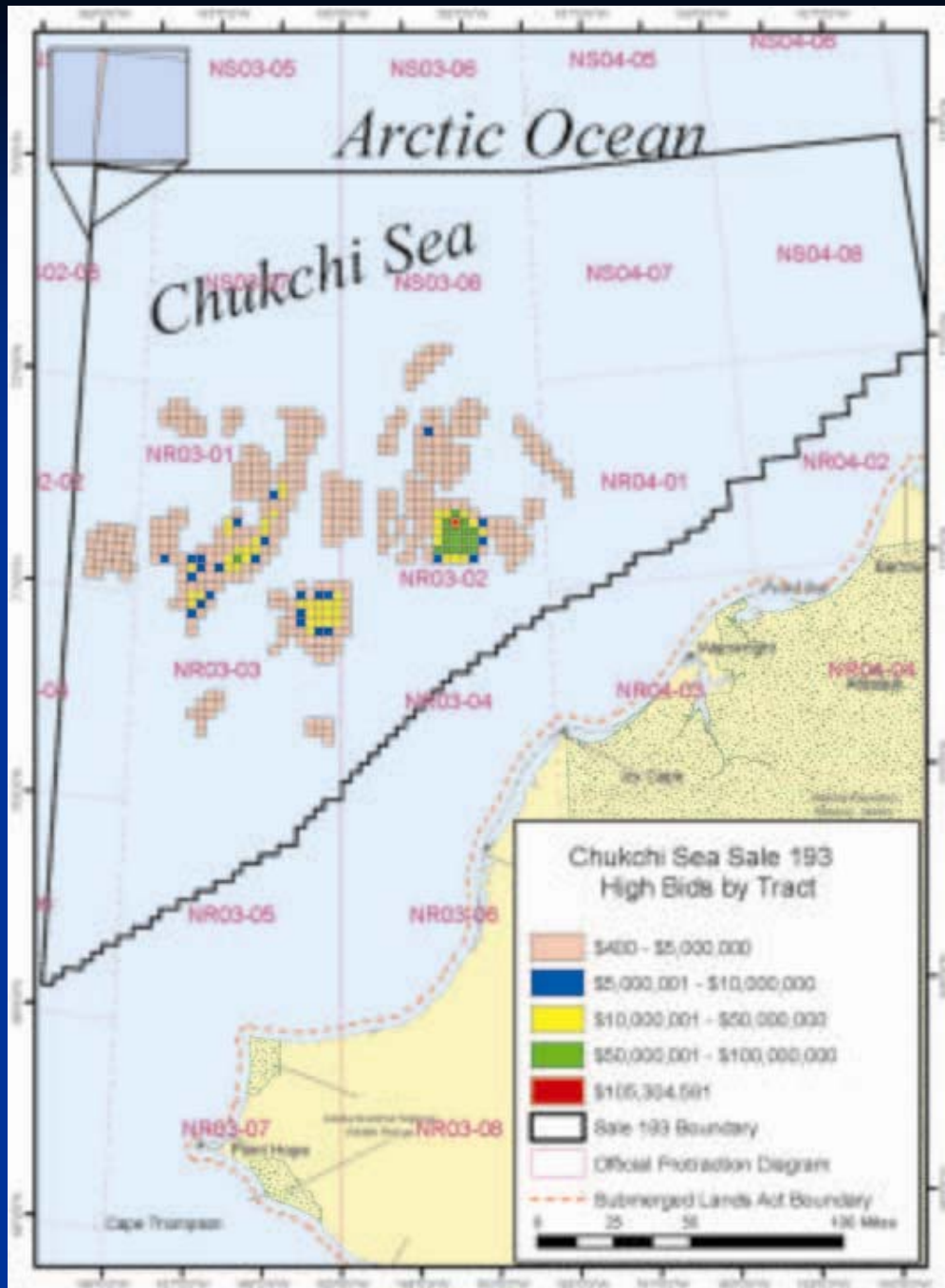
Scale:
North American Datum 1983

0 50 100 150 200 Nautical Miles April, 2007
0 50 100 150 200 Kilometers



Beaufort Sea Oil and Gas Lease Status





Chukchi Sea Oil and Gas Leasing Status

Alaska OCS Lease Sales

2007-12 Program

Arctic

Chukchi Sea

- Sale 193 (2008)
- Sale 212 (2010)
- Sale 221 (2012)

