

Energy Development in the U.S. Arctic: *Outlook, Science, & Subsistence*

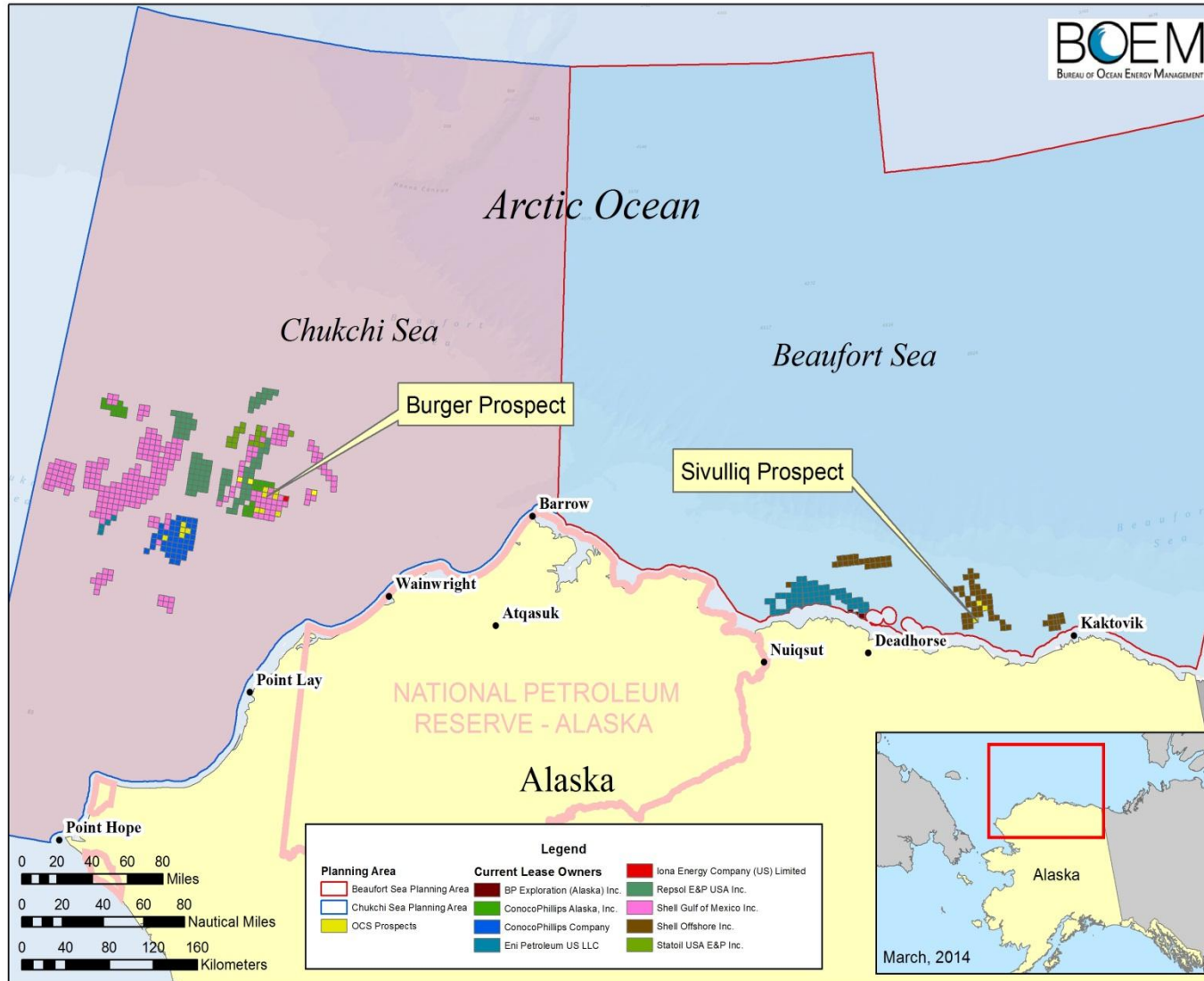
Dr. James (Jim) Kendall

**Regional Director, Alaska OCS Regional Office
Bureau of Ocean Energy Management**

***BOEM, Managing the Energy and Mineral Resources
on the U.S. Outer Continental Shelf in an
Environmentally Sound & Safe Manner***



