

# COOK INLET

## ACTIVITIES & NATURAL GAS UPDATE

AIDEA Board of Directors

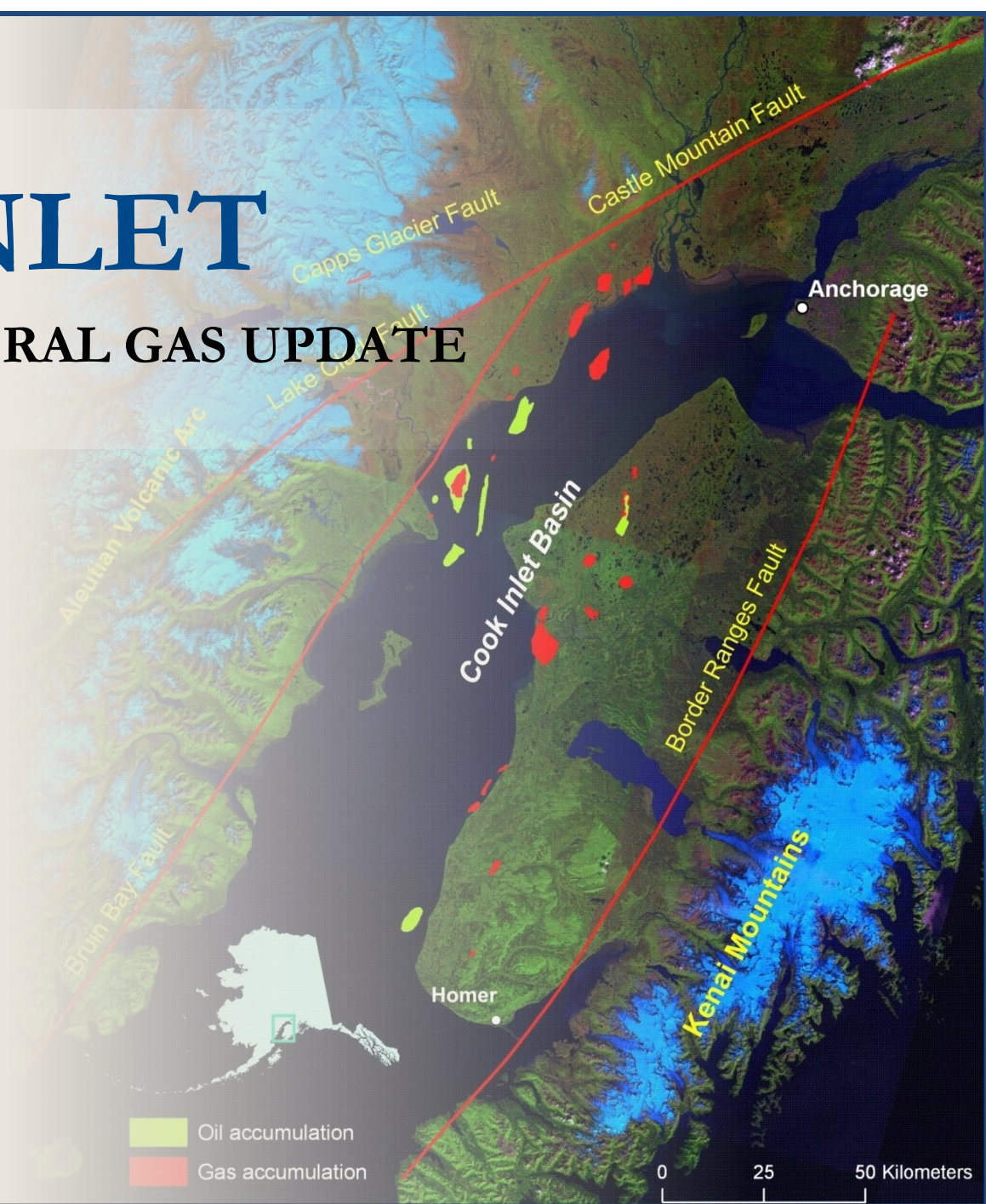
December 18, 2013

Anchorage, AK

Bob Swenson, Deputy Commissioner

*Alaska Department of Natural Resources*

*[www.dnr.alaska.gov](http://www.dnr.alaska.gov)*



# STATE OF ALASKA

## - OIL & GAS RESOURCES -



### GEOLOGIC BASINS AND ENERGY RESOURCES OF ALASKA

SPECIAL REPORT 66  
SWENSON AND OTHERS, 2012  
SHEET 3 OF 2  
REPORT ACCOMPANIES SHEET



**Geothermal Resources**

AA1	Little Belton	NC11	Pliginsk	SC11	Upper	SC11	White Sulphur
AA2	Nonsequoyia	NC12	Pliginsk Wells	SC12	Chukchiak	SC12	Noksa Bay
AA3	Rampart	NC13	Supai	SC13	M. M. Martin	SC13	Tranchar Lake
AA4	Arak	NC14	Lava Creek	SC14	M. M. Martin	SC14	North Ford Basin
AA5	Little Belton	NC15	Barabook Mountain	SC15	M. Griggs	SC15	Tranchar
AA6	Rampart	NC16	Barabook	SC16	Kanayok-Golden Lake	SC16	Tranchar Wells
AA7	Kilchof	NC17	Clear Creek	SC17	M. Trickett	SC17	Noksa
AA8	Miller River	NC18	Chukchi	SC18	Stoney Mt.	SC18	Fish Bay
AA9	Pagan	NC19	Barabook	SC19	Kulak	SC19	Goldard
AA10	Chignik	NC20	South	SC20	M. Douglas	SC20	Barabook
AA11	Rampart	NC21	Upper Division	SC21	Augustine	SC21	Isler Island
AA12	Geopline Right	NC22	Lower Division	SC22	Dunsmuir	SC22	Tara Lakes
AA13	Parson Cove	NC23	Barabook	SC23	Wakusa	SC23	M. Woods
AA14	Hot Springs Cove	NC24	Barabook Mountain	SC24	M. R. Sherer	SC24	Chief Basin
AA15	Okmok Caldera	NC25	Barabook	SC25	Willow Well	SC25	Barabook
AA16	Iditarod Valley	NC26	Barabook	SC26	Lower Okmok	SC26	Barabook-Central
AA17	Chukchi Valley	NC27	Barabook	SC27	Upper Okmok	SC27	Isler Bay
AA18	Iditarod Valley	NC28	Barabook	SC28	North-Central	SC28	Isler Island
AA19	Rampart Bay	NC29	Tranchar Lake	SC29	Tranchar	SC29	Upper Okmok
AA20	Rampart Bay Well	NC30	Tranchar-Mountain	SC30	North-Central	SC30	Isler Island
AA21	Iditarod	NC31	Barabook	SC31	Barabook	SC31	Barabook
AA22	Hot Springs Bay	NC32	Barabook	SC32	Barabook	SC32	Barabook
AA23	Alsea	NC33	Barabook	SC33	Barabook	SC33	Barabook
AA24	Iditarod	NC34	Barabook	SC34	Barabook	SC34	Barabook
AA25	Palau Pass	NC35	Barabook	SC35	Barabook	SC35	Barabook
AA26	Rampart	NC36	Barabook	SC36	Barabook	SC36	Barabook
AA27	Egg Island	NC37	Barabook	SC37	Barabook	SC37	Barabook
AA28	Gold Bay	NC38	Barabook	SC38	Barabook	SC38	Barabook
AA29	Iditarod Lake	NC39	Barabook	SC39	Barabook	SC39	Barabook
AA30	Higson	NC40	Barabook	SC40	Barabook	SC40	Barabook
AA31	Palau	NC41	Barabook	SC41	Barabook	SC41	Barabook
AA32	Palau	NC42	Barabook	SC42	Barabook	SC42	Barabook
AA33	Palau	NC43	Barabook	SC43	Barabook	SC43	Barabook
AA34	Palau	NC44	Barabook	SC44	Barabook	SC44	Barabook
AA35	Palau	NC45	Barabook	SC45	Barabook	SC45	Barabook
AA36	Palau	NC46	Barabook	SC46	Barabook	SC46	Barabook
AA37	Palau	NC47	Barabook	SC47	Barabook	SC47	Barabook
AA38	Palau	NC48	Barabook	SC48	Barabook	SC48	Barabook
AA39	Palau	NC49	Barabook	SC49	Barabook	SC49	Barabook
AA40	Palau	NC50	Barabook	SC50	Barabook	SC50	Barabook

**Major Faults**

- Thrust Fault: Network on upper tectonic highest plate
- Identify and extension vertical, location inferred
- Strike-Slip Fault, Right-Lateral Offset: Assess shear rotation sense
- Identify and extension vertical, location inferred
- Identify and extension vertical, location approximately
- Identify and extension vertical, location inferred

**Geothermal Resources**

- Thermal Springs: Surface temperature unknown, Surface temperature 50°C or lower, Surface temperature higher than 50°C, Surface temperature higher than 80°C
- Thermal Wells: Surface temperature 50°C or lower, Surface temperature higher than 50°C
- Heat Flow: Geothermal gradient and heat flow of local flow values in individual wells, Geothermal gradient and heat flow of individual wells

**Sedimentary Basins** (contoured on thicker portions of basins)

- Outermost Tertiary Sediment
- Older Tertiary Sediment
- Majorly Folded Sedimentary Basins of Mostly Mesozoic Age
- Basogen Gravity: In multiple basins in direction of lowest gravity values interpreted as equivalent to oceanic basins 100 to 150 km long
- Sedimentary Basin Trough: Contour by isobars, All contours in map except for basin basins in North Star that are Mesozoic and younger
- Edge of Measured Area

**Other Symbols**

- Population Flow
- Exploration Well
- Major Road
- Trans-Alaska Pipeline System
- ASA Energy Region
- Sea Field
- Oil Field
- Coal Field or Precursor

State of Alaska  
Division of Geological & Geophysical Surveys

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**EXPLORATION WELLS**  
Alaska Oil and Gas Conservation Commission, 2011. Public Database. <http://www.dgggs.state.ak.us/OGC/PDF/OGCData>

**U.S. BUREAU OF OCEAN ENERGY MANAGEMENT, ALASKA REGION, REGULATORY AND ENFORCEMENT, 2011. OFFSHORE OIL AND GAS OPERATIONS.**  
<http://www.dgggs.state.ak.us/OGC/PDF/OGCData>

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Macko, R.E., Morrison, M.A., and Lee, S.A., 1983. Geothermal resources of Alaska. Alaska Division of Geological & Geophysical Surveys Miscellaneous Publication 83-1, Alaska, vol. 1, 266 pp.

**POPULATED PLACES**  
U.S. Dept. of Commerce, Bureau of Economic Analysis, 2012. Domestic and Foreign Statistical Data. <http://www.bea.gov/data>

**MAJOR FAULTS**  
Hansen, P.J., and Ballou, R.W., 2011. Location and extent of Tertiary structures in Cook Inlet Basin, Alaska, and possible extension of major faults. Bulletin of the Geological Society of America, v. 123, p. 107-120.

**MAJOR FAULTS**  
Kuchler, R.D., Ferry, R.E., Turner, P., and Gashler, R., in press. Digital geology of the Alaska Tertiary Faults and Fold Basins. Alaska Division of Geological & Geophysical Surveys, Miscellaneous Publication 11-1.

**TRANS-ALASKA PIPELINE SYSTEM**  
Trans-Alaska Pipeline System, 2006. Map showing and interpreting the location, route, and construction of the Trans-Alaska Pipeline System. Alaska Division of Geological & Geophysical Surveys Miscellaneous Publication 06-1, Alaska, vol. 1, 148 pp.

**COAL FIELD OR PROVINCE**  
Harris, R.J., and Hawley, C.C., 1996. Map of Alaska's coal resources. Alaska Division of Geological & Geophysical Surveys Special Report 66, 148 pp.

**OIL & GAS FIELDS**  
Trennert, George R., and Sander, Richard G., 2004. Map showing net reservoir properties, surface thermal profile, and locations of production in the Central Alaska Basin. Miscellaneous Publication, 04-1, Alaska, vol. 1, 148 pp.

**U.S. ENERGY INFORMATION ADMINISTRATION, 2011. MAPS: Exploration, Recovery, Production and Consumption.**  
<http://www.eia.doe.gov>

**SEDIMENTARY BASINS**  
Svenson, Andrew M., and Sander, Richard G., 2004. Map showing net reservoir properties, surface thermal profile, and locations of production in the Cook Inlet Basin, Alaska, and possible extension of major faults. Bulletin of the Geological Society of America, v. 116, p. 107-120.