Beaufort Sea

- Sale 209 (2009)
- Sale 217 (2011)

Bering Sea /Gulf of Alaska

North Aleutian Basin

- Sale 214 (2011)

Cook Inlet (if interest)

- Sale 211 (2009)
- Sale 219 (2011)

Alaska Oil and Gas Estimates

Undiscovered Technically Recoverable

<u>OCS Planning Area</u>	<u>Oil and Gas Estimates</u>		
	<u>95%</u>	<u>Mean</u>	<u>5%</u>
Beaufort Sea			
Oil (bbo)	0.4	8.2	23.2
Gas (tcf)	0.7	27.7	72.2
Chukchi Sea			
Oil (bbo)	2.3	15.4	40.1
Gas (tcf)	10.3	76.8	209.5
North Aleutian Basin			
Oil (bbo)	0.02	0.75	2.5
Gas (tcf)	0.4	8.6	23.3
Cook Inlet			
Oil (bbo)	0.06	1.0	2.9
Gas (tcf)	0.03	1.2	3.5

Evolution of Alaska OCS Arctic Exploration

18 - 50 ft.

50 - 80 ft.

80 - 180 ft.



1981
Gravel
Island
18 ft.

1984
CIDS
49 ft.

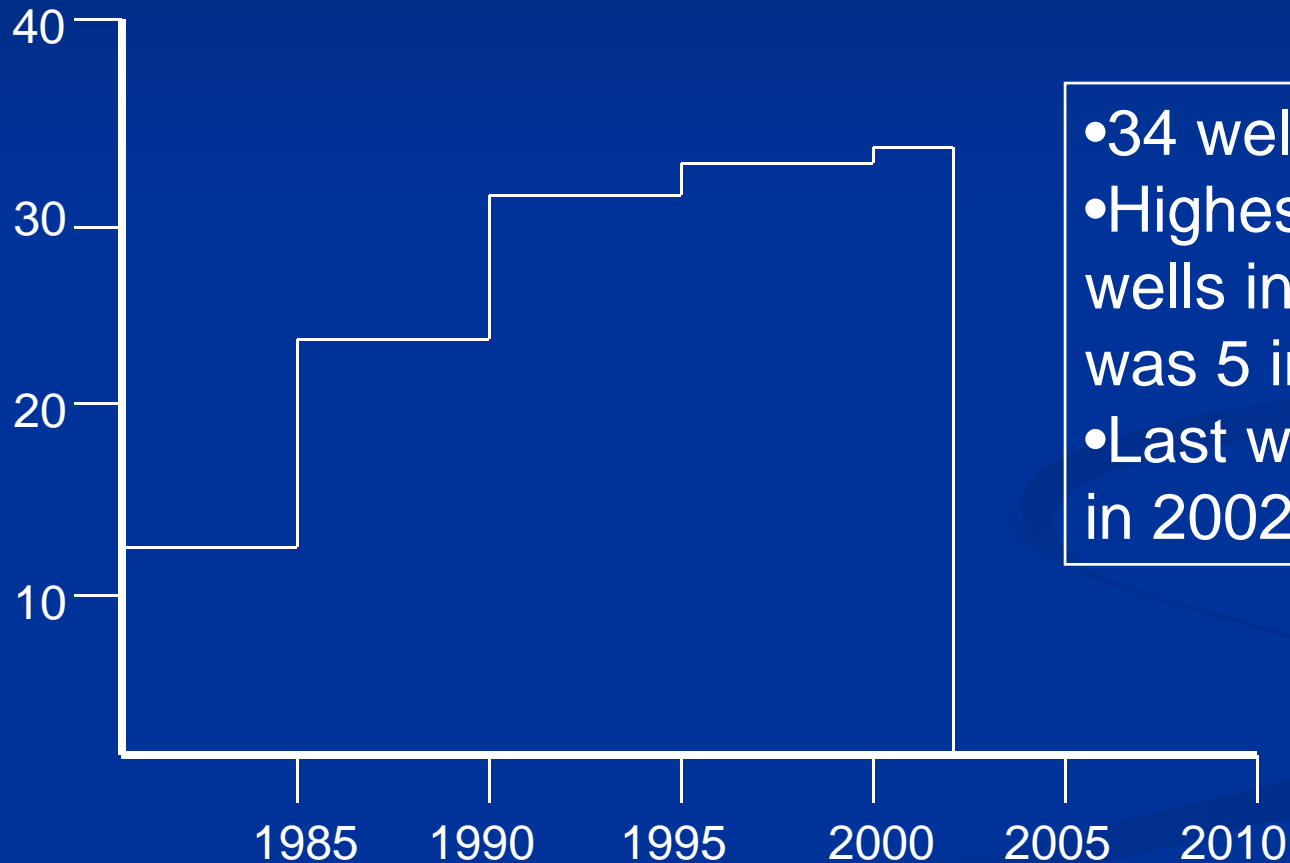
1986
Ice
Island
25 ft.