Alaska OCS Region: Current Leases



Five-Year OCS Oil and Gas Leasing Program for 2012 to 2017

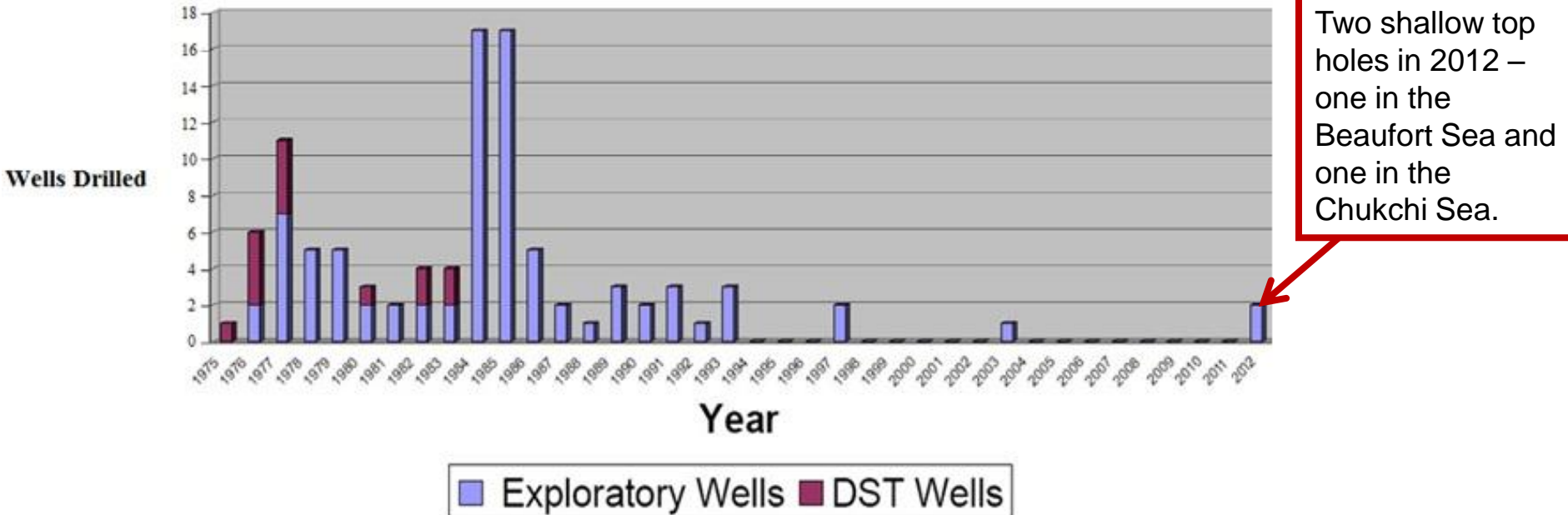
- Cook Inlet Lease Sale proposed 2016
- Chukchi Sea Lease Sale proposed 2016
- Beaufort Sea Lease Sale proposed 2017

Historic Exploration Drilling

86 Exploration Wells and 14 Deep Stratigraphic Test Wells have been drilled on the Alaska OCS

Beaufort Sea	31	St. George Basin	10
Chukchi Sea	6	Cook Inlet	13
Norton Sound	6	Gulf of Alaska	12
Navarin Basin	8		

Number of wells by year from 1975 through 2012.