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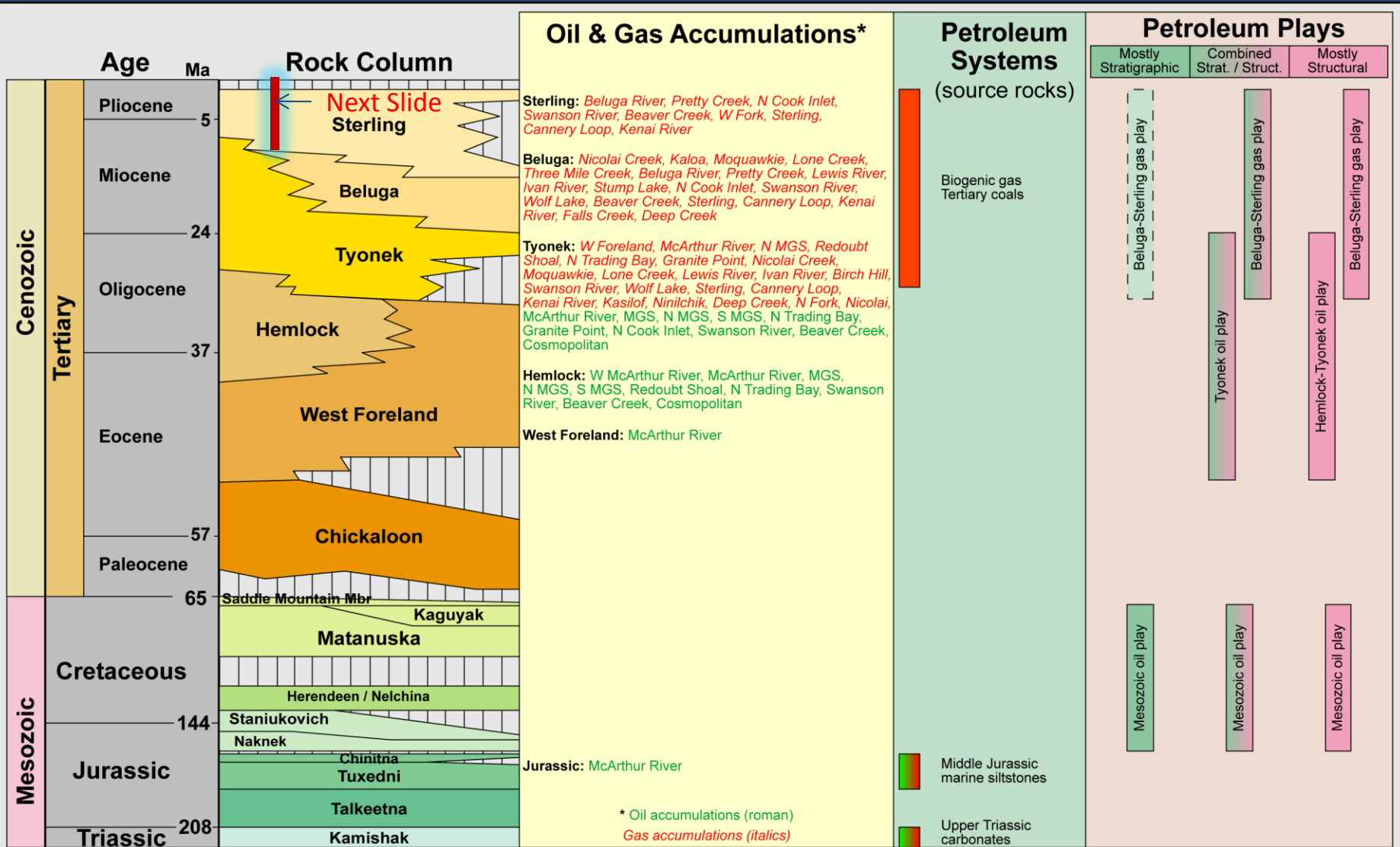
# STATE OF ALASKA

## - RESERVES & RESOURCES -

- **Petroleum Systems – necessary components**
  - *High organic source rock & maturity*
  - *Migration pathway*
  - *Reservoir quality rock – sandstones, porosity, permeability*
  - *Sealing Rock (or ‘cap rock’)*
  - *Trap*
- **Conventional vs. Unconventional Accumulations**
- **Reserves vs. Resources**

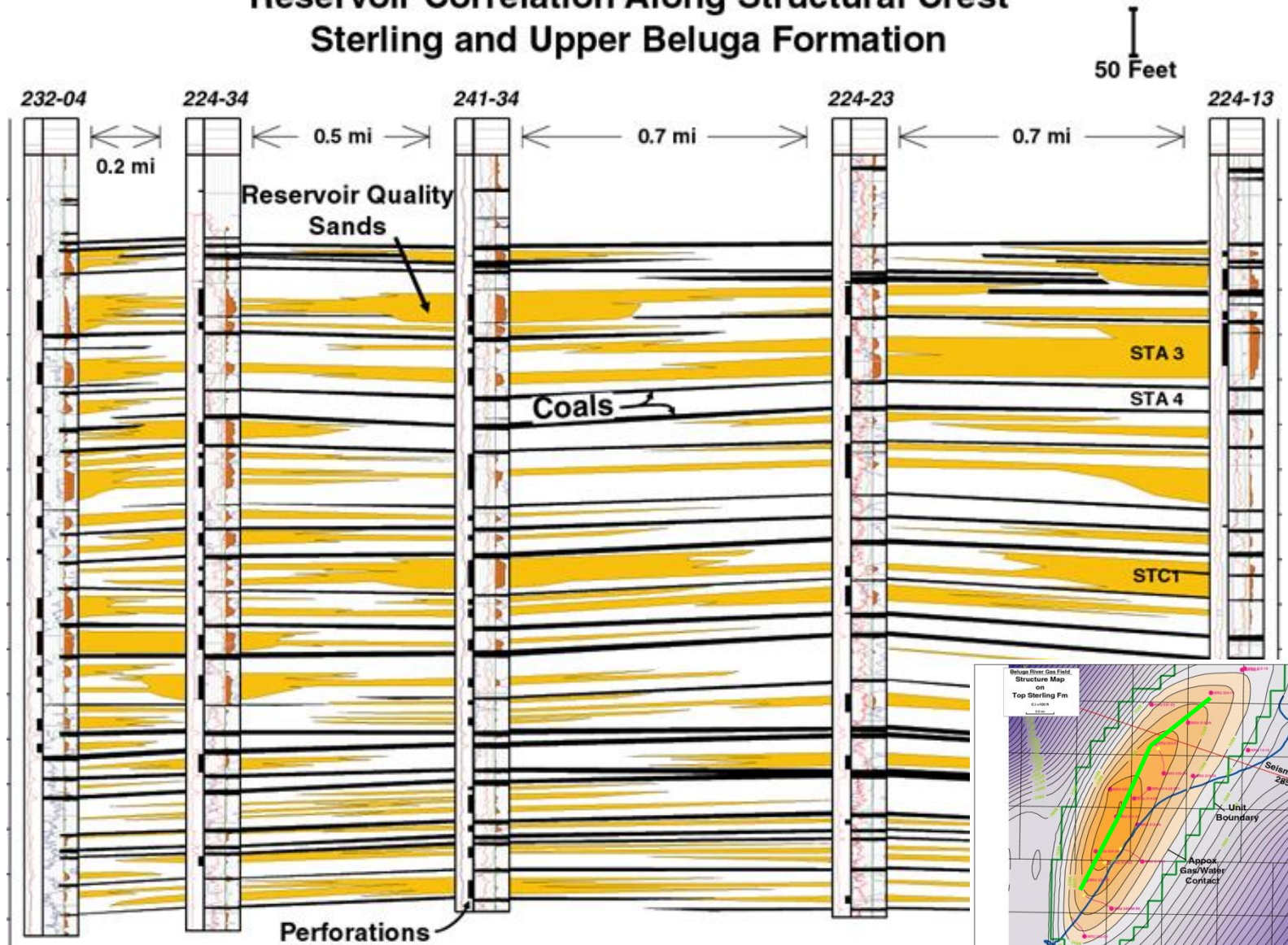
# COOK INLET

## - PETROLEUM SYSTEMS -



# Sand Distribution in a Fluvial System

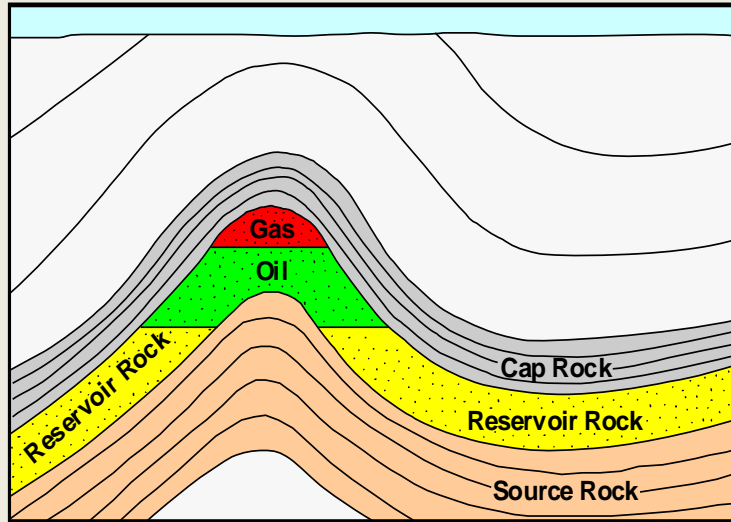
## Beluga River Gas Field Reservoir Correlation Along Structural Crest Sterling and Upper Beluga Formation



