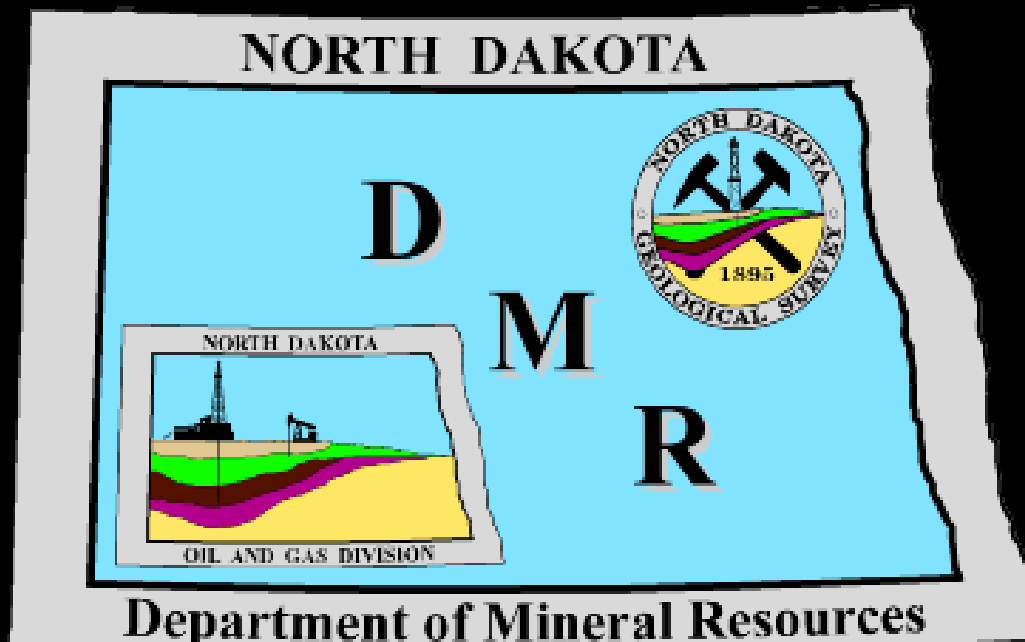


North Dakota Department of Mineral Resources



<http://www.oilgas.nd.gov>

<http://www.state.nd.us/ndgs>

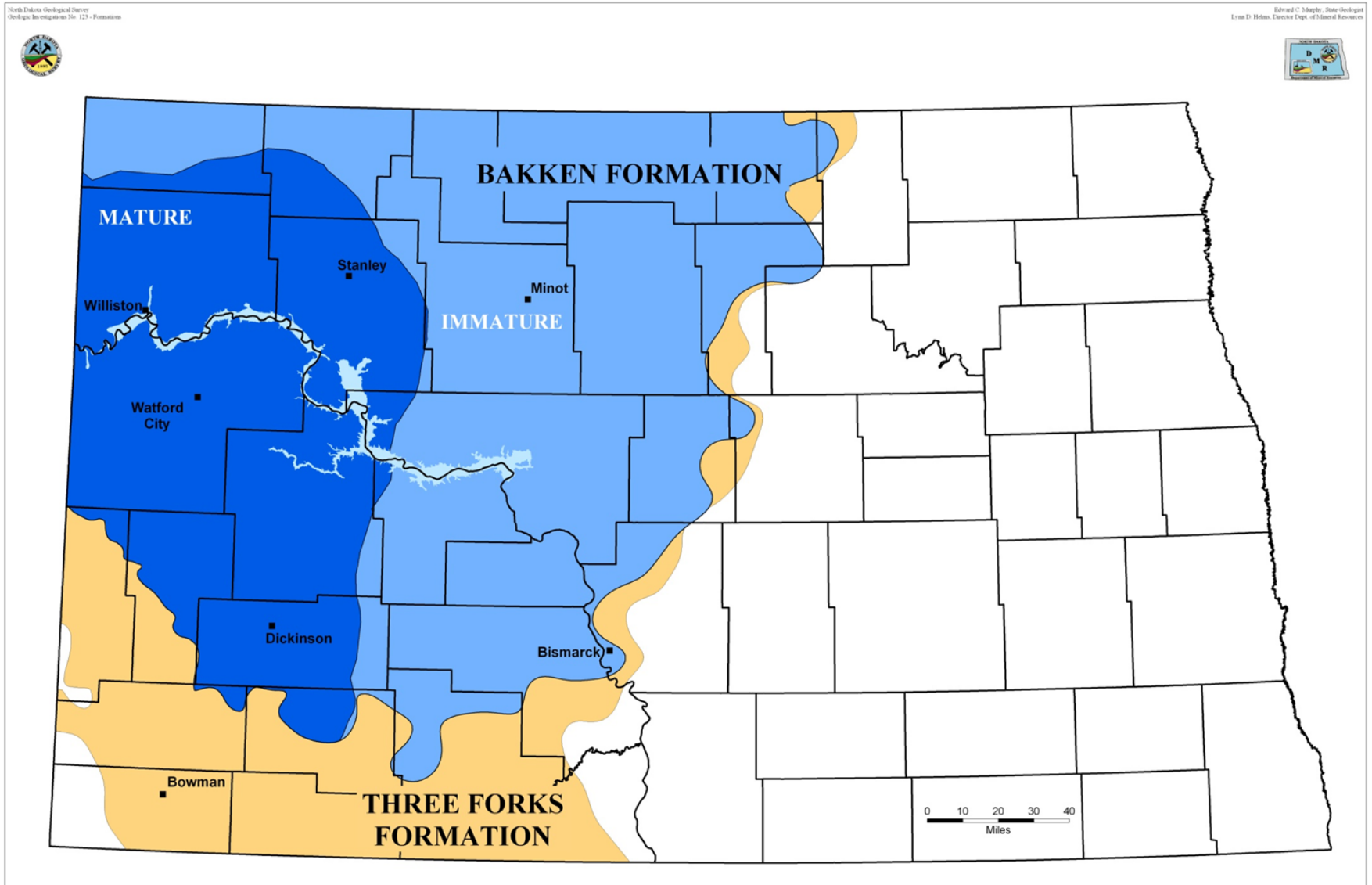
600 East Boulevard Ave. - Dept 405

Bismarck, ND 58505-0840

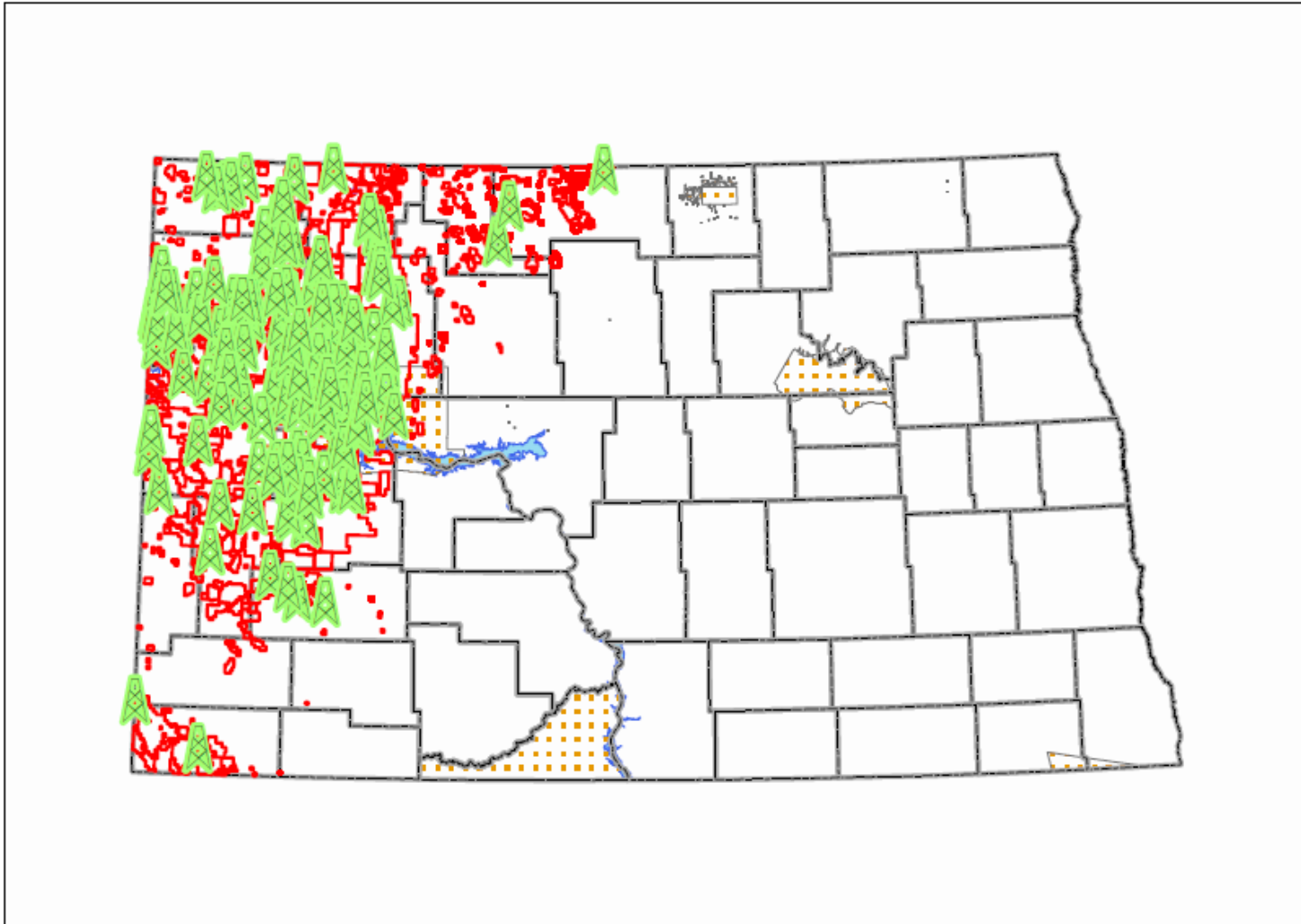
(701) 328-8020

(701) 328-8000

Phase 1 “Discovery” Define the area



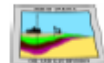
35 rigs in April 2006
200 rigs in January 2012
completed first phase of drilling



Disclaimer: Neither the State of North Dakota, nor any agency, officer, or employee of the State of North Dakota warrants the accuracy or reliability of this product and shall not be held responsible for any losses caused by reliance on this product. Portions of the information may be incorrect or out of date. Any person or entity that relies on any information obtained from this product does so at his or her own risk.