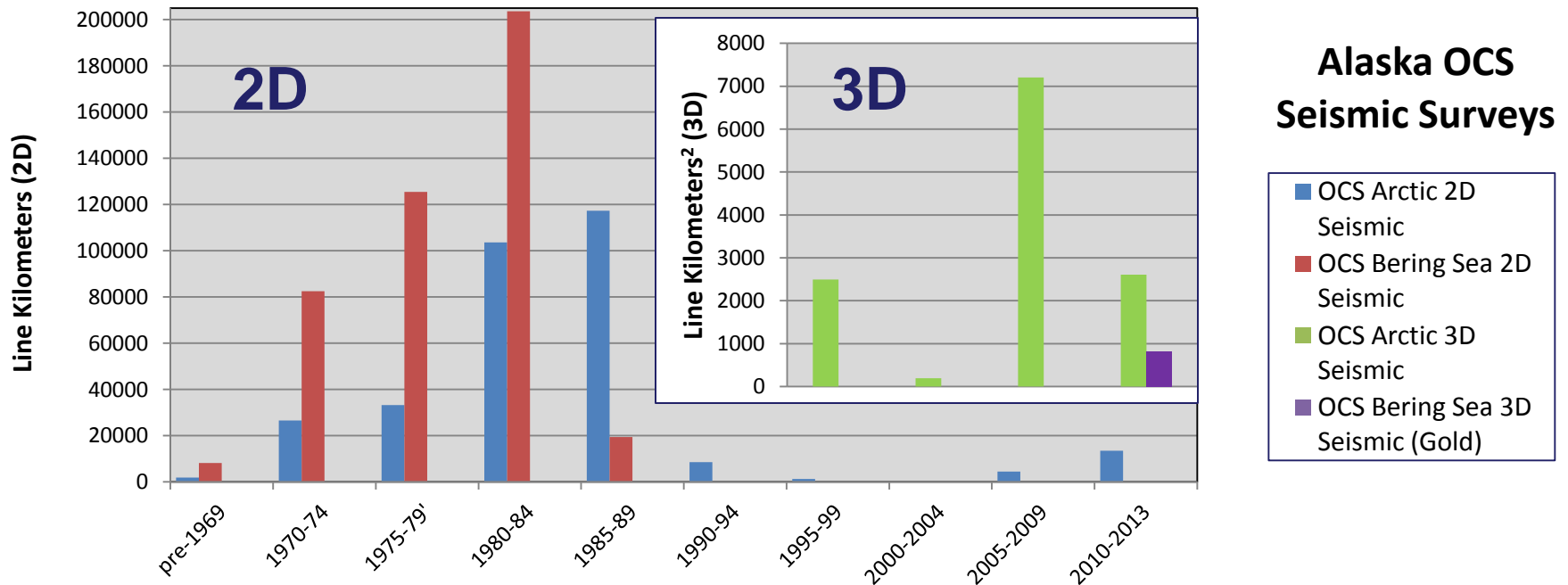


Alaska OCS Exploration Wells 1975 -2012

Historic 2D and 3D Seismic Acquisition

Total 2D and 3D Seismic Acquisition (line km or line km²) 1965-2013 in U.S. OCS Arctic Ocean & Bering Sea

Area	km	km ²	Area	km	km ²
Beaufort Sea	156,019	4,144	St. George Basin	116,200	
Chukchi Sea	137,665	8,356	Navarin Basin	107,044	
Hope Basin	16,742		North Aleutian	116,181	
Norton Basin	61,229	812	Aleutian Basin	3,458	
St. Matthew-Hall	35,019		Bowers Basin	99	



Recent U.S. Arctic OCS Energy Related Vessel Activity Summary

Activity	Number of Vessels *Estimated*			
	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>
G&G	0	4	2	0 (12)
Ancillary Activities	3	0	3	0 (1)
Operational / Drilling	0	22	0	0 (22)
TOTAL	3	26	5	0 (13/ 35)

Note: 2014 vessel numbers in parentheses represent proposed



2008–2013 U.S. Arctic Activity

Bering Strait Transits

2008 = 220
2009 = 280
2010 = 430
2011 = 410
2012 = 480
2013 = 440

Vessels in U.S. Arctic

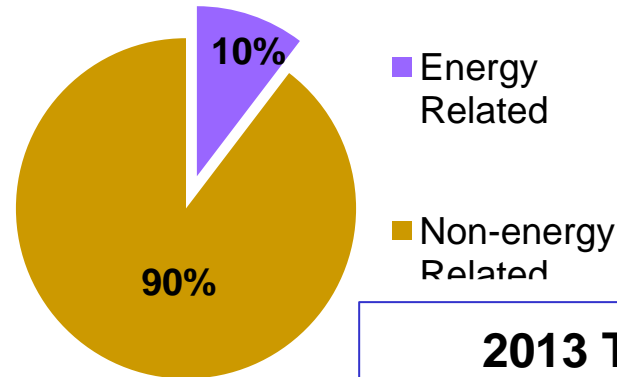
2008 = 120
2009 = 130
2010 = 160
2011 = 190
2012 = 250
2013 = 240

Source: USCG District 17, Sector Anchorage Overview Presentation; February 10, 2014.