1986
SSDC
60 ft.

1985
Explorer II
Drillship
103 ft.

1988
Kulluk
167 ft.

Cumulative Exploratory Wells in the US Arctic

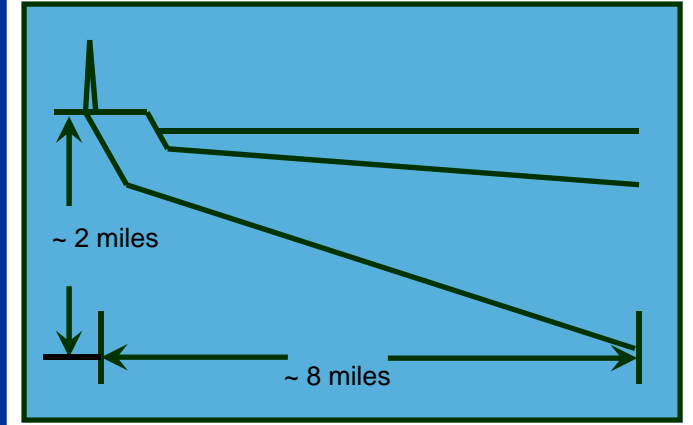


- 34 wells total.
- Highest number of wells in any one year was 5 in 1985.
- Last well drilled was in 2002/03.

Evolution of Alaska OCS Arctic Development



2001
Northstar



2011
Liberty

Exploration Assumptions

- No more than two consecutive exploratory drilling operations per year in each planning area.
- No more than six consecutive seismic surveys per year in each planning area.

Development Terms

Chukchi Sea Sale 193:

- Lessees are advised that MMS intends to prepare an environmental impact statement (EIS) on any Development and Production Plan submitted for a lease issued from Chukchi Sea Sale 193...Preparation of such an EIS typically takes 2-3 years.

