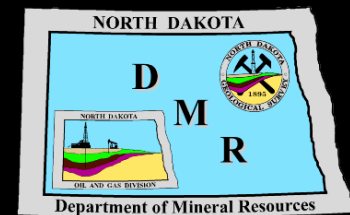


# ***DEVELOPMENT OF THE BAKKEN RESOURCE***

*State Oil and Gas Regulatory  
Exchange*

*Salt Lake City, UT – Dec 9-10, 2014*

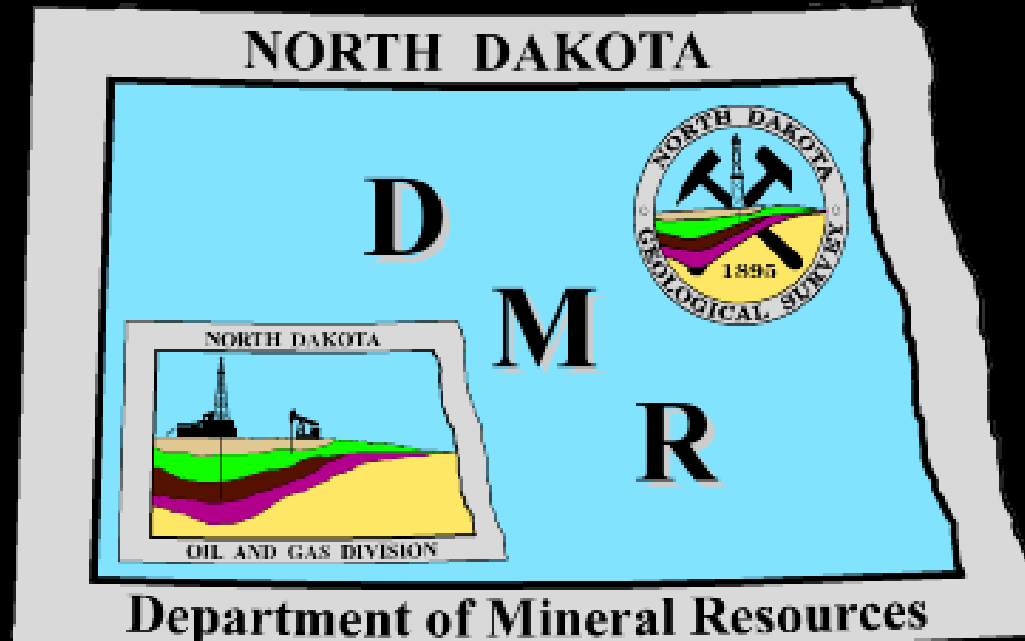


# **North Dakota Development**

- **Regulations**
- **Resource Play**
- **Development**
- **Bakken Results**

*Bruce E. Hicks  
Assistant Director  
NDIC-DMR-OGD  
Bismarck, ND*

# North Dakota Department of Mineral Resources



<https://www.dmr.nd.gov/oilgas/>

<https://www.dmr.nd.gov/ndgs/>

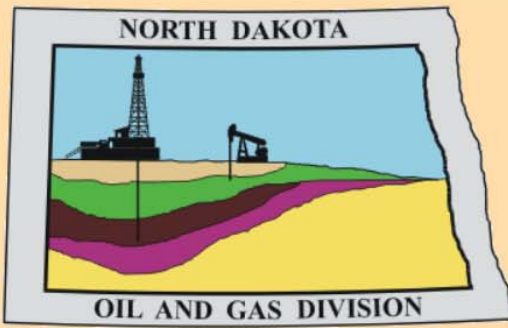
***600 East Boulevard Ave. - Dept 405***

***Bismarck, ND 58505-0840***

***(701) 328-8020***

***(701) 328-8000***

- Services
- Rules & Regulations
- Forms
- Hearing Dockets
- Active Drilling Rigs
- Daily Activity Reports
- Confidential Well List
- General Statistics
- Seismic
- Well Search
- Report a Spill/Incident
- Gathering Lines
- GIS Map Server
- Publications
- Surface Mineral Owner
- Basic Services
- Premium Services
- Electronic Filing
- Related Links
- FAQ & Web Help
- Employment Opportunities
- Contact Us
- Employee Directory
- Email Addresses



Welcome to the North Dakota Industrial Commission, Department of Oil and Gas Division, Home page.

[Director's Cut - 05/13/2014](#) and [Recent Presentations](#)

The Director's Cut is an update on current activity in the North Dakota oil patch from the Director of the ( [View past Director's Cuts](#) [Webinars](#) )

View [press releases](#) from the Oil and Gas Division

[North Dakota Industrial Commission Permitting Policies](#)

["Diesel fuel" in HF stimulation now requires UIC approval](#)

[Bakken and Three Forks Information!](#)

[Class VI Primacy Application for the authority to regulate the Geologic Storage of Carbon Dioxide](#)

Available on the ND Petroleum Council web site are the [Surface Owner Information Center](#), the [Royalty Owner Information Center](#) and the P that were used at the [2012 Williston Basin Petroleum Conference](#).

The Oil and Gas Division regulates the drilling and production of oil and gas in North Dakota. Our mission is to encourage and promote the development, production, and utilization of oil and gas in the state in such a manner as will prevent waste, maximize economic recovery, and fully protect the correlative rights of all owners to the end that the landowners, the royalty owners, the producers, and the general public realize the greatest possible good from these vital natural resources.

**Phone:** (701) 328-8020  
**Fax:** (701) 328-8022  
**Mail:**  
 NDIC Oil and Gas Division  
 600 East Boulevard Ave Dept 405  
 Bismarck, ND 58505-0840  
**General Shipping:**

# North Dakota Development

- **Regulations**
  - Spacing
  - Pooling
  - Unitization
- Resource Play
- Development
- Bakken Results

# Spacing

## Drilling Units

- **NDAC Sec 43-02-03-18**
  - **One hor well per Section (640 acres)**
  - **Exceptions allows after notice & hearing**

## Spacing Units

- **Comm order after notice & hearing**
  - **Multiple hor wells per SU (2-30+)**
  - **320,640,960,1280,1920,2640,3200,5280**

# North Dakota Development

- **Regulations**
  - Spacing
  - **Pooling**
  - Unitization
- Resource Play
- Development
- Bakken Results

# Pooling

## **NDCC Sec 38-08-08**

- **Two or more separately owned tracts**
- **No voluntary pooling**
- **NDIC “shall” force pool all interests**



# North Dakota Development

- **Regulations**
  - Spacing
  - Pooling
  - **Unitization**
- Resource Play
- Development
- Bakken Results

# **Unitization**

## **NDCC Sec 38-08-09.3**

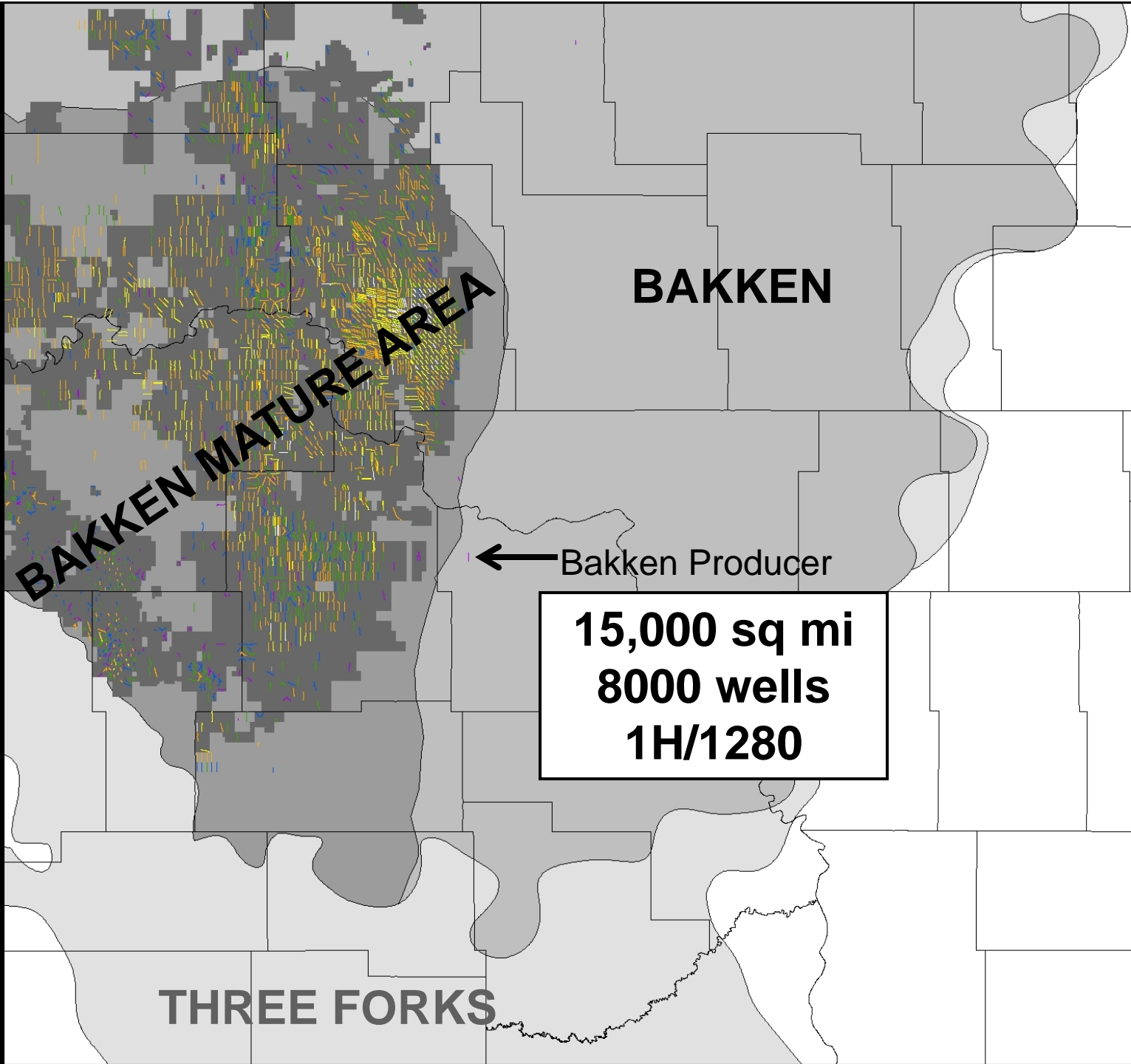
- **Project to substantially increase recovery**
- **EOR unnecessary for approval**

## **NDCC Sec 38-08-09.5**

- **60% MIO approval**
- **60% WIO approval**

# North Dakota Development

- Regulations
  - Spacing units
  - Pooling
  - Unitization
- **Resource Play**
- Development
- Bakken Results



