

# ACTIVITY *and* OPPORTUNITIES *for* ALASKA OIL & GAS EXPLORATION *and* DEVELOPMENT



**Host:**

**Tudor, Pickering, Holt & Co.**

Tuesday, August 21, 2012

Houston, TX

**Presented By:**

**Dan Sullivan**, *Commissioner*, Alaska Department of Natural Resources

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# OUTLINE

**PART I:**

Introduction

**PART II:**

Alaska's Resource Basins

**PART III:**

State Strategies &  
Investment Incentives

**PART IV:**

Recent Activity

**PART V:**

Commercializing North  
Slope Gas

**PART VI:**

Fall 2012 North Slope  
Lease Sale

**PART VII:**

Responsible Resource  
Development

# PART I

## Introduction

# STATE *of* ALASKA

## - DEPARTMENT OF NATURAL RESOURCES -



### Land Base

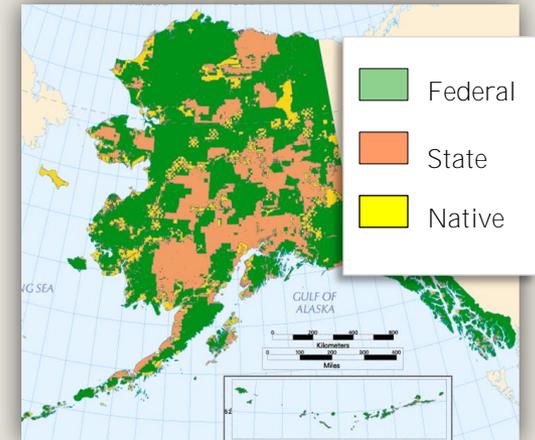
- 586,412 square miles—more than twice the size of Texas
- Is larger than all but 18 sovereign nations
- Has more coastline than all other U.S. states combined
- Has more than 3 million lakes and half of the world's glaciers
- Is the least densely populated U.S. state

### DNR:

- Manages one of the largest portfolios of oil, gas, minerals, renewable resources, water, and land in the world
- Manages all oil and gas fields on state land, including two of the largest oil and gas fields in North America
- Oversees all activities that occur on state land

### Land Ownership

- *Federal Land*: more than 200 million acres
- *State Land*: Approx. 100 million acres of uplands, 60 million acres of tidelands, shore lands, and submerged lands, and 40,000 miles of coastline
- *Native Corporation Land*: 44 million acres



# STATE *of* ALASKA

## - DEPARTMENT OF NATURAL RESOURCES -



***DNR manages one of the largest portfolios of oil, gas, minerals, renewable resources, water, and land in the world.***

### **Mission:**

- *Responsibly develop Alaska's resources by making them available for maximum use and benefit consistent with the public interest*

### **Article 8, Section 1 of the Alaska Constitution provides that:**

- *"it is the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest"*

### **DNR:**

- Manages one of the largest portfolios of oil, gas, minerals, renewable resources, water, and land in the world
- Manages all oil and gas fields on state land, including two of the largest oil and gas fields in North America
- Oversees all activities that occur on state land

# STATE *of* ALASKA

## - AS AN INVESTOR -

### **Alaska's positive investment attributes:**

- State government is committed to enhancing the investment climate and undertaking comprehensive permitting reform and modernization
- OECD/political/legal stability
- One of the highest FDI/per capita rates in the U.S.
- World-class environmental standards and operations; Alaska is a global leader in environmental innovation
- Geostrategically located:
  - Close proximity to Asia and Europe
  - World-class cargo hub
  - Enormous Arctic shipping potential



### **Alaska's significant financial resources:**

- The largest sovereign wealth fund in the country—Alaska Permanent Fund Corporation: \$40 billion
- A budget reserve of \$20 billion
- A retirement fund worth \$18 billion
- Triple-A rated

# PART II

## Alaska's Resource Basins

# STATE *of* ALASKA

## - OIL & GAS RESOURCES -

### North Slope

USGS estimates that Alaska's North Slope has more oil than any other Arctic nation

- **OIL:** Est. 40 billion barrels of conventional oil (USGS & BOEMRE)
- **GAS:** Est. 200 trillion cubic feet of conventional natural gas (USGS)
- Alaska has world-class unconventional resources, including tens of billions of barrels of heavy oil, **shale oil**, and viscous oil, and hundreds of trillions of cubic feet of shale gas, tight gas, and gas hydrates

*Compared to most basins, Alaska is relatively underexplored, with 500 exploration wells on the North Slope, compared to Wyoming's 19,000.*

*Alaska is one of the few places to explore both conventional and unconventional resources in the same basin*

### Cook Inlet

USGS estimates that significant undiscovered volumes of hydrocarbons remain to be found in the Cook Inlet:

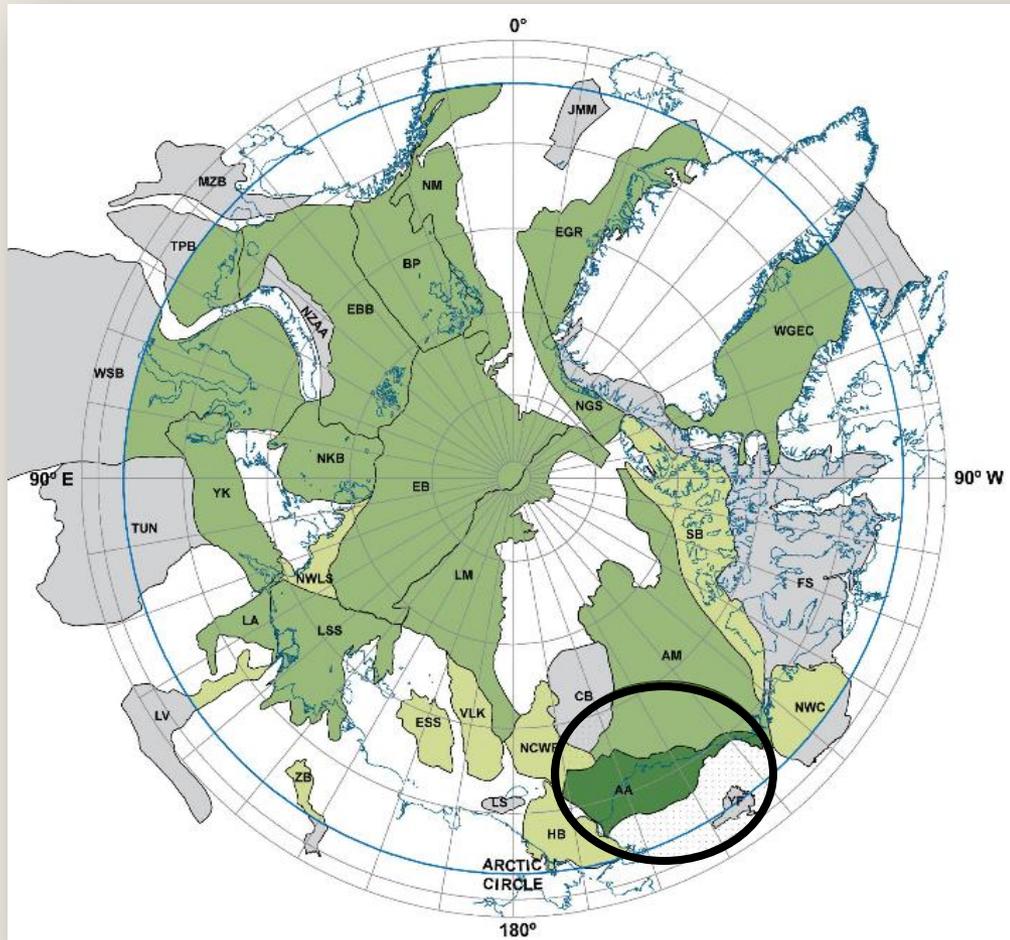
- 19 trillion cubic feet of natural gas
- 600 million barrels of oil
- 46 million barrels of natural gas liquids



# SEDIMENTARY BASINS *in* ALASKA

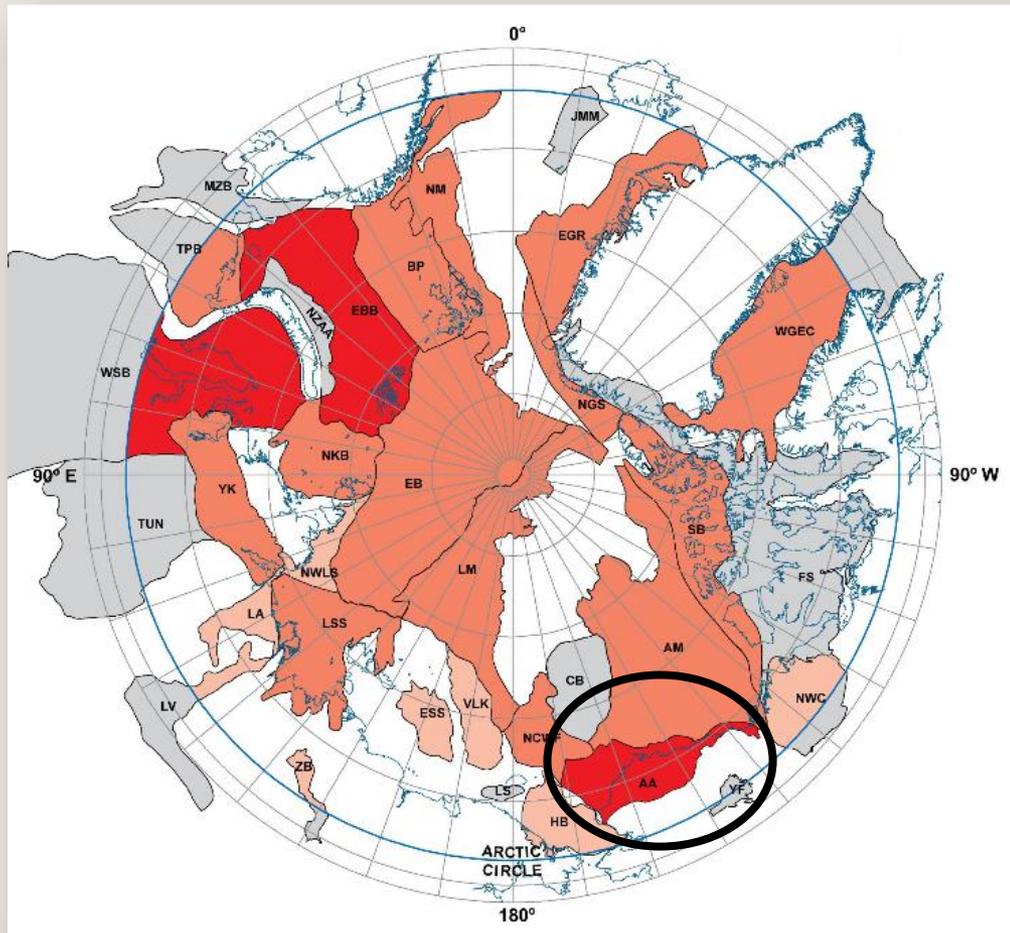


# USGS CIRCUM-ARCTIC RESOURCE APPRAISAL, 2008



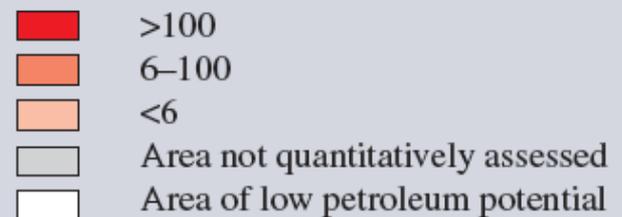
**Arctic Alaska Oil + NGL:  
36 billion barrels**