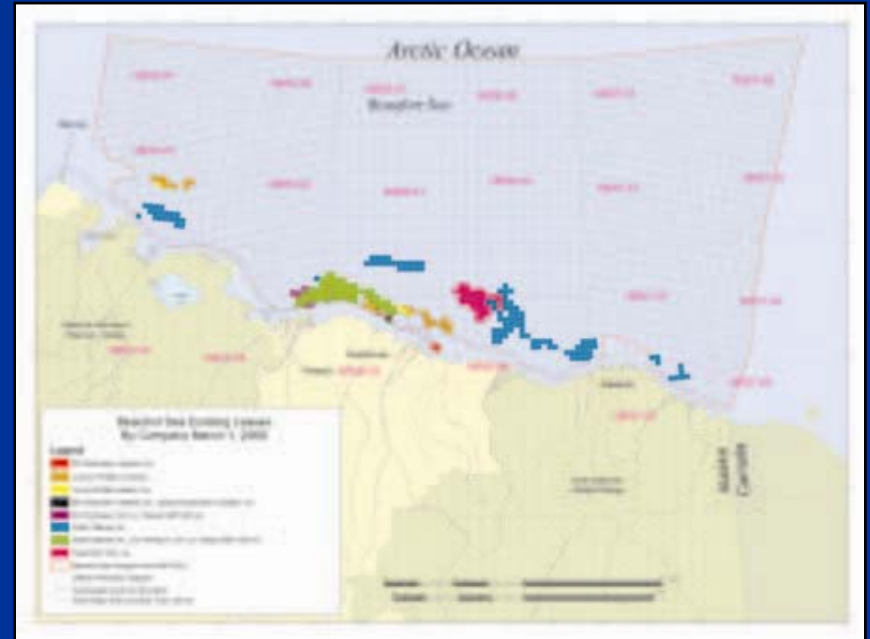
Development Terms

Chukchi Sea Sale 193:

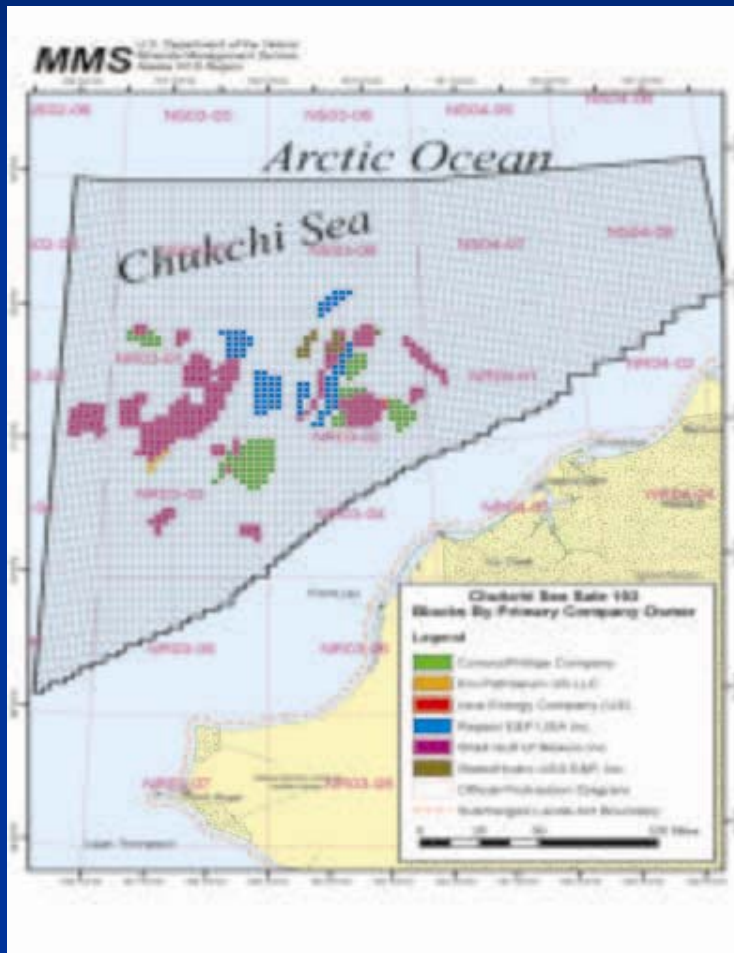
- Pipelines will be required: (a) if pipeline rights-of-way can be determined and obtained; (b) if laying such pipelines is technologically feasible and environmentally preferable; and (c) if, in the opinion of the lessor, pipelines can be laid without net social loss...

Beaufort Sea Activity

- Seismic and environmental data collection on going.
- MMS approved Shell multi-year exploratory drilling program in 2007.
- Court vacated MMS approval action in 2008.
- Shell withdrew the exploration plan in 2009.
- MMS anticipates a new exploration plan for drilling in 2010.