BOEM lease operations require on-site monitoring and mitigation measures for marine mammals



2012 Total Estimated U.S. Arctic Vessel Traffic

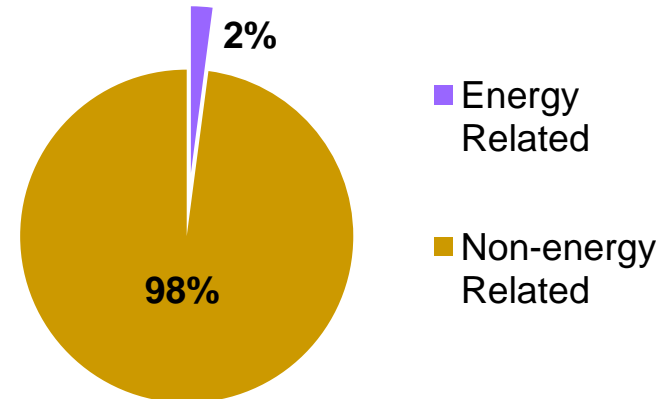


REPORT TO THE SECRETARY OF THE INTERIOR



REVIEW OF SHELL'S 2012 ALASKA OFFSHORE OIL AND GAS EXPLORATION PROGRAM
MARCH 8, 2013

2013 Total Estimated U.S. Arctic Vessel Traffic



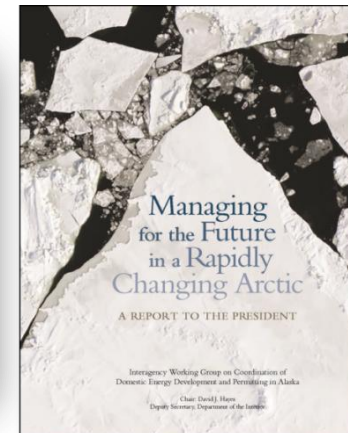
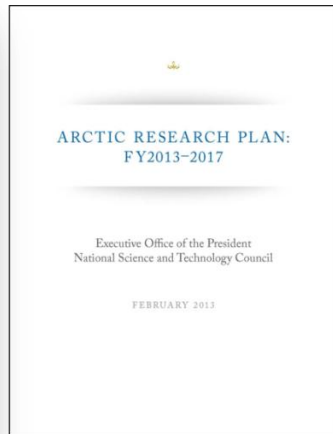
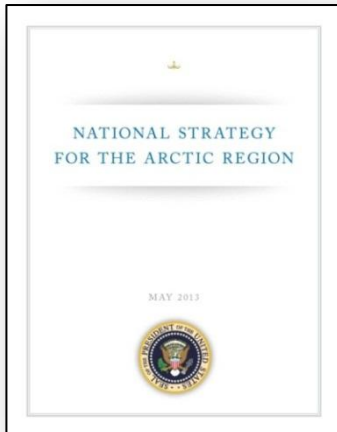
Traditional Knowledge and Community Input

Environmental Studies

- Physical Oceanography
- Biological
- Endangered Species
- Ice

Socioeconomic Studies

- Marine Subsistence Use
- Economic
- Cultural



Changing Climate, Changing Ecosystem

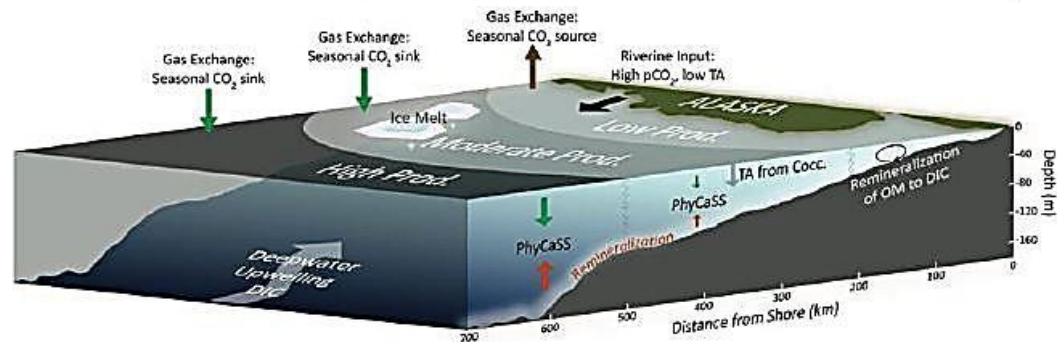
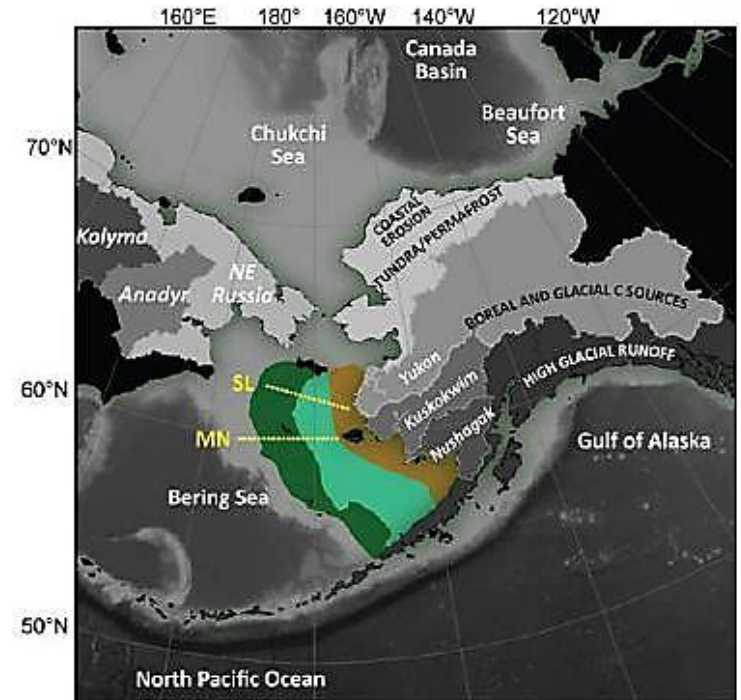
■ Distribution and Relative Abundance of Marine Mammals in the Chukchi Sea and the Fall Migration of Bowhead Whales in the Beaufort Sea:

- More frequent occurrence of humpback, fin, minke, and killer whales
- Shifting distribution of these whales into the Northeastern Chukchi Sea
- Changes may be associated with the northerly shifting of prey due to climate warming and receding summer ice distribution
- Increasing North Pacific populations of whales species resulting from possible re-occupation of habitats after large-scale commercial whaling



Changing Climate, Changing Ecosystem

- **Biogeochemical Assessment of the OCS Arctic Waters: Current Status and Vulnerability to Climate Change:**
 - Providing an assessment of the current status of the ecosystem vulnerability to acidification and climate change
 - Quantifying upper ocean net ecosystem production (NEP) and its fate in the Bering Sea
 - Assessing the effect of ocean acidification on the marine environment of the Bering Sea and Chukchi Sea

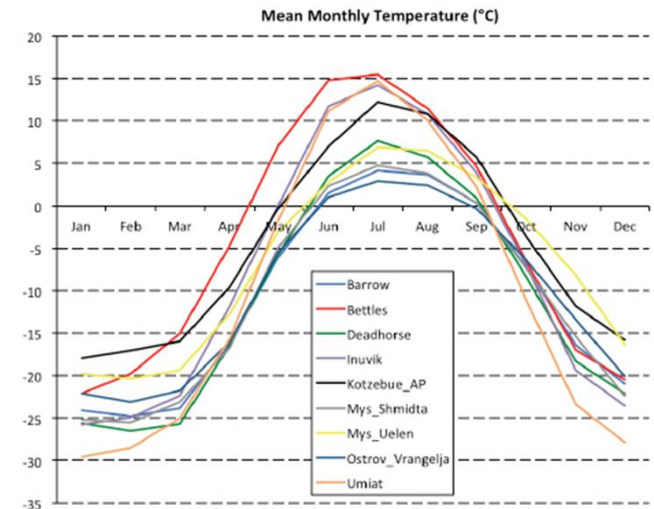
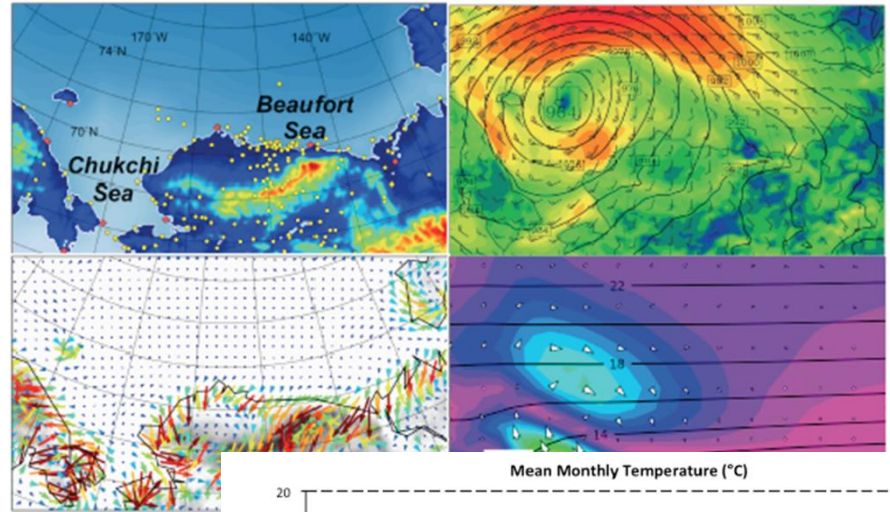


Water column processes affecting carbonate mineral saturation.