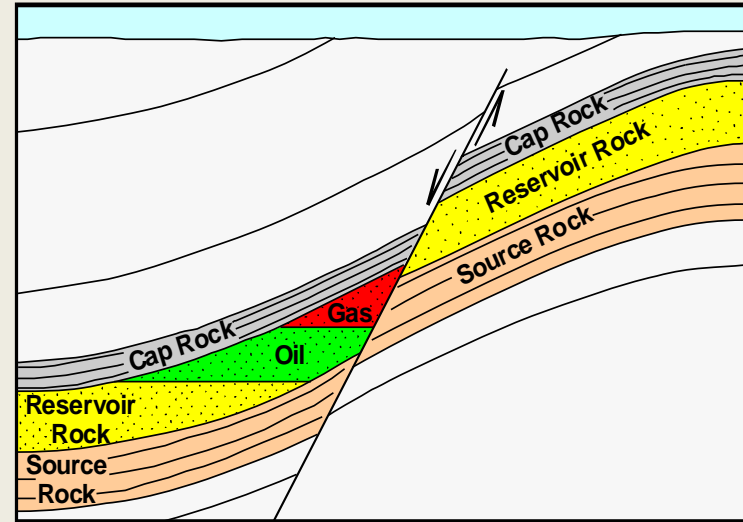
# COOK INLET

## - NEW GAS FROM NEW EXPLORATION TYPES: OIL & GAS TRAPPING MECHANISMS -

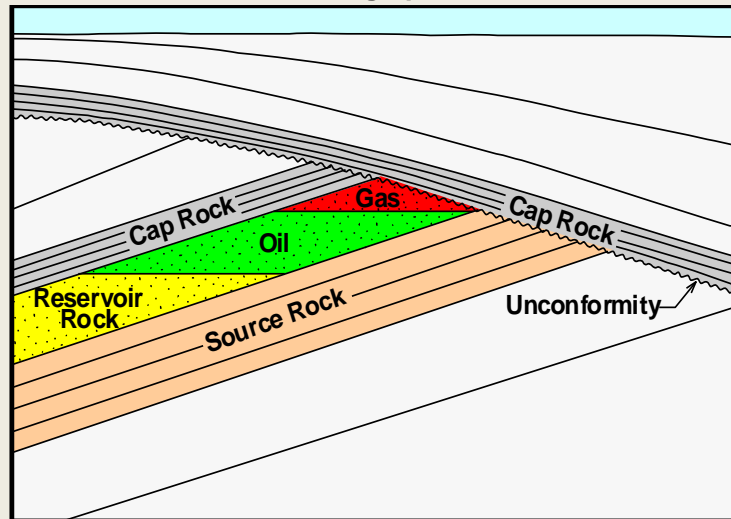
Anticline



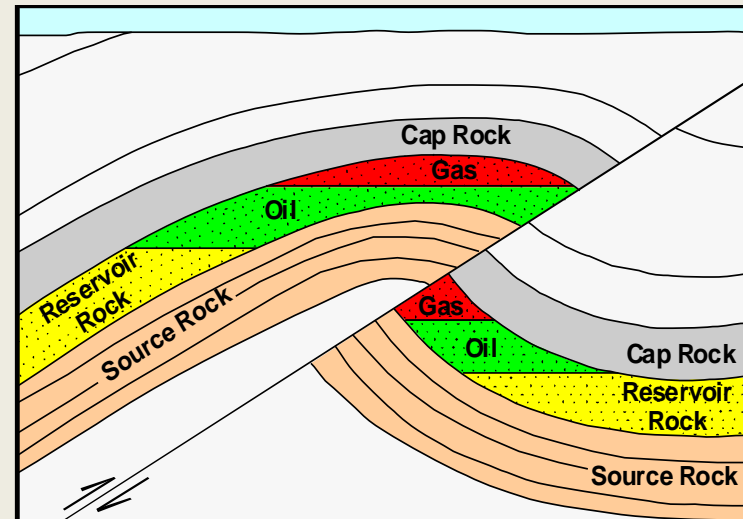
Normal Fault



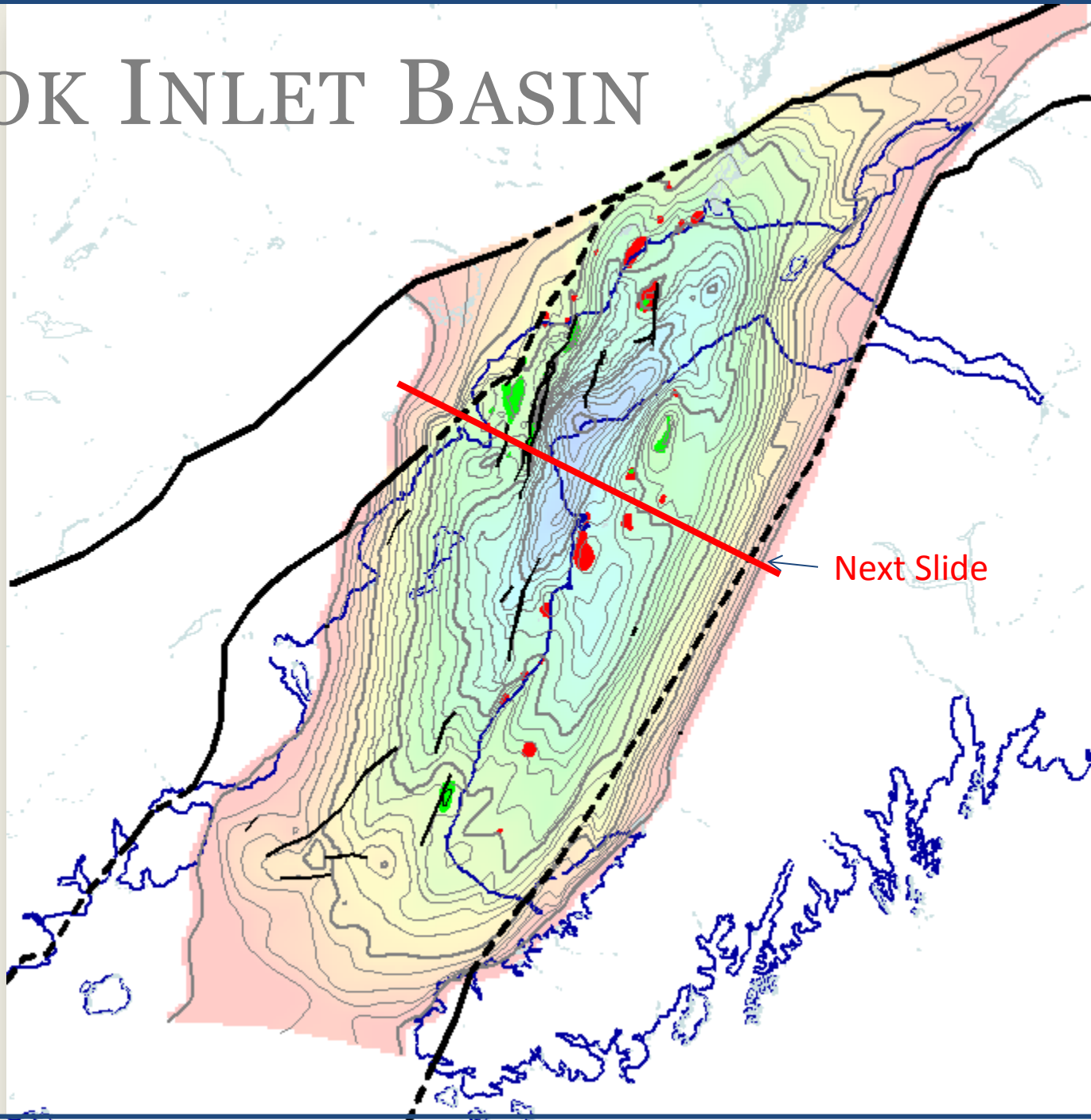
Stratigraphic



Thrust Fault



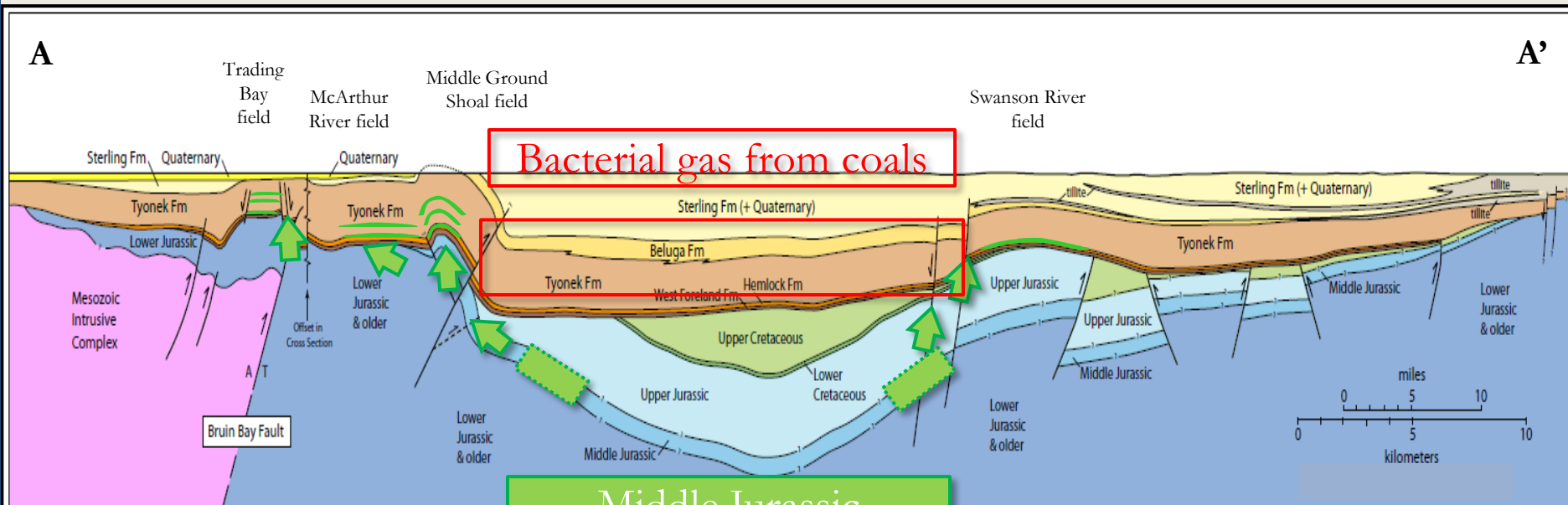
# COOK INLET BASIN



# 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

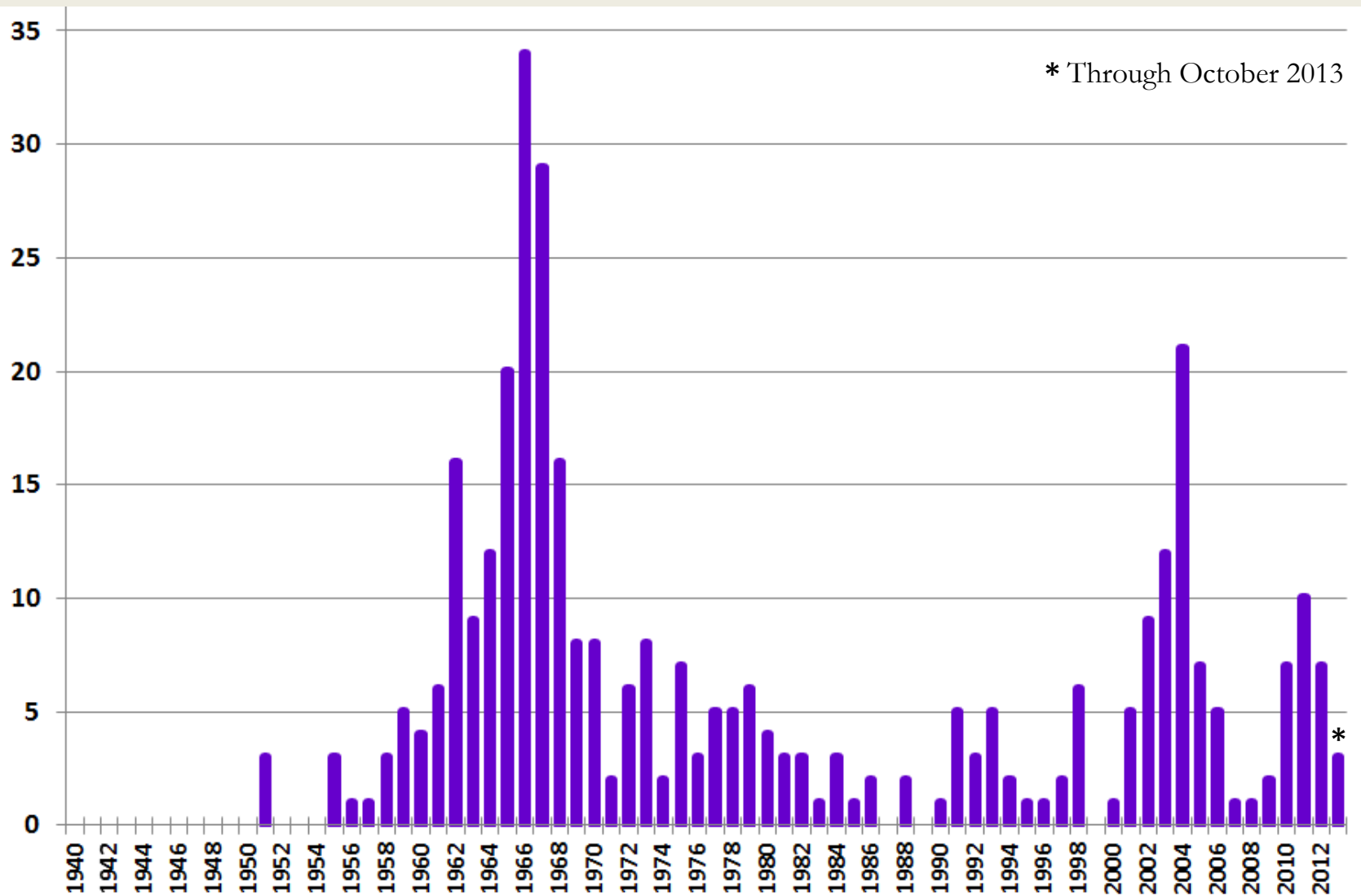
## - GAS EXPLORATION STATISTICS -

- 85% of gas discovered early in exploration cycle while drilling for oil
- Only structural traps had been explored for or developed – stratigraphic trap potential essentially untapped
- Nearly one in ten fields >2 tcf
- 4 largest fields have 86% of reserves
- Field-size distribution lacks discoveries in 300-1300 bcf range → yet to be discovered?



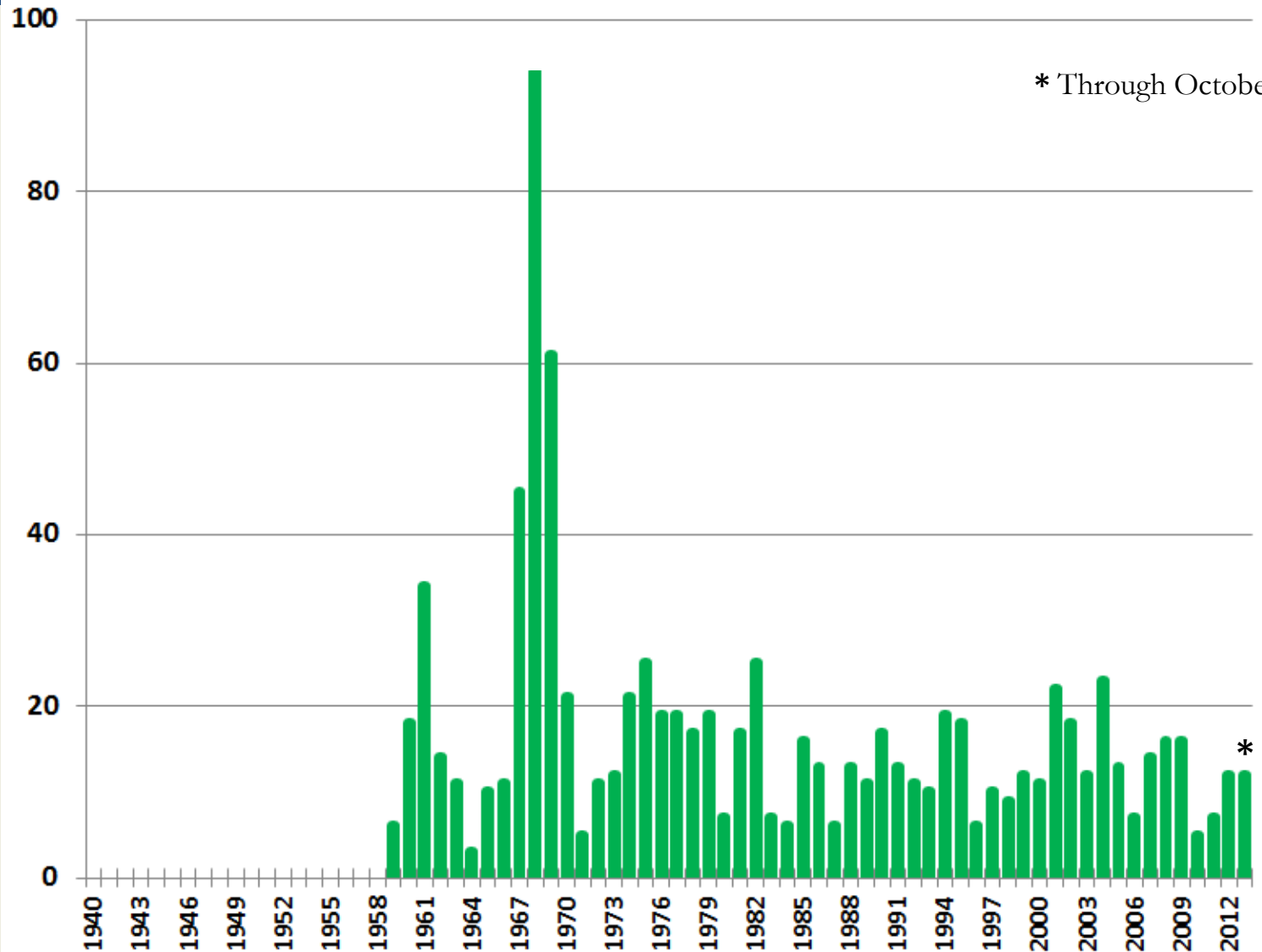
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- EXPLORATION WELLS PER YEAR (EXCLUDING OCS) -



