

Introductory Comments:

This material was presented at a Department of Natural Resources Technical Review Meeting held in Anchorage on March 26th, 2008. This public gathering was aimed at creating a venue to formalize the rapid communication data and results from ongoing work by the Division of Geological & Geophysical Surveys (DGGS) and Division of Oil & Gas (DOG). Additionally, this meeting sought to stimulate discussion on the petroleum geology of northern Alaska.

The following presentation was created and delivered by Marwan Wartes (DGGS). The version included here is only slightly modified from the original; in the absence of a speaker, some slides have been annotated to improve improve clarity and any animations have been removed.

For more information, please contact:

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The Colville Basin of Alaska's North Slope represents one of the most promising onshore exploration frontiers in North America



Curious Cubs...



Canning A-1 Well



Drilling Pad, Prudhoe Bay



Trans-Alaska Pipeline

DGGS

- M. Wartes
- D. LePain
- R. Gillis
- R. Reifenhohl
- P. Delaney
- A. Loveland
- R. Swenson

DOG

- P. Decker
- K. Helmold
- D. Shellenbaum

UAF

- W. Wallace
- M. Whalen
- P. McCarthy

Students

- D. van der Kolk
- P. Flaig
- J. Mongrain
- A. Duncan

USGS

- J. Dumoulin
- D. Houseknecht
- C. Schenk
- T. Moore
- C. Potter

Consultant

- G. Mull

Primary Investigators / Collaborators



DGGS / DOG North Slope Program

- Stratigraphic and structural studies of economically significant units
- Characterization of the regional petroleum system (source rock geochemistry and reservoir quality)
- Detailed 1:63,360-scale geologic mapping of economically significant areas



Funding sources

- DGGS / DOG general funds
- State capital improvement grants
- Federal STATEMAP
- Industry consortium pays for operational expenses and intern support

SUMMARY PROPOSAL FOR THE ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL
SURVEYS NORTH SLOPE PROGRAM:

**PETROLEUM-RELATED GEOLOGICAL STUDIES IN THE BROOKS
RANGE FOOTHILLS AND NORTH SLOPE, ALASKA**

2008 Field Program



Research to be conducted by:

*Marwan Wates¹, David LePain, Robert Gillis, Rocky Reifentuhl,
Paige Delaney, Andrea Loveland, Jim Clough, and Robert Swenson*

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March, 2008

2007 Industry Support

Anadarko

BG Alaska

Petro-Canada

ENI

ConocoPhillips

FEX

Chevron

Pioneer Natural Resources

Shell



- **Student training (internships)**
- **Scientific / logistical support for theses**

UAF Graduate Students

- Dolores van der Kolk
- Peter Flaig
- Jake Mongrain
- Rebecca Bailey (BP)
- Alec Duncan (BP)
- Jesse White
(Kinderhook-Morgan)

