# Alaska Department of Natural Resources
# Division of Geological & Geophysical Surveys

# USGS Resource Assessments
# Conventional Oil & Gas
# Arctic Alaska

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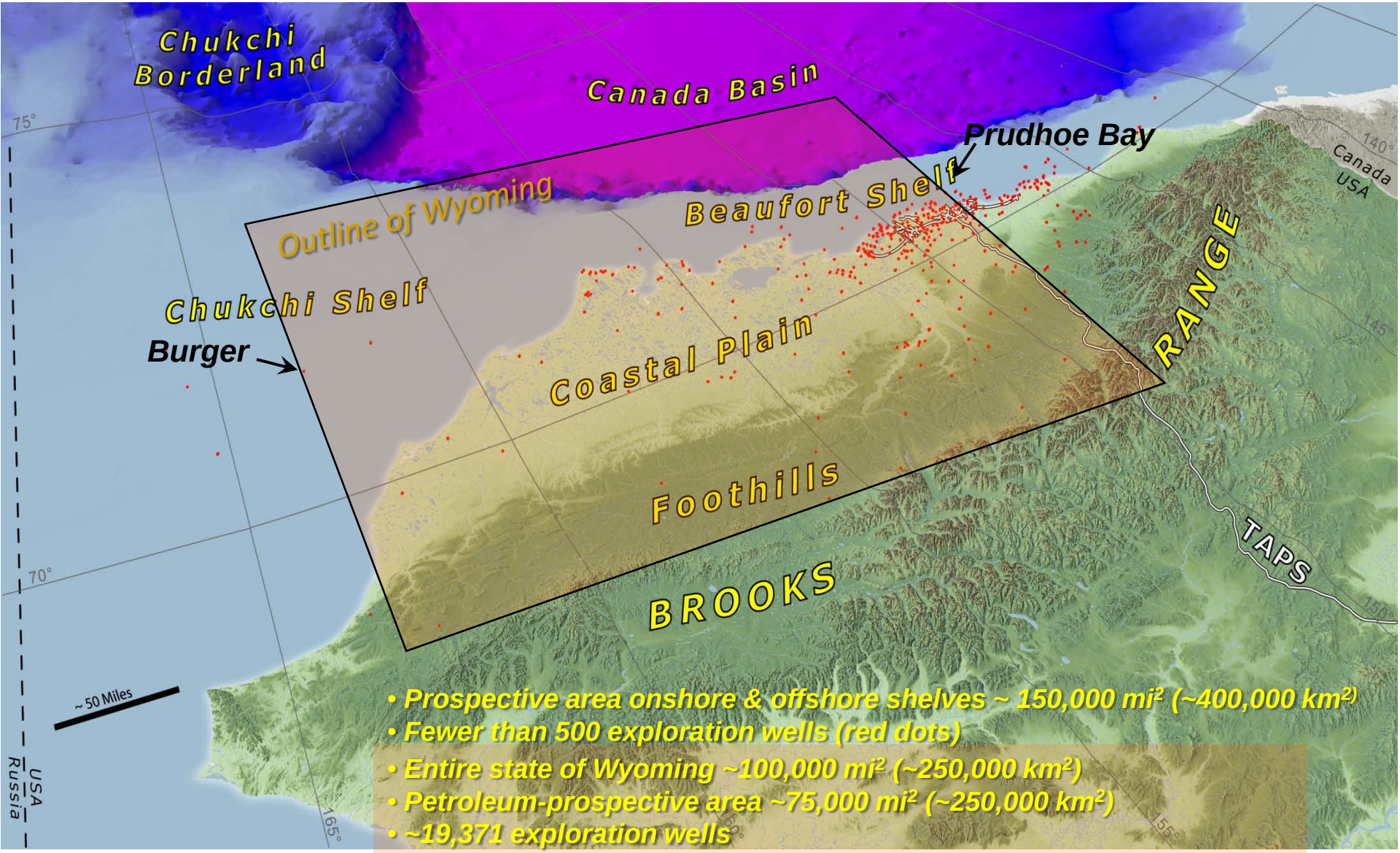
State Geologist & Director
Division of Geological & Geophysical Surveys

*http://www.dggs.alaska.gov*
*http://akgeology.info*

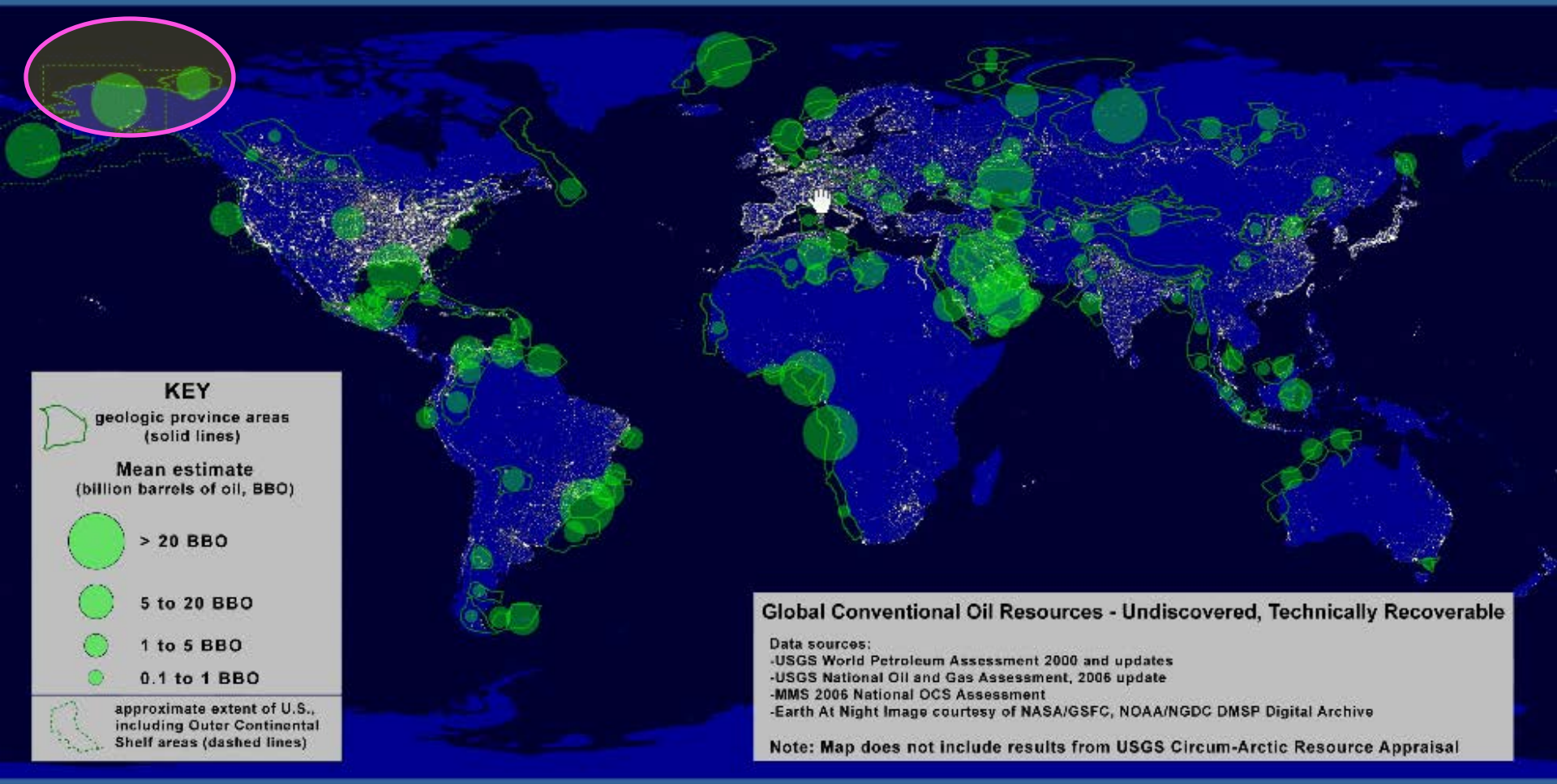
# Arctic Alaska Conventional Oil & Gas Exploration Maturity




- *Prospective area onshore & offshore shelves ~ 150,000 mi² (~400,000 km²)*
- *Fewer than 500 exploration wells (red dots)*
- *Entire state of Wyoming ~100,000 mi² (~250,000 km²)*
- *Petroleum-prospective area ~75,000 mi² (~250,000 km²)*
- *~19,371 exploration wells*