0 35 70 140 Miles

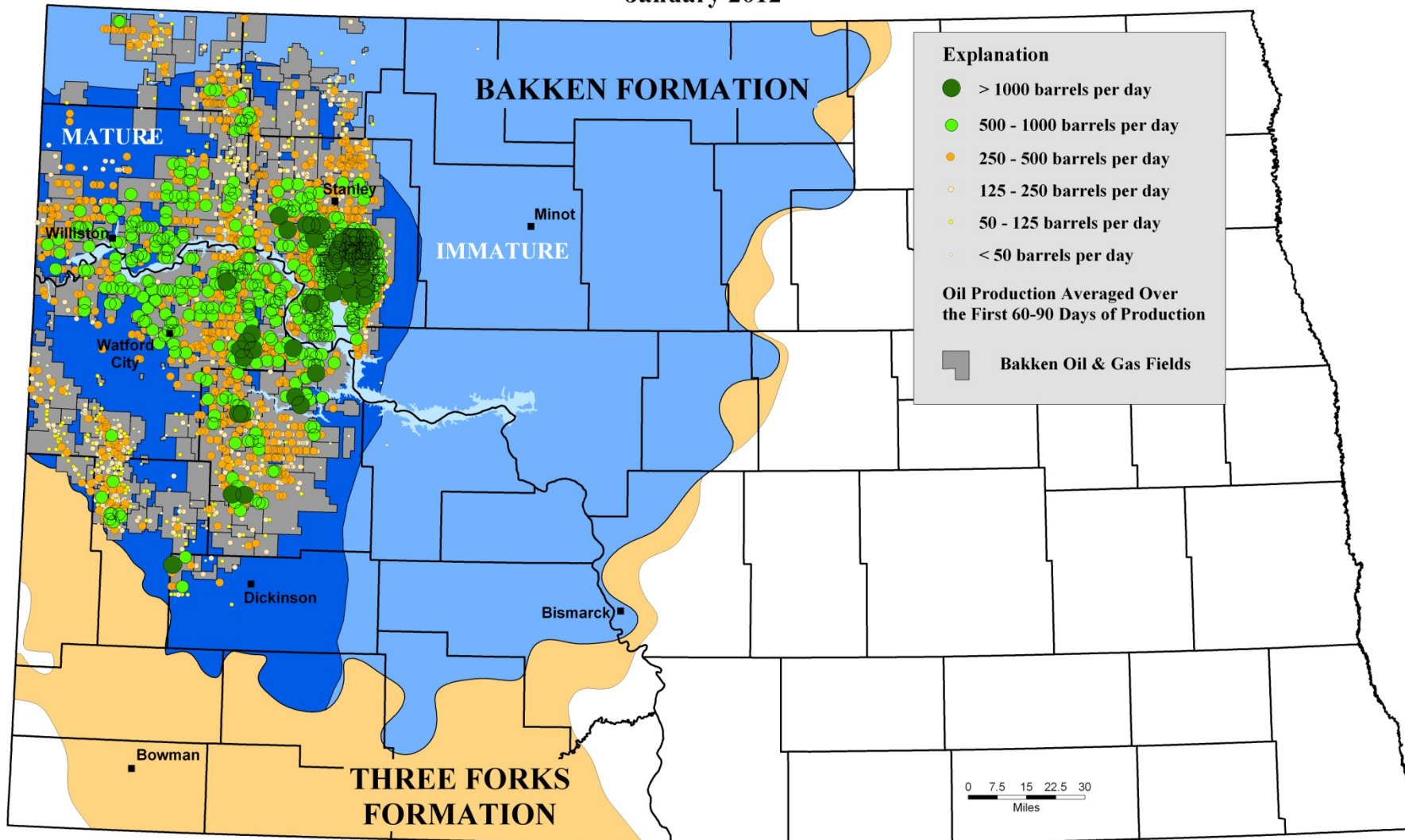
Prepared by N.D.I.C.
Oil and Gas Division
DATE : 10/8/2010
Time : 7:20:05 AM