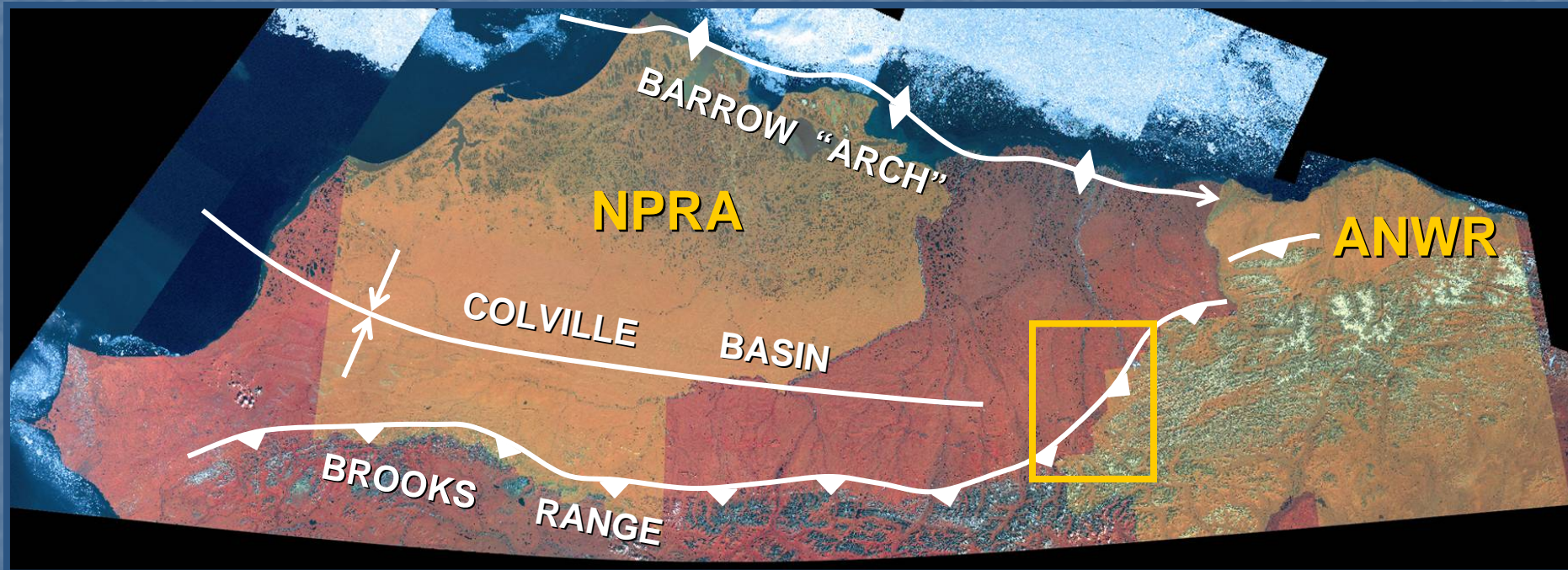


Annual Field Tour

- Overview of stratigraphy and structure relevant to the North Slope petroleum system
- Visit key localities
- Consider new results