# USGS CIRCUM-ARCTIC RESOURCE APPRAISAL, 2008



**Arctic Alaska Gas:  
221 trillion cubic feet**

## UNDISCOVERED GAS (trillion cubic feet)



# ALASKA RESOURCE ASSESSMENTS\*

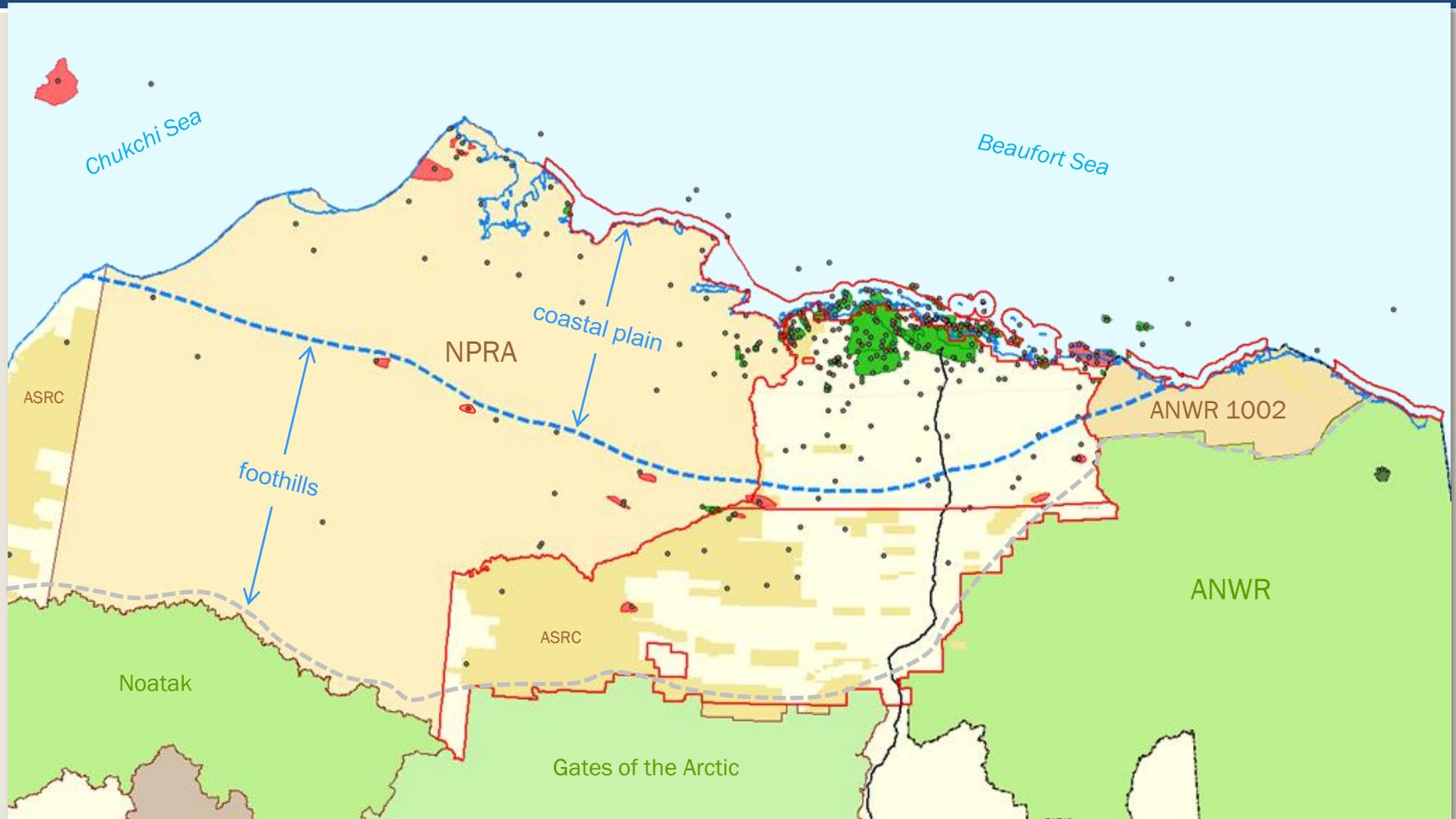
- FEDERAL ESTIMATES – UNDISCOVERED,  
TECHNICALLY RECOVERABLE -

Region	Mean Oil Estimate (Million Barrels)	Mean Gas Estimate (Billion Cubic Feet)
Onshore Arctic	15,908	98,960
Offshore Arctic	23,750	108,180
Interior Basins (only partially assessed)	234	5,641
Upper Cook Inlet	599	19,037
Other Southern Alaska	2,859	23,458
<b>TOTAL</b>	<b>43 BBO</b>	<b>255 TCF</b>

\*Excludes shale oil, shale gas, methane hydrates, and most coal bed methane

# NORTH SLOPE

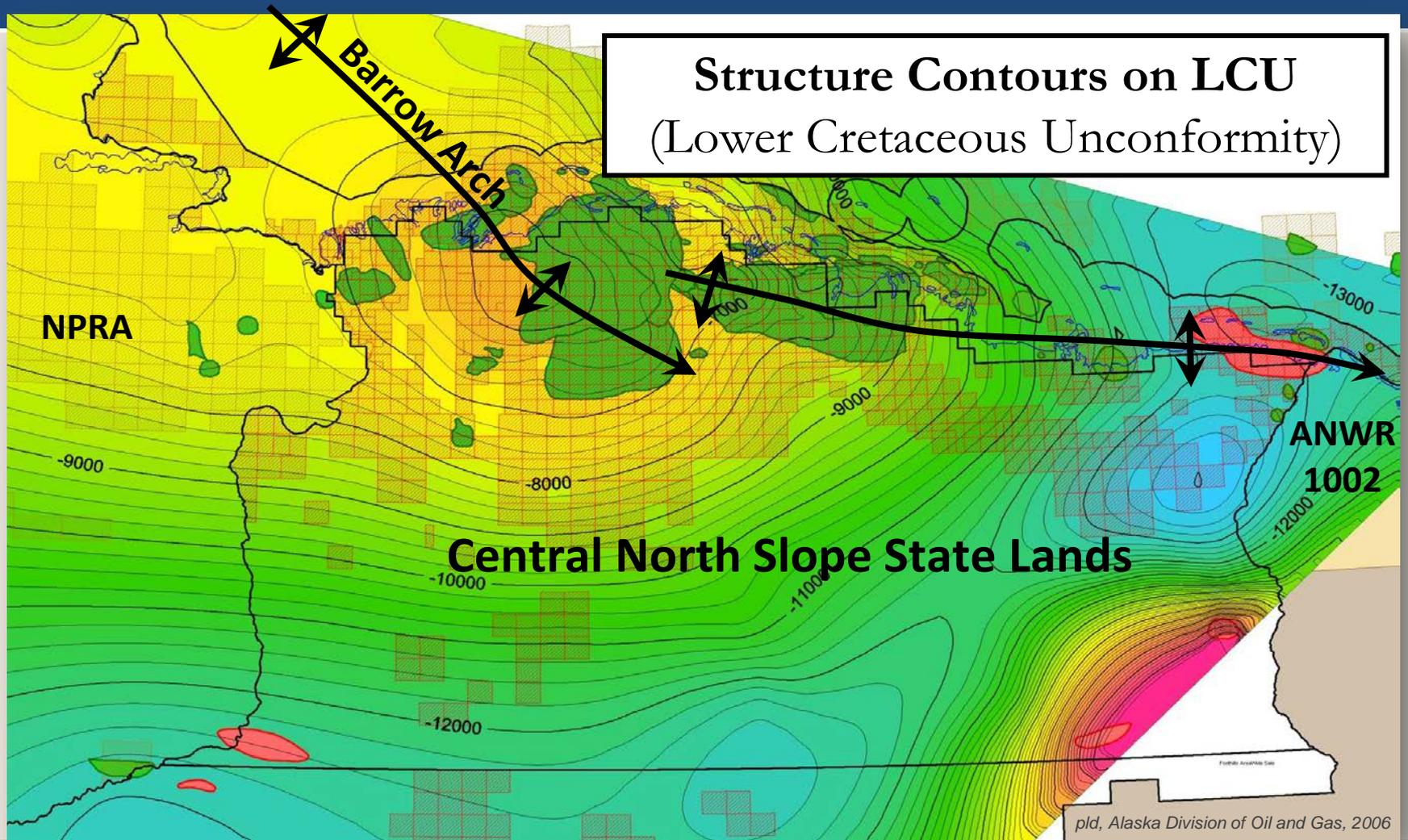
- NORTHERN ALASKA LOCATION MAP -



# NORTH SLOPE

- FIELDS & BARROW ARCH -

**Structure Contours on LCU**  
(Lower Cretaceous Unconformity)



# NORTH SLOPE

## - CONVENTIONAL PLAY TYPES -

- **Cretaceous – Tertiary Brookian Topset Play**

- Structural and potential strat traps, various shallow marine & non-marine sands
- *Fields: West Sak, Schrader Bluff, Orion, Polaris, Ugnu, Umiat, Gubik, Kuvlum, Hammerhead, ...*

- **Cretaceous – Tertiary Brookian Turbidite Play**

- Strat traps (north), structural traps (foothills), local deepwater sands
- *Fields: Tarn, Meltwater, Nanuq, Badami, Sourdough, ...*

- **Early Cretaceous Rift-related Shallow Marine Play**

- Structural traps, Upper and Lower Kuparuk and loosely equivalent sands
- *Fields: Kuparuk, Milne Pt, Pt McIntyre, Niakuk, West Beach, Aurora, Borealis, Walakpa, Pt Thomson, ...*

- **Jurassic Shoreface Play**

- Strat traps, Kingak Fm shallow marine sands (Alpine, Nuiqusut, Nechelik, Simpson, Barrow sands)
- *Fields: Alpine, Lookout, Spark, Rendezvous, Fiord, Barrow Gas Field...*

- **Ellesmerian Sequence Plays**

- Structural and unconformity combination traps in Triassic and older sands, carbonates
- *Fields: Prudhoe Bay, Northstar, Sandpiper (Triassic Ivishak sand), Lisburne (Carboniferous Lisburne carbonates), Endicott, Liberty (Mississippian Kekiktuk sand), ...*

# NORTH SLOPE

## - UNDEVELOPED DISCOVERIES -

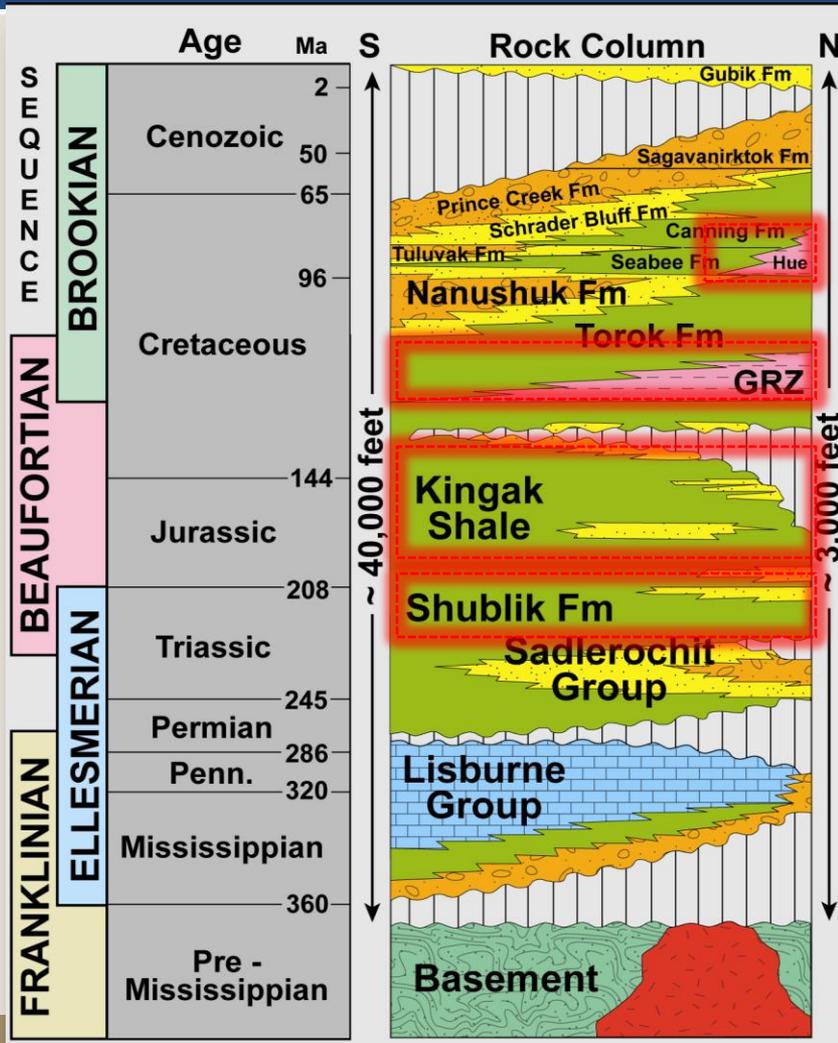
Accumulation	Other un
1. Burger—gas and condensate (Federal offshore area)	
2. East Kurupa—gas (Native lands)	
3. East Umiat—gas (Native lands)	
4. Fish Creek—oil (NPRA)	
5. Gubik—gas (Native lands)	
6. Gwydyr Bay—oil (State onshore-offshore areas)	
7. Hammerhead—oil (Federal offshore area)	
8. Hemi Springs—oil (State onshore area)	
9. Kalubik—oil (State offshore area)	
10. Kavik—gas (State onshore area)	
11. Kemik—gas (State onshore area)	
12. Kuvlum—oil (Federal offshore area)	
13. Liberty—oil (Federal offshore area)	
14. Meade—gas (NPRA)	
15. Mikkleson—oil (State onshore-offshore areas)	
16. Mooses Tooth—oil (NPRA)	
17. Rendezvous—oil (NPRA)	
18. Sandpiper—gas and condensate (Federal offshore area)	
19. Sikulik—gas (Native lands in NPRA)	
20. Simpson—oil (NPRA)	
21. Square Lake—gas (NPRA)	
22. Stinson—oil (State offshore area)	
23. Umiat—oil (NPRA)	
24. Wolf Creek—gas (NPRA)	

Table 2.8. North Slope, Alaska—Undeveloped oil and gas accumulations as of January 1, 2005 (after Bird, 1991 and Thomas, and others, 1991 and 1993)