Changing Climate, Changing Ecosystem

Beaufort and Chukchi Seas Mesoscale Meteorology Study:

- Identified mechanisms that drive ocean circulation models
- Thirty years (1979-2009) of station observations compiled covering the model domain
- High resolution (10Km) mesoscale meteorology model produced hourly surface winds, temperature and pressure



OCS Study BOEM 2013-212

**Aggregate Effects of Oil Industry Operations on Iñupiaq Subsistence Activities, Nuiqsut, Alaska:
A History and Analysis of Mitigation and Monitoring**



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Subsistence and Impacts to Food Security

- 12 multi-year studies since 2000, ~\$5.5M funded by BOEM

Subsistence harvesters:

- Depend on predictable migration cycles, wind, ice conditions, weather, and other environmental factors.
- Provide keen observations on climatic changes that affect the outcome of subsistence harvest.

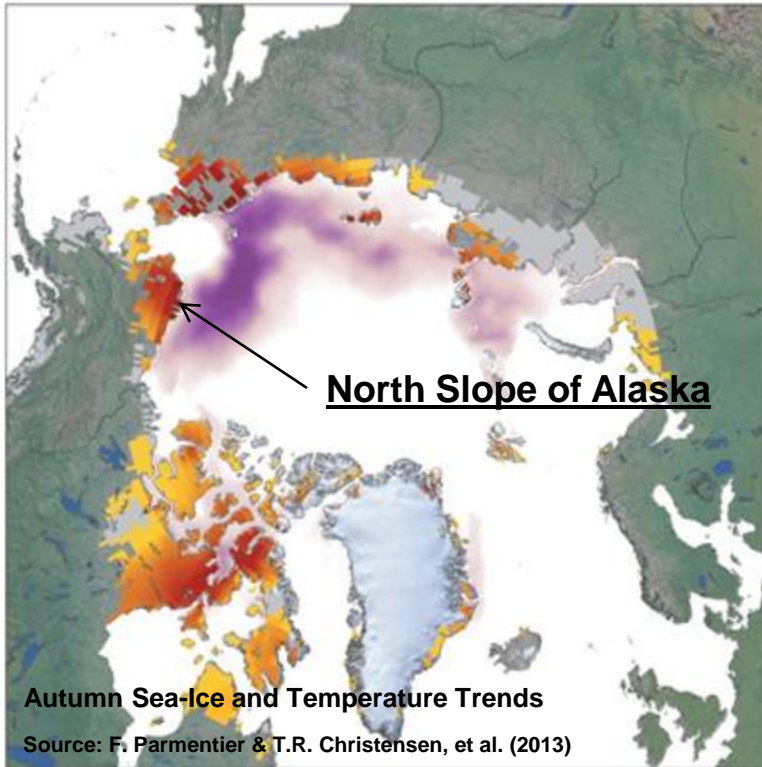
OCS Study BOEM 2013-211

COMIDA: Impact Monitoring for Offshore Subsistence Hunting, Wainwright and Point Lay, Alaska

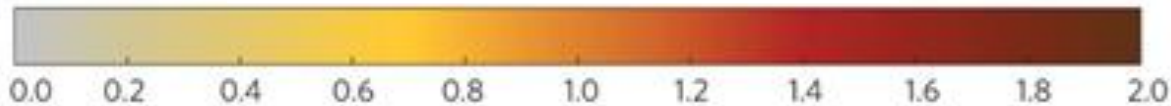


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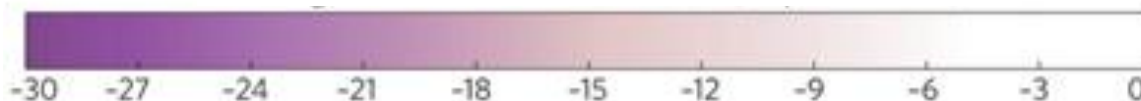
Stephen R. Braund & Associates P.O. Box 1480 Anchorage, Alaska 99510 (907)276-8222 srba@alaska.net



Temperature change ($^{\circ}\text{C}$ per decade)



Change in sea-ice concentration (% per decade)



BOEM evaluates climate change in NEPA environmental review documentation:

- **NEPA**
 - Authority
- **CEQ**
 - Regulations and Guidance
- **DOI**
 - BOEM Approach



*Igamsiqanaghalek!**



Source: BOEM; Photographer: Bill Tracy, Sr.