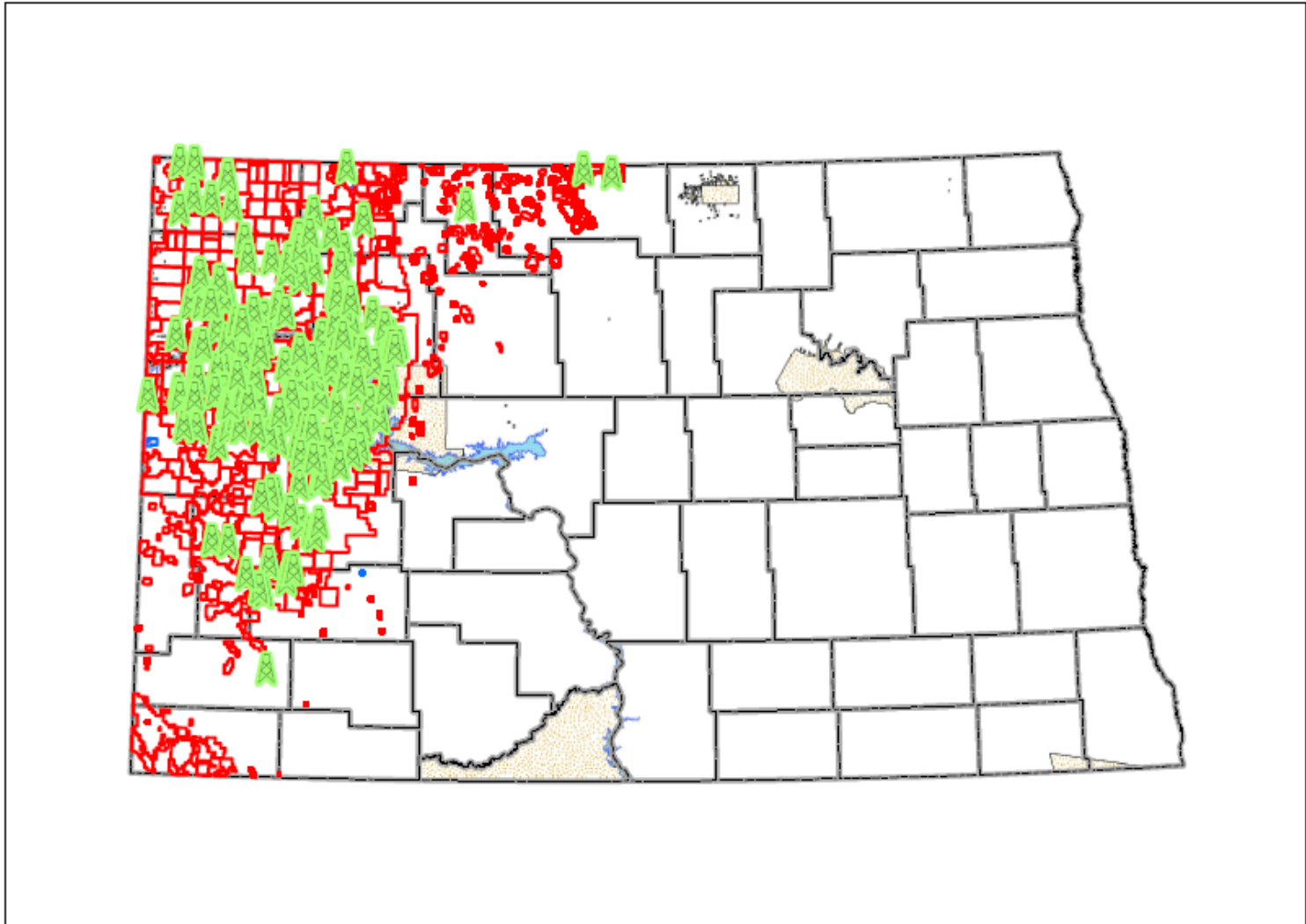


First 60 - 90 Day Average Bakken Pool Production by Well

January 2012



218 rigs in May 2012
190 rigs through January 2015
complete phase 2 of drilling

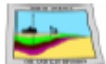


Disclaimer: Neither the State of North Dakota, nor any agency, officer, or employee of the State of North Dakota warrants the accuracy or reliability of this product and shall not be held responsible for any losses caused by reliance on this product. Portions of the information may be incorrect or out of date. Any person or entity that relies on any information obtained from this product does so at his or her own risk.