Accumulation or Field/ Reservoir Formation(s)	Year of Discovery	Estimated Technically Recoverable Resources
		70 MMBO, 50 BCF
Umiat <sup>11</sup> /Nanushuk Fm.	1946	OIL (? MMBO)
Fish Creek <sup>11</sup> /Nanushuk Fm.	1949	12 MMBO
Simpson <sup>11</sup> /Nanushuk Fm.	1950	20 BCF
Meade <sup>11</sup> /Nanushuk Fm.	1950	GAS (? BCF)
Wolf Creek <sup>11</sup> /Nanushuk Fm.	1951	600 BCF
Gubik <sup>11</sup> /Tuluvak And Nanushuk Formations	1951	58 BCF
Square Lake <sup>11</sup> /Nanushuk Fm.	1952	4 BCF
E. Umiat/Nanushuk Fm.	1964	115 BCF
Kavik/Ivishak Fm.	1969	30-60 MMBO
Gwydyr Bay <sup>12</sup> /Ivishak Fm.	1969	100 + BCF
Kemik/Shublik Fm.	1972	OIL (? MMBO)
Flaxman Island/Canning Fm.	1975	GAS (? BCF)
East Kurupa/Torok-Fortress Mtn. Formations	1976	300 MMBO, 5000 BCF
Pt. Thomson/Thomson Sandstone and Canning Fm.	1977	OIL (? MMBO)
Mikkelson/Canning Fm.	1978	150 MMBO
Tern Is. (Liberty)/Kekiktuk Conglomerate	1982	OIL (?MMBO)
Hemi Springs/Kuparuk Fm.	1984	~200 MMBO
Hammerhead/Sagavanirktok Fm.	1985	150 MMBO/GAS (? BCF)
Sandpiper/Ivishak Fm.	1986	16 BCF
Sikulik/Barrow Sandstone	1988	OIL (? MMBO)
Stinson <sup>13</sup> /????	1990	14,000 BCF, 724 MMBO
Burger/Kuparuk Equivalent	1990	400 MMBO
Kuvlum <sup>13</sup> /????	1993	OIL (? MMBO)
Thetis Island <sup>13</sup> /Nuiqsut	1993	~100 MMBO
Sourdough <sup>13</sup> /????	1994	OIL (? MMBO)
Pete's Wicked <sup>13,14</sup> /Sagavanirktok and Ivishak Fms.	1997	19 MMBO(?)
Sambucca <sup>13</sup> /Ivishak Fm.	1997	70 MMBO(?)
Oooguruk <sup>13</sup> /Nuiqsut Sandstone(?)	2003	70 MMBO(?)
Nikaitchuq <sup>13</sup> /Nuiqsut and Sag River Sandstones(?)	2004	OIL (?MMBO)
Tuvaag/Schrader Bluff Fm.	2005	2,300 + MMBO/ 20,000 + BCF
<b>Total</b>		

# NORTH SLOPE

## - SHALE OIL & GAS RESOURCES -



- 3 prolific oil source rock units have sourced nearly all North Slope oil & gas fields.
- Shale oil plays are currently seeing their very first dedicated exploration wells.
- USGS assessment places greatest shale resource potential in Cretaceous and Triassic source rocks beneath state lands:
  - Organic richness
  - Kerogen type
  - Brittleness
  - Thickness
  - Thermal maturity

# NORTH SLOPE

## - SHALE OIL & GAS RESOURCES -

### Hue Shale/GRZ

Type section outcrops at Hue Creek, ANWR



### Shublik Formation

Variability in outcrop and well logs



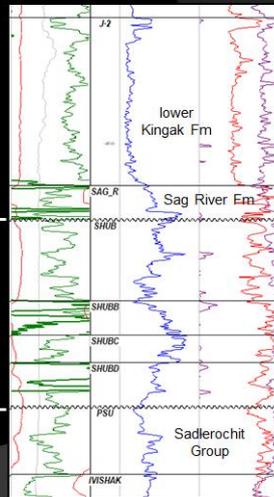
Interbedded shale & limestone, silty-muddy, phosphatic, pyritic (up to 600 ft thick)



Shublik Fm

Zone A  
Zone B  
Zone C  
Zone D

Rock Flour 1



### Total assessed resources:

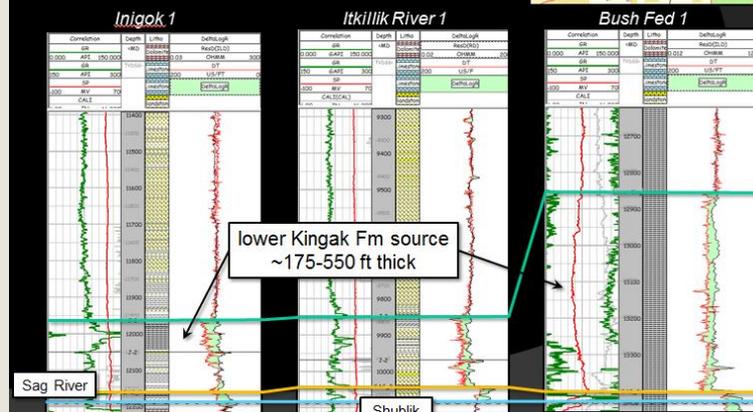
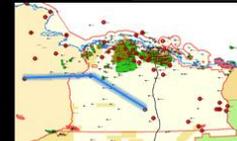
Shale Oil: 0 – 2 BBO (mean **940** MMBO)

Shale NGL: 0 – 571 MMBO (mean **262** MMBO)

Shale Gas: 0 – 80 TCF (mean **42** TCF)

### Lower Kingak Formation

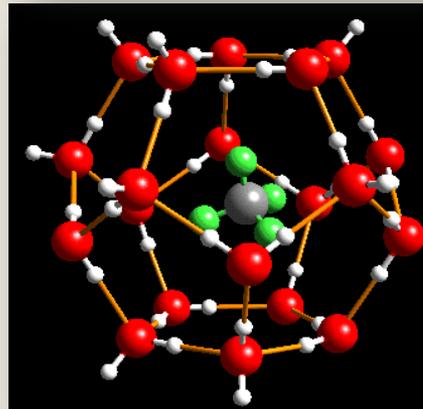
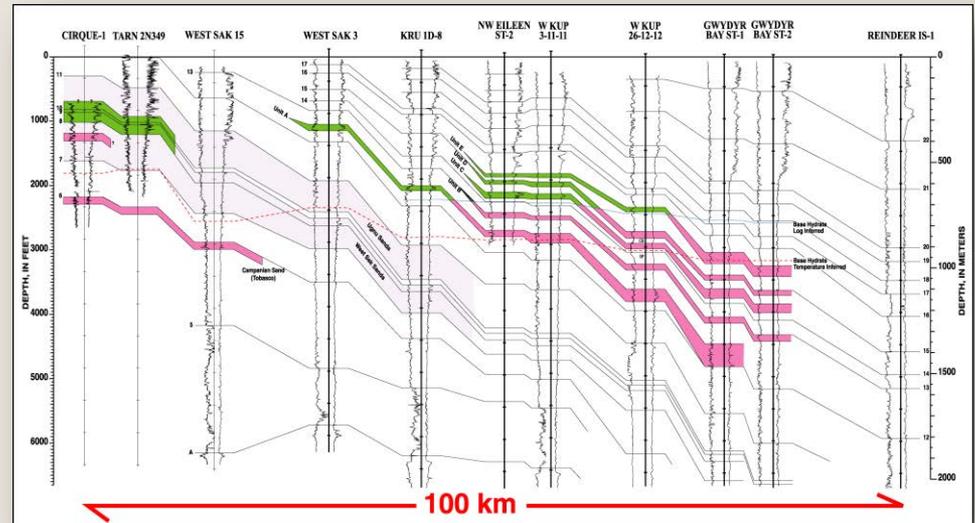
Δ Log R source rock screening



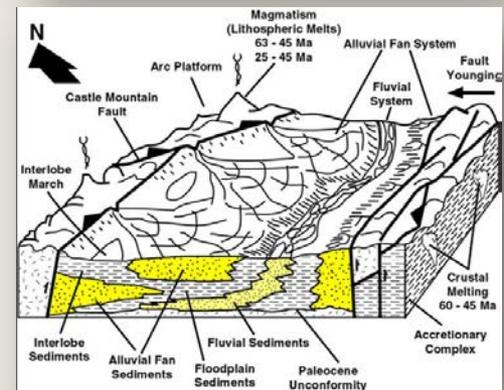
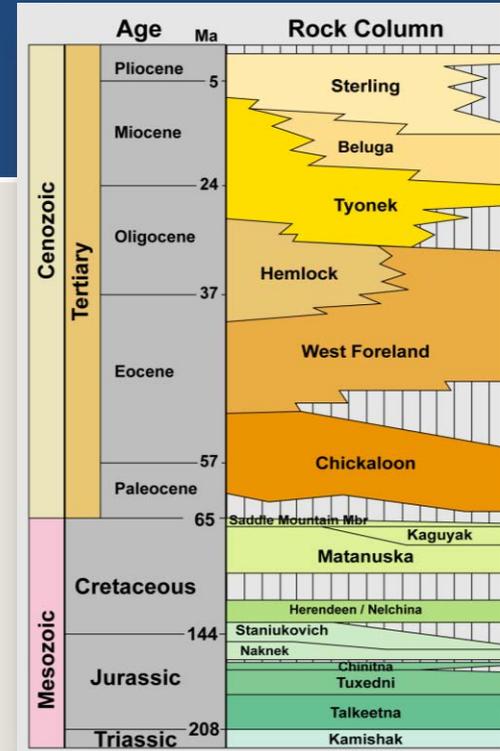
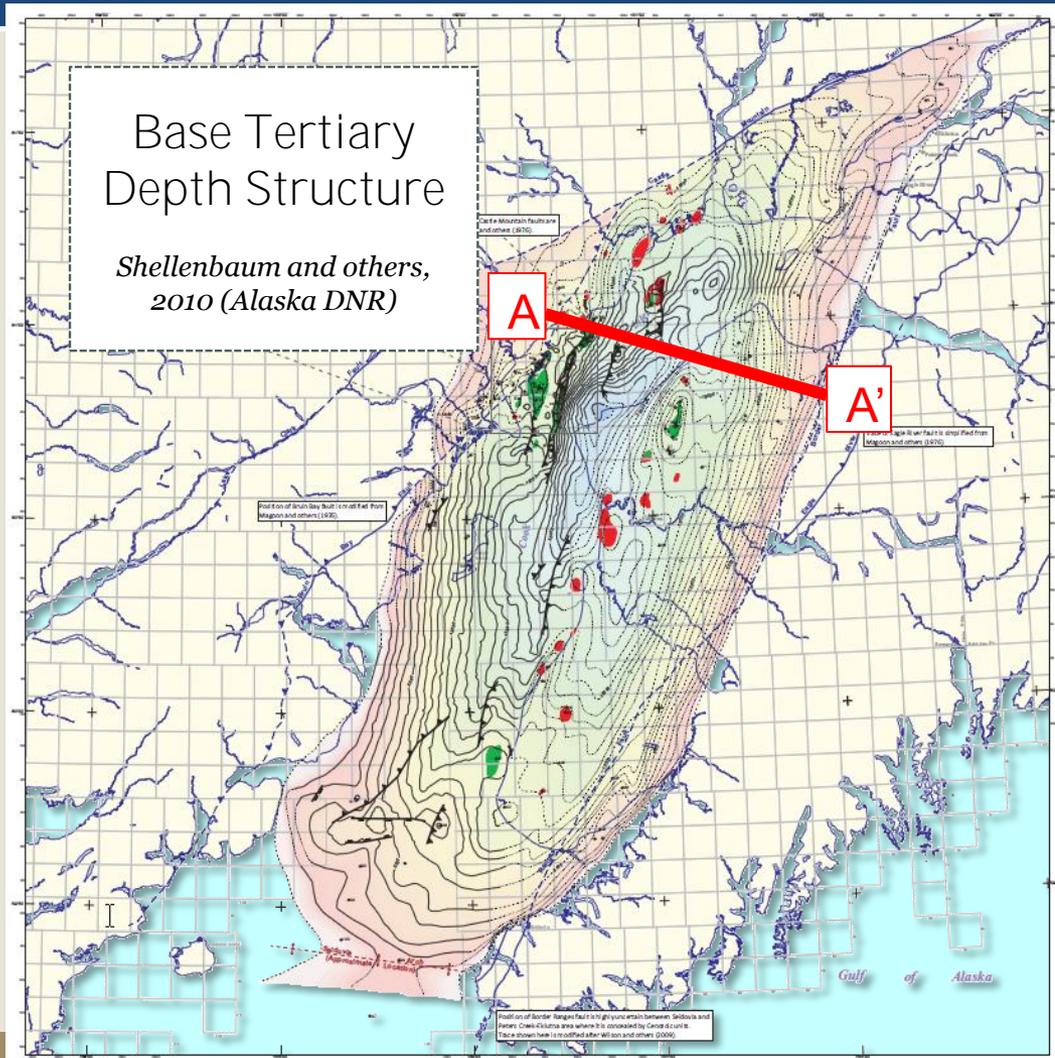
# NORTH SLOPE

## - METHANE HYDRATE RESOURCE POTENTIAL -

- Mean estimated onshore hydrate resource is 590 TCF gas-in-place
- Extraction remains experimental
- Recovery factor unknown