Location Map—2007 Field Tour



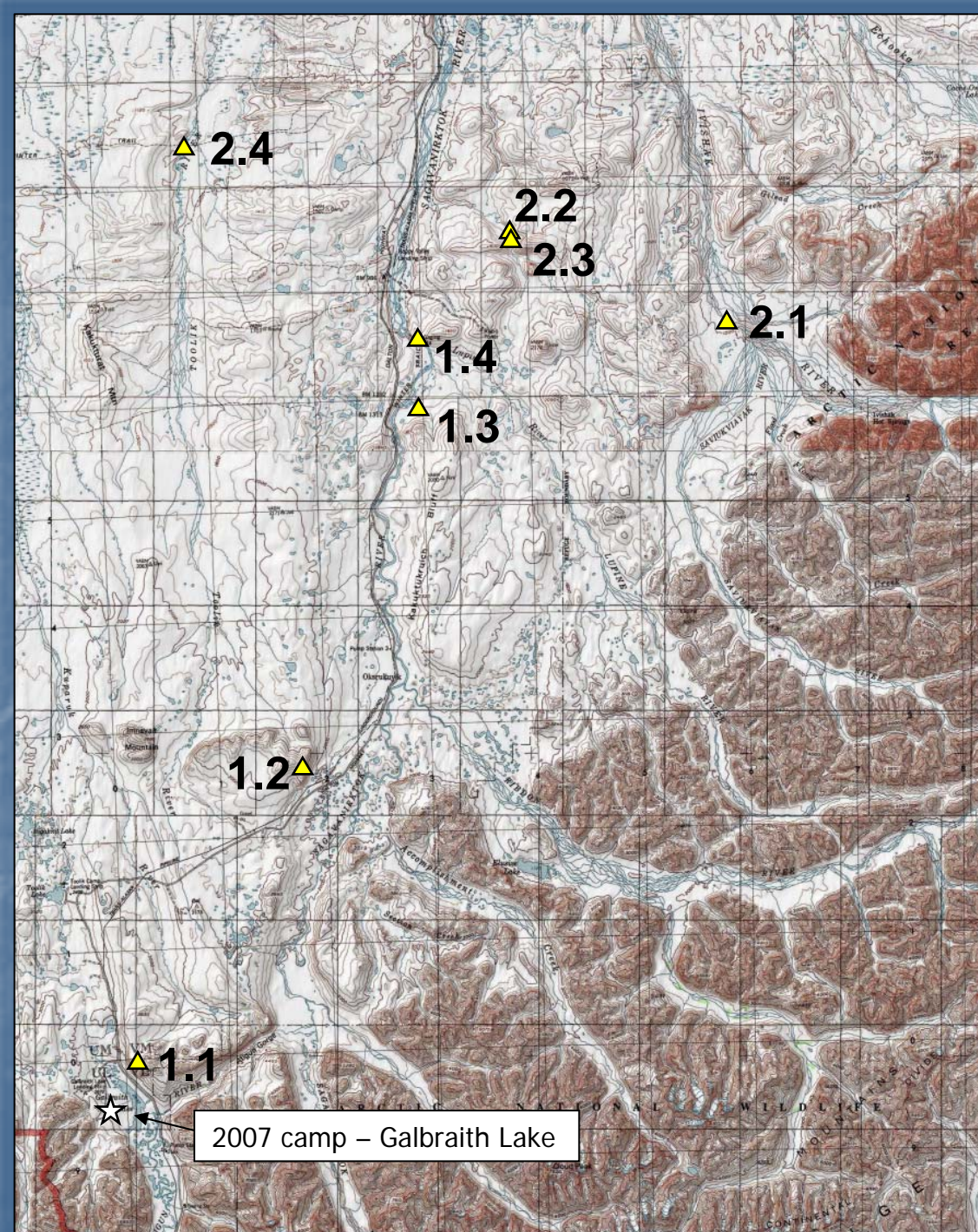
2007 DGGS Tour Localities

Day 1

- Stop 1.1 Fortress Mtn Fm fan delta,
Atigun syncline
- Stop 1.2 Nanushuk Fm shoreface,
Slope Mountain
- Stop 1.3 Nanushuk Fm fluvial,
NE of Icecut
- Stop 1.4 Torok Fm turbidites,
Sagavanirktok R/Lupine R

Day 2

- Stop 2.1 Gilead Ss (Torok Fm) turbidites,
Ivishak River
- Stop 2.2 Seabee Fm turbidites,
Hue Sh-equivalent source, &
basal Canning Fm structure,
Sagashak Creek
- Stop 2.3 Canning Fm turbidites,
Sagashak Creek
- Stop 2.4 Schrader Bluff nonmarine to
shallow marine, Toolik River