Modified from USGS Slide

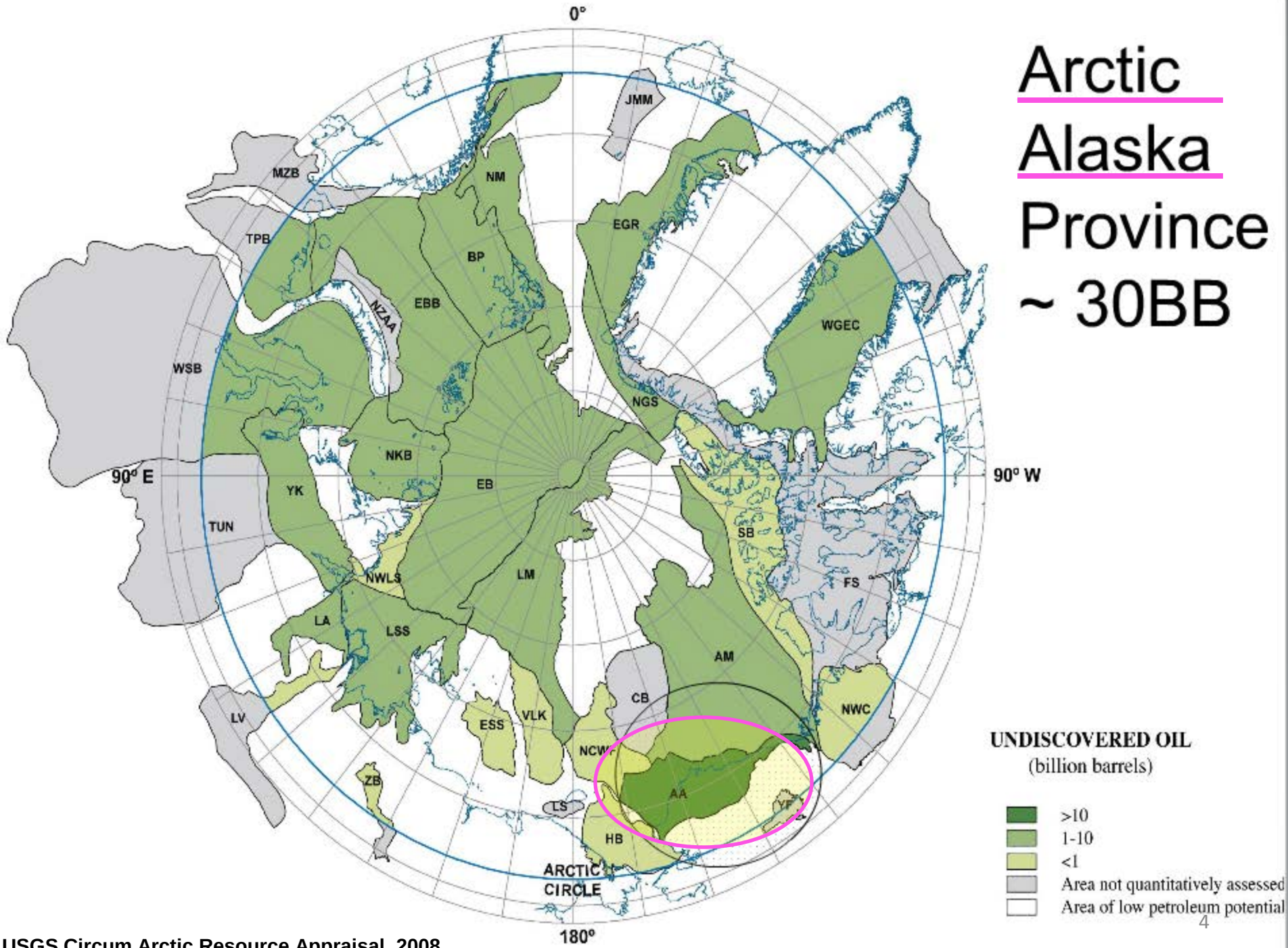
# Global Conventional Oil Resources




USGS

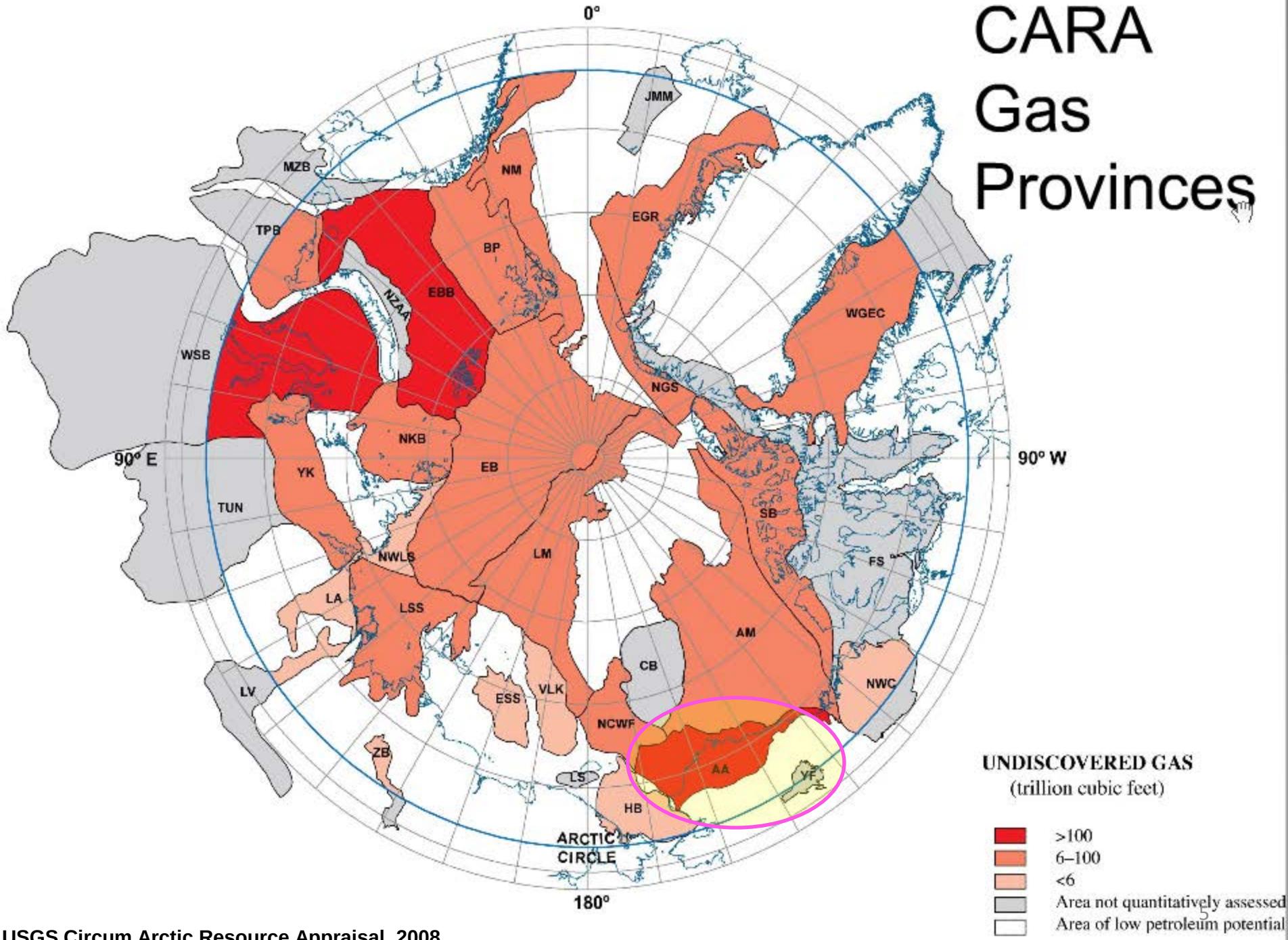
***Note: Does not include results from USGS Circum-Arctic Oil and Gas Resource Appraisal study.***