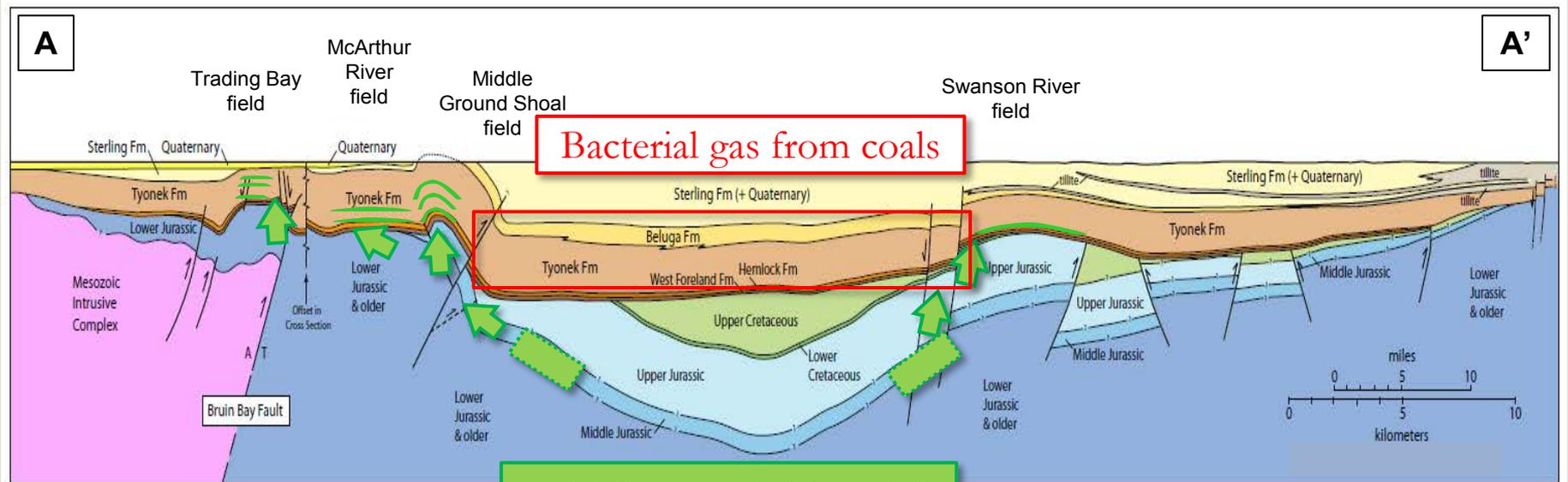


# COOK INLET BASIN



# COOK INLET BASIN

- SCHEMATIC CROSS SECTION: BIOGENIC GAS & THERMOGENIC OIL SYSTEMS -



Bacterial gas from coals

Middle Jurassic Tuxedni source rocks at oil window maturity

Modified from Hauessler and others (2000), revised from Boss and others (1976)

# COOK INLET BASIN

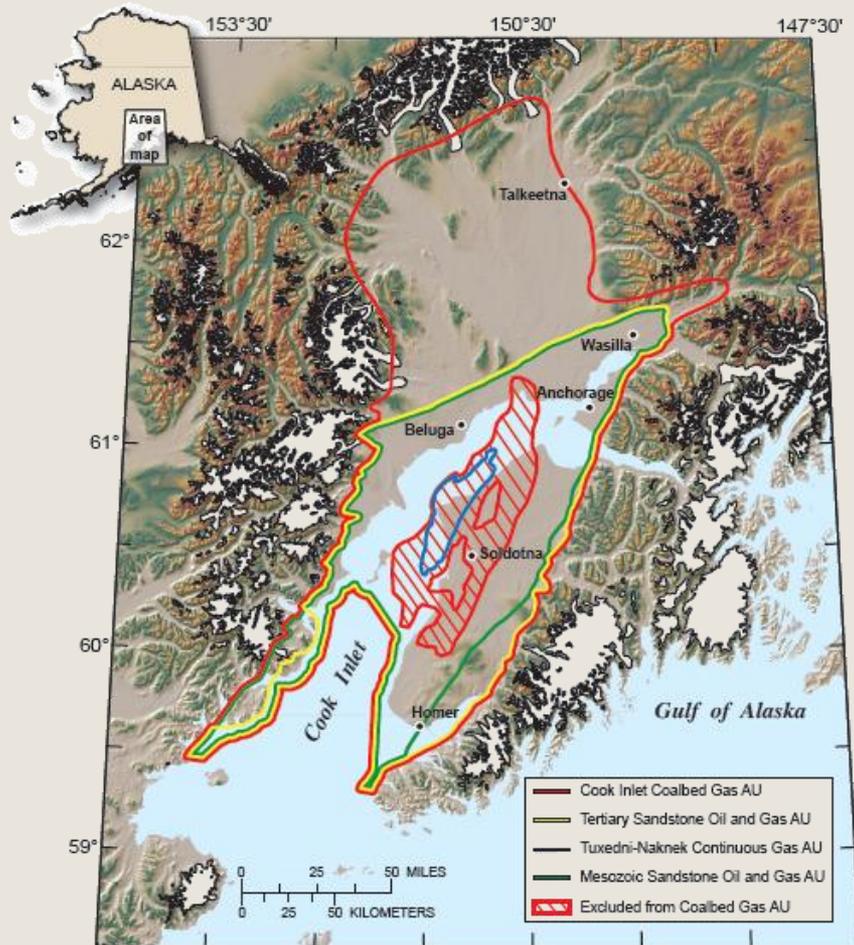
## - KEY ATTRIBUTES -

- Up to 25,000 ft of high net-to-gross fluvial & alluvial Tertiary strata
- Ubiquitous coal → biogenic gas source
- Depressed geothermal gradient (20 deg C/km) limits Tertiary reservoir diagenesis
- Oil sourced from Jurassic throughout much of Tertiary time
- Late structural uplift key for gas migration out of coals, likely caused some oil re-migration
- Sealing facies distributed throughout section



# COOK INLET BASIN

- RESOURCE POTENTIAL: USGS RESOURCE ASSESSMENT 2011 -



## Undiscovered, Technically Recoverable Oil and Gas

- **mean conventional oil 599 MMBO**

372 MMBO in Tertiary Ss play

227 MMBO in Mesozoic Ss play

- **mean conventional gas 13.7 TCF**

12.2 TCF in Tertiary Ss play

1.5 TCF in Mesozoic Ss play

- **mean unconventional gas 5.3 TCF**

0.6 TCF Mesozoic tight ss play

4.7 TCF Tertiary Coalbed play

# PART III

## State Strategies & Investment Incentives

# ONE MILLION BARRELS/DAY

## - ARRESTING TAPS THROUGHPUT DECLINE -



- TAPS has transported over 16.3 billion barrels of oil and natural gas liquids since June of 1977. Production peaked at 2.2 million barrels per day in the late 1980s, representing 25% of the U.S. domestic production
- Since its peak, however, throughput has steadily declined; today, TAPS is 2/3 empty and declining at 6% per year
- TAPS throughput decline threatens economic disruption and the very existence of our pipeline
- We must encourage industry to invest in exploration and development of conventional and unconventional resources on state and federal land, onshore and offshore
- TAPS has plenty of capacity for increased throughput
- Most near-term critical economic issue facing the state

# SECURE ALASKA'S FUTURE: *OIL*

## Objective:

*The State of Alaska's  
Comprehensive Strategy  
to Increase TAPS  
Throughput to One  
Million Barrels/Day*

- I. Enhance Alaska's global competitiveness and investment climate
- II. Ensure the permitting process is structured and efficient
- III. Facilitate and incentivize the next phases of North Slope development
- IV. Unlock Alaska's full resource development potential through partnerships with key stakeholders
- V. Promote Alaska's resources and positive investment climate to world markets



# STATEWIDE PERMITTING REFORM

## Objective:

*Improve the State of Alaska's permitting processes in order to advance the public interest by ensuring projects are permitted in a timely, predictable and efficient manner while safeguarding the environment.*

**DNR has been working with a team from DNR, DEC, ADF&G, and LAW to develop and advance strategies that aim to:**

- I. Improve agencies' internal permitting structure to create a more efficient, timely, and certain process
- II. Enhance coordination within different state departments and with different entities and stakeholders throughout the state
- III. Seek input from the public about the permitting process including input from municipalities, industry and non-governmental organizations
- IV. Improve coordination between the state and the federal government—federal permitting issues have a strong influence on state projects
- V. Anticipate and plan for permitting the next phases of resource development, e.g. the Shale Oil Task Force



# FINANCIAL & INVESTMENT INCENTIVES - NORTH SLOPE -

## Incentives & Credits

- Royalties calculated on gross value with modifications available
- Production taxes calculated on net value
  - capital can be expensed in a single year
  - any losses can convert to credits
  - capital expenses receive 20% credit
  - greenfield exploration receives a 40% credit
- Credits can be used to offset tax liability for the current tax year, carried forward to offset tax liability in a future year, sold to another taxpayer, or refunded for cash
- Total credits claimed since 2007 exceed \$3 billion



## Proposed Tax Reforms

- Reduce marginal rates on production taxes
- Increase tax credits—up to 40% for most expenditures
- Lower the base rate to 15% for fields not yet in production

# FINANCIAL & INVESTMENT INCENTIVES

- COOK INLET -

- State allows credits up to 40 percent of capital expenses related to wells and seismic activity
- State offers tax credits for exploration expenses of 100, 90, and 80 percent respectively for drilling the first, second, and third exploration wells by a jack-up drilling rig, up to \$25 million
- Natural gas storage tax credits are established for any natural gas storage facility—the credit equals \$1.50 per thousand cubic feet of “working gas” storage capacity, up to \$15 million
- No production tax on oil
- 18 cents/mcf
- Significant tax credits



# FINANCIAL & INVESTMENT INCENTIVES

## - FAVORABLE PRICING & TRANSPORTATION TERMS -

### WTI-ANS Differential

- WTI has historically traded at a premium to ANS (“Alaska North Slope”) crude.
- Because of seriously unfavorable transportation logistics in the U.S. Mid-Continent, WTI now has been trading at a substantial discount to waterborne crudes including ANS.
- ANS now commands a premium over WTI by as much as \$20 per barrel.
- Alaska producers have enjoyed the benefit of this premium.

### Transportation Costs to Deliver ANS to U.S.

- Transportation costs to deliver ANS to the U.S. West Coast—via TAPS and tankers—are relatively inexpensive when compared to the transportation costs faced by producers between in the Northern Tier states, i.e., North Dakota’s Bakken play, and the Canada Western Sedimentary Basin and their markets in the Mid-Continent and U.S. Gulf Coast—crude from these areas is now being shipped by rail as pipelines fill up.
- The Alaska Department of Revenue uses a transportation deduction of \$8.76 per barrel off of the U.S. West Coast ANS price to calculate state tax revenues (FY 2012 Forecast).
- This compares very favorably to rail shipments of crude from North Dakota and the netback price for ANS is still higher than these alternative crude supplies.



# PART IV

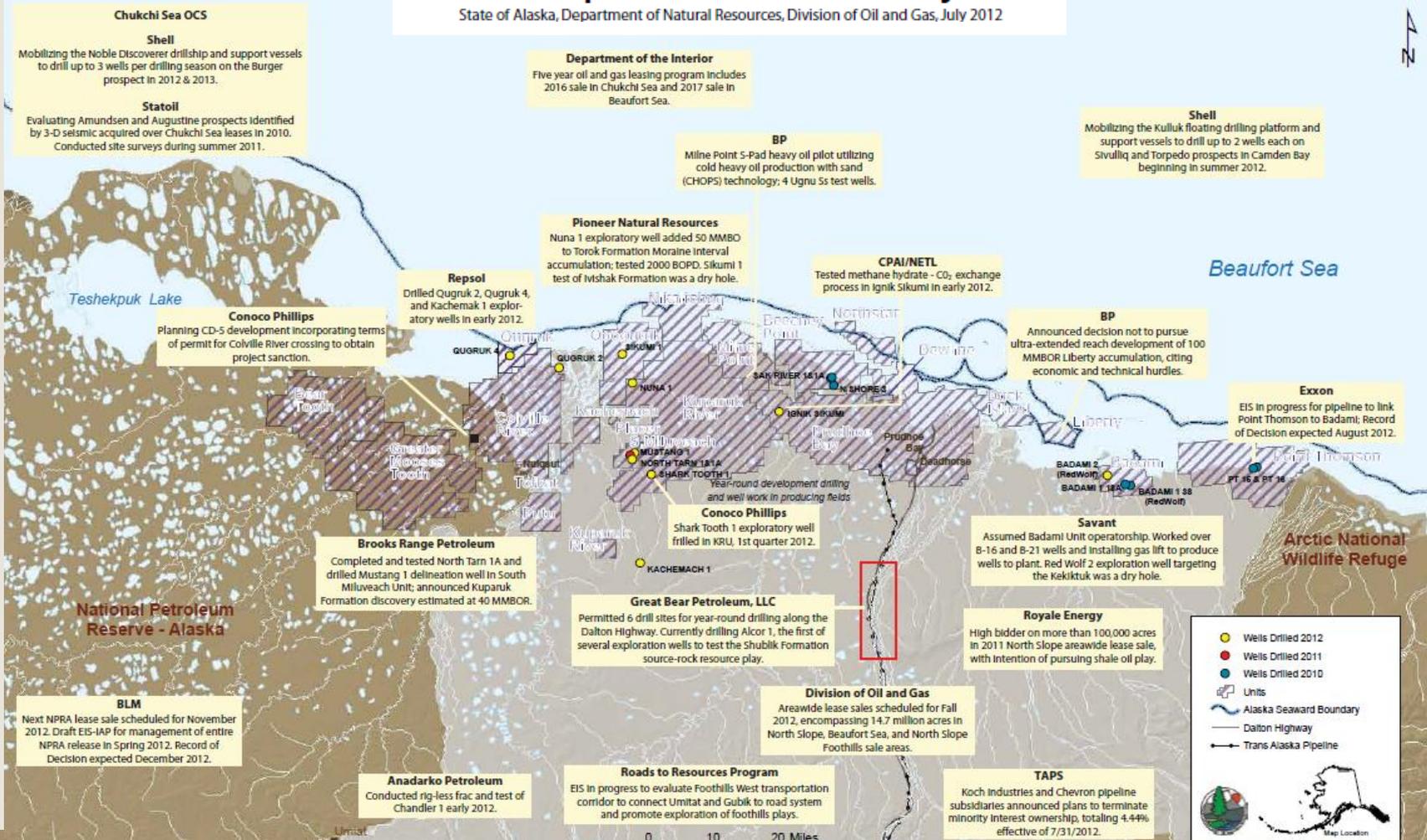
## Recent Activity

# RECENT ACTIVITY

## - NORTH SLOPE RECENT & PROPOSED ACTIVITY -

### North Slope Oil and Gas Activity 2012

State of Alaska, Department of Natural Resources, Division of Oil and Gas, July 2012