**BAKKEN MATURE AREA**

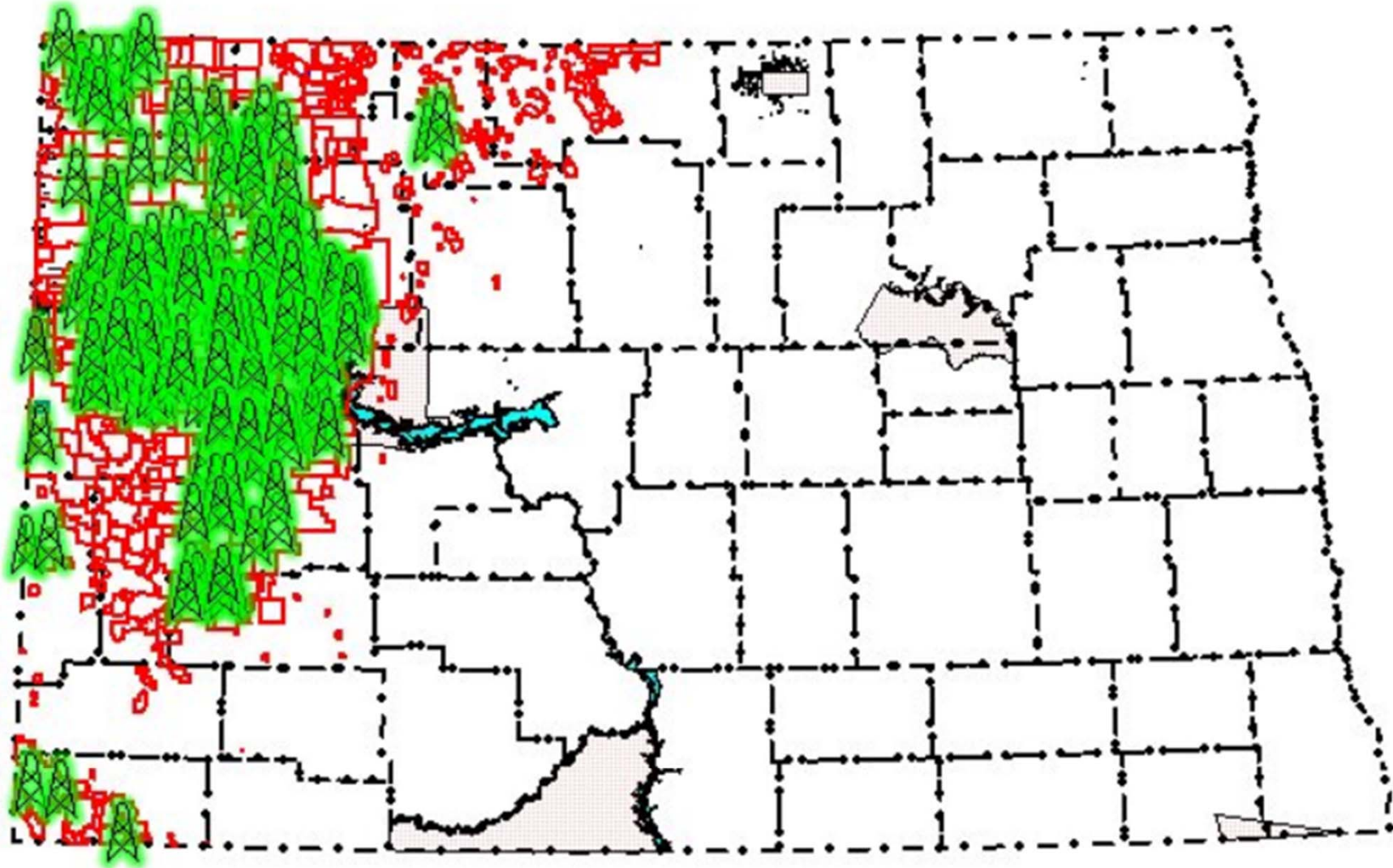
**BAKKEN**

← Bakken Producer

**15,000 sq mi**  
**8000 wells**  
**1H/1280**

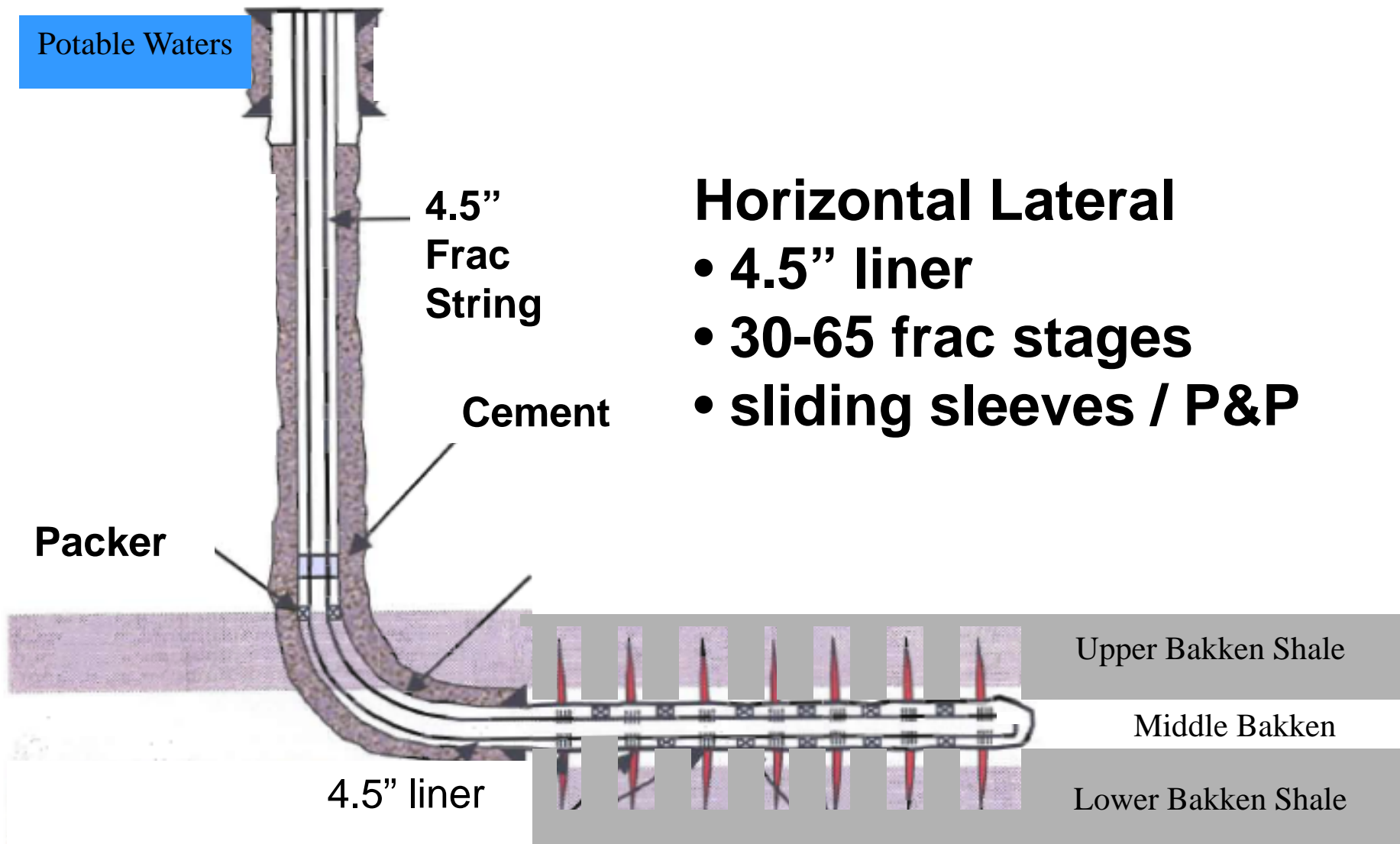
**THREE FORKS**

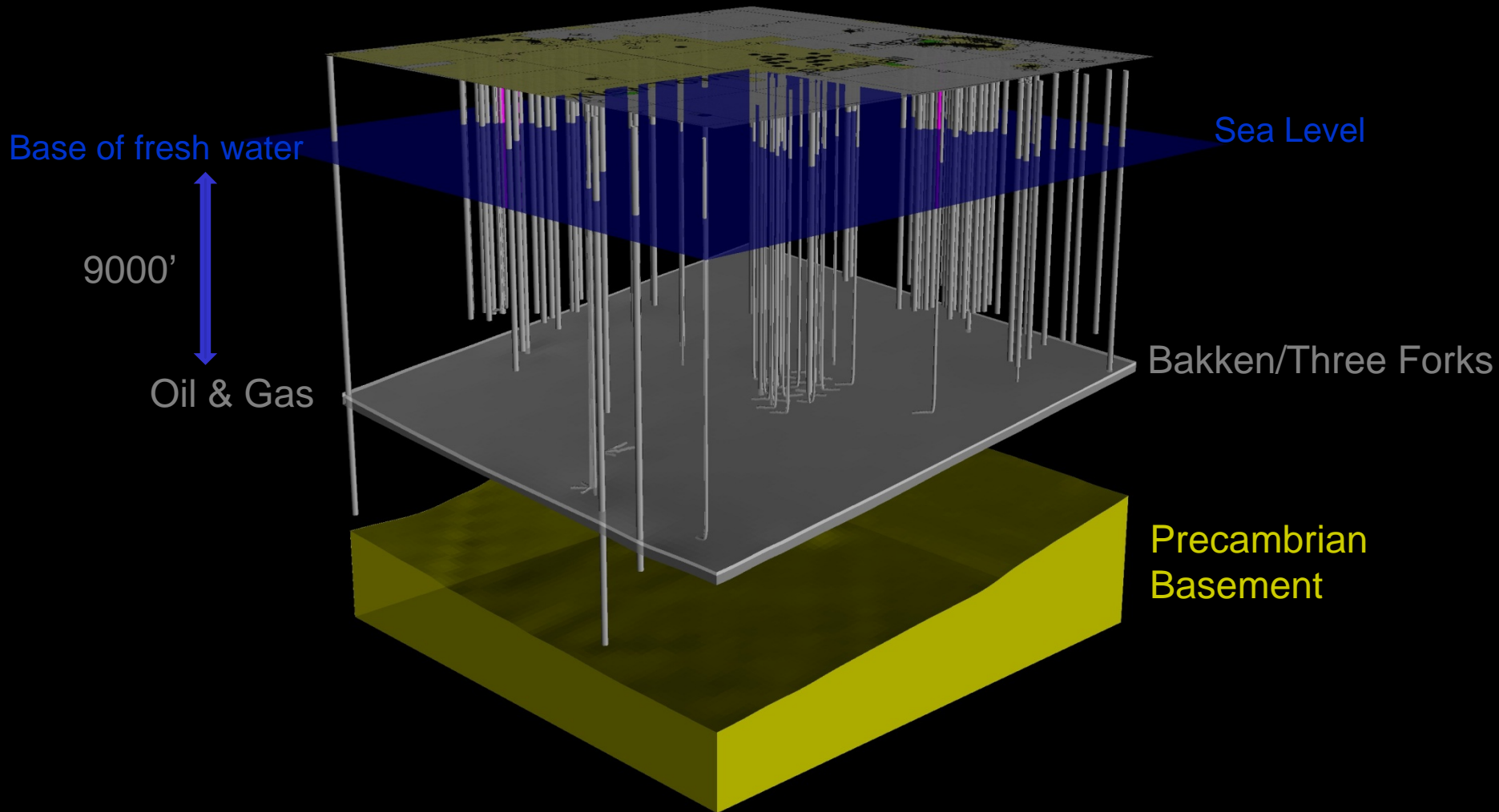
# NORTH DAKOTA – 191 DRILLING RIGS – DECEMBER 2014