# Arctic Alaska Province ~ 30BB



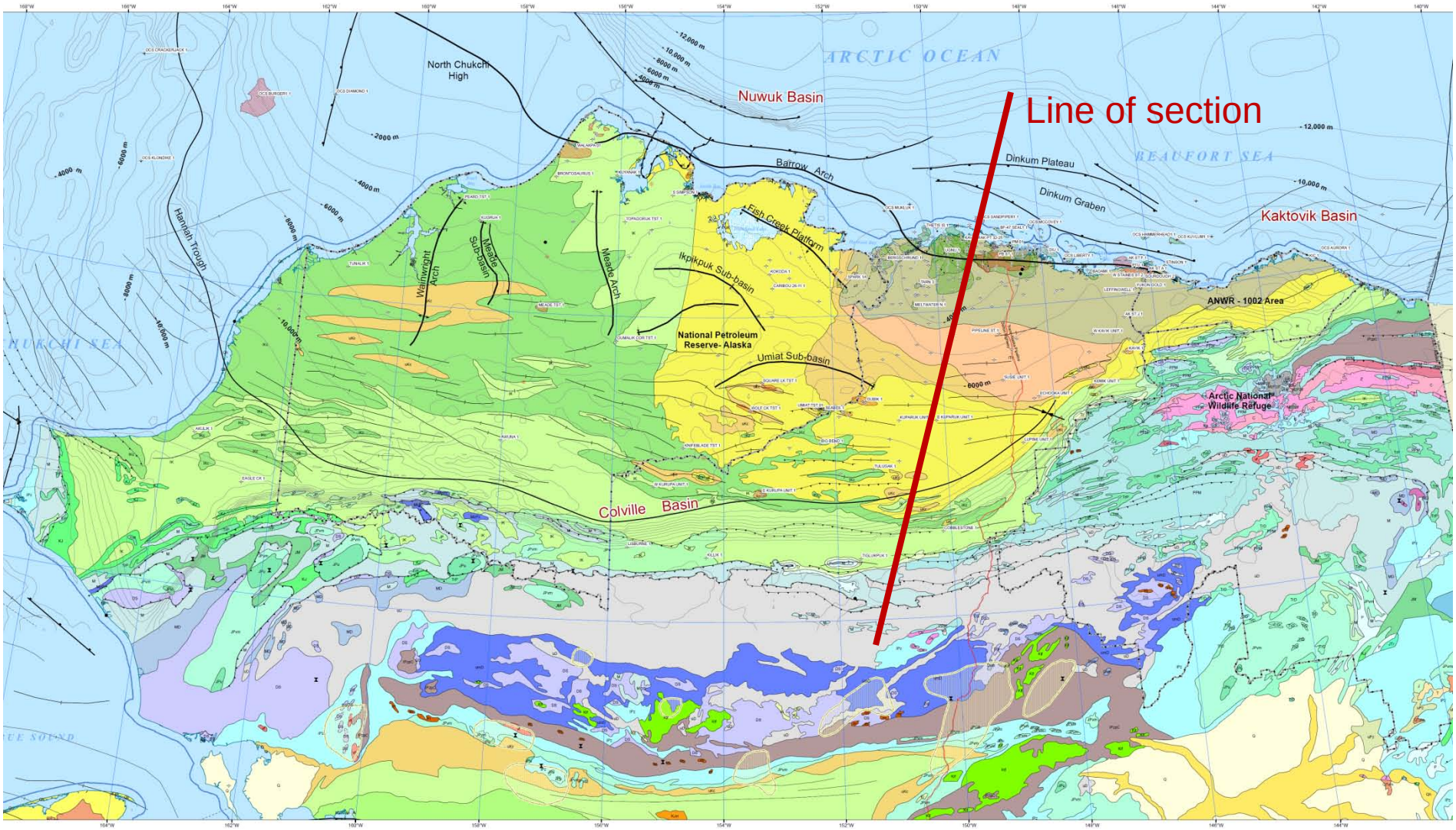

USGS Circum Arctic Resource Appraisal, 2008

# CARA Gas Provinces



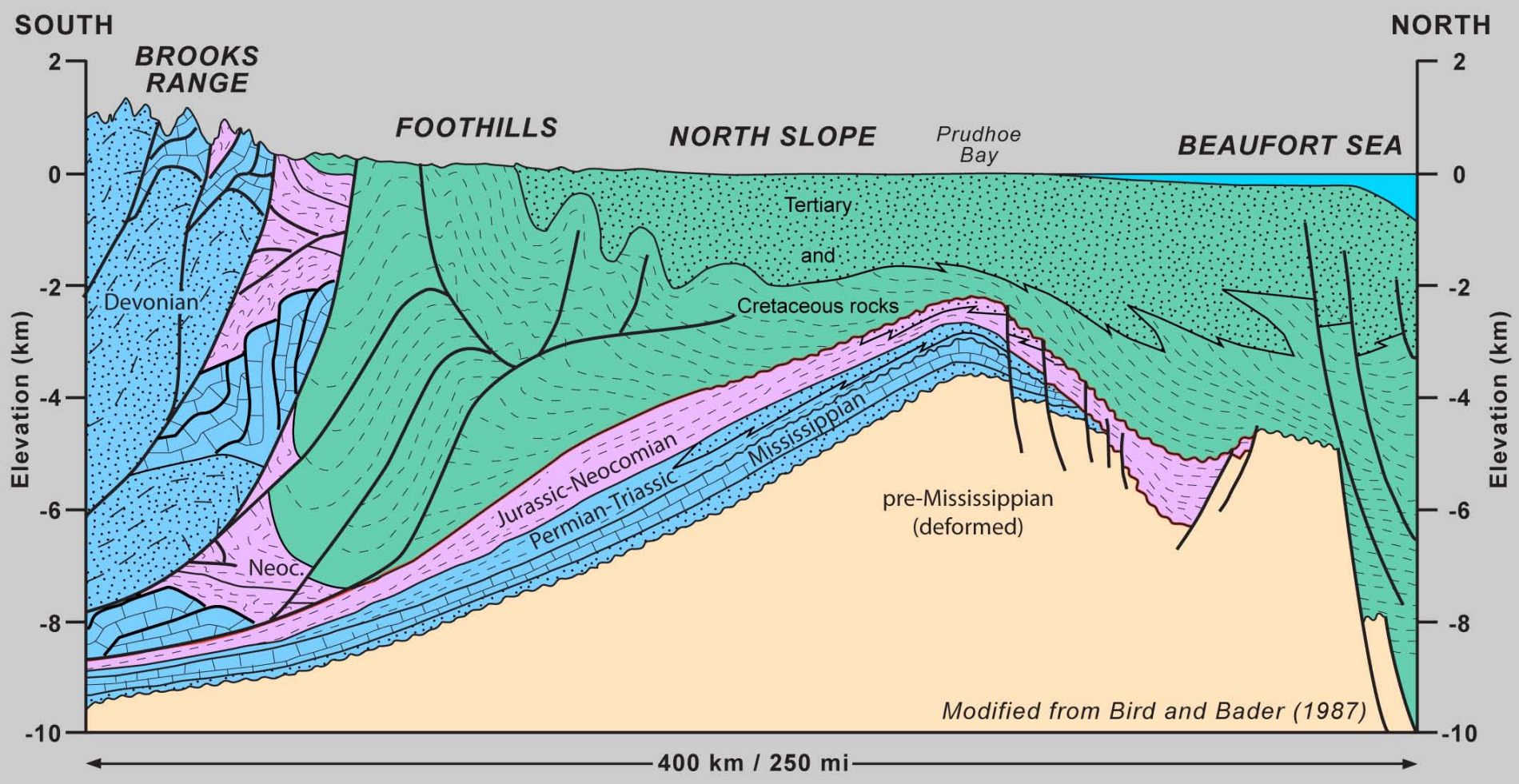

USGS Circum Arctic Resource Appraisal, 2008

# North Slope Regional Geology



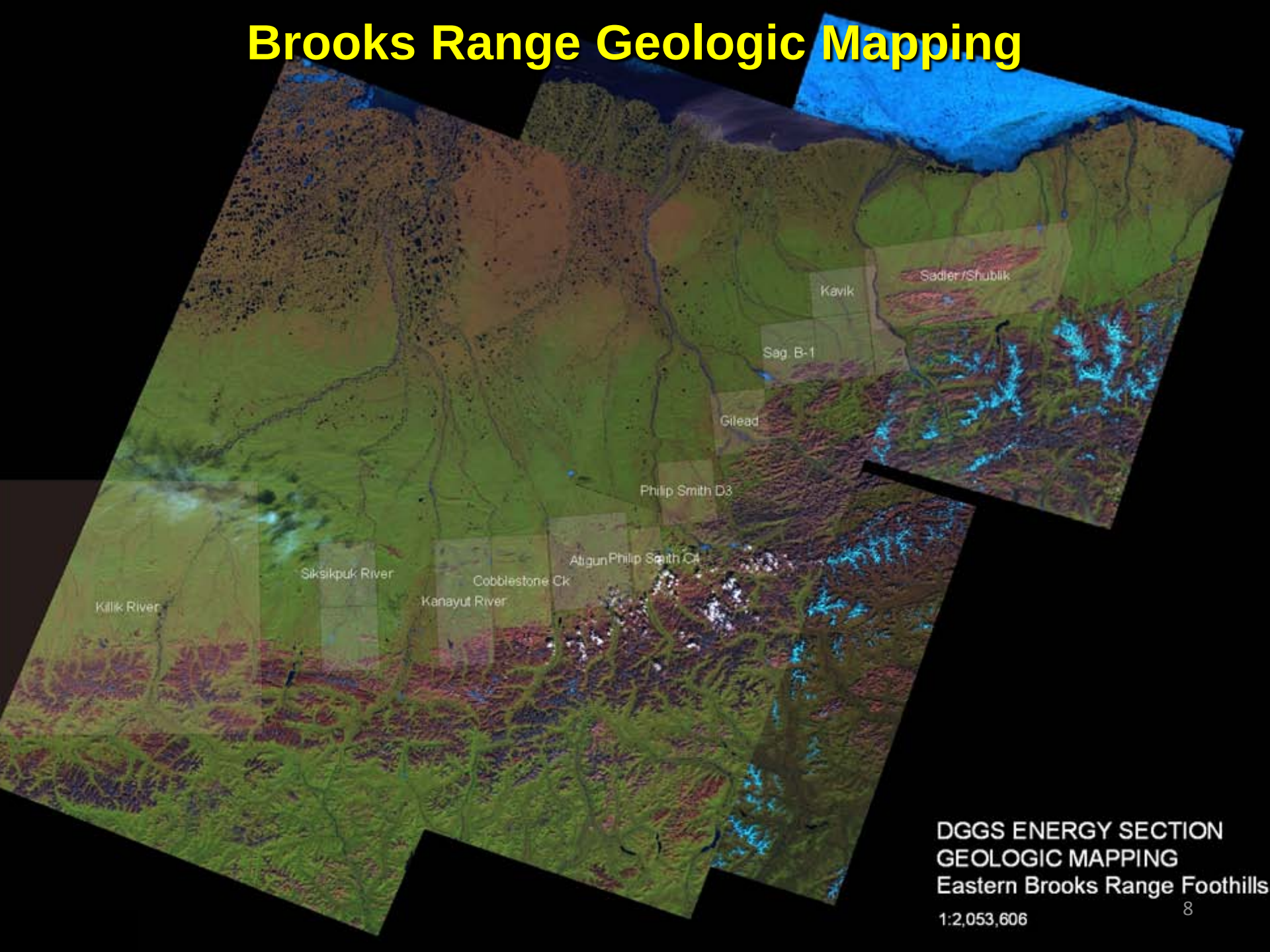