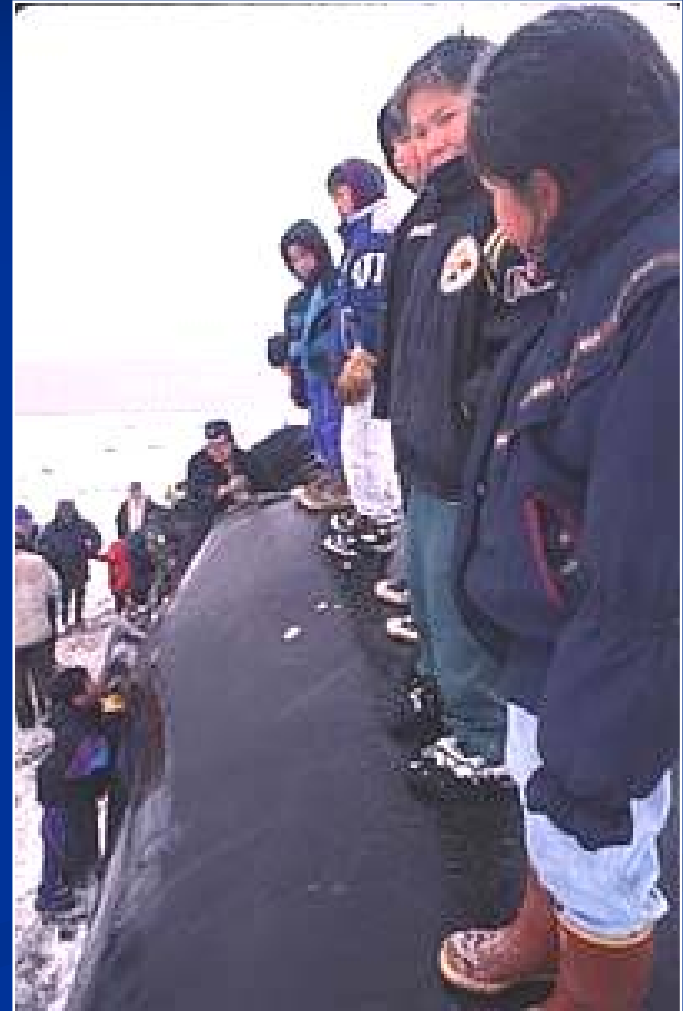
Chukchi Sea Activity



- Seismic surveys and environmental data collection on going.
- MMS anticipates an exploration plan for drilling in 2010.

Ongoing Concerns

- Subsistence
- Protected Species
- Noise
- Oil Spill Response
- Design criteria for oil and gas facilities



MMS Studies & Research Programs



■ Technology Assessment & Research Program

- Operational Safety & Engineering Research (OSER)
- Oil Spill Research (OSR)