**Current drilling activity is focused  
in Mountrail, Dunn, McKenzie, and Williams Counties.**

# TYPICAL HORIZONTAL OIL WELL



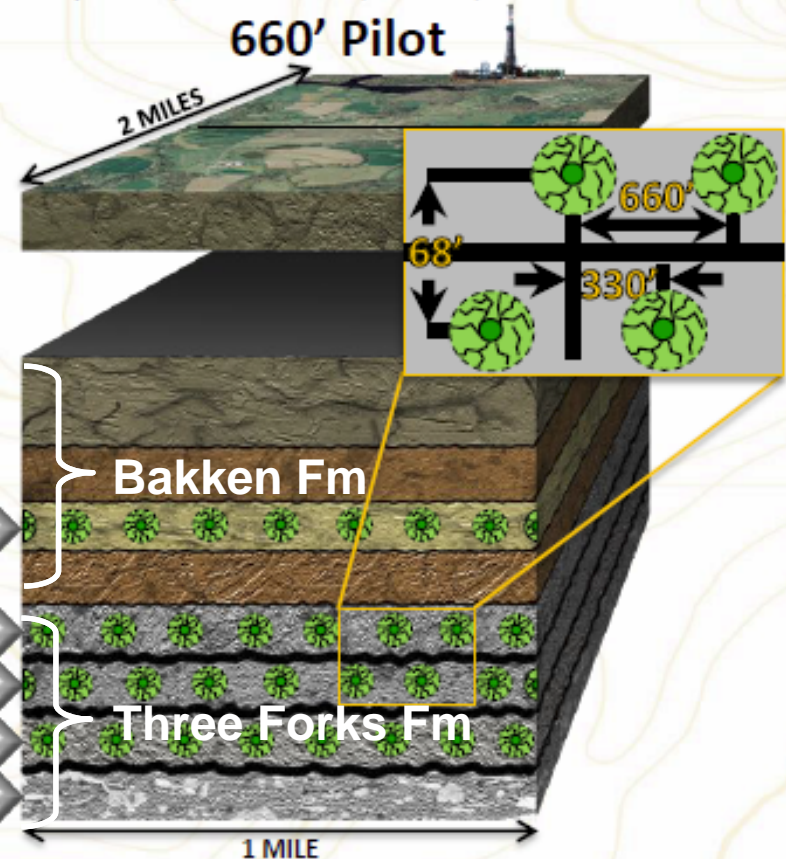
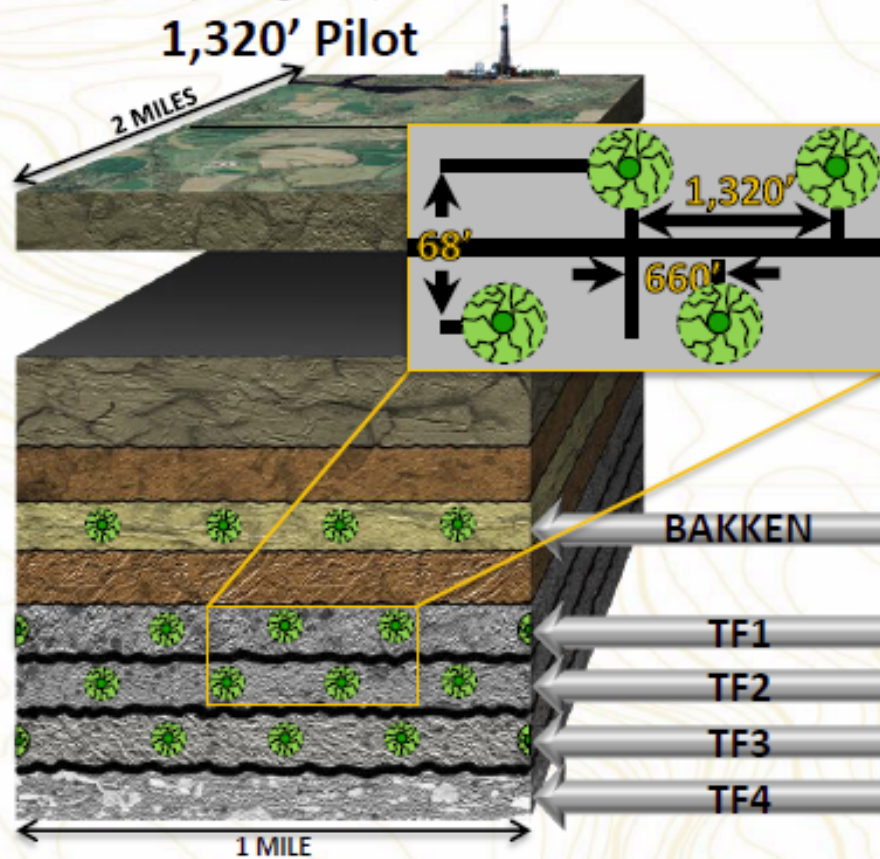




# 1,320' & 660' Pilot Density Projects: 2013-14

*Hawkinson, Tangsrud, and Rollefstad*

*Wahpeton, Lawrence, Mack, and Hartman*



- 3 project areas
- 1,320 ft. same-zone spacing
- 34 new wells (gross)

- 4 project areas
- 660 ft. same-zone spacing
- 31 new wells (gross)



# North Dakota Development

- Regulations
  - Spacing
  - Pooling
  - Unitization
- Resource Play
- **Development**
  - **Uniform Spacing—orderly development**
  - Multi-well locations—small footprint
  - Energy Corridors—industry & residents
- Bakken Results

# ArcIMS Viewer



Five Spacing Patterns

Townships

Rec	Township	Tdir	Range	Rdir	TWPRNG	TWPTEXT	RNGTEXT
1	156	N	90	W	156090	T156N	R 90W

ND OIL

- Oil an
- We
- Pe
- Rig
- Dir
- Dir
- Ho
- Ho
- Ca
- Oil
- Un
- Ins
- Dri
- Se
- Ga
- Other
- Re
- Co
- Riv
- Lai
- Imagery
- Topo/
- Topo/
- NAIP

R

Power

Download Shape Files



**ND OIL & GAS LAYERS**

- Oil and Gas
  - Wells
  - Permit Status Before Spud
  - Rig Location
  - Directional Surveys
  - Directional Legs
  - Horizontal Surveys
  - Horizontal Legs
  - Cases Docketed
  - Oil Fields
  - Unit Boundaries
  - Inspector Areas
- Drilling / Spacing
  - Seismic
- Gas Plants
- Other
- Imagery
  - Topo/DRG 250k
  - Topo/DRG 100k
  - NAIP 2009

**Refresh Map**

Auto Refresh

Help:

- A closed group, click to open.
- An open group, click to close.
- A map layer.

# North Dakota Development

- Regulations
  - Spacing
  - Pooling
  - Unitization
- Resource Play
- **Development**
  - Uniform Spacing—orderly development
  - **Multi-well locations—small footprint**
  - Energy Corridors—industry & residents
- Bakken Results









Vern Whitten Photography

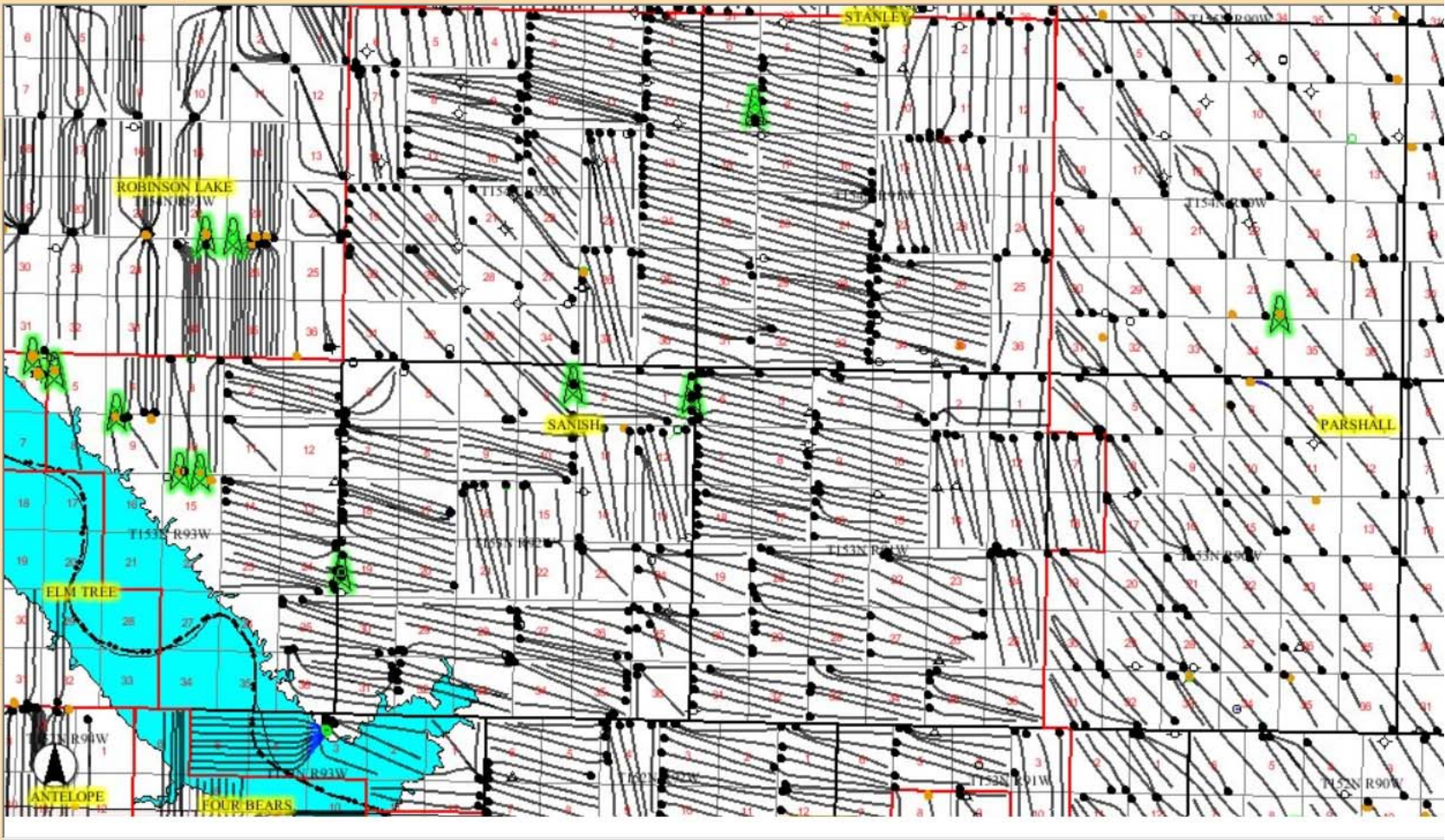
# North Dakota Development

- Regulations
  - Spacing
  - Pooling
  - Unitization
- Resource Play
- **Development**
  - Uniform Spacing—orderly development
  - Multi-well locations—small footprint
  - **Energy Corridors—industry & residents**
- Bakken Results