Alaska Dept. of Natural Resources
Division of Oil & Gas

# Simplified and Generalized Regional Cross-section

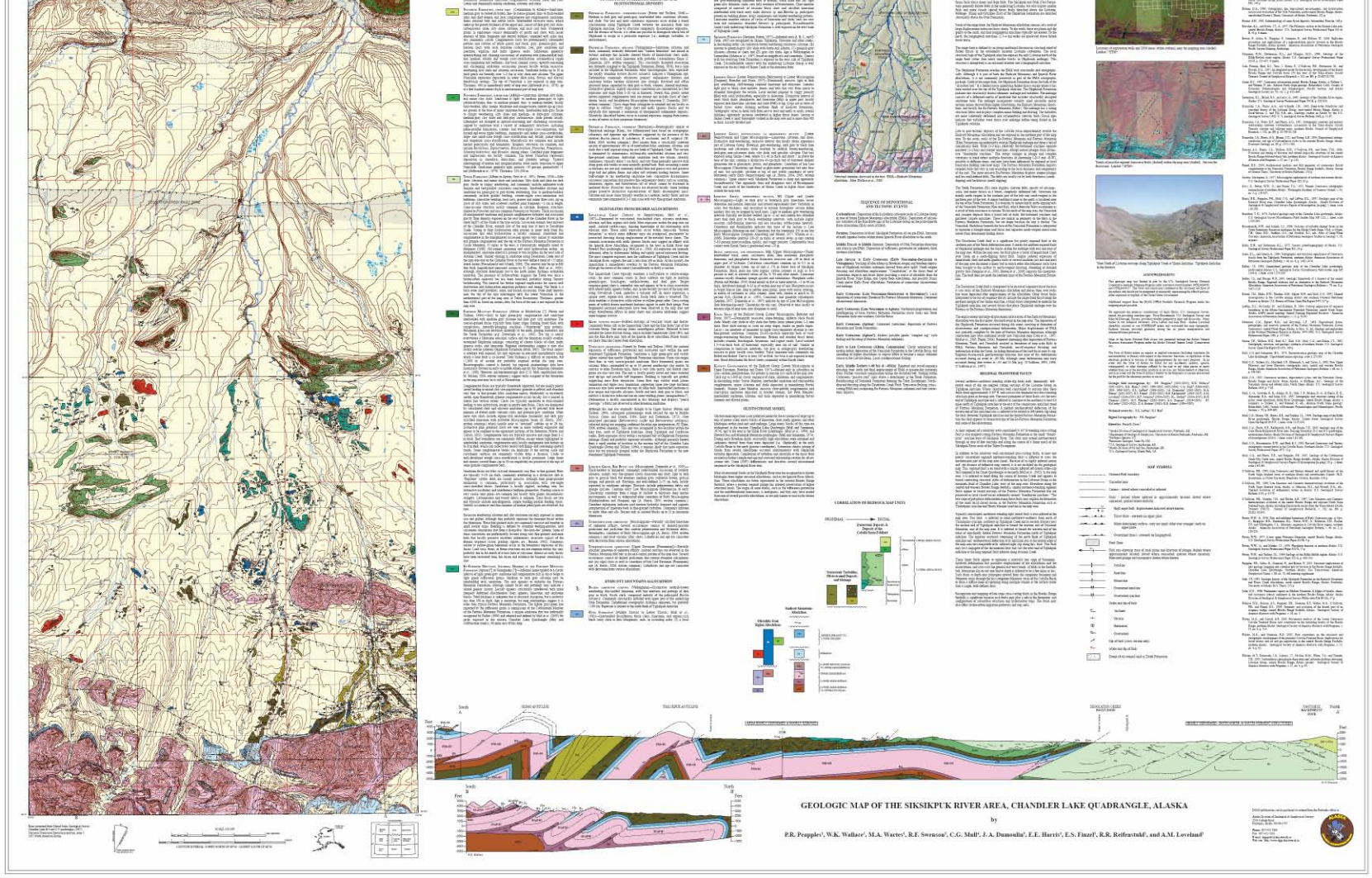



USGS Slide

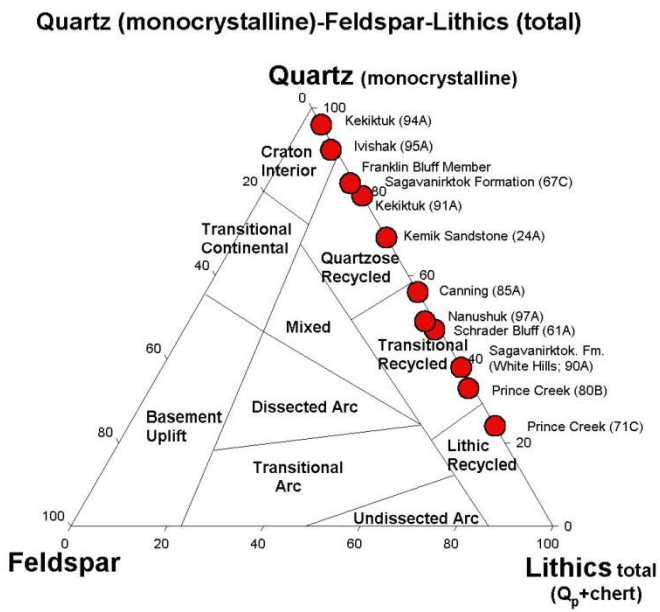