■ Environmental Studies Program

- Physical Oceanography
- Biological Sciences



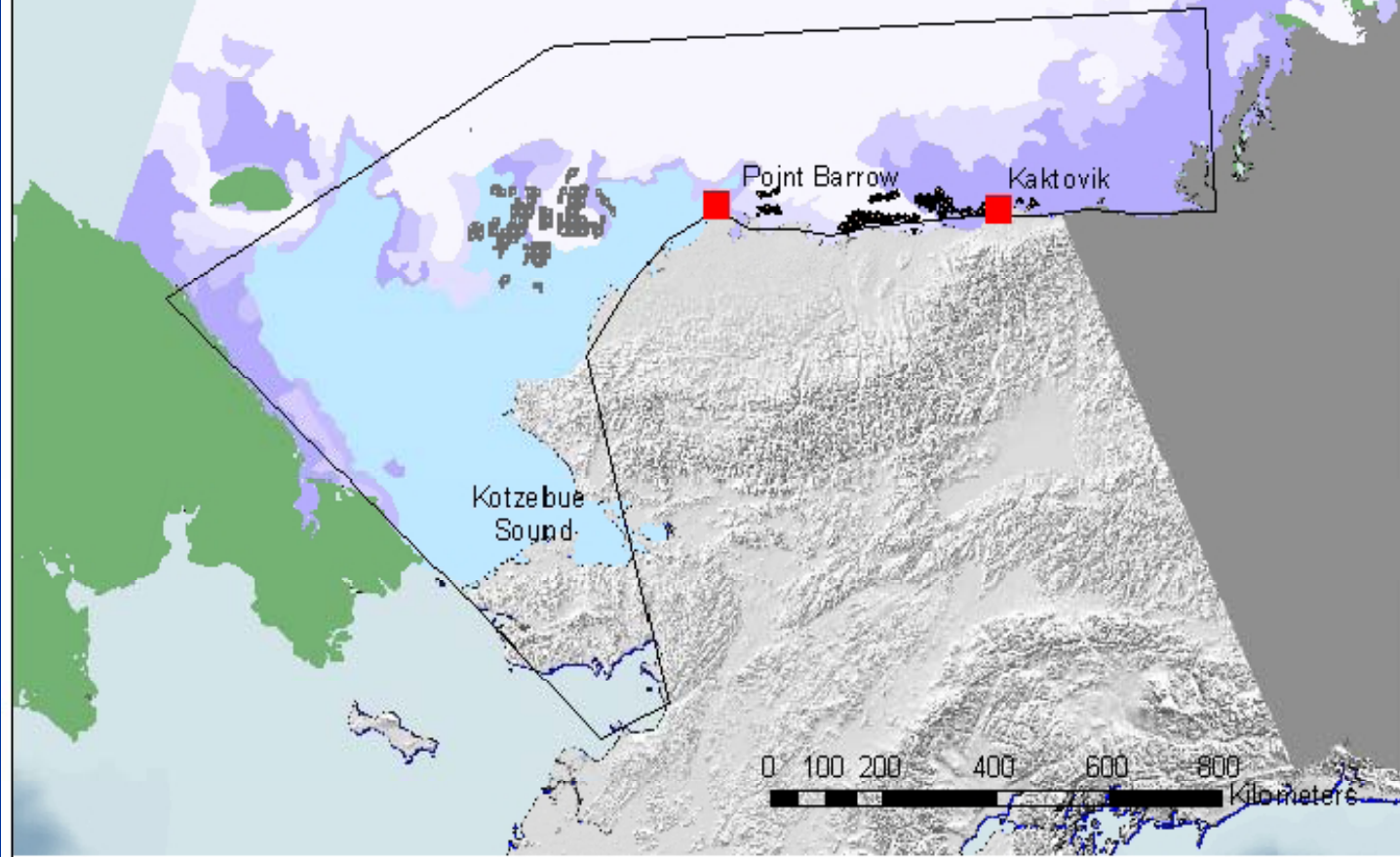
TARP Projects

- Beaufort and Chukchi Sea Ice Design Criteria
- Collection and Archival of Environmental Data Relevant to Design of Arctic Structures.
- Seabed Scour and Buried-Pipeline Deformation.
- Arctic Offshore Technology Assessment of Exploration and Production Options for Cold Regions of the US Outer Continental Shelf.
- Research at Ohmsett on the Effectiveness of Chemical Dispersants on Alaskan Oils in Cold Water.
- Detection of Oil on and Under Ice.