# COOK INLET

- DEVELOPMENT WELLS PER YEAR (EXCLUDING OCS) -

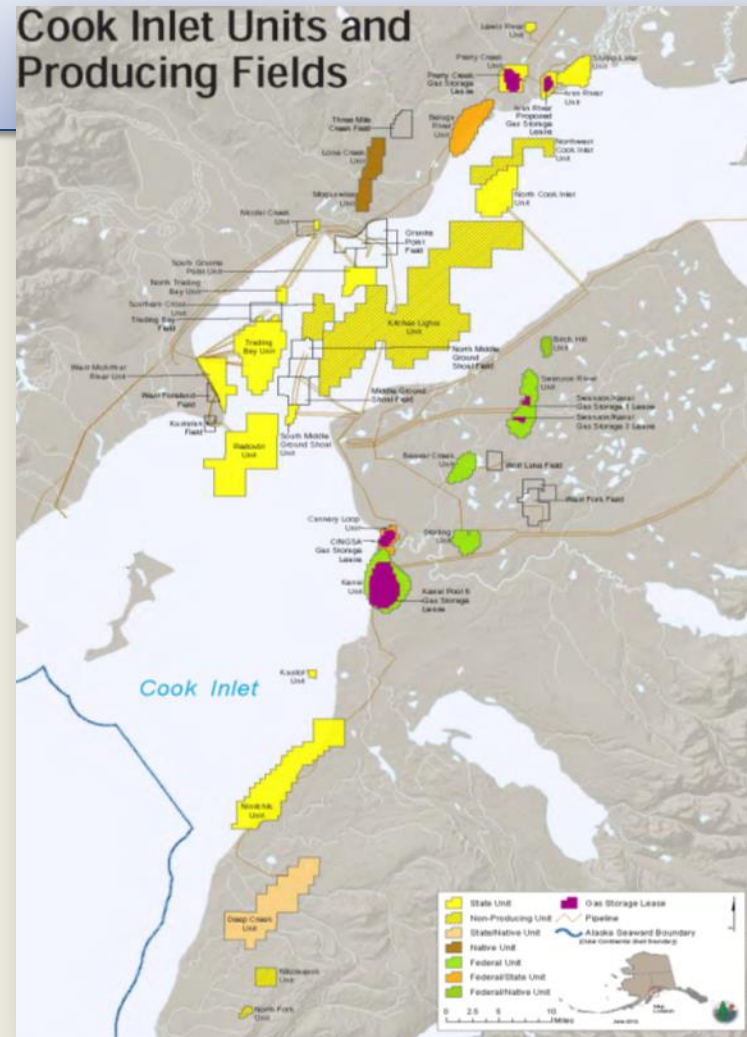


# COOK INLET

## - DNR, DIVISION OF OIL & GAS -

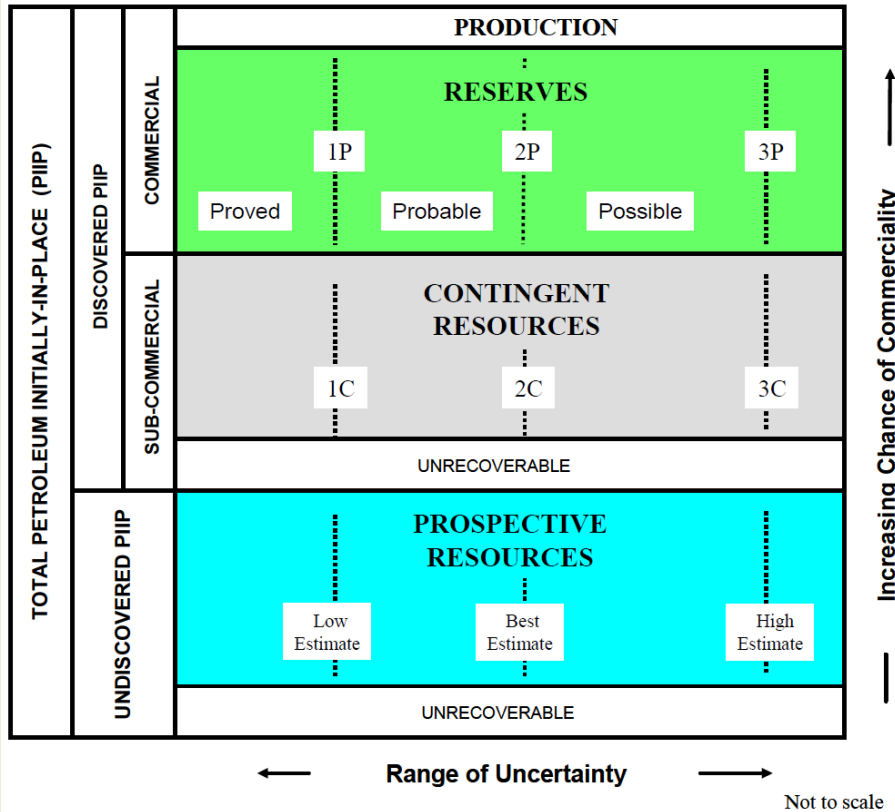
### Cook Inlet Gas Estimates, DOG, December 2012

- ~ **1.1 TCF** estimated remaining producible reserves in 28 fields
- ~ **355 BCF** in undeveloped gas resources in 3 primary fields
  - Beluga River Unit (BRU) (233 BCF)
  - Trading Bay Unit (TBU) Grayling Gas Sands (72 BCF)
  - North Cook Inlet Unit (NCIU) (50 BCF)
- Recent drilling has proven new reserves in existing fields
- Current production from these wells: 1.0-7.0 MMCF/D

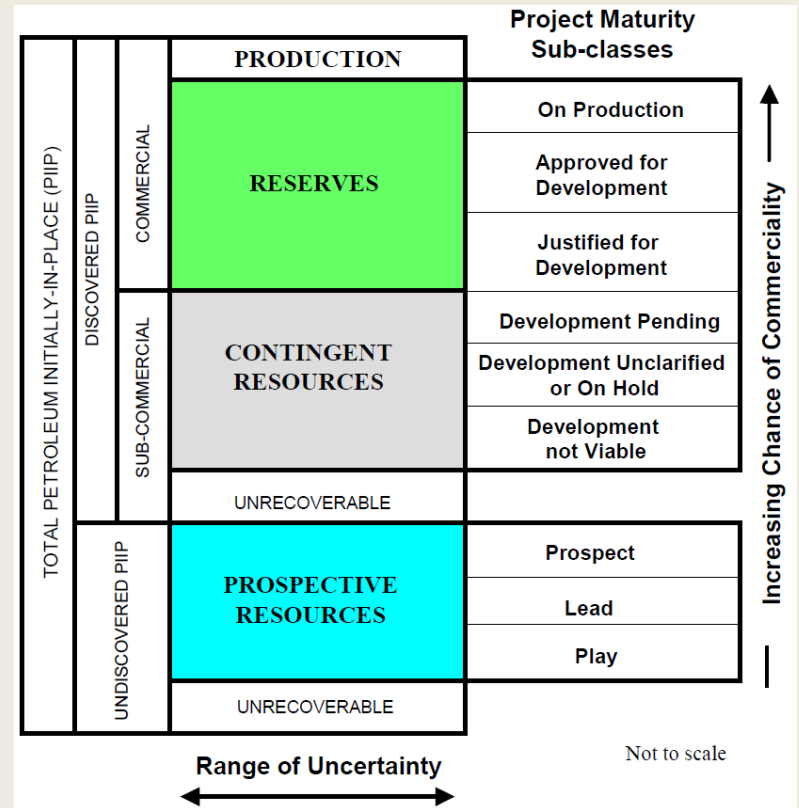


# COOK INLET

## - PETROLEUM RESERVES & RESOURCE DEFINITIONS -



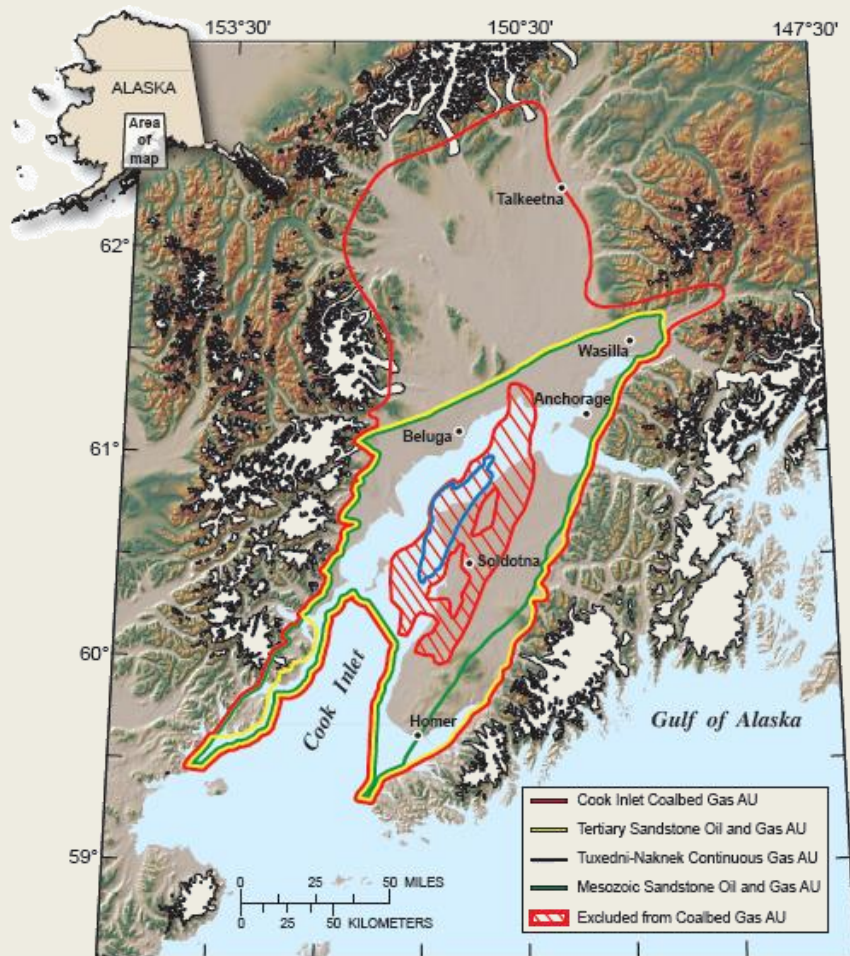
Resources Classification Framework



Subclasses Based on Project Maturity

# COOK INLET 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

# COOK INLET RESOURCE POTENTIAL

- USGS RESOURCE ASSESSMENT, 2011 -

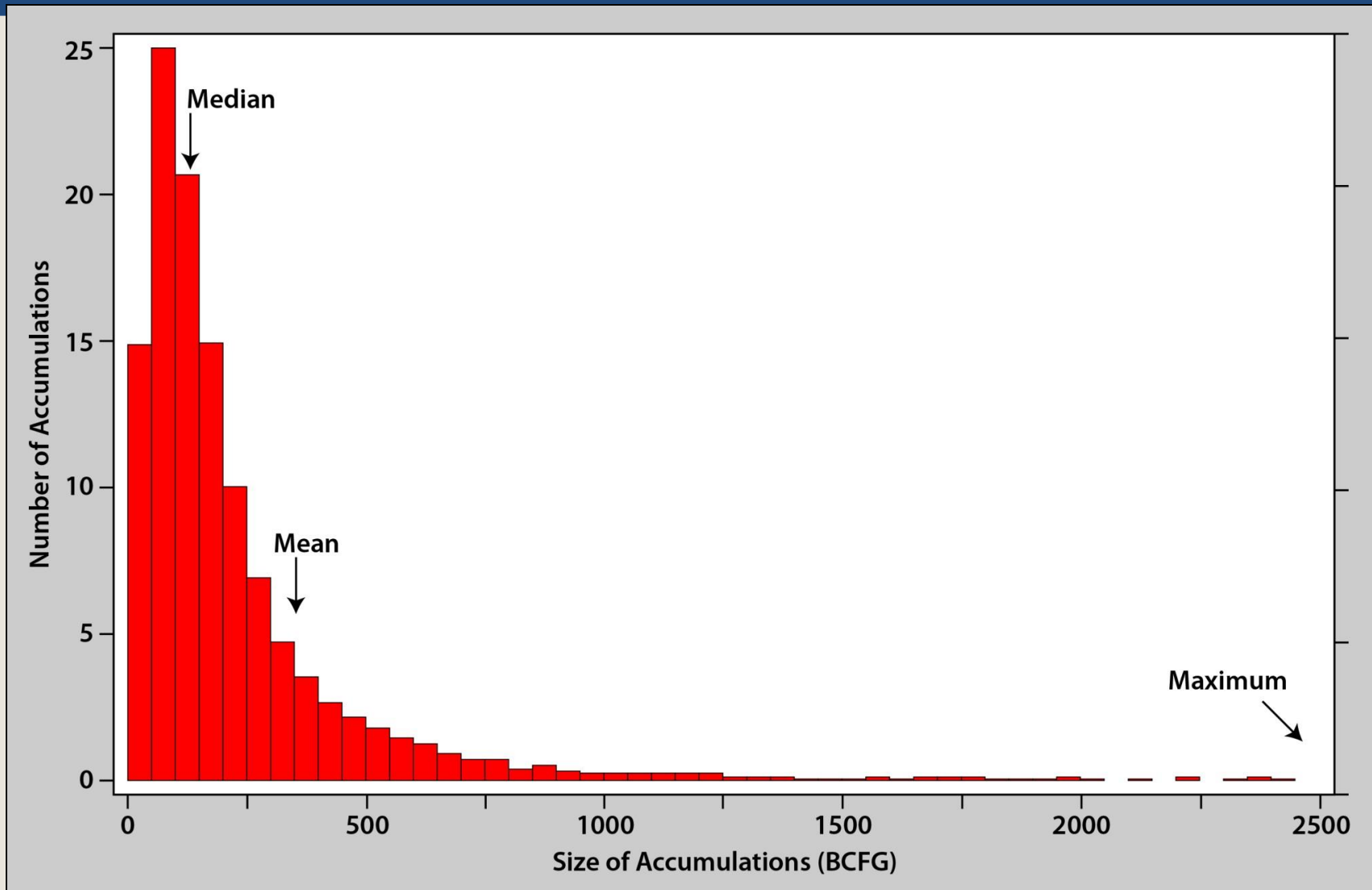
## Cook Inlet assessment results.

[MMBO, million barrels of oil. BCFG, billion cubic feet of gas. MMBNGL, million barrels of natural gas liquids. Results shown are fully risked estimates. For gas accumulations, all liquids are included as NGL (natural gas liquids). Undiscovered gas resources are the sum of nonassociated and associated gas. F95 represents a 95 percent chance of at least the amount tabulated; other fractiles are defined similarly. Largest expected oil field in MMBO; largest expected gas field in BCFG. TPS, total petroleum system; AU, assessment unit. Gray shading indicates not applicable]

Total Petroleum Systems (TPS) and Assessment Units (AU)	Field type	Largest expected mean field size	Total undiscovered resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
<b>Cook Inlet Composite Total Petroleum System</b>														
Tertiary Sandstone Oil and Gas AU	Oil	111	68	322	844	372	32	156	443	186	0	2	5	2
	Gas	2,002					2,836	11,004	24,422	11,992	1	14	60	20
Mesozoic Sandstone Oil and Gas AU	Oil	65	40	197	515	227	19	96	269	114	0	1	3	1
	Gas	426					251	1,241	3,280	1,434	2	12	34	14
<b>Total Conventional Resources</b>			<b>108</b>	<b>519</b>	<b>1,359</b>	<b>599</b>	<b>3,138</b>	<b>12,497</b>	<b>28,414</b>	<b>13,726</b>	<b>3</b>	<b>29</b>	<b>102</b>	<b>37</b>
<b>Continuous Oil and Gas Resources</b>														
<b>Tuxedni-Naknek Continuous Gas Total Petroleum System</b>														
Tuxedni-Naknek Continuous Gas AU	Gas						257	568	1,254	637	3	8	19	9
<b>Cook Inlet Coalbed Gas Total Petroleum System</b>														
Cook Inlet Coalbed Gas AU	Gas						1,581	3,989	10,069	4,674	0	0	0	0
<b>Total Continuous Resources</b>							<b>1,838</b>	<b>4,557</b>	<b>11,323</b>	<b>5,311</b>	<b>3</b>	<b>8</b>	<b>19</b>	<b>9</b>
<b>Total Undiscovered Oil and Gas Resources</b>			<b>108</b>	<b>519</b>	<b>1,359</b>	<b>599</b>	<b>4,976</b>	<b>17,054</b>	<b>39,737</b>	<b>19,037</b>	<b>6</b>	<b>37</b>	<b>121</b>	<b>46</b>