# Brooks Range Geologic Mapping

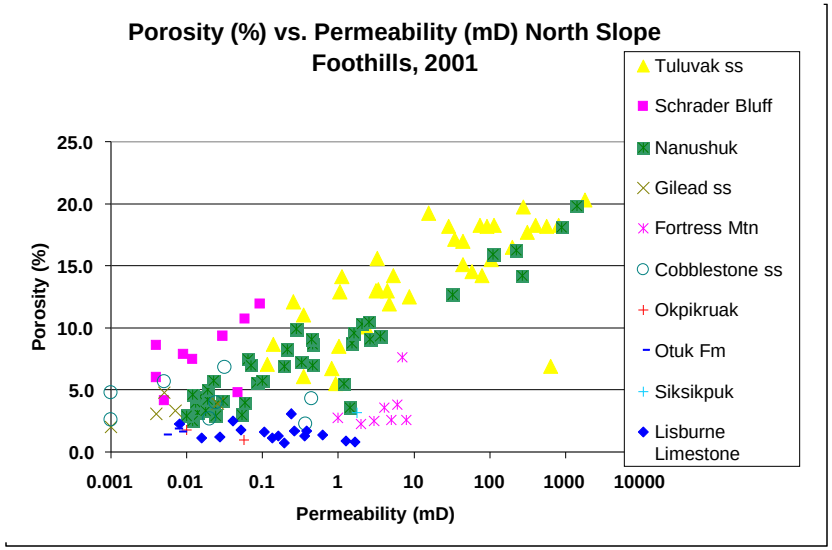


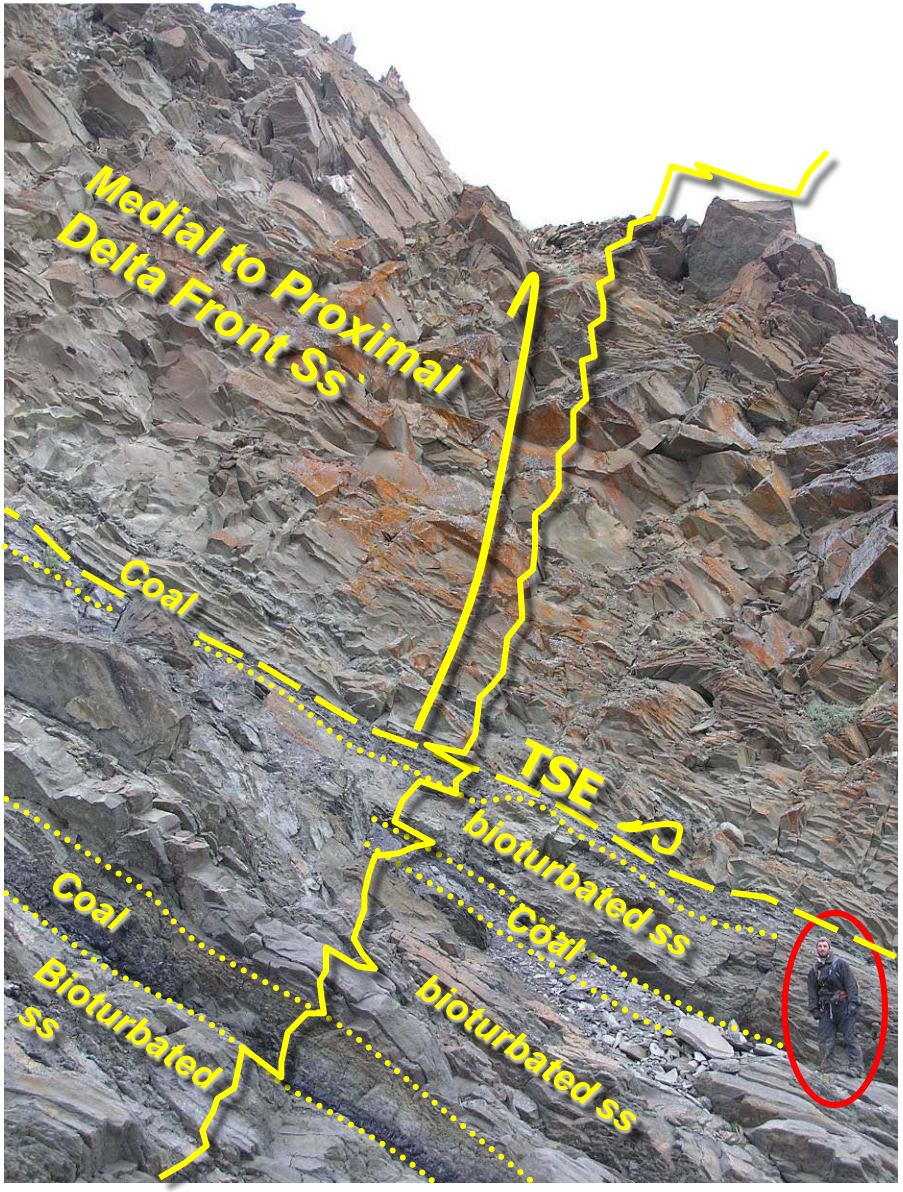
# Geologic Mapping



# Topical Petroleum-related Studies



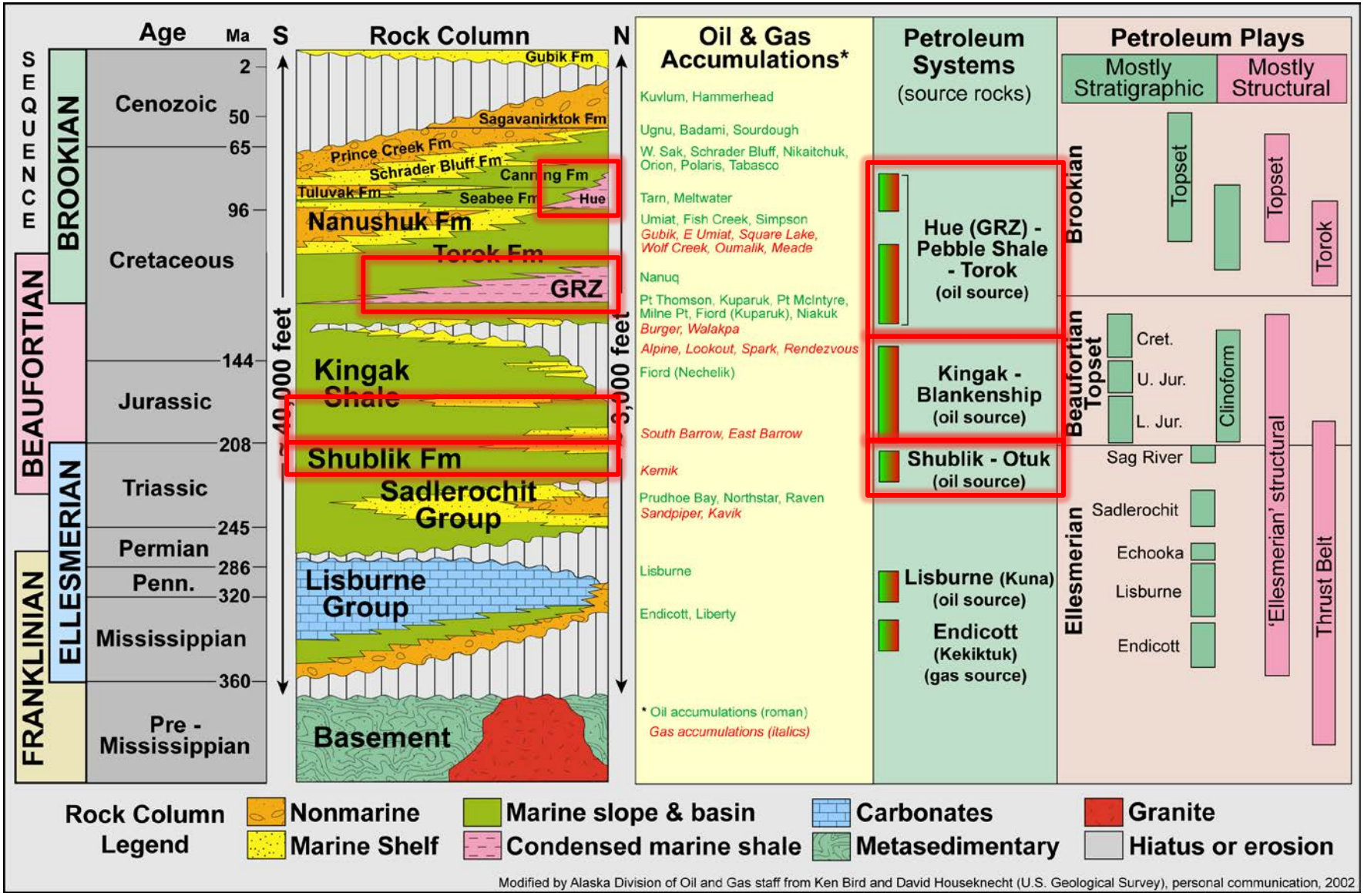




*Killik Bend non-marine to deltaic succession highstand aggradational system tract*