# Oil and Gas Subscription: ArcIMS Viewer

- Legend / Layers
- Overview Map
- View Entire State
- Previous View
- Clear Selection
- Search
- Create PDF
- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field / Unit
- Find Section

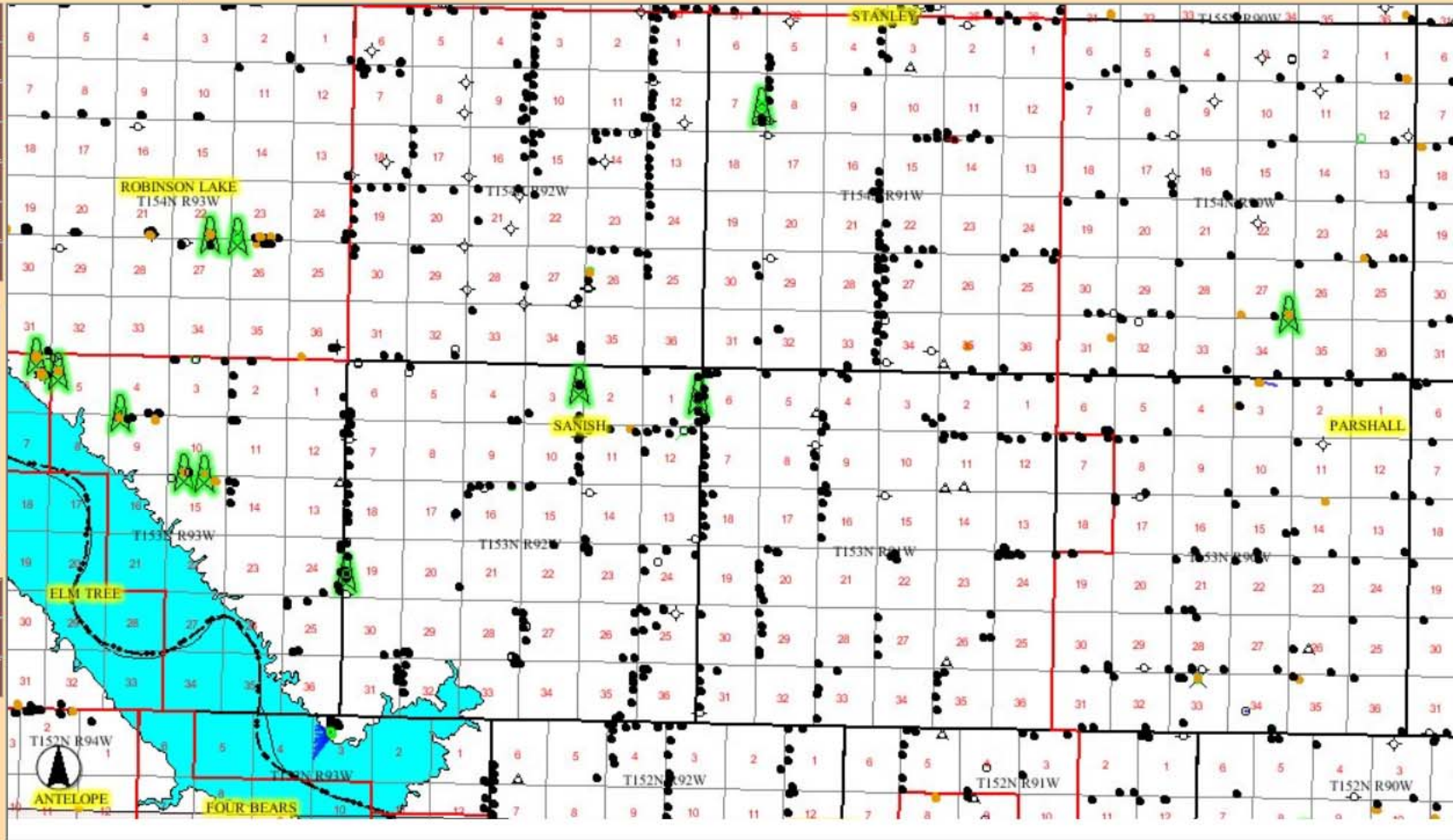


Pan



# Oil and Gas Subscription: ArcIMS Viewer

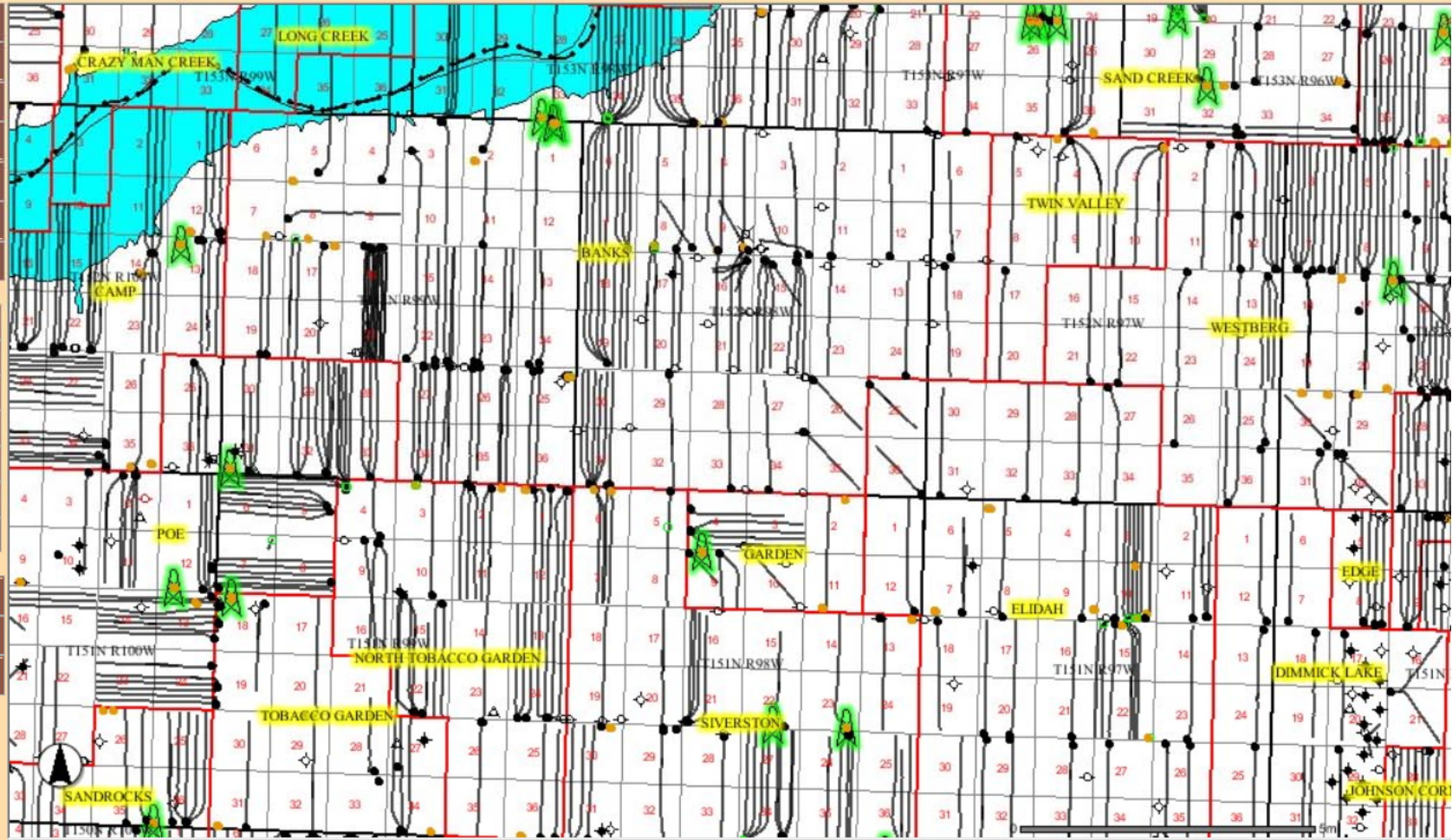
- Legend / Layers
- Overview Map
- View Entire State
- Previous View
- Clear Selection
- Search
- Create PDF
- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field / Unit
- Find Section



Pan

# Oil and Gas Subscription: ArcIMS Viewer

- Legend / Layers
- Overview Map
- View Entire State
- Previous View
- Clear Selection
- Search
- Create PDF
- Zoom In
- Zoom Out
- Pan**
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field / Unit
- Find Section