# COOK INLET RESOURCE POTENTIAL

- LOG NORMAL DISTRIBUTION OF GAS ACCUMULATION SIZE -

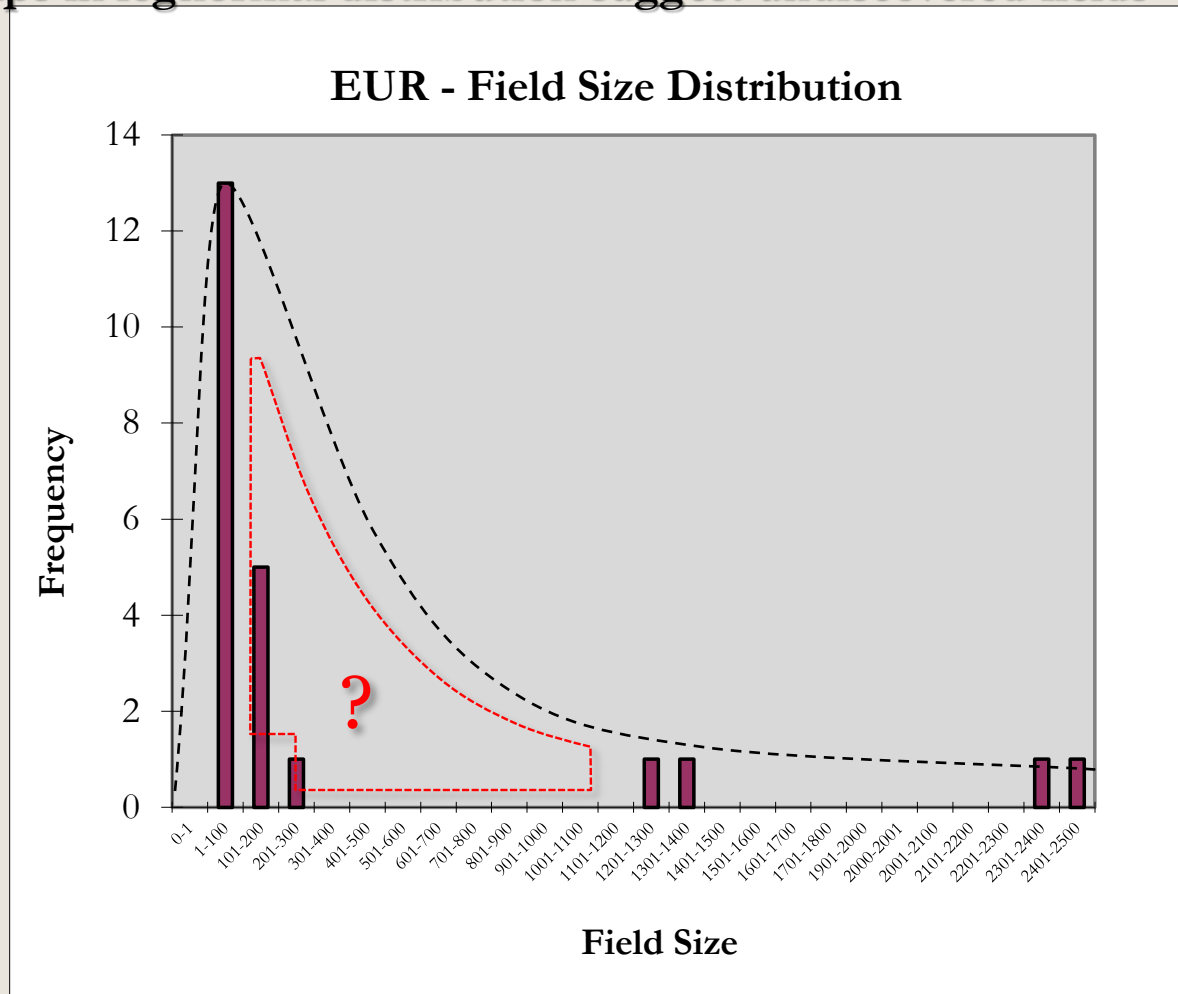




# COOK INLET RESOURCE POTENTIAL

## - GAS FIELD SIZE DISTRIBUTION: EUR -

Gaps in lognormal distribution suggest undiscovered fields



*Dashed curve is schematic, for illustrative purposes only*

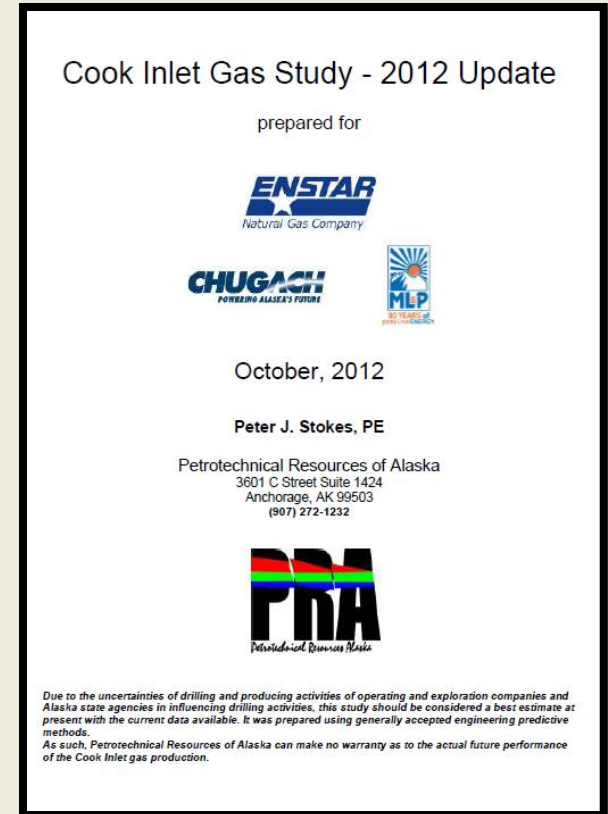
Stump Lake	6
Pretty Creek	6
West Fork	7
Lewis River	9
North Fork	12
Falls Creek	13
Birch Hill	22
Sterling	26
N Trading Bay Unit	30
Moquakie	43
Wolf Lake	50
Trading Bay	90
Ivan River	104
M G S	112
Cannery Loop	116
Granite Point	137
Swanson River	145
Beaver Creek	242
BRU	1266
McArthur River	1384
NCI	2328
Kenai	2425

**TOTAL = 8576 Bcf**  
**Mean = 373 Bcf**

# COOK INLET

## - PETROTECHNICAL RESOURCES OF ALASKA (PRA) STUDY -

- In 2009, ENSTAR, Chugach Electric and ML&P commissioned PRA to study Cook Inlet supplies from existing fields; in 2012, PRA updated the study
- Good solid product and analysis
- PRA report uses a decline curve analysis – a commonplace engineering technique that examines historical gas production rates and extrapolates forward, forecasting for how production rates will decline in years ahead
  - However, this assumes no further drilling or other redevelopment work
- Based on the PRA report, predicted gas supply decline curve drops below the anticipated demand level in 2014-15, with the supply shortfall increasing year-on-year after that
- This is and should be a concern for all



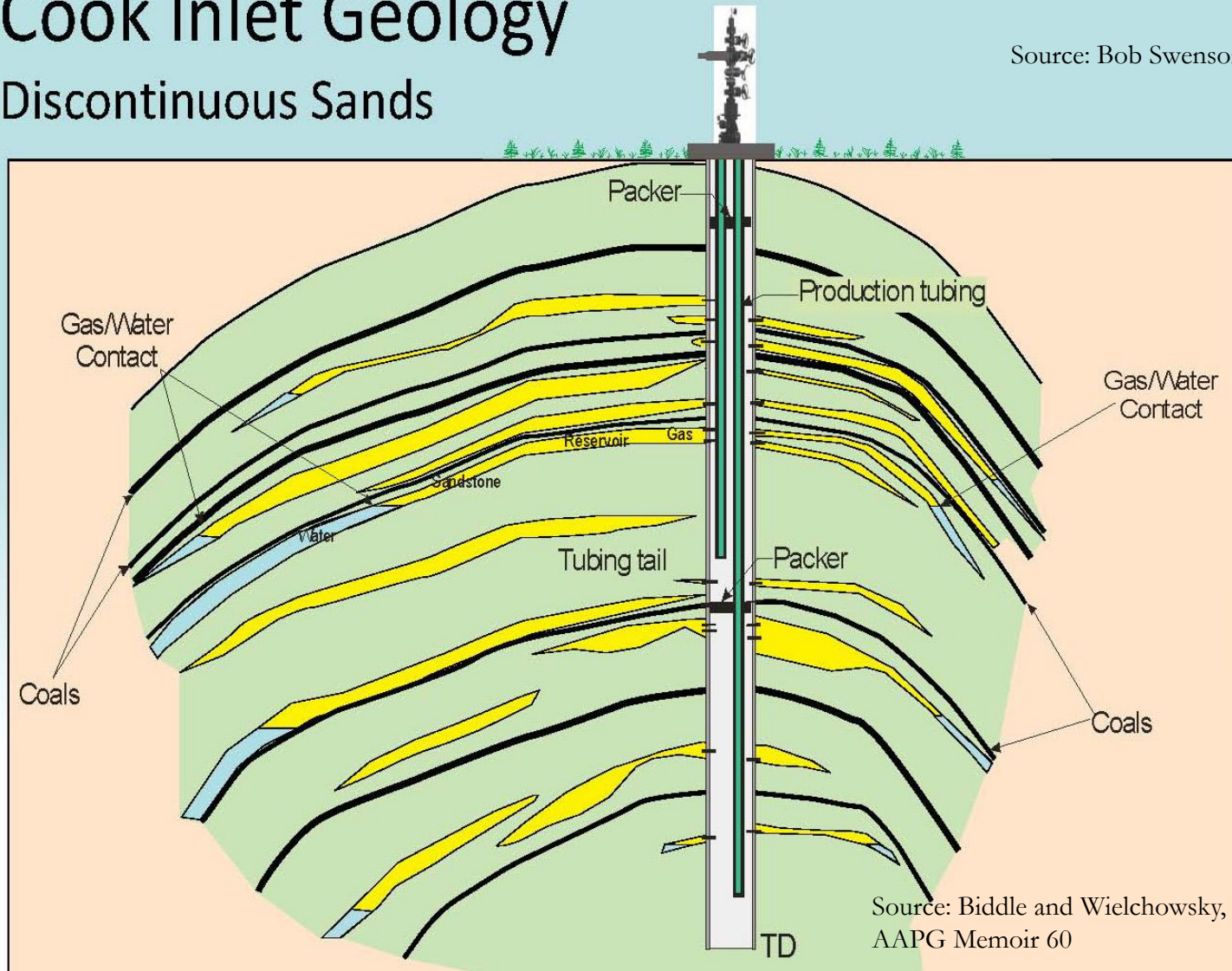
# COOK INLET RESOURCE POTENTIAL

- "NEW GAS" IN EXISTING FIELDS -

## Cook Inlet Geology

Discontinuous Sands

Source: Bob Swenson, DGGGS



Source: Biddle and Wielchowsky, 1994, AAPG Memoir 60

# COOK INLET

## - PETROTECHNICAL RESOURCES OF ALASKA (PRA) STUDY -

### Material Balance Analysis Explained:

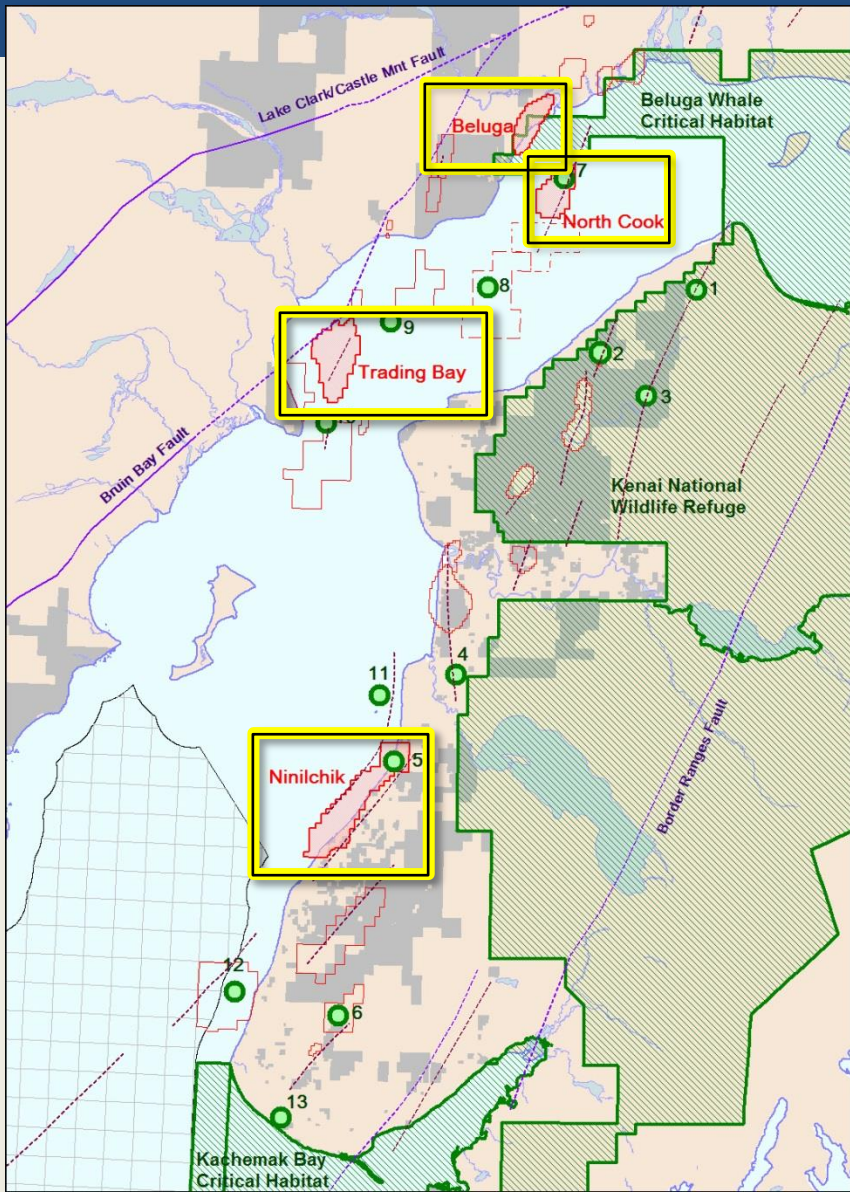
- This approach uses the change in reservoir pressure over time to estimate how much gas is contained in the parts of the field that are in pressure communication with the wells
- Basin wide, DNR's material balance analysis identified 32% more gas reserves than the decline curve analysis in the existing developed field areas
- Reserve estimates that were quoted by the utilities do not include material balance work