**Chukchi Sea OCS**  
**Shell**  
 Mobilizing the Noble Discoverer drillship and support vessels to drill up to 3 wells per drilling season on the Burger prospect in 2012 & 2013.  
**Statoil**  
 Evaluating Amundsen and Augustine prospects identified by 3-D seismic acquired over Chukchi Sea leases in 2010. Conducted site surveys during summer 2011.

**Department of the Interior**  
 Five year oil and gas leasing program includes 2016 sale in Chukchi Sea and 2017 sale in Beaufort Sea.

**BP**  
 Milne Point 5-Pad heavy oil pilot utilizing cold heavy oil production with sand (CHOPS) technology; 4 Ugnu Ss test wells.

**Shell**  
 Mobilizing the Kulluk floating drilling platform and support vessels to drill up to 2 wells each on Sivullik and Torpedo prospects in Camden Bay beginning in summer 2012.

**Pioneer Natural Resources**  
 Nuna 1 exploratory well added 50 MMBO to Torok Formation Moraine interval accumulation; tested 2000 BOPD. Sikumi 1 test of Ivshak Formation was a dry hole.

**CPAI/NETL**  
 Tested methane hydrate - CO<sub>2</sub> exchange process in Ignik Sikumi in early 2012.

**Repsol**  
 Drilled Quguruk 2, Quguruk 4, and Kachemak 1 exploratory wells in early 2012.

**BP**  
 Announced decision not to pursue ultra-extended reach development of 100 MMBOR Liberty accumulation, citing economic and technical hurdles.

**Conoco Phillips**  
 Planning CD-5 development incorporating terms of permit for Colville River crossing to obtain project sanction.

**Exxon**  
 EIS in progress for pipeline to link Point Thomson to Badami; Record of Decision expected August 2012.

**Brooks Range Petroleum**  
 Completed and tested North Tarn 1A and drilled Mustang 1 delineation well in South Miluveach Unit; announced Kuparuk Formation discovery estimated at 40 MMBOR.

**Conoco Phillips**  
 Shark Tooth 1 exploratory well drilled in KRU, 1st quarter 2012.

**Savant**  
 Assumed Badami Unit operatorship. Worked over 8-16 and 8-21 wells and installing gas lift to produce wells to plant. Red Wolf 2 exploration well targeting the Kekiktuk was a dry hole.

**Great Bear Petroleum, LLC**  
 Permitted 6 drill sites for year-round drilling along the Dalton Highway. Currently drilling Alcor 1, the first of several exploration wells to test the Shublik Formation source-rock resource play.

**Royale Energy**  
 High bidder on more than 100,000 acres in 2011 North Slope areawide lease sale, with intention of pursuing shale oil play.

**BLM**  
 Next NPRA lease sale scheduled for November 2012. Draft EIS-IAP for management of entire NPRA release in Spring 2012. Record of Decision expected December 2012.

**Division of Oil and Gas**  
 Areawide lease sales scheduled for Fall 2012, encompassing 14.7 million acres in North Slope, Beaufort Sea, and North Slope Foothills sale areas.

**Anadarko Petroleum**  
 Conducted rig-less frac and test of Chandler 1 early 2012.

**Roads to Resources Program**  
 EIS in progress to evaluate Foothills West transportation corridor to connect Umitat and Gubik to road system and promote exploration of foothills plays.

**TAPS**  
 Koch Industries and Chevron pipeline subsidiaries announced plans to terminate minority interest ownership, totaling 4.44% effective of 7/31/2012.

**Legend**

- Wells Drilled 2012
- Wells Drilled 2011
- Wells Drilled 2010
- Units
- Alaska Seaward Boundary
- Dalton Highway
- Trans Alaska Pipeline

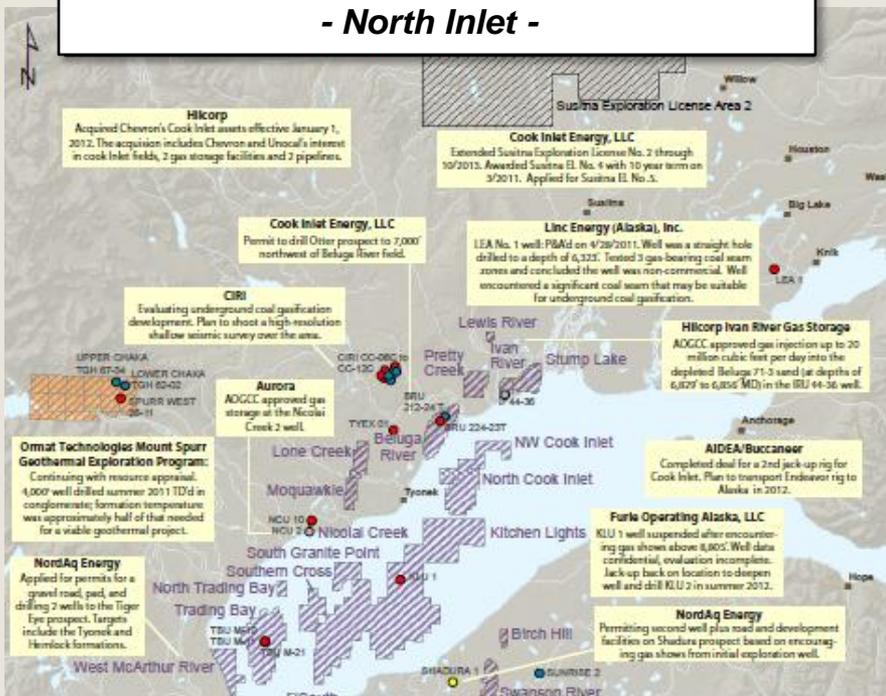
# RECENT ACTIVITY

## - COOK INLET RECENT & PROPOSED ACTIVITY -

### Cook Inlet Oil and Gas Activity 2012

State of Alaska, Department of Natural Resources, Division of Oil and Gas, July 2012

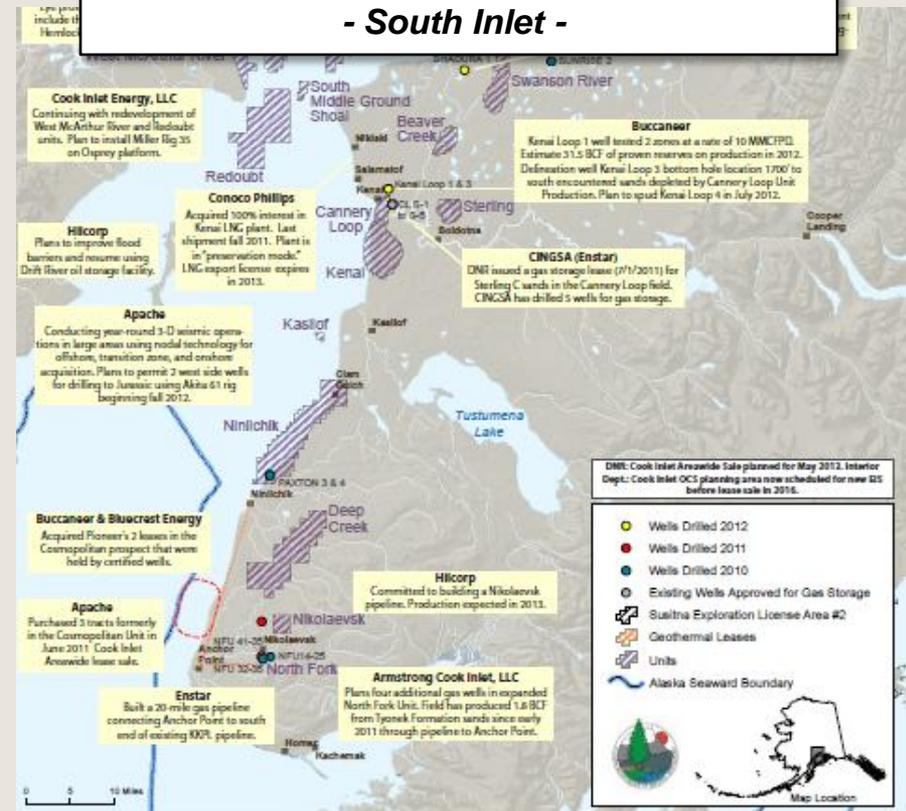
#### - North Inlet -



### Cook Inlet Oil and Gas Activity 2012

State of Alaska, Department of Natural Resources, Division of Oil and Gas, July 2012

#### - South Inlet -



DMI: Cook Inlet Anawick Sale planned for May 2012. Interior Dept.: Cook Inlet OCS planning area now scheduled for new IS before lease sale in 2016.

- Wells Drilled 2012
- Wells Drilled 2011
- Wells Drilled 2010
- Existing Wells Approved for Gas Storage
- Suzaina Exploration License Area #2
- Geothermal Leases
- Units
- Alaska Seaward Boundary

Map Location

# LEASE SALES

## - COOK INLET, NORTH SLOPE & BEAUFORT SEA LEASE SALES -

### Cook Inlet, 2011 & 2012 Lease Sales

- In June 2011, the state received the highest number of Cook Inlet lease sale bids in 28 years, totaling more than \$11 million
  - Total tracts sold: 109
  - Total high bonus bids: \$11,125,063.80
- In May 2012, Cook Inlet lease sale bids totaled more than \$6.8 million
  - Total tracts sold: 44
  - Total high bonus bids: \$6,865,835



### NS & Beaufort Sea, Dec. 2011 Lease Sale

- Received more than 300 bids from more than 15 bidders, totaling more than \$21 million, signifying one of the most successful sales in recent Alaska history
- Included new players targeting shale oil
- Attracted world-class companies such as Shell, ConocoPhillips, and Repsol, who are staking out new positions on state land
- Private equity investment taking root

# RECENT ACTIVITY

## - NORTH SLOPE: NEXT PHASES AND NEW AREAS OF EXPLORATION -

- Shale oil exploration – ongoing
  - July 31<sup>st</sup> conference in Anchorage on Shale Oil
- Shell exploration appears likely—finally
  - Demonstrates the need for comprehensive federal regulatory overall
- Eastern North Slope open, PT settled
- New players, operators and exploration on state land
  - Shell, Repsol, Brooks Range, Great Bear, Savant
  - Exxon Mobil, Conoco Phillips



# RECENT ACTIVITY

## - COOK INLET RECENT & PROPOSED ACTIVITY -



**WSJ Article, August 27, 2011:**

***“New Energy Estimate Breathes Life Into a Declining Alaskan Oil Field”***

- New players investing: Apache, Hilcorp, Armstrong, Linc, Buccaneer, Nordaq
- Significant exploration and development activity: 10-15 new oil and gas wells, one geothermal exploration well, one jack-up rig (and one on the way), and companies shooting 3-D seismic over large areas of the basin
- 3 new gas supply contracts with utilities
- New gas storage project
- State continues to focus on safe, responsible development and operations
- Competitive price for gas relative to lower 48 markets