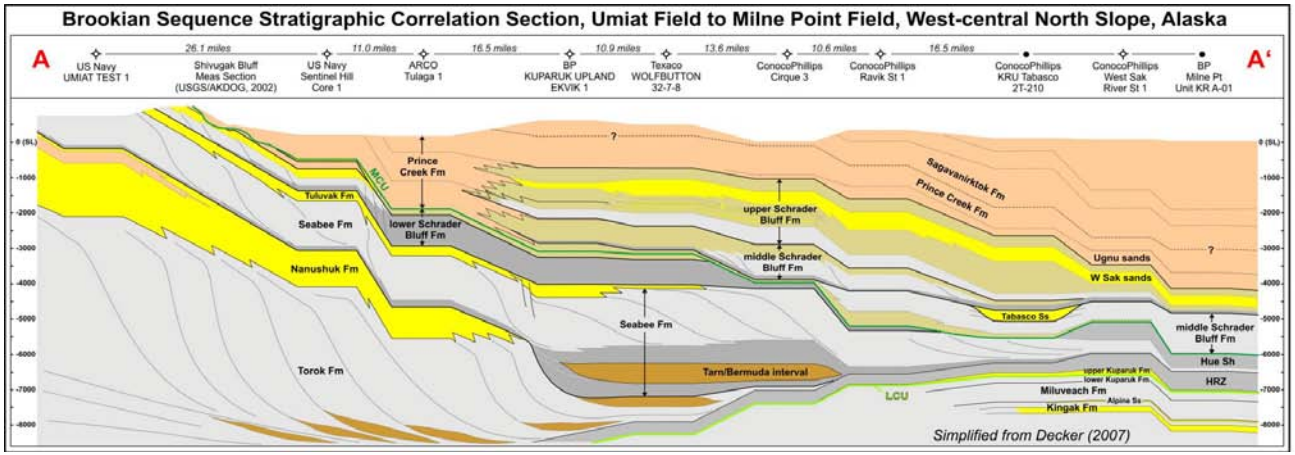
# North Slope Petroleum Systems

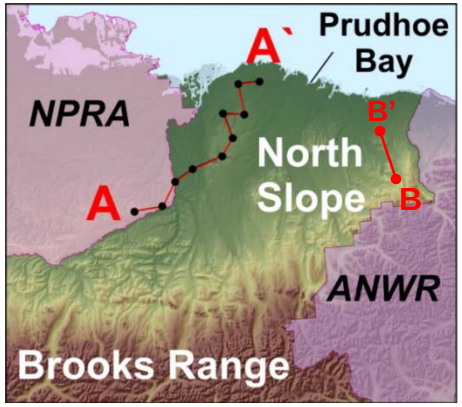
## 3 prolific source rock intervals



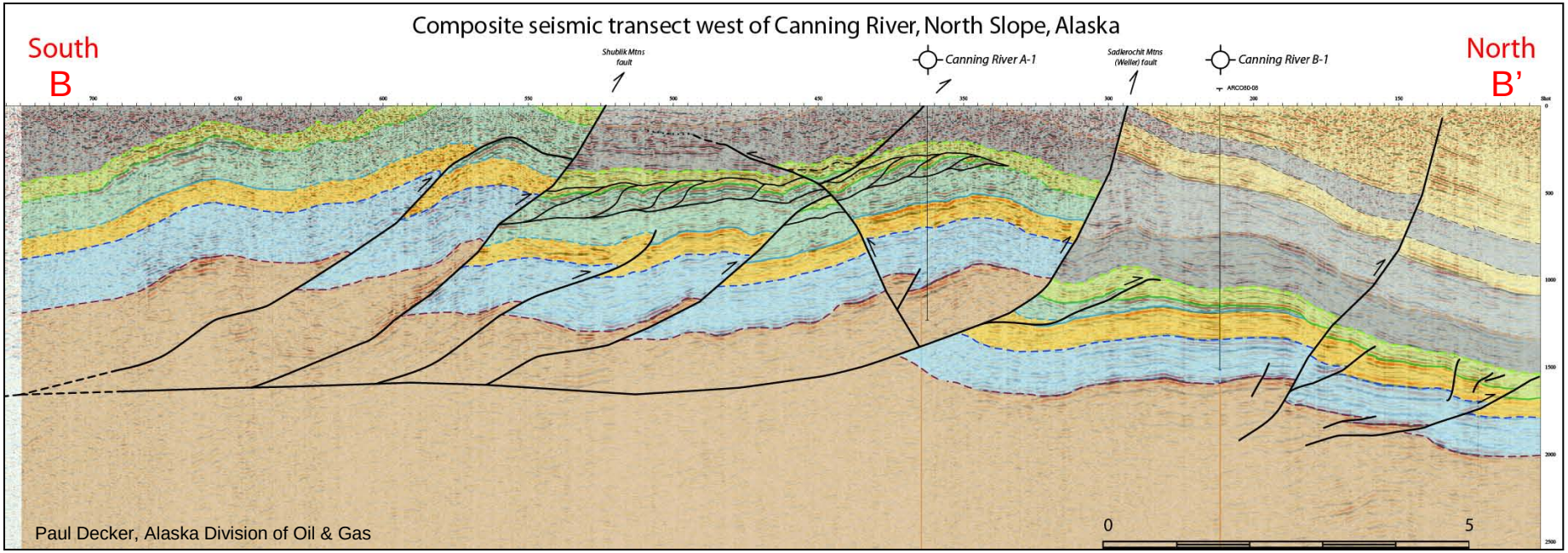

Modified by Alaska Division of Oil and Gas staff from Ken Bird and David Houseknecht (U.S. Geological Survey), personal communication, 2002