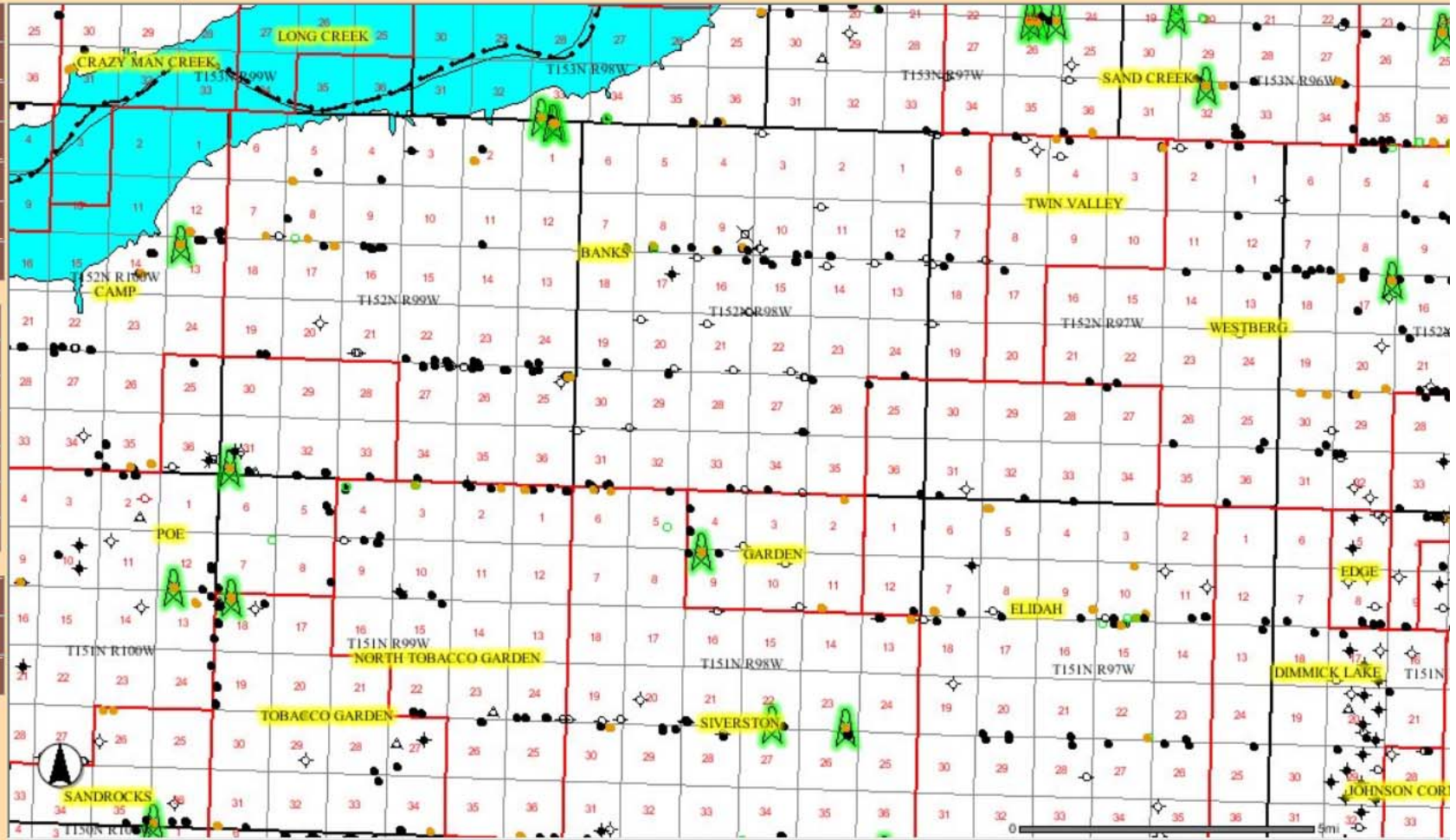


Pan



# Oil and Gas Subscription: ArcIMS Viewer

- Legend / Layers
- Overview Map
- View Entire State
- Previous View
- Clear Selection
- Search
- Create PDF
- Zoom In
- Zoom Out
- Pan
- Rect Identify
- Select Object
- Buffer
- Distance
- Find Well
- Find Field / Unit
- Find Section



Pan





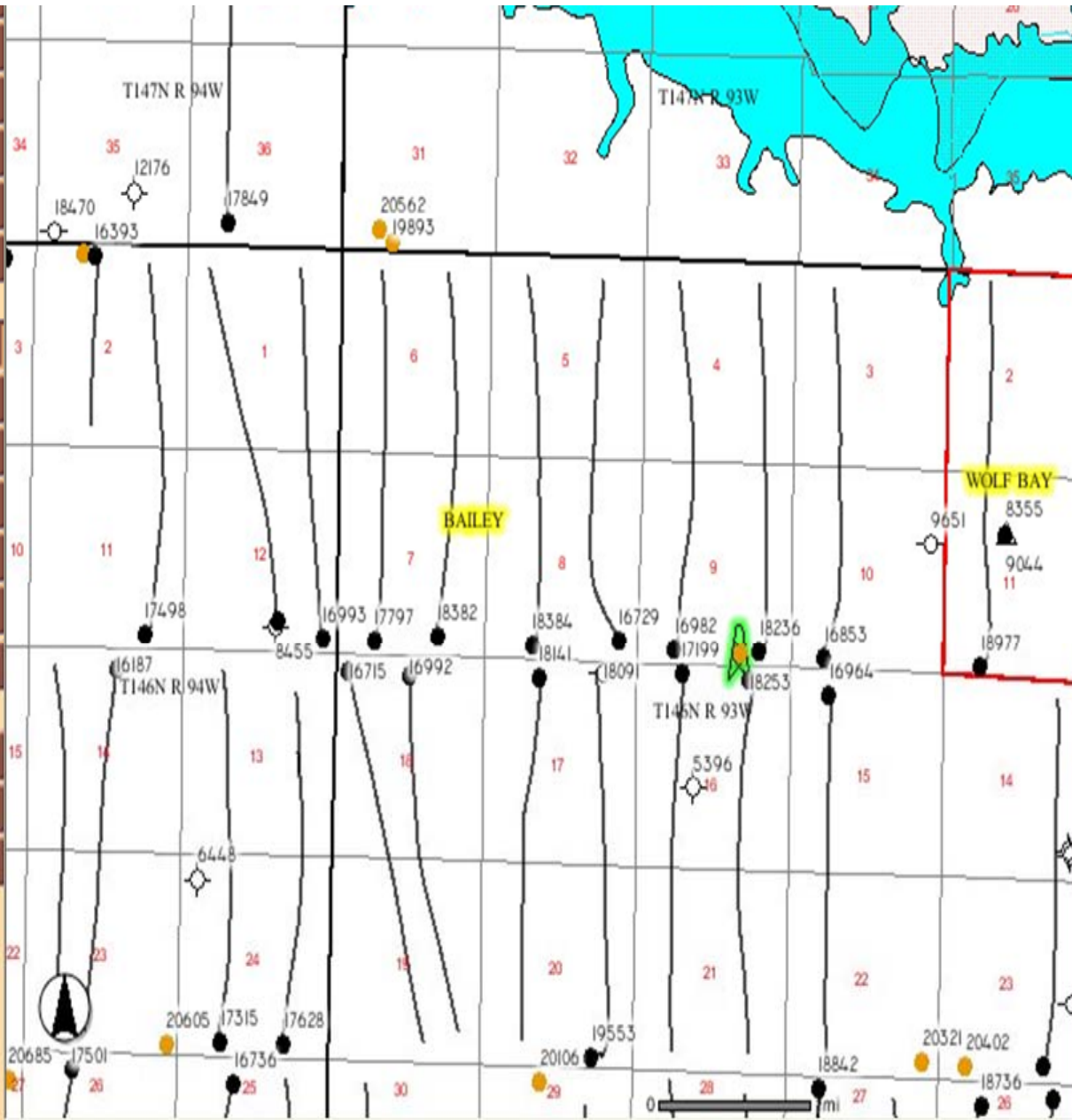
## Energy Corridor

- uniform development
- pipelines, electrical, traffic
- less impact on adjacent roads

Vern Whitten Photography

View Entire State  
Previous View  
Clear Selection  
Search  
Generate PDF

Zoom In  
Zoom Out  
Pan  
Rect Identify  
Select Object  
Buffer  
Distance  
Find Well  
Find Field/Unit  
Find Section



Major Rivers  
Selection cleared.

- Rig Location
- Directional Surveys
- Directional Legs
- Horizontal Surveys
- Horizontal Legs
- Cases Docketed
- Oil Fields
- Unit Boundaries
- Inspector Areas
- Drilling / Spacing
- Seismic
- Gas Plants
- Other
- Reservations
- Corporate Boundaries
- Rivers and Roads
- County Roads
- Major Roads
- Major Rivers
- Missouri River
- Land Ownership
- Imagery
  - Topo/DRG 250k
  - Topo/DRG 100k
  - NAIP 2009

Refresh Map

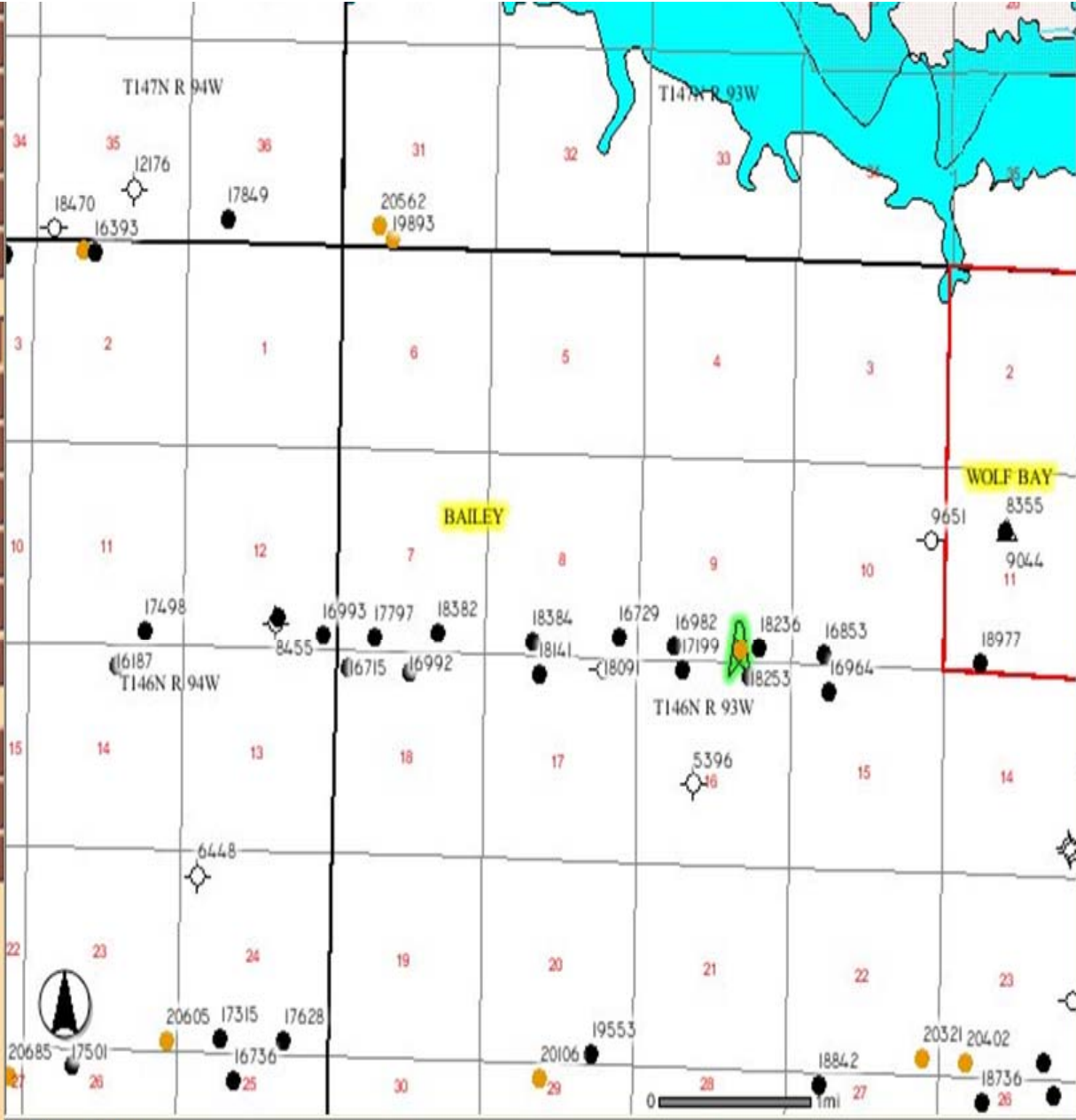
Auto Refresh

Help:  
 A closed group, click to open.  
 An open group, click to close.  
 A map layer.  
 A hidden group/layer, click to make visible.