### "Behind Pipe" Volumes:

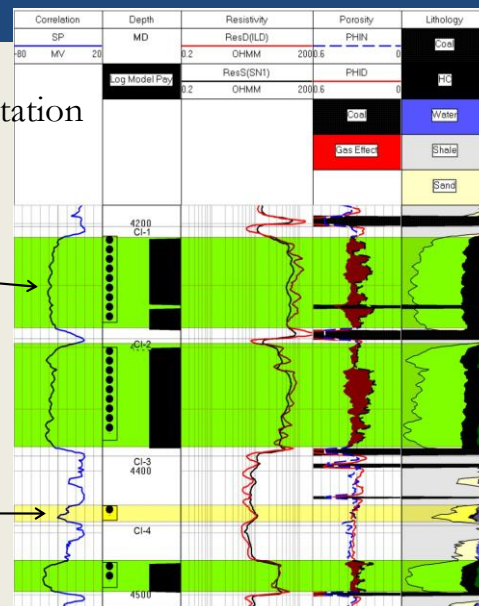
- PRA's study only accounts for production from active completions
- As discussed in DNR's 2009, 2011 and 2012 studies, well logs indicate that existing Cook Inlet fields have nonproducing gas volumes behind pipe or in geologically isolated portions of the reservoir
- These nonproducing volumes cannot be observed by either decline curve or material balance analysis because both approaches are based on production data

# COOK INLET

## - ENGINEERING EVALUATION -

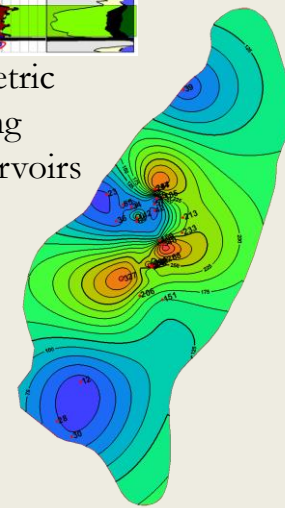


Well log interpretation



Engineering evaluation of all 28 gas fields using Decline Curve Analysis and Material Balance Analysis augmented by in-depth geological estimates of gas reserves and resources for 4 of the 5 largest Cook Inlet gas fields

Volumetric mapping of reservoirs



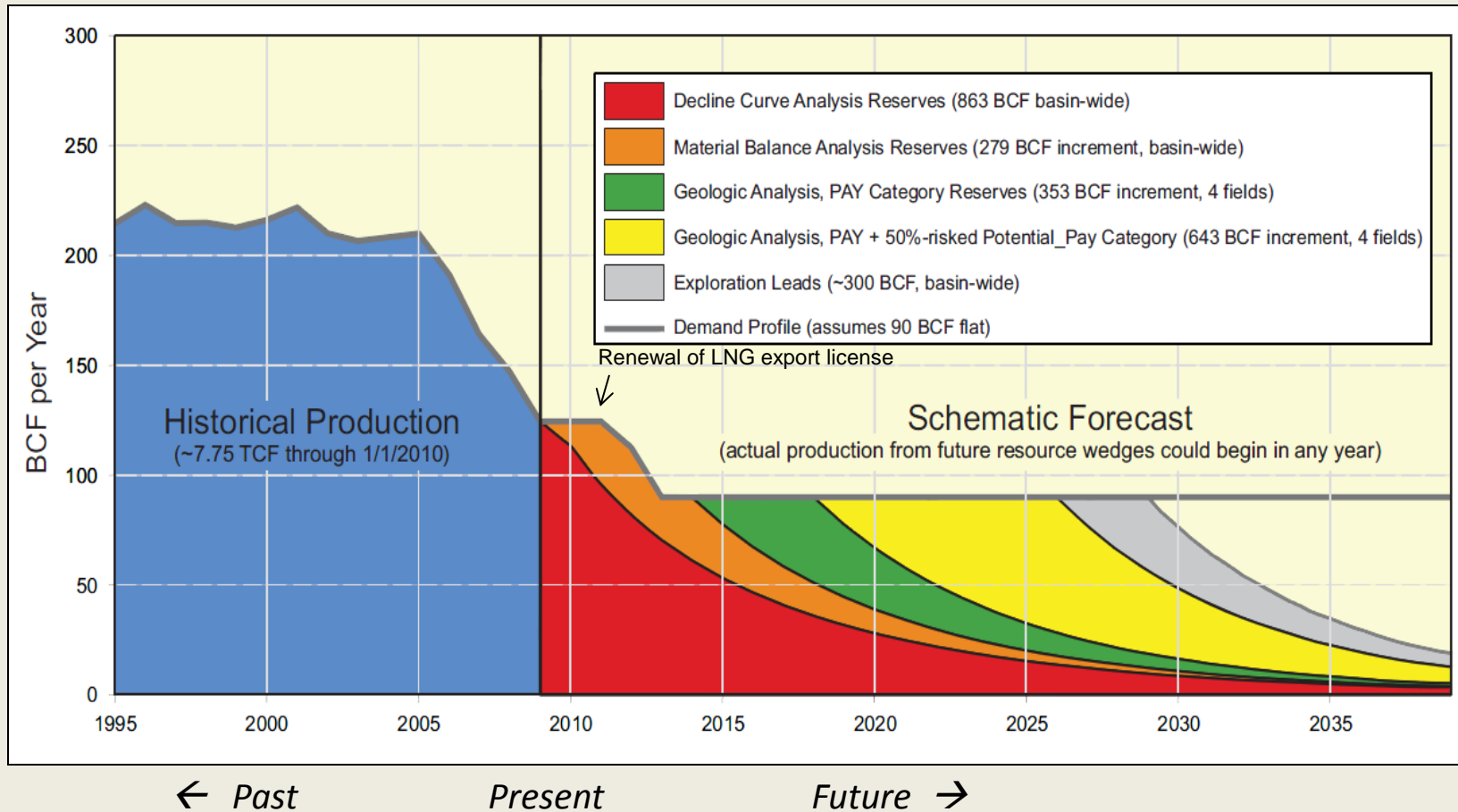
Contour Interval = 25 feet

# COOK INLET

## - DNR, DIVISION OF OIL & GAS -

### Cook Inlet Natural Gas Reserves and Resources: Hypothetical Production Forecast

(Assumes substantial investment in redevelopment activity in existing fields + some exploration success but does not include wild-cat drilling that is going on today)

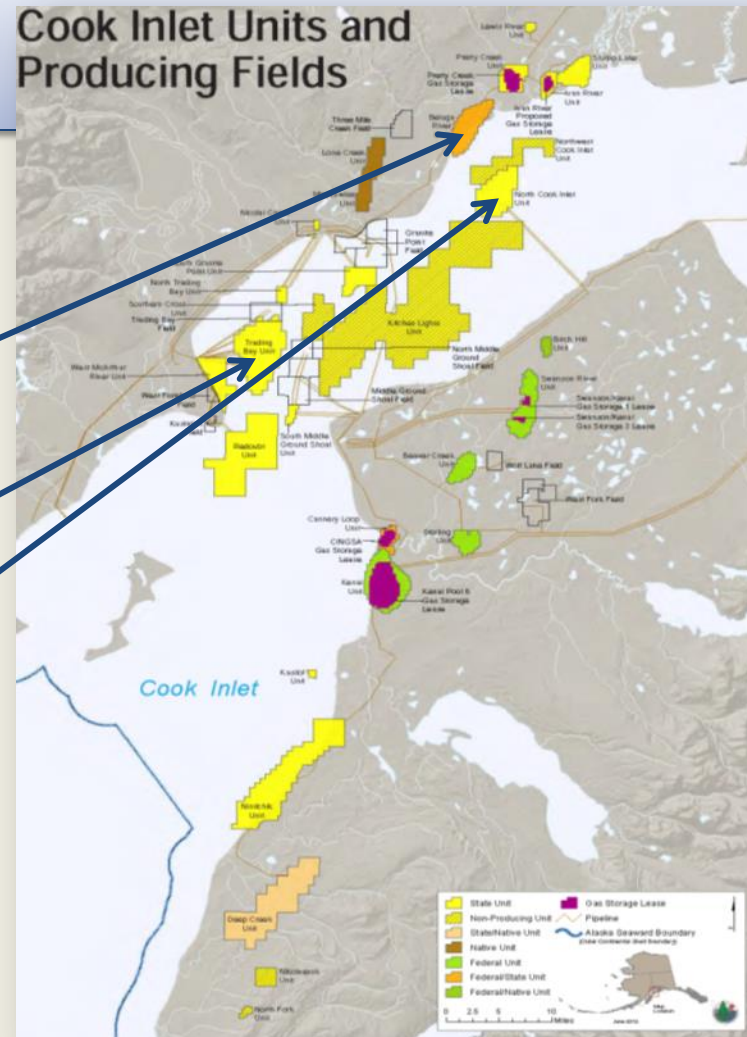


# COOK INLET

- DNR, DIVISION OF OIL & GAS -

## Cook Inlet Gas Estimates, DOG, December 2012

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  - Beluga River Unit (BRU) (233 BCF)
  - Trading Bay Unit (TBU) Grayling Gas Sands (72 BCF)
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- Recent drilling has proven new reserves in existing fields
- Current production from these wells: 1.0-7.0 MMCF/D



# COOK INLET

## - RECENT ACTIVITY -

### Hilcorp

- Sharply increasing oil and gas production from legacy Marathon & Unocal fields
- Filling south-central utilities gas supply contracts through Q1 2018
- Dominant bidder in May 2013 areawide lease sale

### Cook Inlet Energy

- Increased Osprey platform production at Redoubt Unit with RU-5B sidetrack, 250 bopd
- Drilled and completed Sword #1, flowed 833 boepd from Hemlock oil zone; planning tests of Tyonek G oil sands and Tyonek gas sands
- Aquiring North Fork Unit from Armstrong; expect closing Q1 2014

### Buccaneer

- Used Endeavor jack-up to drill Cosmopolitan State #1; encountered & flow tested two Tyonek gas sands that may warrant development; Lower Tyonek oil zone not penetrated in previous wells
- Farmed-in for deep oil rights at North Cook Inlet
- Completed two more Kenai Loop wells in 2013; in dispute with CIRI

### Furie

- Used Spartan 151 jack-up to drill and test Kitchen Lights #3, delineating gas encountered in KLU # 1 & # 2 with successful tests
- Planning offshore monopod development, two 10" pipelines to Nikiski

### ConocoPhillips

- Applied to DOE for new Nikiski LNG export license

### Agrium

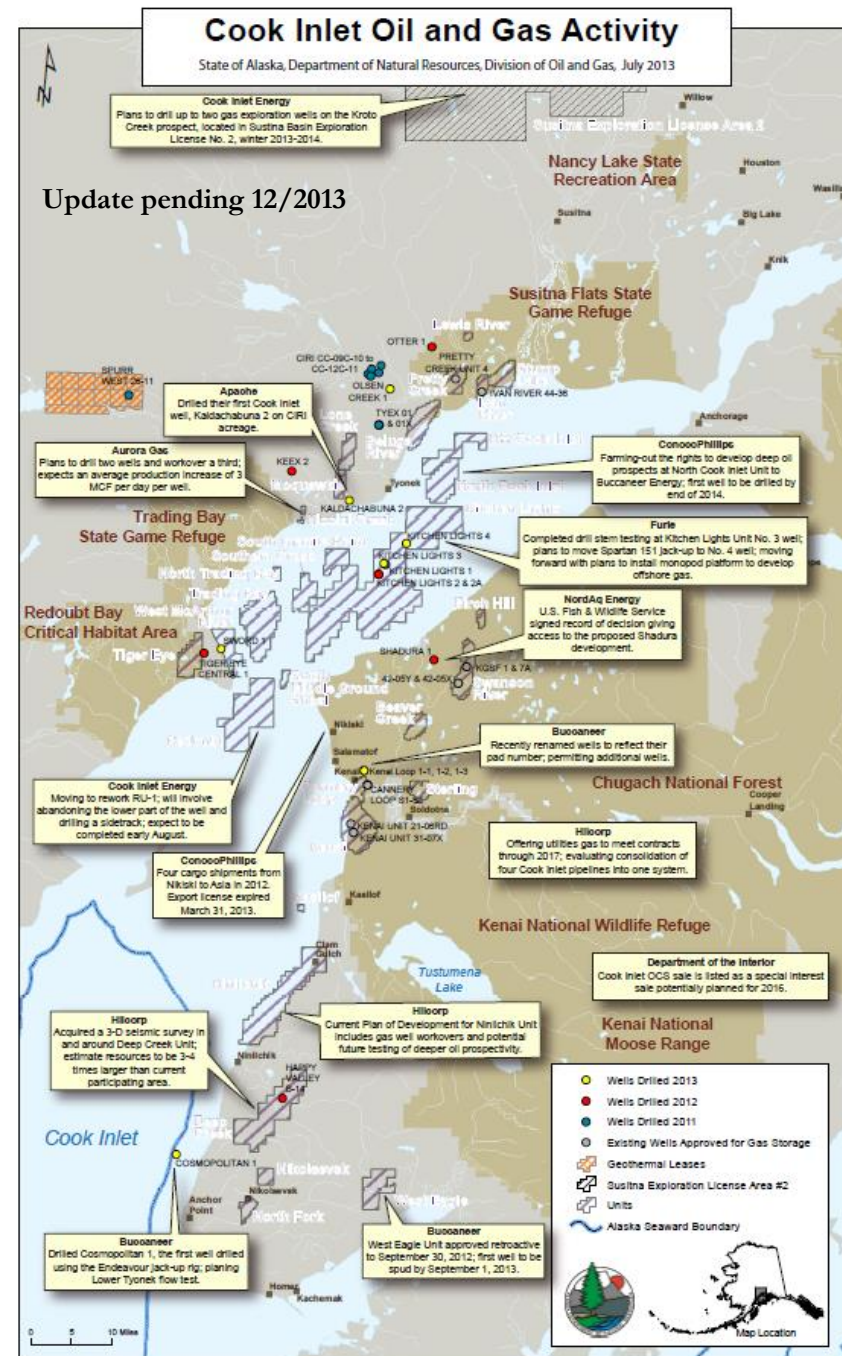
- Evaluating restarting Nikiski fertilizer plant; applied for air quality permit

### NordAq

- 2013 Record of Decision allows access to develop Shadhura gas resources on CIRI land

### Apache

- Regional cable-free 3-D seismic acquisition; drilled Kaldachabuna #2 well on CIRI land