# PART V

## Commercializing North Slope Gas

# COMMERCIALIZING NS GAS

## - MASSIVE RESOURCE BASE -

- The North Slope of Alaska is estimated to have 236 trillion cubic feet of conventional gas (*USGS*)
- 35 tcf of known reserves
- Prudhoe Bay reinjects 8 bcf of gas per day, which is enough to meet Canada's daily gas needs
- These numbers do not include the trillions of cubic feet of shale gas, tight gas, and gas hydrates estimated for the North Slope
- This is an almost inexhaustible supply of gas with new technology
- Alaska is the only state in the United States currently exporting gas to Asia
- North Slope gas is “wet” gas
  - Wet gas has a higher energy content (BTU value) than dry gas when used as fuel
  - Wet gas is more valuable than dry gas as a petrochemical feedstock—it contains more of the larger molecules that can be refined and reconfigured into more varied compounds, such as methane
  - Natural gas at Prudhoe Bay is 76% methane

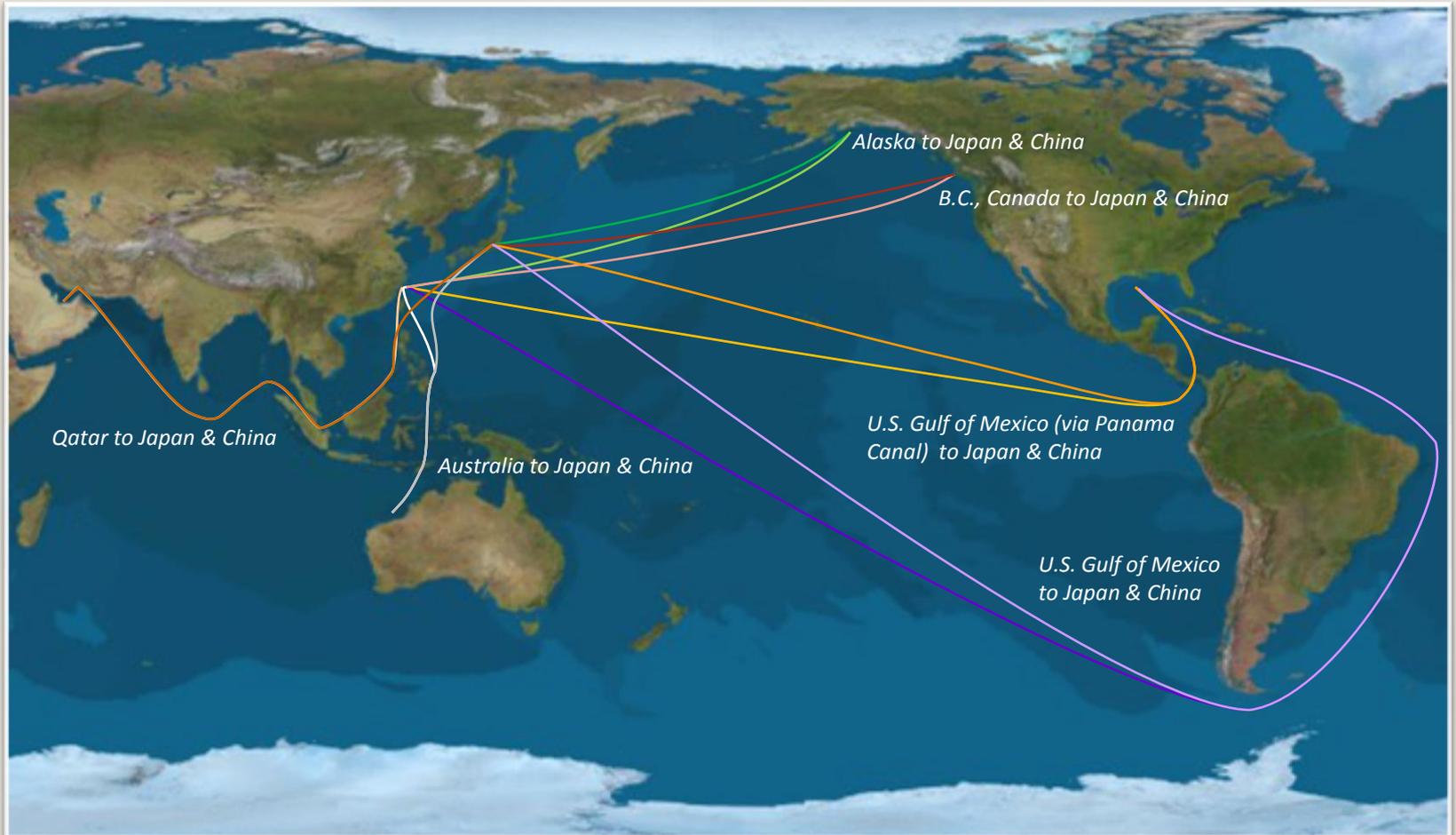
# COMPARATIVE ADVANTAGES *of* ALASKA LNG

- Huge conventional gas resources next to existing infrastructure
- Limited environmental impact
- Liquid-rich gas
- Longstanding tradition of exporting to Asia—40 years of LNG exports to Japan with accompanying DOE export licenses
- Not part of shale LNG export debate in the Lower 48
- Stable investment and political climate
- World-class businesses already investing
- Trained workforce
- Close proximity to markets; avoids strategic shipping choke points
- Cost competitive
- State regulatory approvals are in place to produce and transport gas
- Geo-strategic portfolio diversification



LNG tanker at the Kenai, Alaska LNG marine export terminal.  
Photo from ConocoPhillips, "The Kenai LNG Plant celebrates 40 years."

# COMPARATIVE ADVANTAGES *of* ALASKA LNG



# COMPARATIVE ADVANTAGES

- COST COMPETITIVE: WOOD MACKENZIE STUDY & BROOKINGS INSTITUTION POLICY BRIEF -

**Wood Mackenzie**, the global research and consulting firm, recently completed a study for the State of Alaska to evaluate the economic competitiveness of Alaskan LNG exports relative to other projects.

- From an economic perspective Alaskan LNG exports would be competitive and could generate between \$220 and \$419 billion
- Alaskan LNG exports have a delivered cost structure *below* \$10/MMBtu
- Most competing Australian projects and proposed North American LNG exports yet to secure Final Investment Decision are expected to deliver LNG to Asia at a cost of \$10-\$12/MMBtu under current gas price assumptions
- ***Taking all into account—basis, shipping, capital requirements—Alaska LNG export facilities can deliver LNG to Asia less expensively than the U.S. Lower 48 or Canada and competitively vis-à-vis traditional Australian LNG sources.***

*Alaskan LNG Exports Competitiveness Study, AGPA, Final Report, July 27, 2011”*

**Brookings Institution**, the public policy organization, recently published a policy brief that discussed the strong competitive position of a potential, large-scale Alaska LNG to Asia project.

- Alaskan exports may prove to be a source of strong competition at the margin for U.S. LNG in the Pacific Basin. An Alaska project may be one of the least costly alternatives for delivering LNG to Japan in 2020

Brookings Institution Policy Brief,  
*“Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas,”* May 2012

# COMMERCIALIZING NS GAS

## - SIGNIFICANT PROGRESS -

### **The State of Alaska has made significant progress on commercializing North Slope gas**

- Much of the upstream infrastructure is in place
- There is a renewed focus from key stakeholders on monetizing the massive reserves of North Slope gas
- Hundreds of millions of dollars have been spent on critical engineering and environmental regulatory and commercial work required for a gas project



# COMMERCIALIZING NS GAS

## - SIGNIFICANT PROGRESS -

### Two critical recent developments:

#### 1. Resolution of Point Thomson litigation

- Pt. Thomson holds 25% of known gas reserves on the Alaska North Slope
- Cloud of litigation has been removed, which will allow for development to begin
- Development at Pt. Thomson will jump start gas commercialization efforts

#### 2. Producer alignment on an Alaska pipeline to tidewater

- ExxonMobil, ConocoPhillips, BP, and TransCanada are now formally aligned and are undertaking work together on the commercialization of North Slope gas with a specific focus on a large scale LNG project from southcentral Alaska
- Until just recently, these three companies pursued different directions on Alaska's gas
- The parties have signed formalized agreements to work together on evaluating the feasibility of LNG from southcentral Alaska

#### **WSJ: Alaska, Gas Firms Clear Way For Pipeline**

Point Thomson settlement "...paves the way for a pipeline project to ship natural gas from the North Slope, unleashing the state's massive gas reserves." - WSJ, 3/30/12

#### **FT: Oil Groups Agree on \$40bn Alaska Gas Project**

*"ExxonMobil, BP and ConocoPhillips have reached agreement with the state of Alaska to take a significant step forward on a \$40bn-plus project to export liquefied natural gas to Asia, resolving a long-running lease dispute that had been holding up progress.*

*In a joint letter, the chief executives of the three companies said they were "aligned" on a plan to develop the huge gas reserves of Alaska's North Slope, which until now have been stranded without a route to market." - Financial Times, 3/30/12*

# COMMERCIALIZING NS GAS

## - SIGNIFICANT PROGRESS -

ExxonMobil

ConocoPhillips



March 30, 2012

Governor Sean Parnell  
550 West 7<sup>th</sup> Avenue, Suite 1700  
Anchorage, Alaska 99501

Dear Governor Parnell,

Our three corporations, collectively and individually, value our relationship with Alaska and believe that its citizens across the state, as well as our shareholders around the world, share a common interest in responsible resource development. We write today to inform you of our progress in working together on the next generation of North Slope resource development.

Alaska's vast North Slope holds over 35 trillion cubic feet of discovered natural gas. To date, this gas has been used to enhance North Slope oil production, adding several billion barrels to Prudhoe and Kuparuk recoveries. However, under the right business climate, the full commercial potential of this world-class resource can be unlocked. North Slope gas commercialization will bring new job opportunities, increased state revenues, reliable in-state energy supplies and new exploration opportunities, which will be key toward reaching your goal of 1 million barrels of oil per day through the Trans-Alaska Pipeline System.

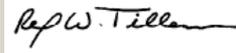
Serious discussions between our companies have taken place along with the Alaska Pipeline Project (APP) parties who are supporting the AGIA License. We have aligned on a structured, stewardable and transparent approach with the aim to commercialize North Slope natural gas resources within an AGIA framework. As a result of the rapidly evolving global market, large-scale liquefied natural gas (LNG) exports from south-central Alaska will be assessed as an alternative to gas line exports through Alberta. In addition to broadening market access, a south-central Alaska LNG approach could more closely align with in-state energy demand and needs. We are now working together on the gas commercialization project concept selection, which would include an associated timeline and an assessment of major project components including in-state pipeline routes and capacities, global LNG trends, and LNG tidewater site locations, among others.

Commercializing Alaska natural gas resources will not be easy. There are several issues that must be resolved, and we cannot do it alone. Unprecedented capital for gas development will require competitive and stable financing for Alaska first be established. Appropriately structured, stable fiscal policies will create new opportunities around the world, and will play a pivotal role in making Alaska competitive in the global market and unlocking the economic potential of North Slope resources.

Point Thomson is an excellent example of a challenged, world-class resource. With approximately 25% of known North Slope natural gas, Point Thomson development is an important element in consideration of North Slope gas commercialization. However, economic models must span decades into an uncertain future to estimate economic returns. Your Administration has taken the lead in forging a Point Thomson settlement that will bring long-term resources, revenues and jobs to help Alaska's economy. With settlement now finalized, our companies are moving forward, as participating co-venturers, with the initial development phase at Point Thomson with confidence that North Slope gas development will ultimately bring the Point Thomson resource to market.

We agree the next generation of North Slope resource development is achievable, working together with the APP parties, as well as with the State of Alaska. Thank you for your leadership and your confidence in us to take on these challenges. We join you in a vision of prosperity and promise. There is much work to do and opportunities yet to discover.

Sincerely,

  
Rex Tillerson

  
Jim Mulva

  
Bob Dudley

Serious discussions between our companies have taken place over the past several months, along with the Alaska Pipeline Project (APP) parties who are supporting the AGIA License. We have aligned on a structured, stewardable and transparent approach with the aim to commercialize North Slope natural gas resources within an AGIA framework. As a result of the rapidly evolving global market, large-scale liquefied natural gas (LNG) exports from south-central Alaska will be assessed as an alternative to gas line exports through Alberta. In addition to broadening market access, a south-central Alaska LNG approach could more closely align with in-state energy demand and needs. We are now working together on the gas commercialization project concept selection, which would include an associated timeline and an assessment of major project components including in-state pipeline routes and capacities, global LNG trends, and LNG tidewater site locations, among others.