[View Entire State](#)  
[Previous View](#)  
[Clear Selection](#)  
[Search](#)  
[Generate PDF](#)

[Zoom In](#)  
[Zoom Out](#)  
[Pan](#)  
[Rect Identify](#)  
[Select Object](#)  
[Buffer](#)  
[Distance](#)  
  
[Find Well](#)  
[Find Field/Unit](#)  
[Find Section](#)



**Major Rivers**  
 Selection cleared.

- Rigs
- Rig Location
- Directional Surveys
- Directional Legs
- Horizontal Surveys
- Horizontal Legs
- Cases Docketed
- Oil Fields
- Unit Boundaries
- Inspector Areas
- Drilling / Spacing
- Seismic
- Gas Plants
- Other
- Reservations
- Corporate Boundaries
- Rivers and Roads
- County Roads
- Major Roads
- Major Rivers
- Missouri River
- Land Ownership
- Imagery
- Topo/DRG 250k
- Topo/DRG 100k
- NAIP 2009

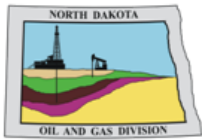
**Refresh Map**

Auto Refresh

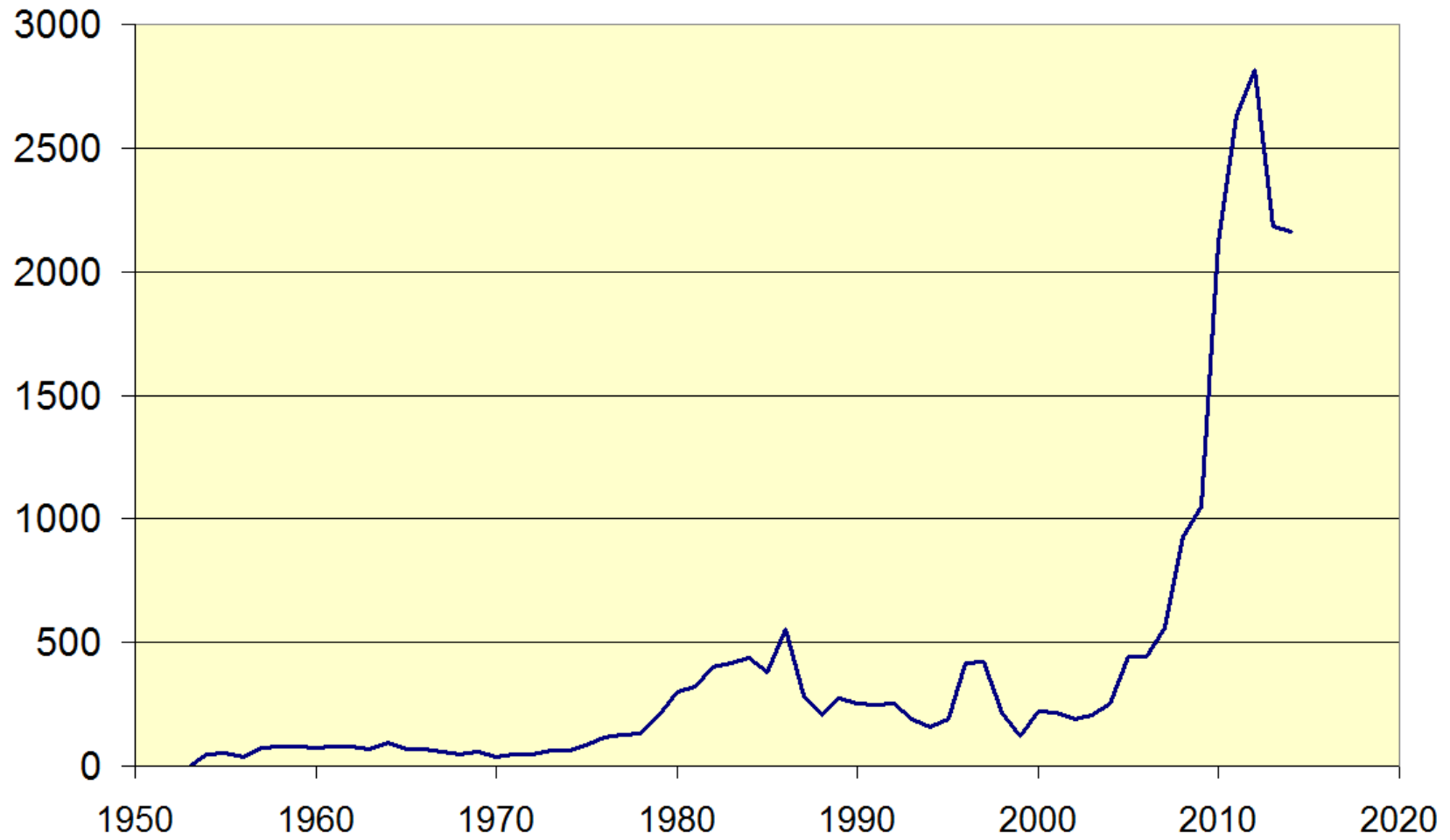
Help:  
 A closed group, click to open.  
 An open group, click to close.  
 A map layer.  
 A hidden group/layer, click to make visible.

# North Dakota Development

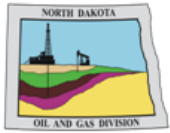
- **Regulations**
  - Spacing
  - Pooling
  - Unitization
- **Resource Play**
- **Development**
  - Uniform Spacing—orderly development
  - Multi-well locations—small footprint
  - Energy Corridors—industry & residents
- **Bakken Results**



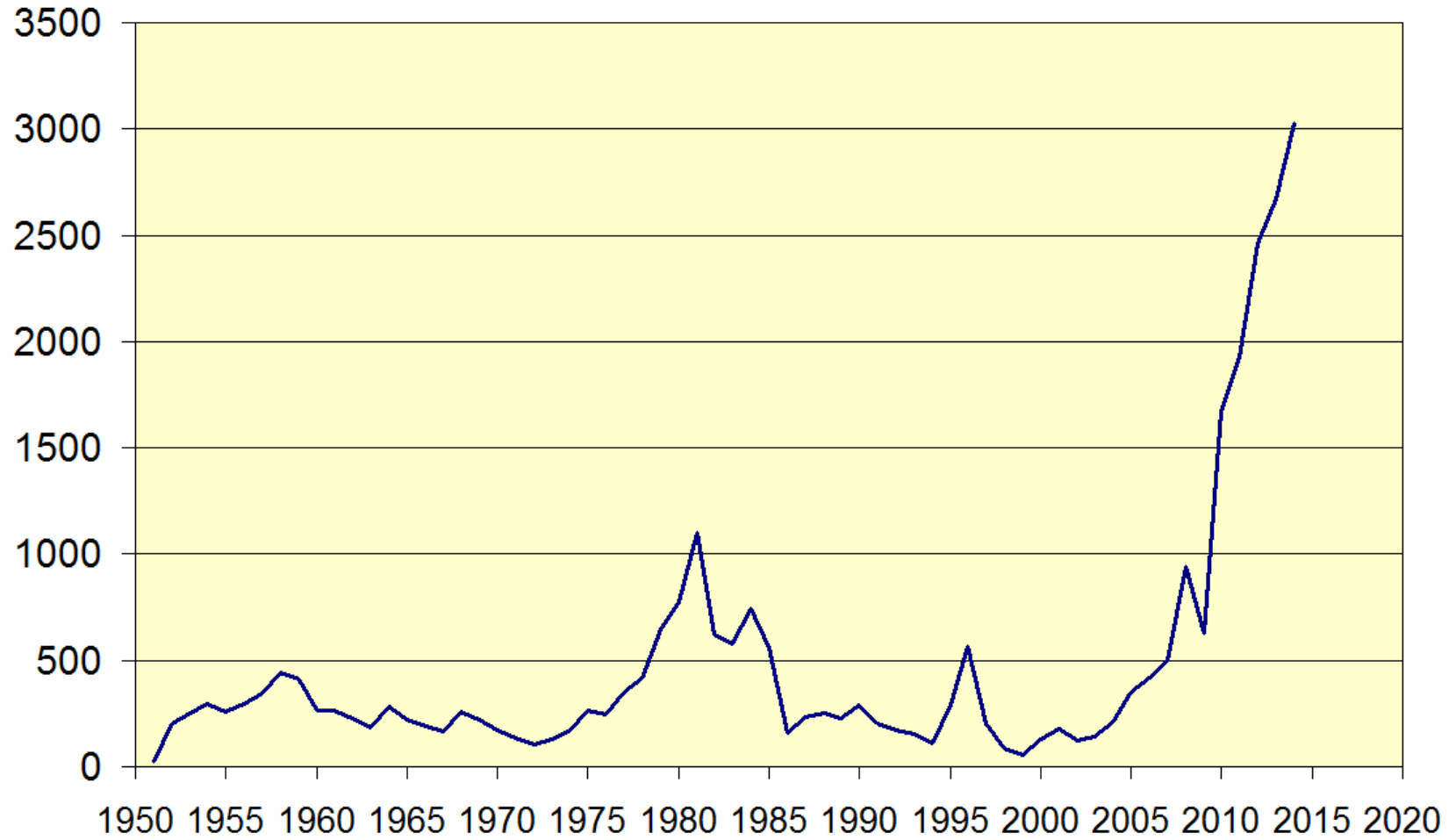
## North Dakota Industrial Commission Cases Heard