**FIVE-YEAR OIL AND GAS LEASING PROGRAM  
PUBLIC NOTIFICATION SCHEDULE FOR AREAWIDE LEASE SALES**

Proposed Sale Area & Date	2011												2012												2013												2014												2015																					
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D										
Alaska Peninsula Areawide 2011	May	F	S	S																																																																		
Cook Inlet Areawide 2011	May	F	S	S																																																																		
Beaufort Sea Areawide 2011	Oct	C	E	F	S					S																																																												
North Slope Areawide 2011	Oct	C	E	F	S					S																																																												
North Slope Foothills Areawide 2011	BIF Oct	P	E	F	N					S																																																												
Alaska Peninsula Areawide 2012	May									C	E	F	S	S																																																								
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Alaska Division of Oil and Gas Leasing

- Consistent areawide lease offerings every year
- 3 in Northern Alaska, 2 in Southern Alaska

# COOK INLET

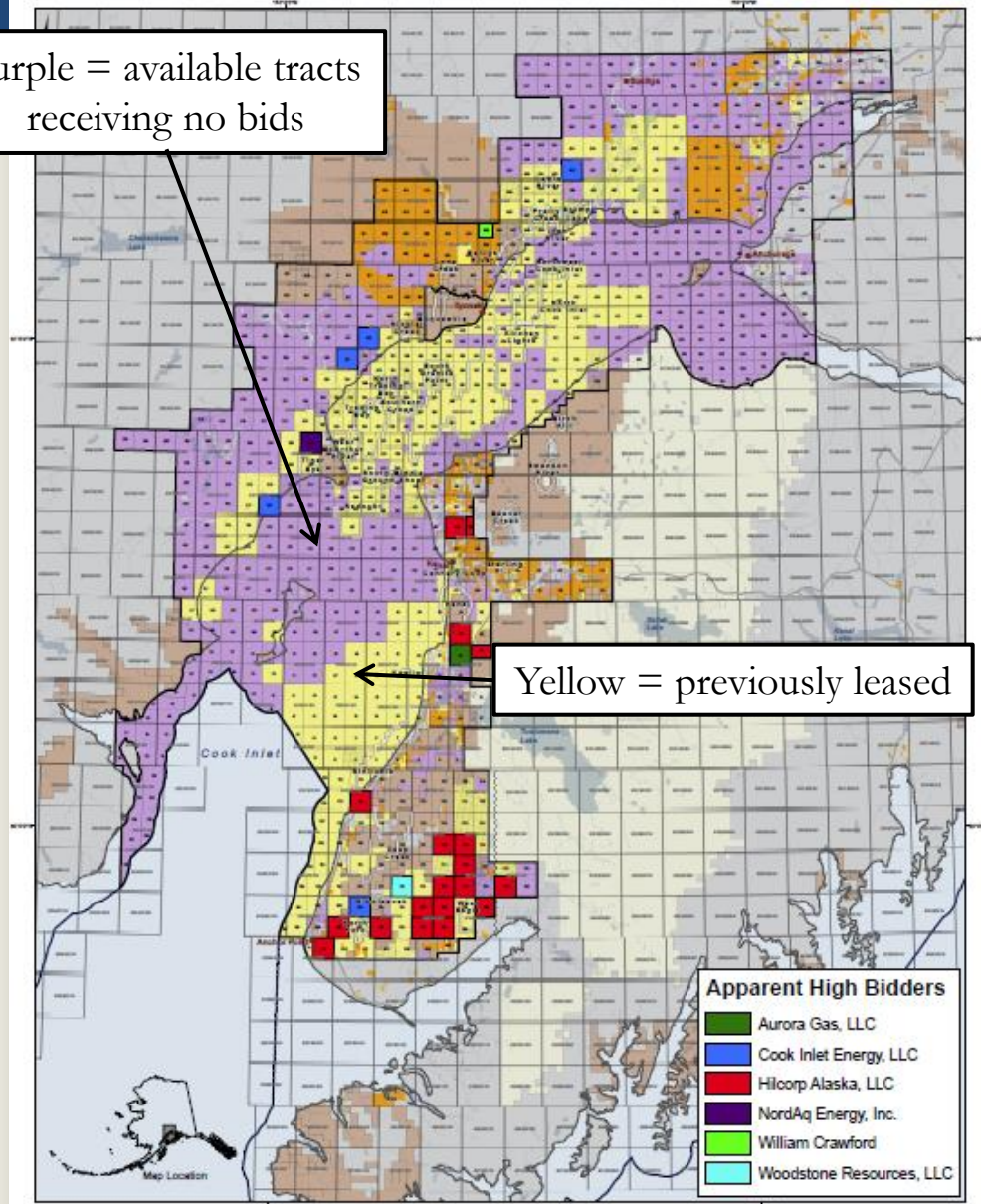
## - 2013 LEASE SALE -

- Total tracts sold: 28
- Total acres sold: 100,322
- Total number of valid bids: 33
- Total high bonus bids: \$3.08 MM
- Sale dominated by Hilcorp
  - > 60,000 acres on Kenai Peninsula
  - Bid on 22 tracts, won 16
  - Total high bids of \$1.57 MM
- Historic Sales
  - 2012- \$4.6 MM; 2011- \$ 8.2 MM
  - 2010- \$1.7 MM; 2009- \$ 0.08 MM
  - 2008- \$ 0.17 MM; 2007-\$ 1.8 MM

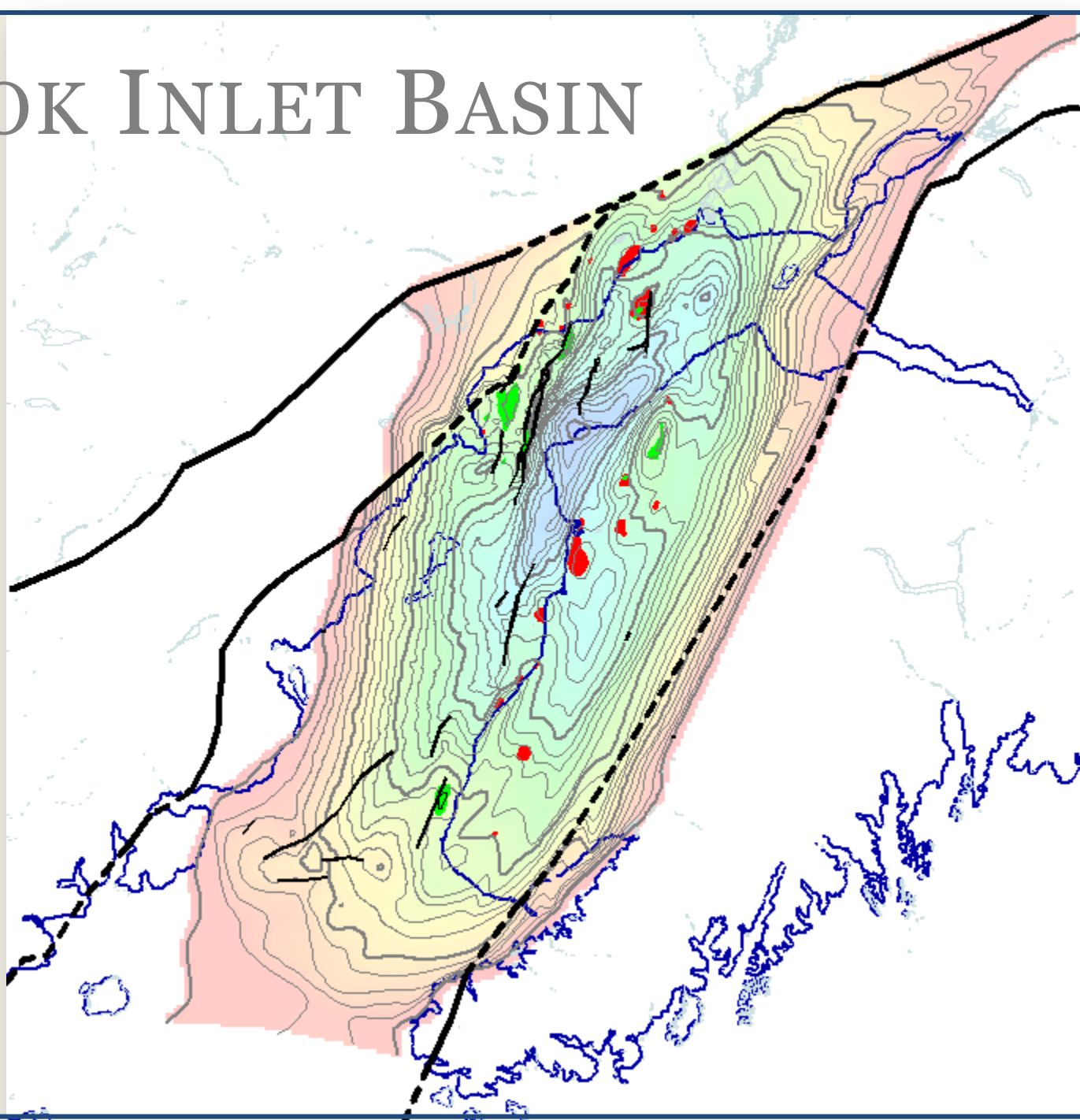
Cook Inlet Areawide 2013W  
Competitive Oil and Gas Lease Sale Regional Tract Map  
May 8, 2013

Purple = available tracts receiving no bids

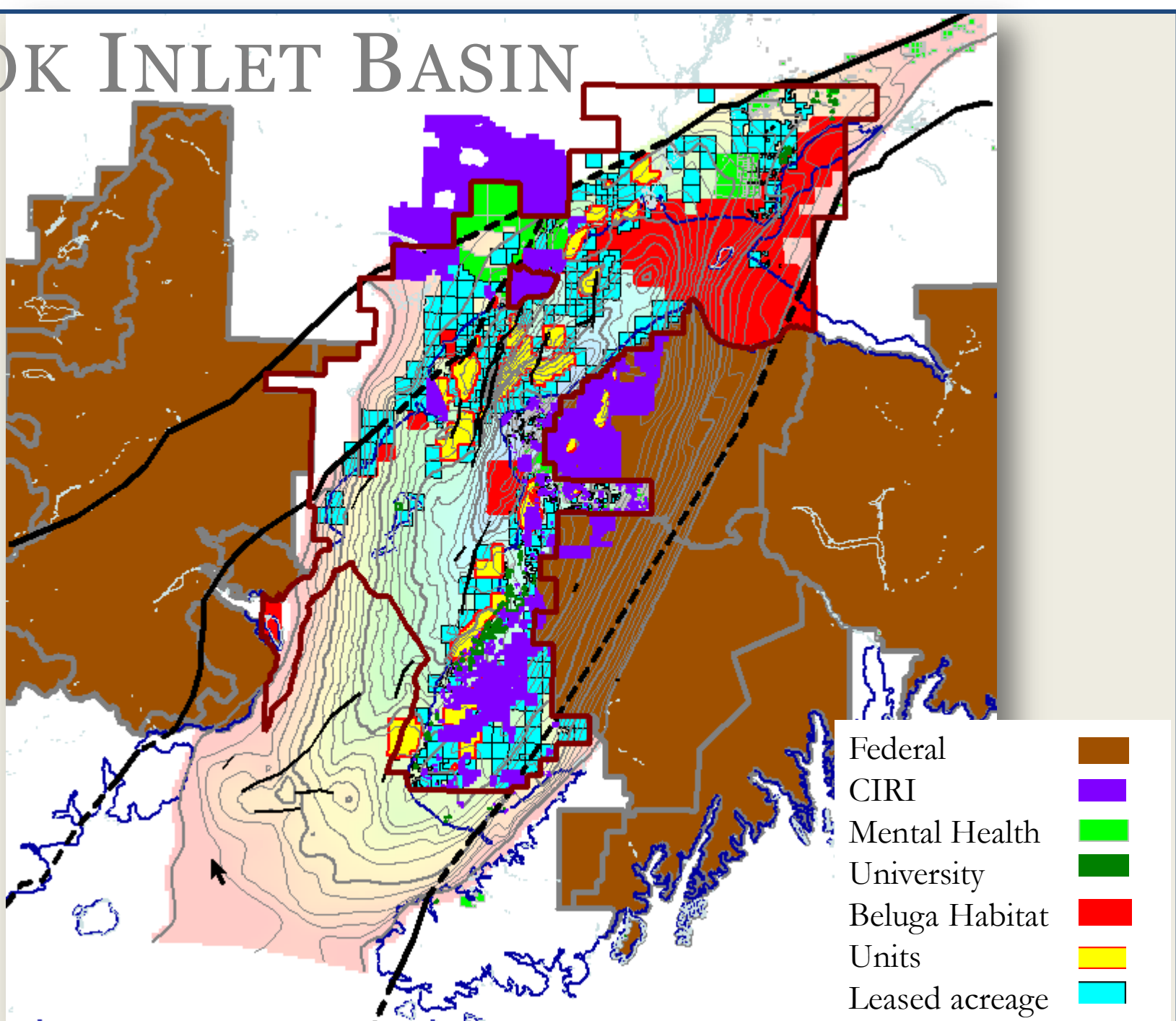
Yellow = previously leased



# COOK INLET BASIN



# COOK INLET BASIN



# COOK INLET

## - GETTING FROM UNDISCOVERED RESOURCES TO PROVED DEVELOPED RESOURCES -

The keys to proved developed resources are:  
exploration success and commercial validation

### 1. Find and Map Prospects with Seismic Data

- Recon seismic acquisition and G&G interpretation (coarse 2-D grid)
- Prospect-scale seismic acquisition and GG&E interpretation (tight 2-D grid or 3-D)

### 2. Land/Lease Access to Prospect

- Competitive lease sale (e.g., DNR, BOEM, BLM)
- Private lease (e.g., Native corporations)
- Exploration license (DNR)

### 3. Exploration Drilling → Reservoir Discovery

- Wildcat exploration drilling, logging, testing (80-90% failure rate); refine prospect model
- Appraisal and delineation drilling of discovery; extensive logging, testing; refine model

### 4. Project Sanction

- Engineering analysis, design, costing
- Environmental/Permitting feasibility
- Commercial hurdles, board/investor approval