# Merging Surface and Subsurface Data



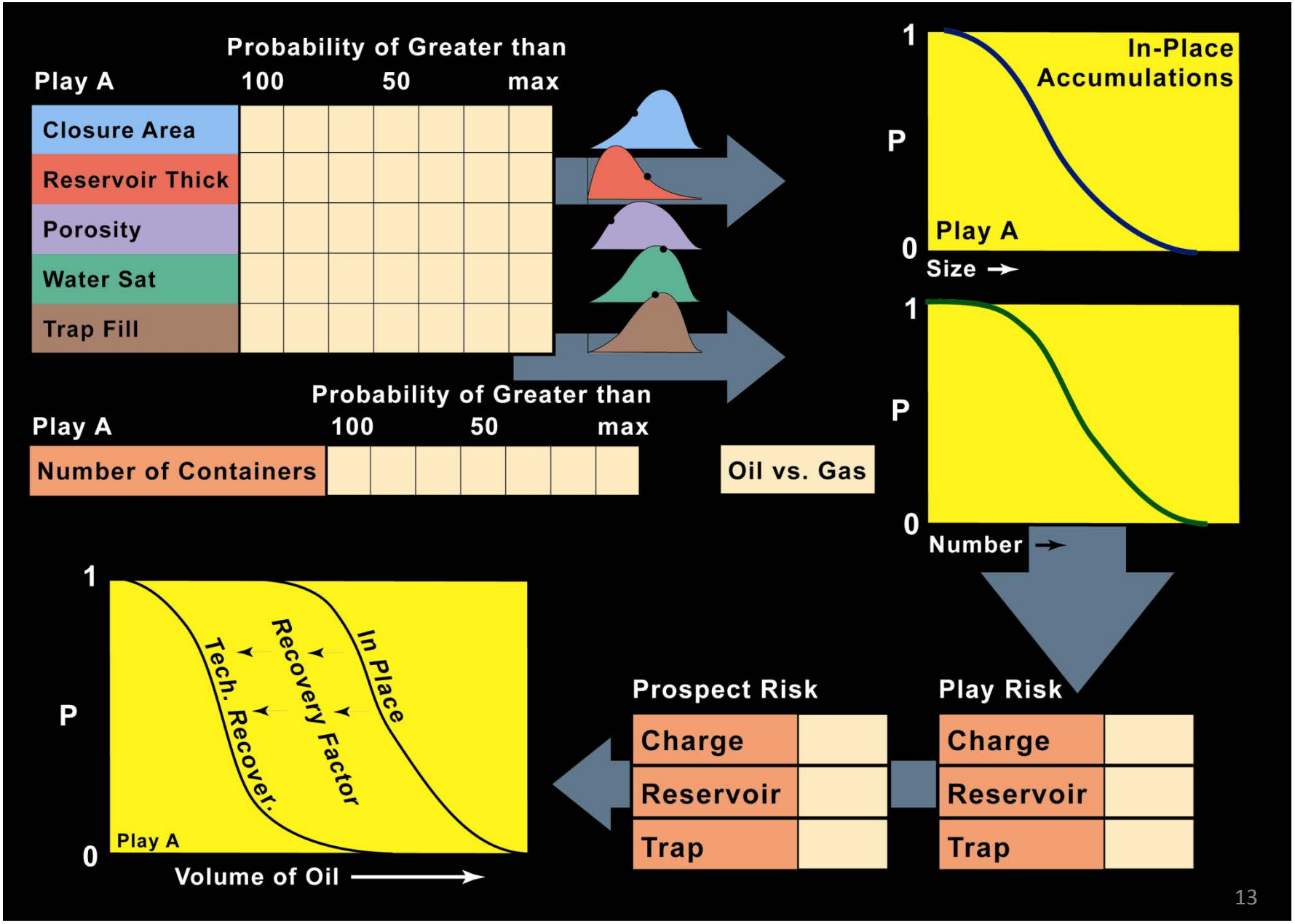




- nonmarine undifferentiated
- shallow marine to proximal shelf ss.
- distal shelf ss. to sltst.
- toe-of-slope turbidites (sand-prone)
- shelf to slope mudst. to sltst.
- condensed or bentonitic sh.



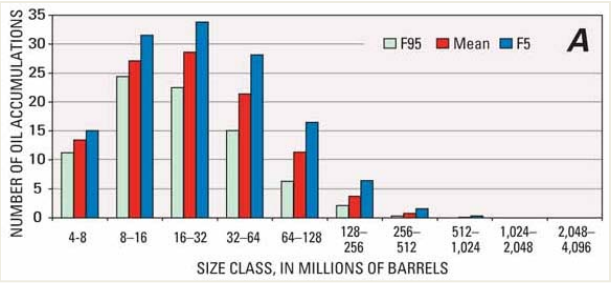

Paul Decker, Alaska Division of Oil & Gas

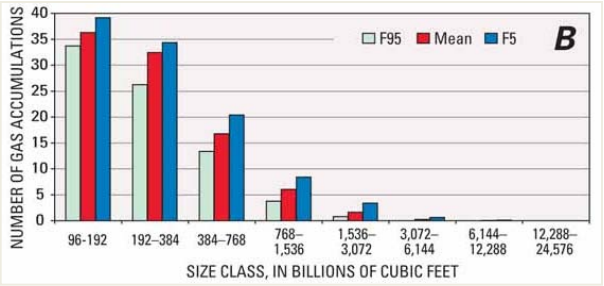
# USGS Assessment Methodology – Geologic Basis



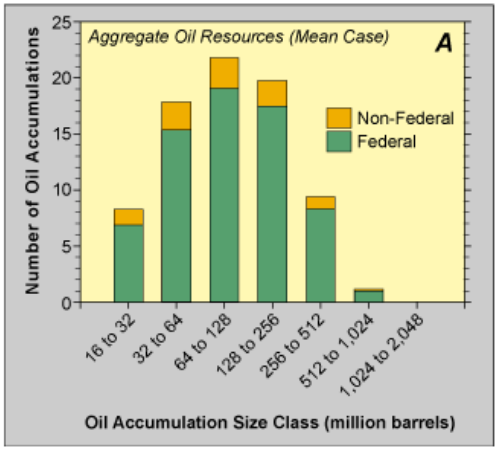
# Undiscovered Mean Field Size Distributions - USGS

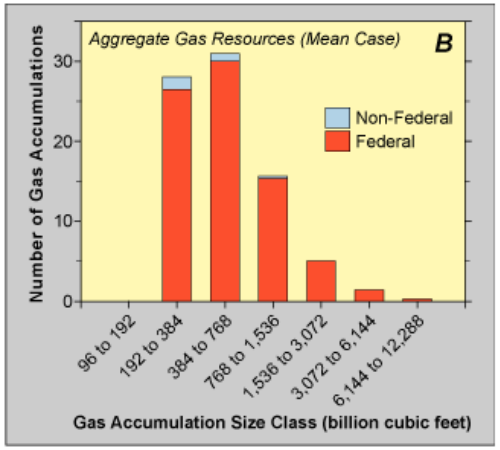
State Lands: ~1 undis-covered oil accumulation > 250 MMBO recoverable. ~ 2 undis-covered gas accumulations > 1.5 TCF recoverable.



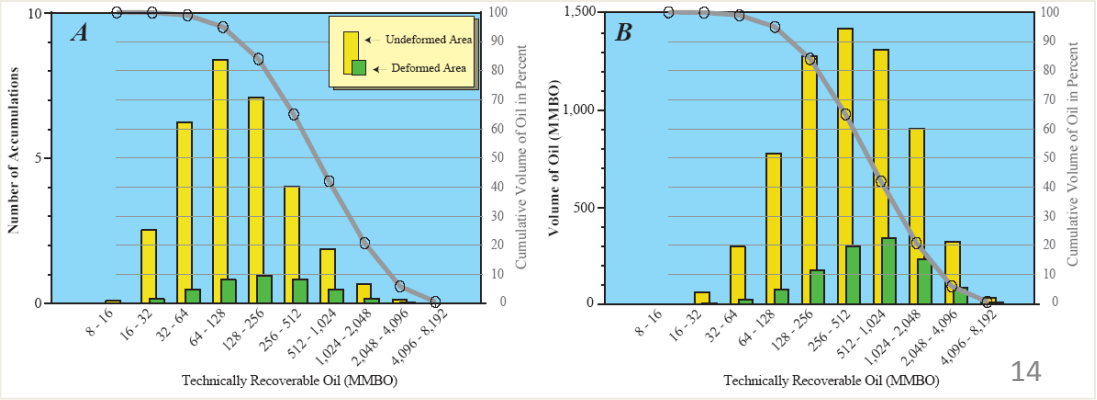




NPRA: ~11 undiscovered oil accumulations > 250 MMBO recoverable. ~7 undiscovered gas accumulations > 1.5 TCF recoverable.