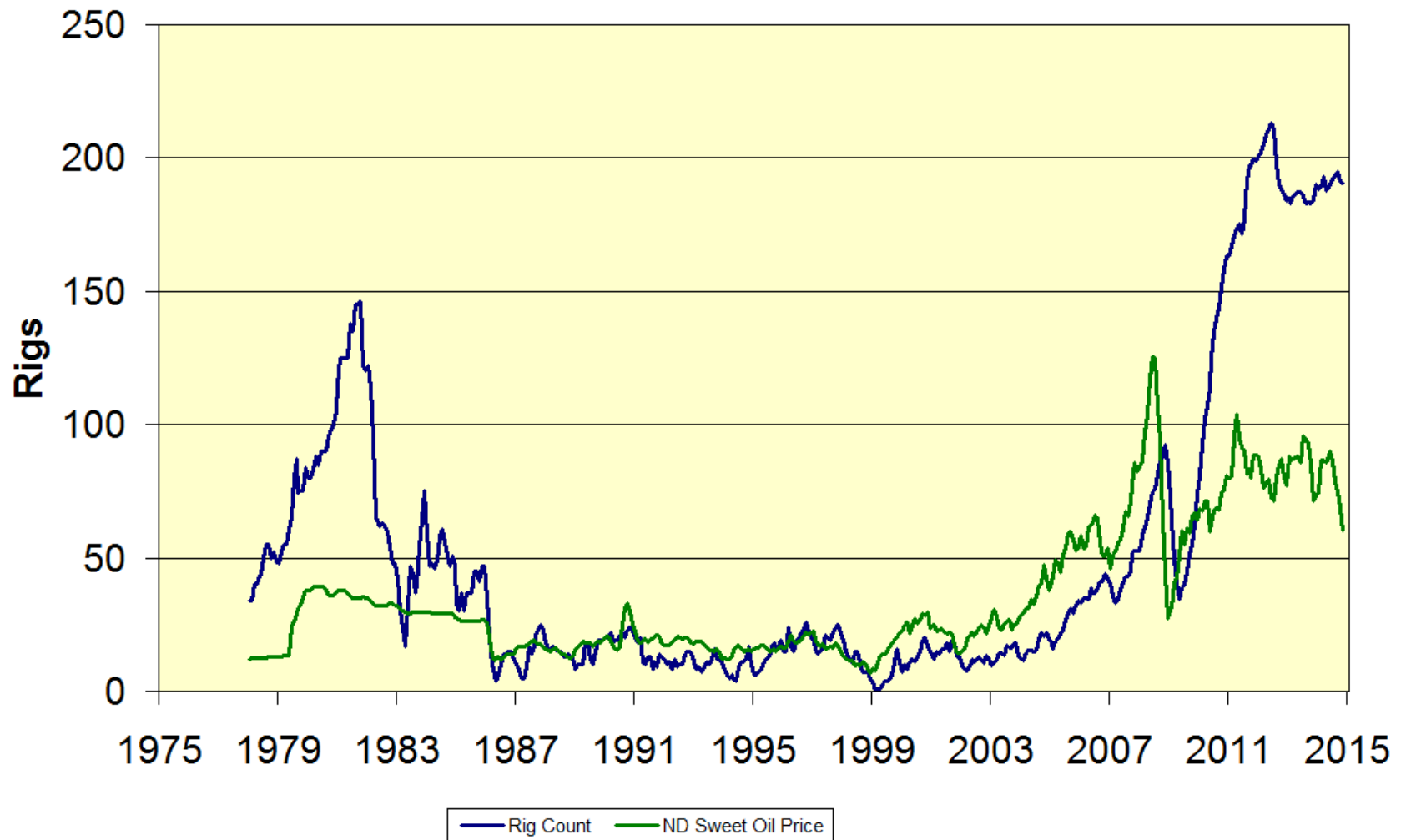


## North Dakota New Well Permits Issued



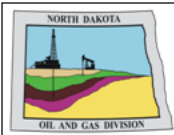


## North Dakota Average Monthly Rig Count

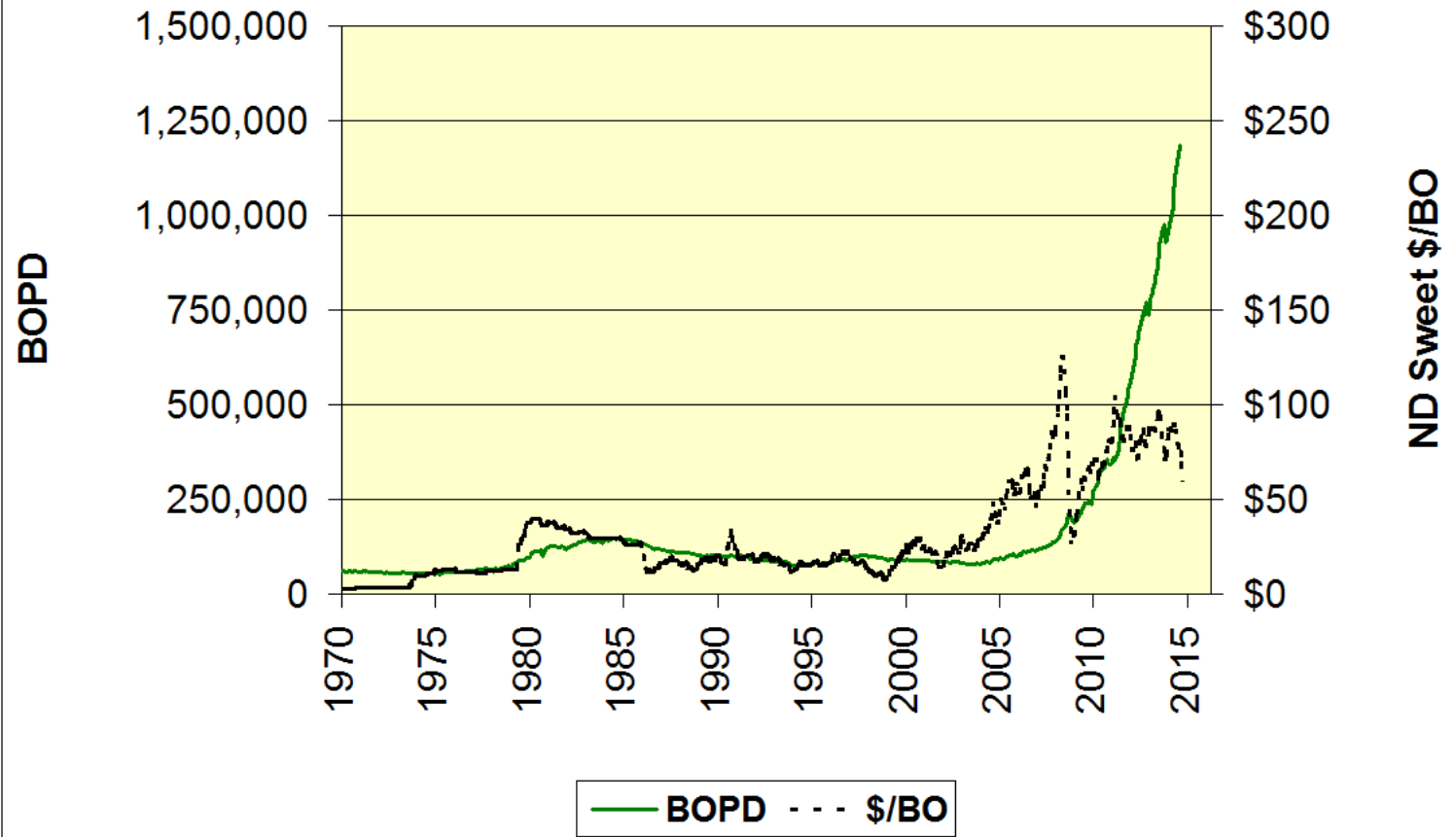


# WELLS

- **11,741 wells currently producing**
  - **8,238 Bakken**
- **< 1,000 to secure leases**
- **40,000 additional development wells**
  - **190 rigs – another 18 years**
- **Bakken Pool – 4 targets = more wells**



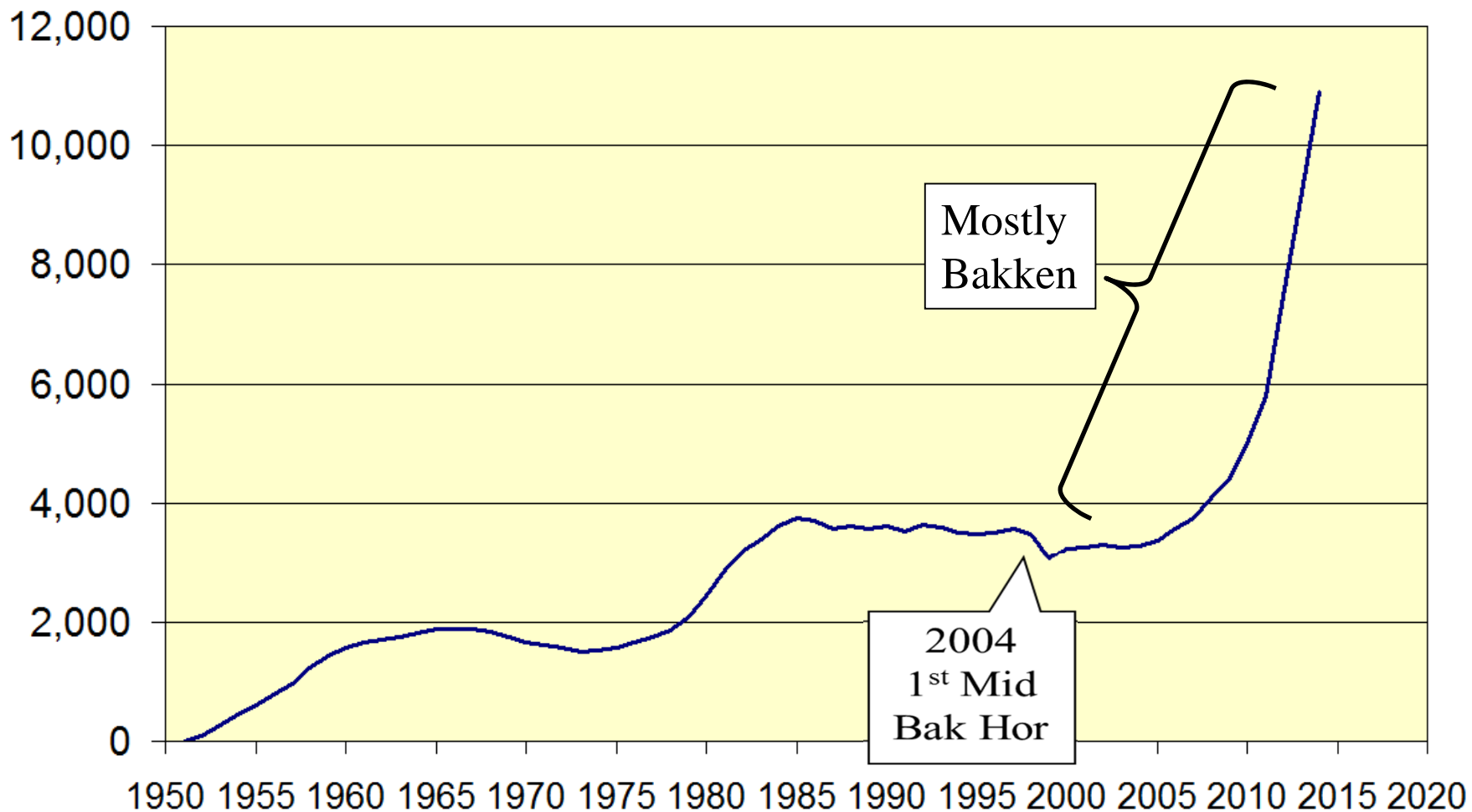
### North Dakota Daily Oil Produced and Price



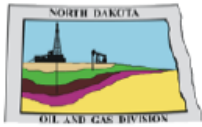
**Production 1,185,635 bopd (appr 1,120,031 Bakken—95%)**