### 5. Development

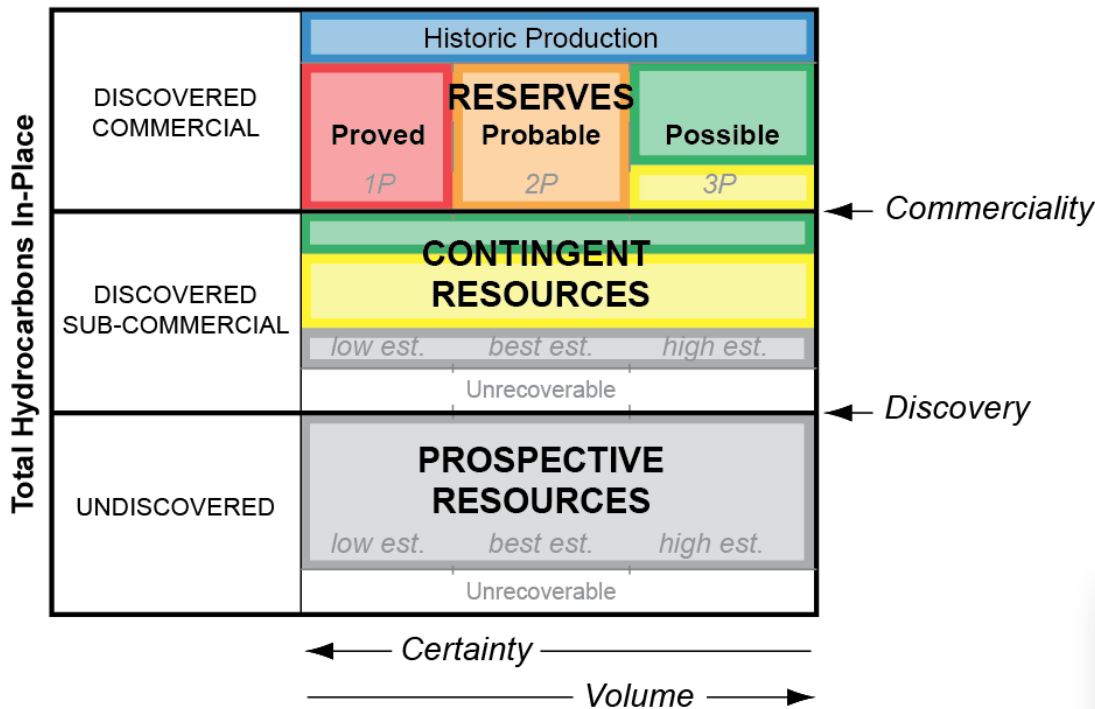
- Gravel construction
- Facilities & pipeline construction and installation
- Development drilling



# COOK INLET

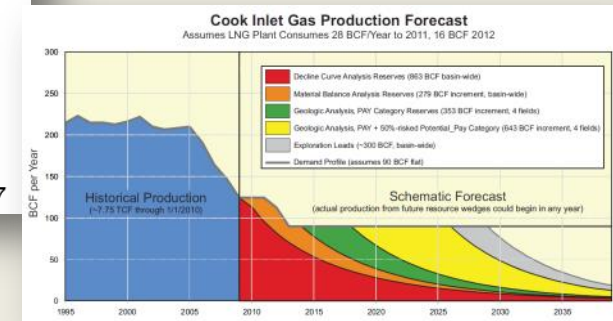
## - RESERVES AND RESOURCES NOMENCLATURE -

### Categorization of Cook Inlet gas volumes identified by DNR



Important to note distinction between “resource” and “reserve” when discussing gas supplies:

- **Reserves** = oil and gas volumes that have been confirmed by drilling and are known or expected to be economically producible
- **Resources** = much broader term, and includes volumes that have not yet been proved by drilling, as well as volumes that have been discovered but whose commerciality is not yet established

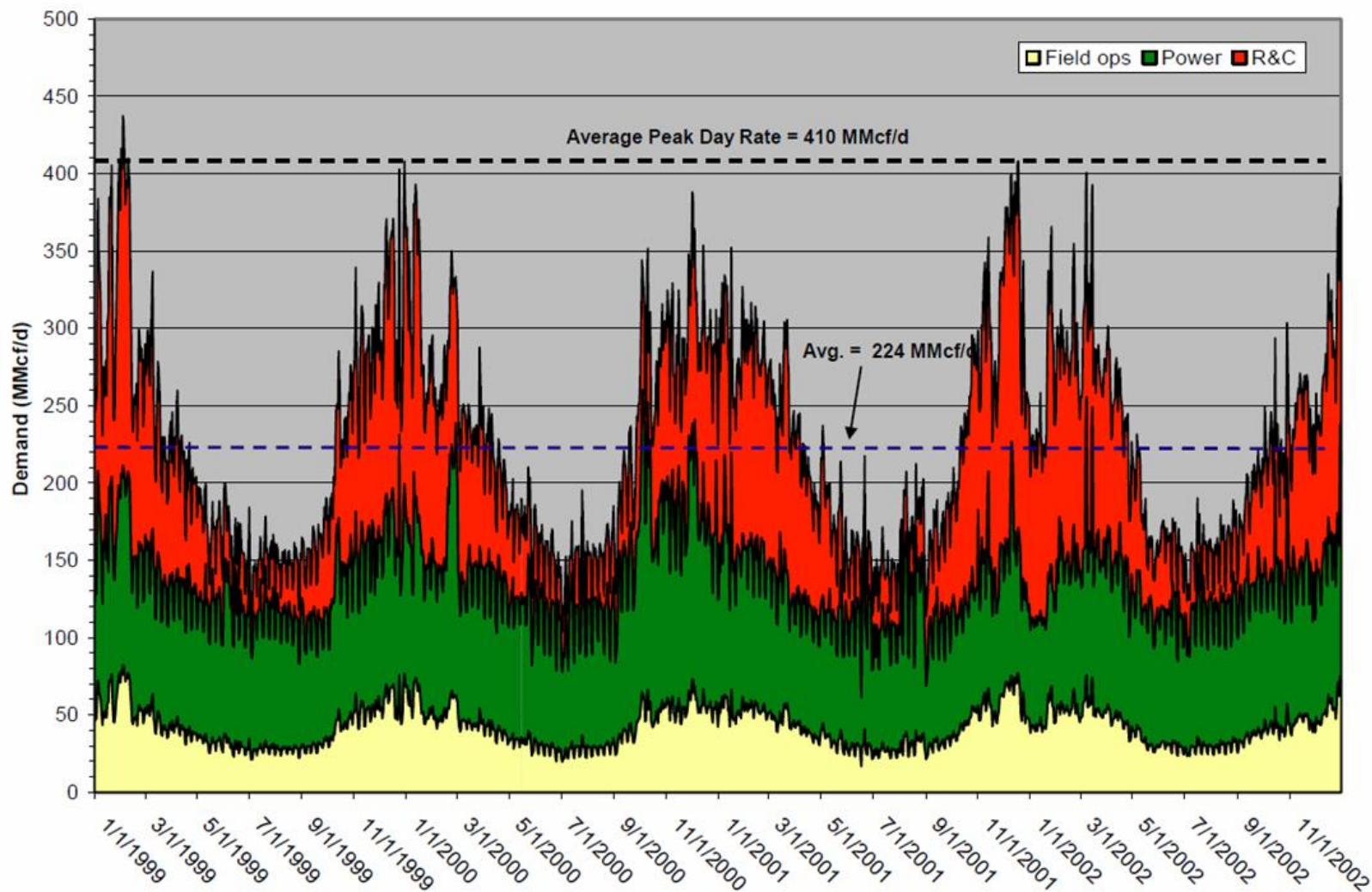


Alaska Division of Oil & Gas, 2010

Adapted from SPE and others, 2007

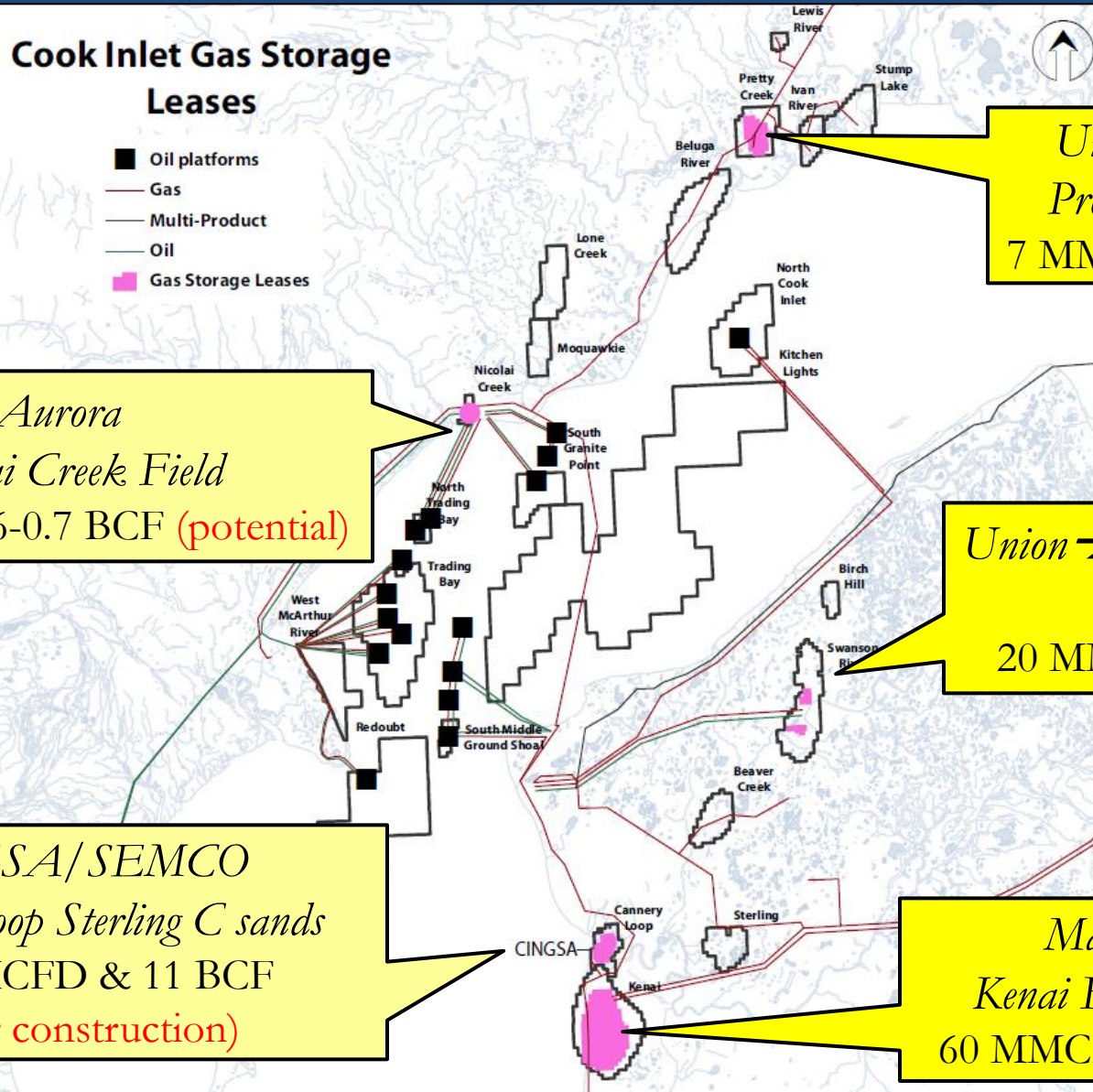
# COOK INLET

- SEASONAL SWINGS IN SOUTH-CENTRAL DAILY DEMAND -



# COOK INLET

- GAS STORAGE DESIGN RATE & CAPACITY -



*Aurora*  
*Nicolai Creek Field*  
 Rate TBD, 0.6-0.7 BCF (potential)

*Union → Hilcorp*  
*Pretty Creek Field*  
 7 MMCFD & 0.7 BCF

*Union → Hilcorp Swanson*  
*River Field*  
 20 MMCFD & 2 BCF

*CINGSA/SEMCO*  
*Cannery Loop Sterling C sands*  
 150 MMCFD & 11 BCF  
 (under construction)

*Marathon*  
*Kenai Field Pool 6*  
 60 MMCFD & 6 BCF



# COOK INLET

## - RECENT ACTIVITY -

- Legacy fields being reworked to increase deliverability
- Cook Inlet pipeline reconfigured for flow in either direction
- CINGSA gas storage reservoir in operation, major increase in deliverability, year- round gas market
  - Potential for further expansion of gas storage capacity
- New wells brought online in legacy and newly discovered fields
- Increased onshore and offshore exploration for both oil and gas, attributed to legislative incentives
  - Extensive 3-D seismic
  - Jack-up drilling offshore
  - Onshore drilling
- USGS 2011 resource assessment estimates up to 19 TCF undiscovered gas



# COOK INLET

## - RECENT ACTIVITY -

- Hilcorp aggressive as single-operator of former Marathon and Unocal assets
  - New life to mature fields through workovers, new wells, recompletions
- Higher gas price contracts approved
- New players, new technologies
- Increased gas storage → year-round production
- Industrial users considering restarting facilities
  - ConocoPhillips LNG export facility
  - Agrium fertilizer plant
- Tax credits and related incentives customized to Cook Inlet
  - Jack-up credits (80-100% up to \$20-25 MM; first 3 wells) AS 43.55.025(a)(5), (l)
  - Alternative tax credit for exploration (30-40% for wells and seismic) AS 43.55.025(a)(1-4)
  - Capital expenditure credit (40%) AS 43.55.023(a), (l)
  - Loss carry-forward (25%) AS 43.55.023(b)
  - Cook Inlet Tax ceiling (Zero for oil, 17.7 cents per MCF for gas) AS 43.55.011(j), (k), (o)
  - Gas storage incentives (\$1.50/MCF up to \$15 MM or 25% of facility cost) AS 43.20.046

# OIL AND GAS

## - RESOURCES VS. RESERVES -

### **Undiscovered, Technically Recoverable Resource:**

- Oil and gas estimated to exist in accumulations that have not yet been found by drilling, but if found, could be potentially produced using current technology and industry practices.
- Only an unknown fraction of this category will be commercially viable to find, develop, and produce. Sometimes called **Prospective Resources**.

### **Proved Reserves:**

- “oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations...” (*Securities Exchange Commission, 2008*).
- Sometimes called **1P Reserves**, with a 90% certainty of meeting or exceeding the quoted value (SPE, 2007).

### **Proved Developed Reserves:**

“Proved reserves that... can be expected to be recovered through existing wells with existing equipment and operating methods...” (*Securities Exchange Commission, 2008*)



# Questions