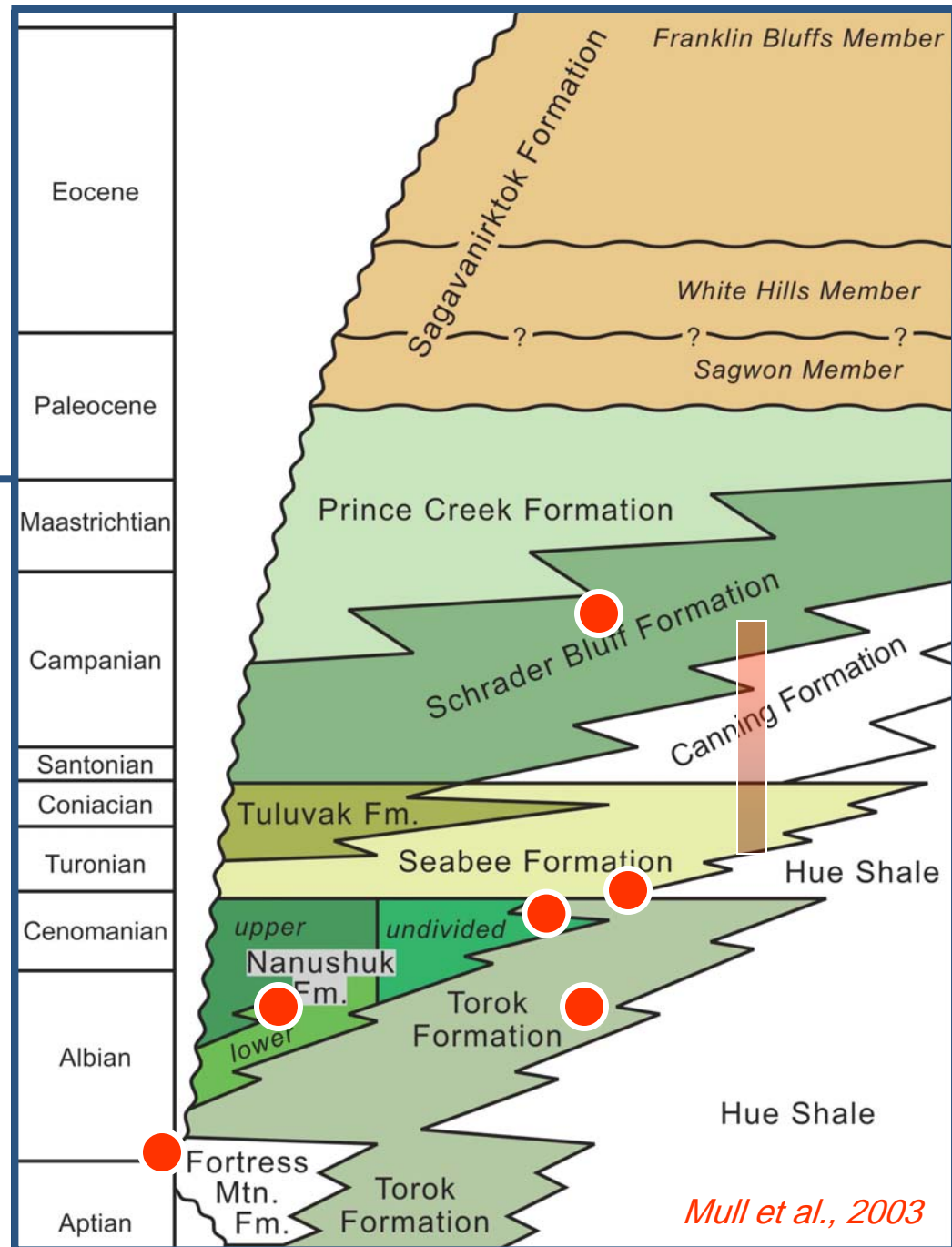
2007 Field Tour Stops

See Wartes and Decker, 2008



TERTIARY

CRETACEOUS



PROGRAM OBJECTIVE

Provide high quality, publicly available data to stimulate exploration in northern Alaska



PUBLICATION LIST FROM THE ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS(DGGS) BROOKS RANGE FOOTHILLS AND NORTHSLOPE PROGRAM (1994PRESENT)

- Brown, P.J. II, Saltus, R.W., Peapples, P., Swenson, R.F., Duncan, A.S., and Wallace, W.K., 2006, Reduction procedures and implications of a high resolution gravity traverse in the Brooks Range Foothills, Alaska [abs.]: Geological Society of America Abstracts with Programs, Vol. 38, No. 5, p. 83.
- Crowder, R. K., Adams, K. E., and Mull, C. G., 1994, Measured stratigraphic section of the Tingmerkup Sandstone (Neocomian), western NPRA, Alaska: Alaska Division of Geological and Geophysical Surveys Publiedata file report 9429, 5 p, 1 sheet (strat. column).
- Crowder, R. K., Mull, C. G., Adams, K. E., 1995, Lowstand Depositional Systems Related to Early Cretaceous Rifting of the Arctic Alaska Plate [abs.]: A New Stratigraphic Play on Alaska's North Slope: AAPG Pacific Section Meeting, AAPG Bulletin, vol. 79, no 4, p. 582,
- Decker, P.L., 2006, A Brief Overview of Alaska Petroleum Systems: Alaska GeoSurvey News, V. 9, No. 2, p. 1-6.
- Decker, P.L., 2007, Brookian Sequence Stratigraphic Correlations, Umiat Field to Milne Point Field, West-central North Slope, Alaska: DGGS Preliminary Report of Investigations.
- Decker, P.L., in review., Organic Geochemical and Thermal Maturity Investigations, 2004-2005 Field Programs, North Slope Foothills and Eastern Brooks Range, Alaska: DGGS Preliminary Interpretive Report.
- Dow, W.G., and Talukdar, S. C., 1995, Geochemical analysis of outcrop samples, Northwestern DeLong Mountains, Brooks Range, Alaska: Alaska Division of Geological and Geophysical Surveys Public-data file report, 9529, 40pp.
- Dow, W. G, 1998, Organic geochemistry of Cretaceous, Jurassic, and Triassic shales from the northwestern DeLong Mountains, western Brooks Range, Alaska, 1994-1997: Alaska Division of Geological and Geophysical Surveys Public data file report 9835, 181 p., 1 Sheet.
- Dow, W.G, 2000, Geochemical analysis of outcrop samples from Tingmerkup 1998 project: Alaska Division of Geological and Geophysical Surveys Raw data file 20003, 63 p., 1 Map.