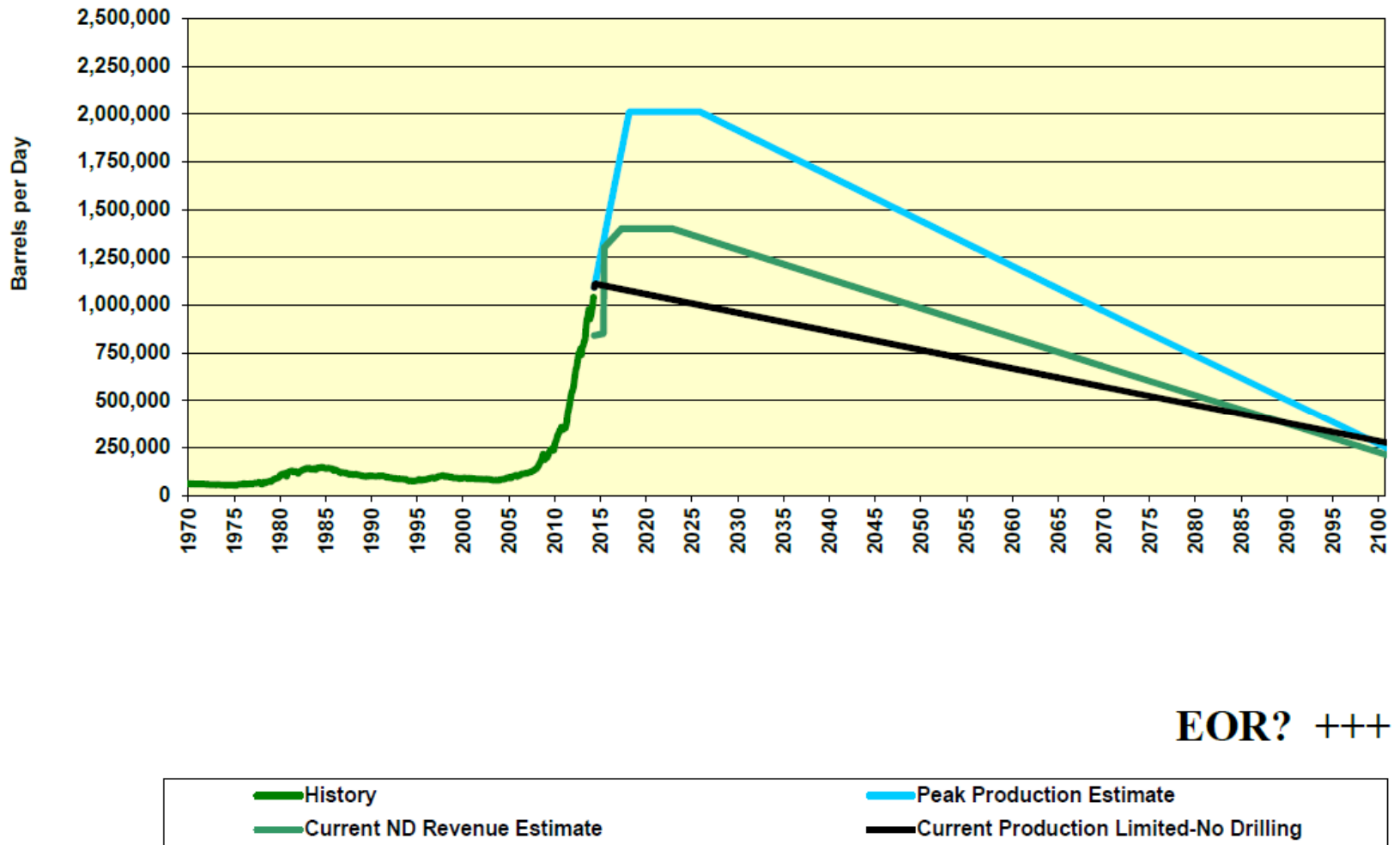
## North Dakota Wells Producing



**11,741 total wells – 8,238 Bakken horizontal (70%)**

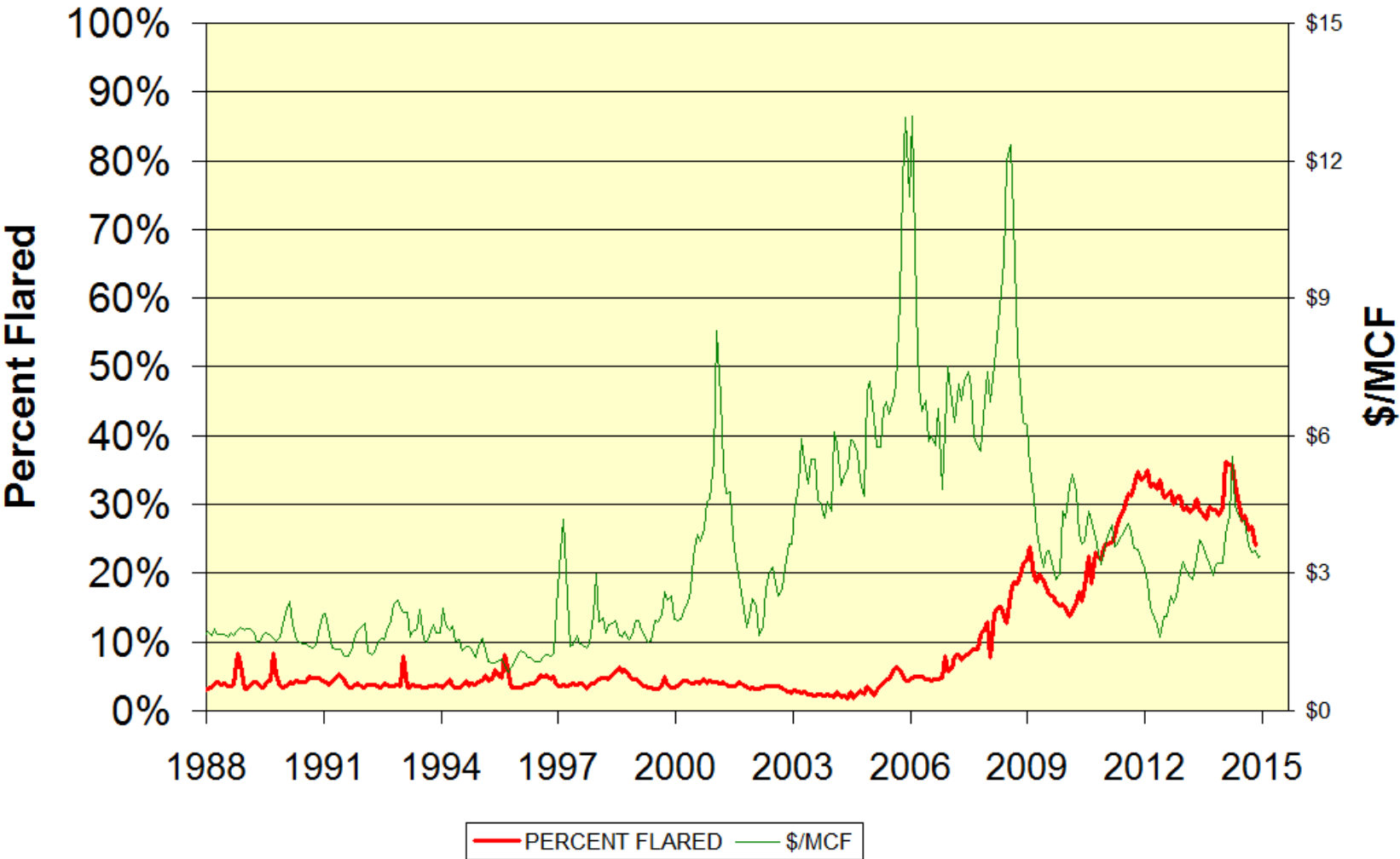


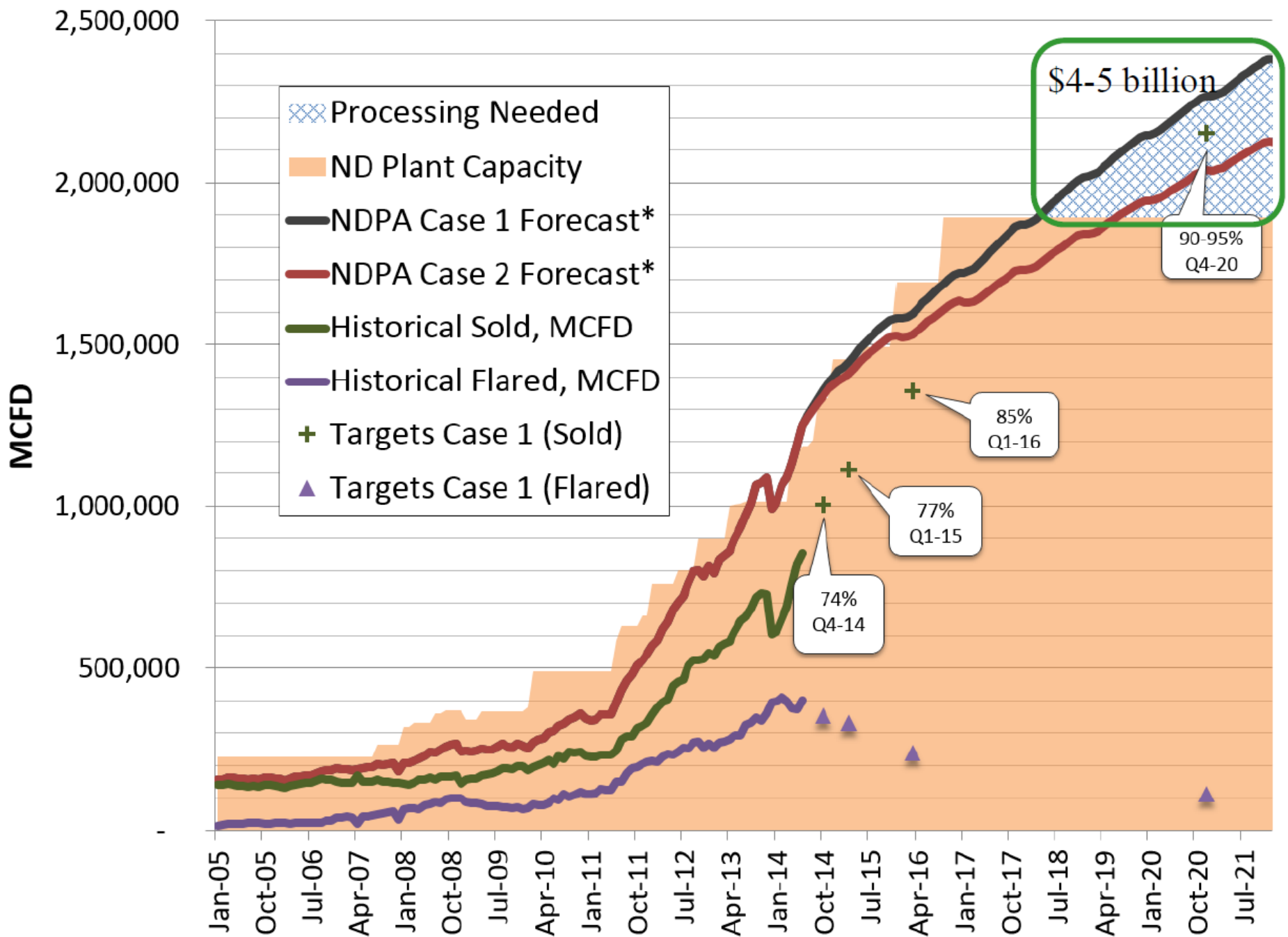
### North Dakota Oil Production



**EOR? +++**

# North Dakota Monthly Gas Flared







# **WHAT'S AHEAD**

- **Spearfish horizontal play**
- **Tyler horizontal play**
- **Three Forks—testing lower benches**
- **Enhanced Recovery in Bakken**

## Reclaimed Location