# SIGNIFICANT BENEFITS *to* U.S. & ALASKA

## To the United States

- Significant increase in jobs
- Reduce trade deficit
- Reduce Budget deficit
- Increased gas supply to U.S. military bases
- Potential increased gas supply to Hawaii
- Minimal environmental impact and footprint
- Increased oil and gas exploration
- Increased oil production through the Trans-Alaska Pipeline System
- Enhanced national security/foreign policy
- Deepen commercial and energy ties with key allies and economic partners

## To Alaskans

- In-state use of gas at low cost
- Increased in-state investment and jobs
- Relief for rural and urban communities—Alaskans pay some of the highest prices in the nation, with costs in rural communities exponentially higher than those in city centers
- Increased energy support for Alaska military
- Diversification of Alaska economy

# PART VI

Fall 2012 North Slope  
Lease Sale

# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -



# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -

- Annual sale of oil and gas lease tracts in Beaufort Sea, North Slope, and North Slope Foothills will take place on **November 7, 2012** in Anchorage
- Encompasses 14.7 million acres (the size of Massachusetts, Vermont and Connecticut combined)
- Will include tracts adjacent to federal acreage, including lands nominated for inclusion in the NPR-A lease sale, which is also tentatively scheduled for late 2012
- Approximately 40 billion barrels of conventional oil and more than 200 trillion cubic feet of conventional natural gas remain untapped in the North Slope region
  - Region also estimated to contain tens of billions of barrels of unconventional oil and hundreds of trillions of cubic feet of unconventional gas

# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -

## Terms & Conditions

- Lease terms are designed to encourage financially sound, responsible operators to join in the accelerated development of the state's natural resources
- Rental schedule encourages timely production while reflecting reasonable and achievable timelines for development—discourages lessees from “warehousing” acreage
- **Annual lease rental** for tracts *adjacent to federal lands*: \$1.00/acre, rising by \$0.50 each year until the fifth year; set at \$3.00/acre for the fifth year and each year thereafter
- **Annual lease rental** for *all other tracts*; \$10.00/acre each year through year seven; set at \$250.00/acre in each years eight through ten. Rental rate will revert to \$10.00/acre beginning in the year sustained production commences on the lease

# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -

## Terms & Conditions, cont.

### • Lease Royalty Rates:

- **North Slope:** *NSA-North* is 16-2/3%; *NSA-South* is 12-1/2% (distinction captures the potentially greater value for leases that are nearer to existing infrastructure, as well as division's basic assessment of prospectivity)
- **Beaufort Sea:** 16-2/3%, except those leases adjacent to federal land in the OCS, NPR-A, or ANWR 1002 area, which will be offered at 12-1/2%
- **Foothills:** 12-1/2%

### • Primary Lease Term:

- **All areas:** 10-years (longest term allowed by statute—when combined with the proposed higher rental schedule, the primary term provides a realistic timeline for development while encouraging lessors to make expeditious decisions about their development plans)

### • Bid Variable and Minimum Bid:

- **North Slope:** \$25/acre minimum, except for tracts adjacent to NPR-A and ANWR, which is \$10/acre
- **Beaufort Sea:** \$25/acre minimum, except for tracts adjacent to OCS, NPR-A and ANWR, which is \$10/acre
- **Foothills:** \$10/acre

# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -

## North Slope

## Beaufort Sea

## Foothills

	NSA-North	NSA-South	State-ASRC	Adjacent to Federal Lands		BSA	State-ASRC	Adjacent to Federal Lands		FHA
<b>Rent:</b>					<b>Rent:</b>				<b>Rent:</b>	
\$1-\$3 per acre				X	\$1-\$3 per acre			X	\$1-\$3 per acre	X
\$10; \$250 per acre	X	X	X		\$10; \$250 per acre	X	X		\$10; \$250 per acre	
<b>Royalty Rate:</b>					<b>Royalty Rate:</b>				<b>Royalty Rate:</b>	
12-1/2%		X		X	12-1/2%			X	12-1/2%	X
16-2/3%	X		X		16-2/3%	X	X		16-2/3%	

# NORTH SLOPE, BEAUFORT SEA, & NORTH SLOPE FOOTHILLS

- FALL 2012 LEASE SALE -

## North Slope

### Primary Lease Term

10 years	X	X	X	X
----------	---	---	---	---

### Minimum Bid

\$10 per acre				X
---------------	--	--	--	---

\$25 per acre	X	X	X	
---------------	---	---	---	--

### Tract Size:

3 X 3 mi		X		X
----------	--	---	--	---

3 X 3 mi / 4	X		n.a.	
--------------	---	--	------	--

## Beaufort Sea

### Primary Lease Term

10 years	X	X	X	
----------	---	---	---	--

### Minimum Bid

\$10 per acre			X	
---------------	--	--	---	--

\$25 per acre	X	X		
---------------	---	---	--	--

## Foothills

### Primary Lease Term

10 years	X
----------	---

### Minimum Bid

\$10 per acre	X
---------------	---

\$25 per acre	
---------------	--

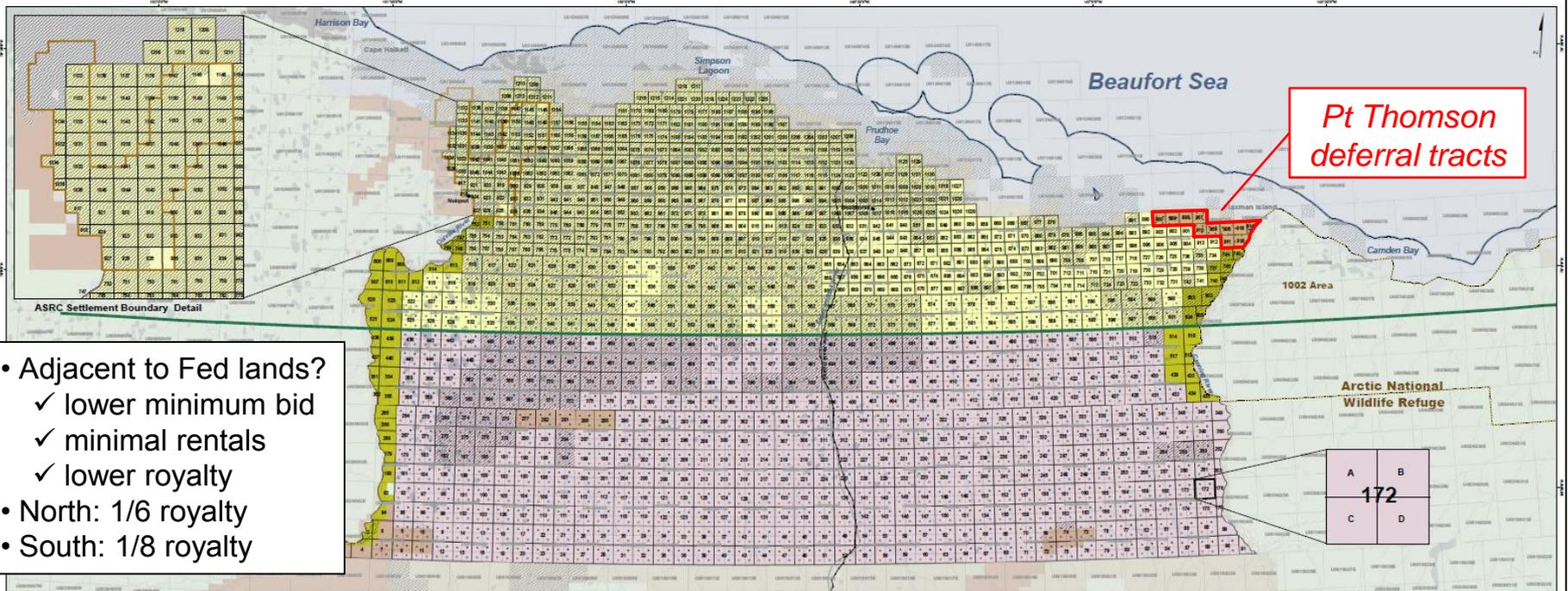
# NORTH SLOPE AREAWIDE

## - FALL 2011 STATUS – NEXT SALE NOVEMBER 2012 -

State of Alaska  
Department of Natural Resources  
Division of Oil and Gas

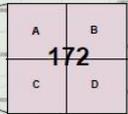
### Oil and Gas Lease Sale North Slope Areawide 2011 W Lease Sale

North Slope  
Regional Tract Map  
October 17, 2011



**Pt Thomson  
deferral tracts**

- Adjacent to Fed lands?
  - ✓ lower minimum bid
  - ✓ minimal rentals
  - ✓ lower royalty
- North: 1/6 royalty
- South: 1/8 royalty



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\*Bidders are solely responsible for determining the availability of acreage prior to submitting a bid.



- Leased Tracts
- NS-North (Available)
- Adjacent to Federal Lands (Available)
- NS-South (Available)
- Deferred Tracts
- Federal Land
- Native Land
- ASRC Settlement Boundary
- ANWR 1002 Area
- Alaska Seaward Boundary
- Royalty Boundary

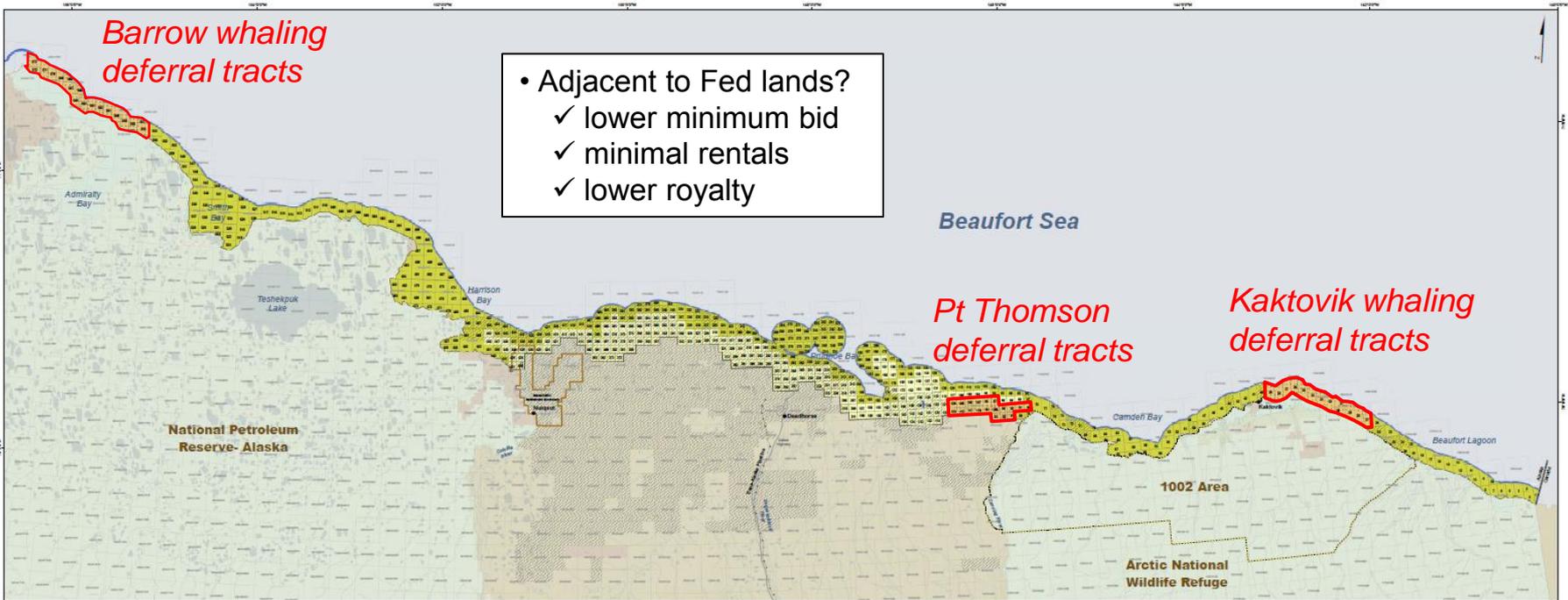
# BEAUFORT SEA AREAWIDE

- FALL 2011 STATUS – NEXT SALE NOVEMBER 2012 -

State of Alaska  
Department of Natural Resources  
Division of Oil and Gas

## Oil and Gas Lease Sale Beaufort Sea Areawide 2011 W Lease Sale

Beaufort Sea  
Regional Tract Map  
October 17, 2011



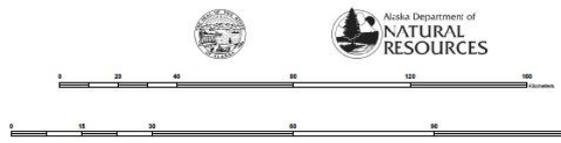
- Adjacent to Fed lands?
  - ✓ lower minimum bid
  - ✓ minimal rentals
  - ✓ lower royalty

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\*Bidders are solely responsible for determining the availability of acreage prior to submitting a bid.