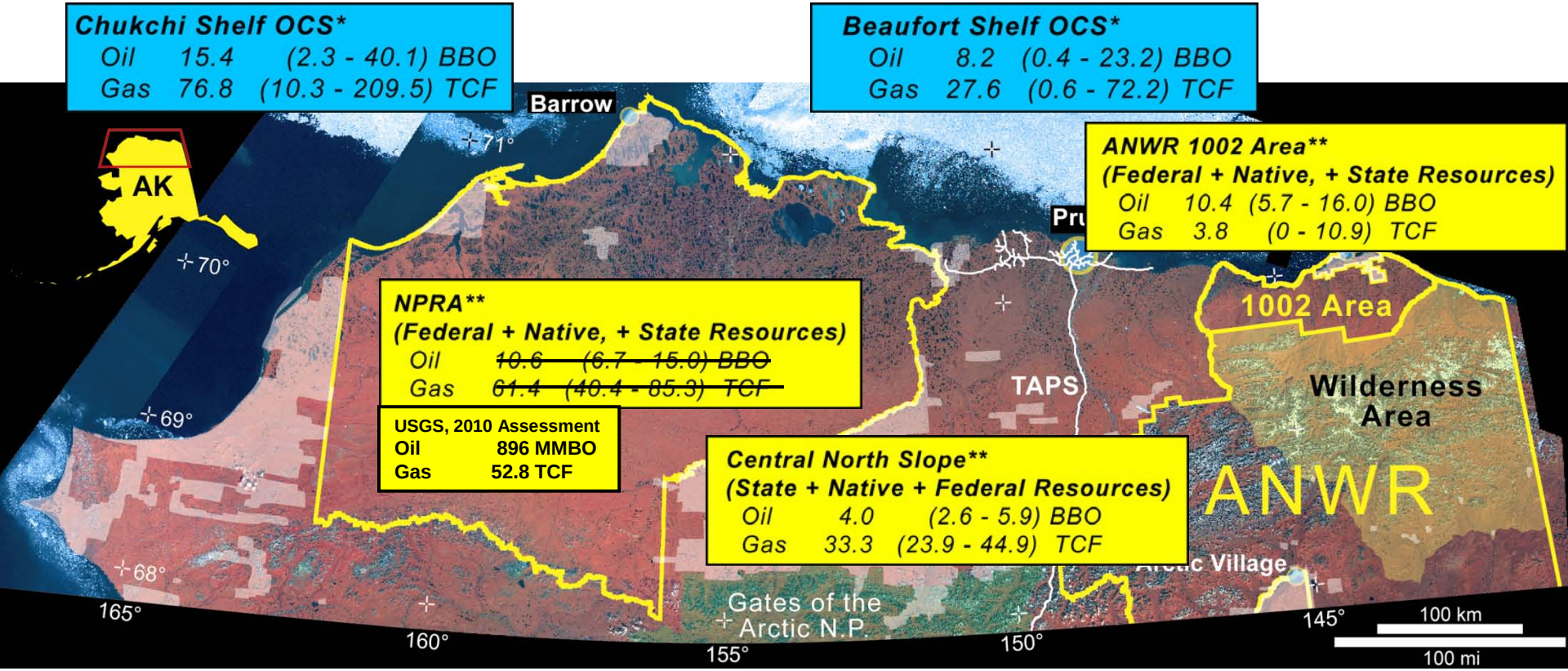



ANWR 1002: ~9 undis-covered oil accumulations > 250 MMBO recoverable (~65% of estimated total recoverable oil volume); gas resource not shown.



# USGS & BOEMRE Estimates
# Undiscovered Petroleum in Arctic Alaska
## Conventional Reservoirs Only




Total Mean Undiscovered Technically Recoverable Conventional Resource:

40 BBO, 207 TCF

* Oil includes crude oil + natural gas liquids
Gas includes nonassociated + associated gas

** Oil includes crude oil only
Gas includes nonassociated gas only

# Current USGS and BOEMRE Assessments – Arctic Alaska

## Undiscovered, Technically Recoverable Conventional Oil and Gas

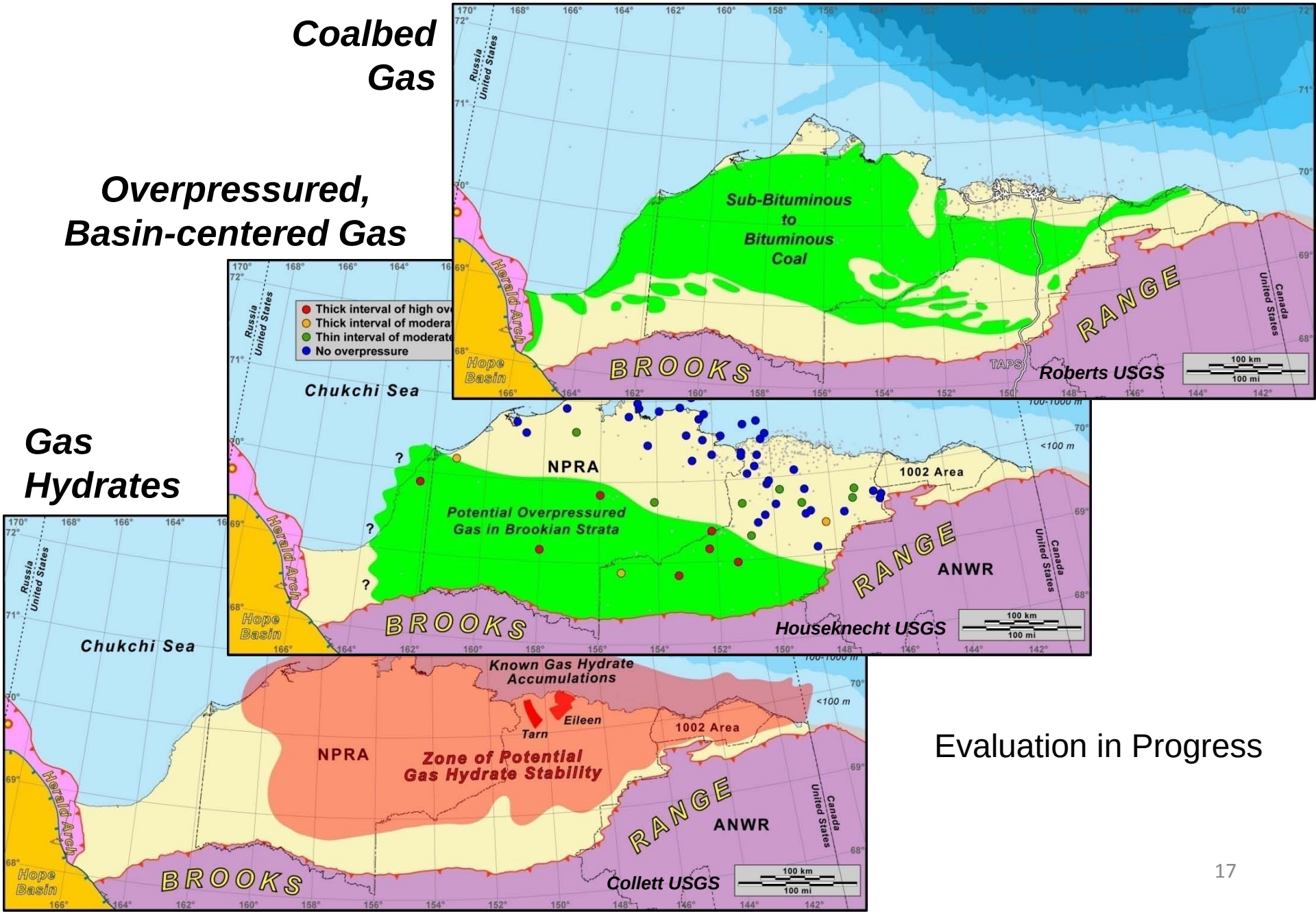
| Region and Assessment Segment | | Oil, MMSTB (million stock tank barrels) | | | Gas, BCF (billion cubic feet) | | |
|---|---|---|---|---|---|---|---|
| | | Probabilty Distribution | | | Probabilty Distribution | | |
| **North Slope Onshore & State Waters[2]** | | **F95** | **Mean** | **F05** | **F95** | **Mean** | **F05** |
| Central North Slope | *Oil & Associated gas* | 2,565 | 3,984 | 5,854 | 2,681 | 4,198 | 6,092 |
| | *NGL & Non-associated gas* | --[3] | 478 | --[3] | 23,939 | 33,318 | 44,873 |
| Nat'l Petrol Reserve Alaska | *Oil & Associated gas* | -- | 896 | -- | -- | -- | -- |
| | *NGL & Non-associated gas* | --[3] | -- | --[3] | -- | 52,839 | -- |
| ANWR coastal plain[2] | *Oil & Associated gas* | 5,724 | 10,360 | 15,955 | -- | 4,764 | -- |
| | *NGL & Non-associated gas* | --[3] | 190 | --[3] | 0 | 3,841 | 10,852 |
| total - North Slope Onshore | | --[3] | 15,908 | --[3] | --[3] | 98,960 | --[3] |
| **Arctic Alaska Outer Continental Shelf (OCS)** | | | | | | | |
| Chukchi Shelf | *Oil & all gas* | 2,317 | 15,380 | 40,075 | 10,316 | 76,772 | 209,527 |
| Beaufort Shelf | *Oil & all gas* | 412 | 8,224 | 23,235 | 649 | 27,645 | 72,178 |
| Hope Basin | *Oil & all gas* | 0 | 150 | 600 | 0 | 3,770 | 14,980 |
| total - Arctic OCS (offshore) | | 6,030 | 23,754 | 53,170 | 27,830 | 108,187 | 247,190 |
| **TOTAL - Arctic Alaska** | | --[3] | ***39,662*** | --[3] | --[3] | ***207,147*** | --[3] |

# “Unconventional” Gas Resources (continuous resources)

***Coalbed Gas***

***Overpressured, Basin-centered Gas***

***Gas Hydrates***




Evaluation in Progress