PRELIMINARY INTERPRETIVE REPORT 2008-1

**PRELIMINARY RESULTS OF RECENT GEOLOGIC FIELD INVESTIGATIONS
IN THE BROOKS RANGE FOOTHILLS AND NORTH SLOPE, ALASKA**

by
Marwan A. Wartes and Paul Decker, *editors*



March 2008

THIS REPORT HAS NOT BEEN REVIEWED FOR
TECHNICAL CONTENT (EXCEPT AS NOTED IN TEXT) OR FOR
CONFORMITY TO THE EDITORIAL STANDARDS OF DGGs.

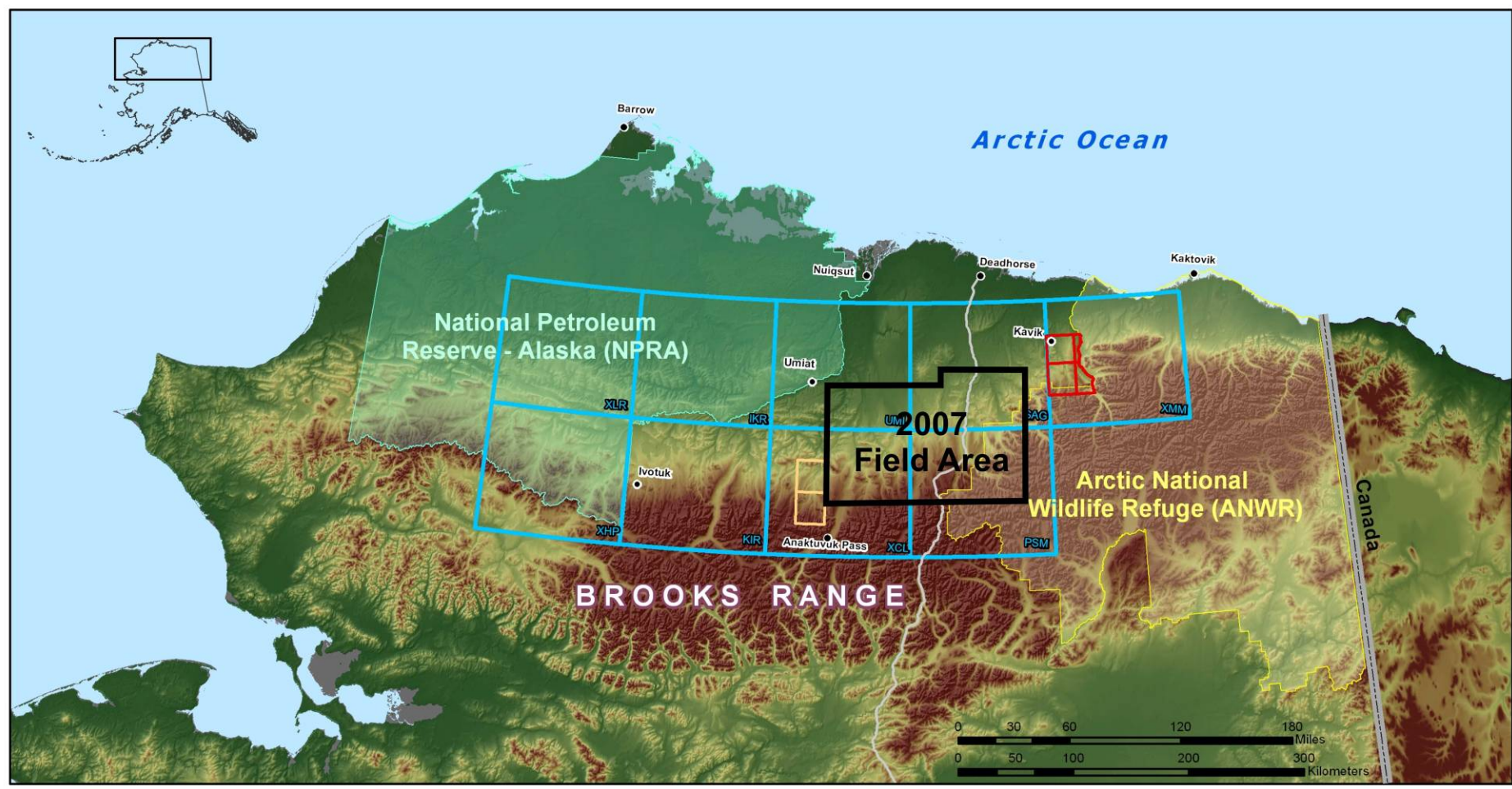
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SPrice