- Leased Tracts
- Available Tracts
- Adjacent to Federal Lands (Available)
- Deferred Tracts
- Federal Land
- Native Land
- ASRC Settlement Boundary
- ANWR 1002 Area
- Alaska Seaward Boundary

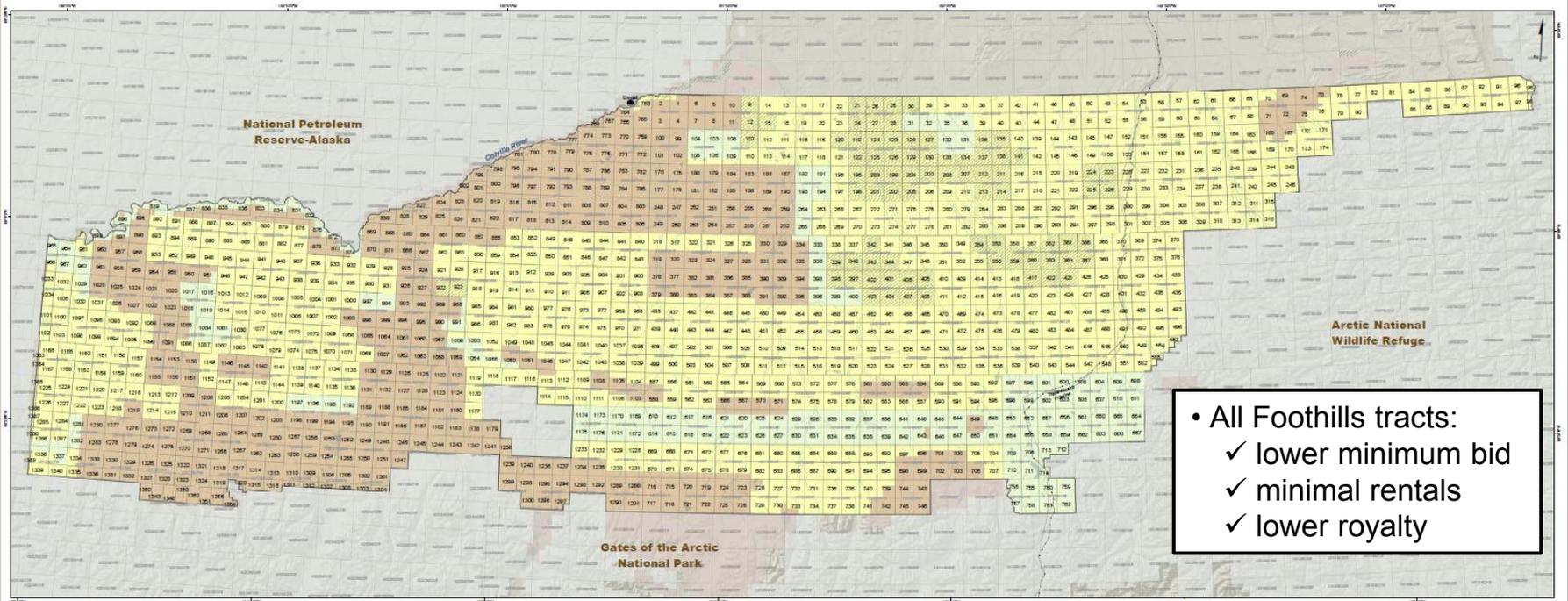
# NORTH SLOPE FOOTHILLS

## - FALL 2011 STATUS – NEXT SALE NOVEMBER 2012 -

State of Alaska  
Department of Natural Resources  
Division of Oil and Gas

### Oil and Gas Lease Sale North Slope Foothills Areawide 2011 Lease Sale

North Slope Foothills  
Regional Tract Map



- All Foothills tracts:
  - ✓ lower minimum bid
  - ✓ minimal rentals
  - ✓ lower royalty

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The State of Alaska makes no representation or warranty regarding the accuracy or completeness of the information contained herein. The State of Alaska is not liable for any damages, direct or indirect, resulting from the use of this information. Bidders are solely responsible for determining the availability of acreage prior to submitting a bid.



Bidders are solely responsible for determining the availability of acreage prior to submitting a bid.



**DATA SOURCES**

- Leased Tracts
- Available Tracts
- Federal Land
- Native Land

Seam map data, including hydrologic data, village and town locations, land status and ownership, etc. are from the State of Alaska, Division of Oil and Gas, and the Alaska Division of Oil and Gas. Data on the Alaska Division of Oil and Gas is derived from the Alaska Division of Oil and Gas. Data on the Alaska Division of Oil and Gas is derived from the Alaska Division of Oil and Gas. Data on the Alaska Division of Oil and Gas is derived from the Alaska Division of Oil and Gas.

Information on this map is derived only as a result of aerial and satellite imagery. For detailed information regarding any specific area, interested parties should consult the best records of use of land in the following agencies:

The State of Alaska, Division of Natural Resources  
The Alaska Bureau of Land Management  
The Alaska Division of Oil and Gas  
The Alaska Division of Wildlife Conservation  
The Alaska State Regional Corporation

Discrepancies in boundary alignments are the result of merging multiple data sets from a number of different sources.

# PART VII

## Responsible Resource Development

# RESPONSIBLE RESOURCE DEVELOPMENT - ROBUST ENVIRONMENTAL STANDARDS -

- Responsible resource development and protecting the environment go hand in hand
- ***We all must be leaders in this regard***
- In Alaska, our efforts to protect the environment and wildlife have been successful. For example:
  - When debating the development of the Trans-Alaska Pipeline System (TAPS), many predicted that oil and gas development would decimate caribou herds
  - These predictions have not come true
  - In fact, caribou have thrived over the past 35 years. The Central Arctic caribou herd, which occupies summer ranges surrounding Prudhoe Bay—the largest oil field in North America—has grown from 5,000 in 1975 to over 66,000 today

***Because of efforts taken by federal, state, and local governments and the energy industry, oil and gas development in Alaska is conducted in a safe and responsible manner with standards that exceed most other jurisdictions in the world.***



# RESPONSIBLE RESOURCE DEVELOPMENT

## - ROBUST ENVIRONMENTAL STANDARDS -



- Oil and gas development in Alaska is conducted in a safe and responsible manner with some of the most stringent standards in the world
  - “No impact exploration”
    - pipelines are built above ground, they are elevated so caribou can migrate
  - No operations can be conducted within one mile of polar bear dens
  - Alaska mandates that operators use the best available technology for oil discharge containment, storage, transfer, and cleanup
  - The state will not lease acreage in sensitive areas
  - The state encourages the unitization of leases
  - Nearly 50 years of operations in Cook Inlet have coexisted with world-class fisheries
  - Whenever possible, onshore pipelines are buried to minimize impacts on wildlife – if

# ROBUST ENVIRONMENTAL STANDARDS - ADVANCES IN EXPLORATION & DRILLING TECHNOLOGY -

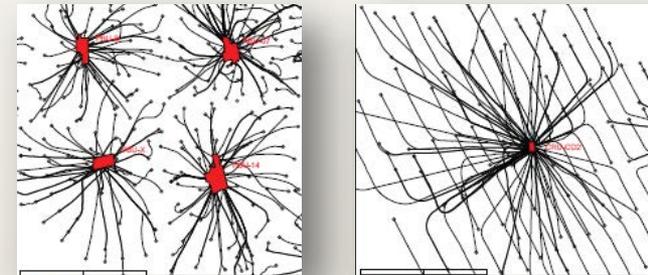
## Minimal Impact During Exploration

- Advances in technology allow for minimal impact during the exploration phase of development
- For instance, onshore exploration drilling occurs only in the winter
  - Heavy equipment is brought out to remote sites on ice roads and the drilling rigs are assembled on ice pads
  - When the ice melts, there is no trace left of the pad—the only visible sign of prior activity is an eight-by-eight foot well house that will remain on location because the well is part of a field under development and will one day produce oil
- In short, it is possible to explore for oil on the North Slope and leave no visible footprint



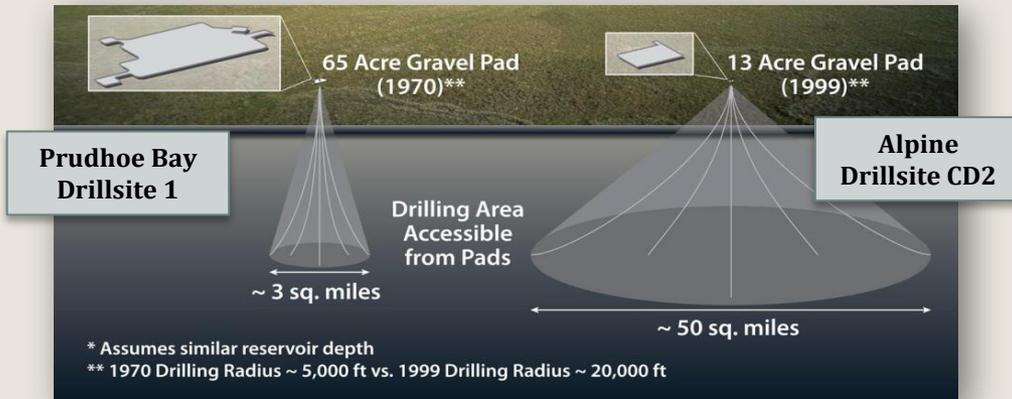
## Drilling Technology

- Horizontal and multi-lateral drilling technology represents a cost-effective method to develop remaining oil
- Extended-reach horizontal drilling means that today, the same level of production can be achieved with fewer wells
- This means that not only more complicated stratigraphic plays can be developed, but also any formations can be more efficiently drilled and produced with a smaller number of wells



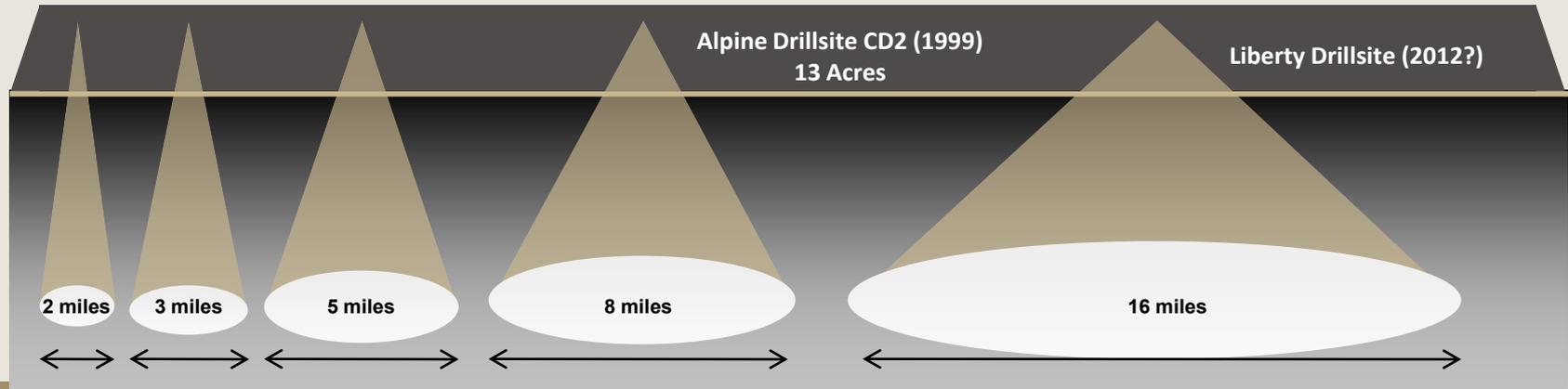
Figures show how one pad (right) can now service the same area underground as four larger pads could thirty years ago

# ROBUST ENVIRONMENTAL STANDARDS - ADVANCES IN EXPLORATION & DRILLING TECHNOLOGY -



- In 30 years, surface footprint requirements have been dramatically reduced. At the Alpine field, 54 wells have been drilled from one 13-acre pad
- Wells can also reach a much larger radius – from 3 sq. miles in 1970 to 50 sq. miles in 1999 and, perhaps, 100 sq. miles in 2012
- If a rig was set at the U.S. Capital Building, the wells could extend out to Andrews Air Force Base in the southeast, Silver Spring to the north, and well into Fairfax County to the west

Prudhoe Bay Drillsite 1 (1970)	Kuparuk Drillsite 2B (1980)	Kuparuk Drillsite 3H (1985)
65 Acres	24 Acres	11 Acres



# ALASKA'S ALL-INCLUSIVE ENERGY APPROACH

*The State of Alaska has set a goal to have 50% of the state's electrical power come from clean and renewable sources by 2025.*



## Alaska's Energy Efficiency Programs

- Since 2008, the State has appropriated more than \$460 million for home energy efficiency rebates
- The program has produced an average 33.3% improvement in home energy efficiency with over 21,500 Alaskans participating in the program
- The state also provides a \$7,500 rebate to homeowners who finance a new home that is rated 5 Star +
- The Alaska Legislature has mandated that 25% of the state's public buildings be energy retrofitted by 2020 and created \$250 million revolving loan fund to finance that work

## Alaska's Renewable Energy Fund

- The Alaska Legislature has created a renewable energy fund to help foster renewable energy projects throughout the state and appropriated over \$150 million for 133 renewable energy projects

## Renewable Energy Projects

- Today, hydropower provides 21% of statewide electrical power and the state is supporting a new hydro-electric project that will be able to provide for nearly 50% of power for the majority Alaska's population
- Wind turbines have been installed in communities throughout Alaska, decreasing reliance on diesel for energy; some of these projects have nearly displaced reliance on diesel fuel – Kodiak wind farm has displaced ~ 930,000 gallons of diesel per year
- Wood fired boilers have been installed in rural communities and significantly reduce diesel fuel consumption
- Anchorage groups are converting waste fry oil into fuels for heating and transportation; producing over 250,000 gallons annually

# CONCLUSION

- Alaska is still a world-class resource basin
- Interest in the Arctic is quickly growing. Alaska's Arctic—both onshore and offshore—is a premier place to gain experience
- State of Alaska has developed—and is implementing—comprehensive strategies to increase exploration and development, reform and modernize our permitting processes, and commercialize natural gas resources
- State of Alaska has excellent incentives across the board, particularly with regard to exploration, and is working to improve incentives for development and production
- There is a lot of positive activity in Alaska, but it only scratches the surface of our state's potential