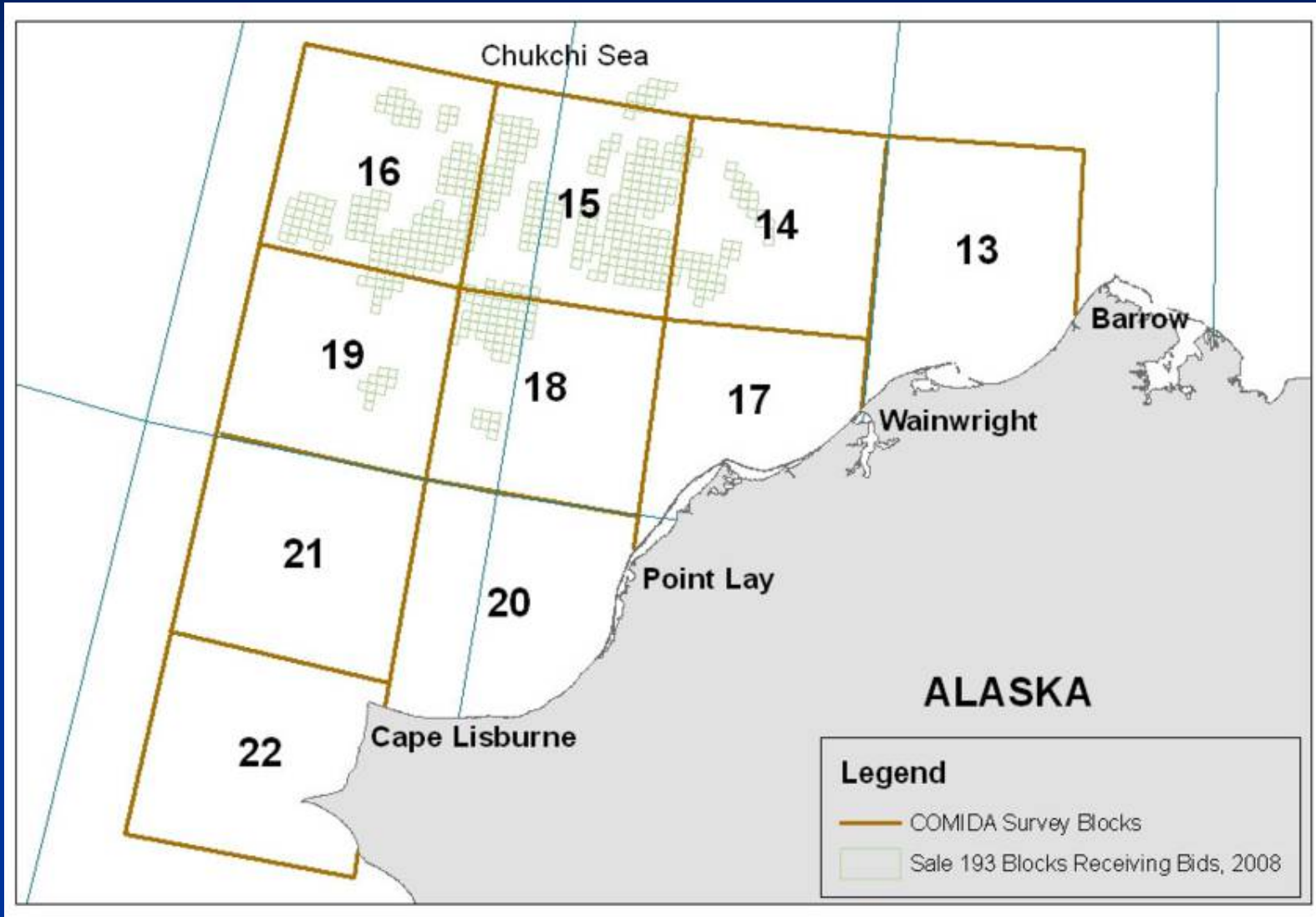
Environmental Studies

- Mesoscale Meteorology in Beaufort and Chukchi Sea
 - Focus on wind and surface stress fields
 - Optimize prediction of spatial variability, accounting for sea breeze & orographic effects
- Mapping of Recurring Polynyas and Landfast Ice
 - Beaufort (prior) / Chukchi (new)
- COMIDA: Chemistry and Benthos

Mapping and Characterization of Recurring Spring Leads and Landfast Ice in the Chukchi and Beaufort Seas



COMIDA Study Area



MMS Links

- <http://www.mms.gov/alaska/ess/index.htm>
- <http://www.mms.gov/tarphome/index.htm>

How to meet Challenges posed by Ice-Diminished Conditions

- Management based on high quality science coupled with engineering.
- Adaptive management of resources and activities.
- Research and incentives for new technology
- Monitoring and evaluating changes.

The MMS program is founded
on these principles.