Ongoing work (in prep)

- **Geologic Maps (Cobblestone, Kanayut, & Kavik)**
- **Brookian sedimentology & stratigraphy**
- **Kemik Ss facies and paleogeography**
- **Organic geochemistry**
- **Brookian petrology & reservoir quality**
- **Subsurface studies**
- **Thermochronology/structure/burial history**
- **Gravity Survey**
- **Biostratigraphy (megafossil and microfossil)**

2007 Program Focus



2007 Program Focus

■ NORTHERN (East-central North Slope)

- *Sedimentology and Sequence Stratigraphy of Upper Cretaceous and Tertiary Exposures in the Sagavanirktok River Area*
- *Stratigraphy, Structural Geology, and Depositional Setting of Albian-Turonian Rocks in the Gilead Area*

■ SOUTHERN (Proximal Foreland Basin)

- *Reconstruction of the Lower Cretaceous Depositional System, Southern Colville Basin*
- *Structural Evolution of the Brooks Range Foothills—Constraining Burial History and Timing in the Foothills Province*

■ GENERAL

- *Controls on Brookian Sandstone Reservoir Quality*
- *Source Rock Quality and Hydrocarbon Occurrence*
- *Geologic Mapping*

NORTH SLOPE PROGRAM (Morning)

Topic	Presenter(s)	Start Time
Safety comment	BP rep	8:30
Introduction	R. Swenson	8:35
North Slope program overview	M. Wartes	8:45
Summary of recent North Slope studies with an emphasis on work in the Sagavanirktok Quadrangle	P. Decker & M. Wartes	9:00
Structural and stratigraphic investigations of Albian-Turonian strata in the Gilead area	P. Decker	9:15
Surface to subsurface correlations, Sagavanirktok River area, east-central North Slope	P. Decker	9:45
POSTERS & ADDITIONAL DISCUSSION OF MORNING TOPICS	Staff	10:00-11:30
LUNCH		11:30 - 1:00

POSTERS & ADDITIONAL DISCUSSION

10:00-11:30 am
2:15-5:00 pm

- Preliminary interpreted regional seismic lines
- Preliminary annotated well log cross sections
- Geochemistry and stratigraphy of the Pebble Shale (eastern North Slope)
- Turonian-Campanian facies analysis (“Sagashak” Creek)
- Schrader Bluff and Prince Creek formations measured sections (Toolik River)
- Schrader Bluff Formation sedimentology and stratigraphy (Ivishak River)
- Cenomanian(?)-Turonian(?) measured section and facies (Sagavanirktok rivers)
- Measured sections and facies in the Nanushuk Formation (Colville River)
- Summaries of past work on the Nanushuk Formation (Tuktu escarpment)
- Preliminary petrography and reservoir quality of the Fortress Mountain Formation
- Summaries of past work on the Fortress Mountain Formation
- Geologic Mapping in the Kavik area
- Geologic Mapping in the East-central Brooks Range Foothills