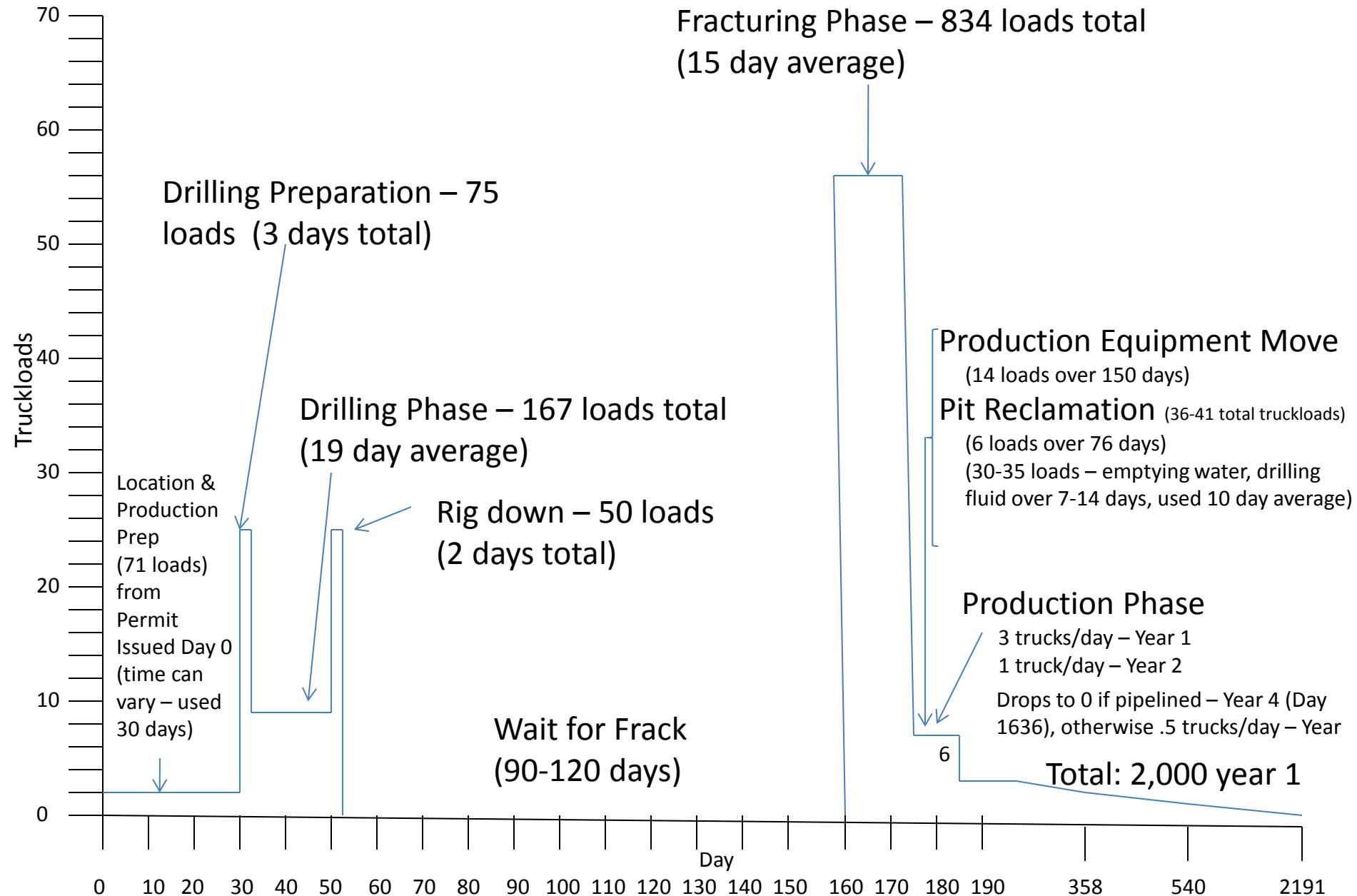
0 30 60 120 Miles

Prepared by N.D.I.C.
Oil and Gas Division

1/17/2014
4:08:20 PM



New Bakken Well – Truckload Timeline





Vern Whitten Photography

Parshall, ND

pizza near NYC

[Get Directions](#) [History](#)

Parshall, ND 58770, USA

miles of gravel
road needed
reduced 10 fold

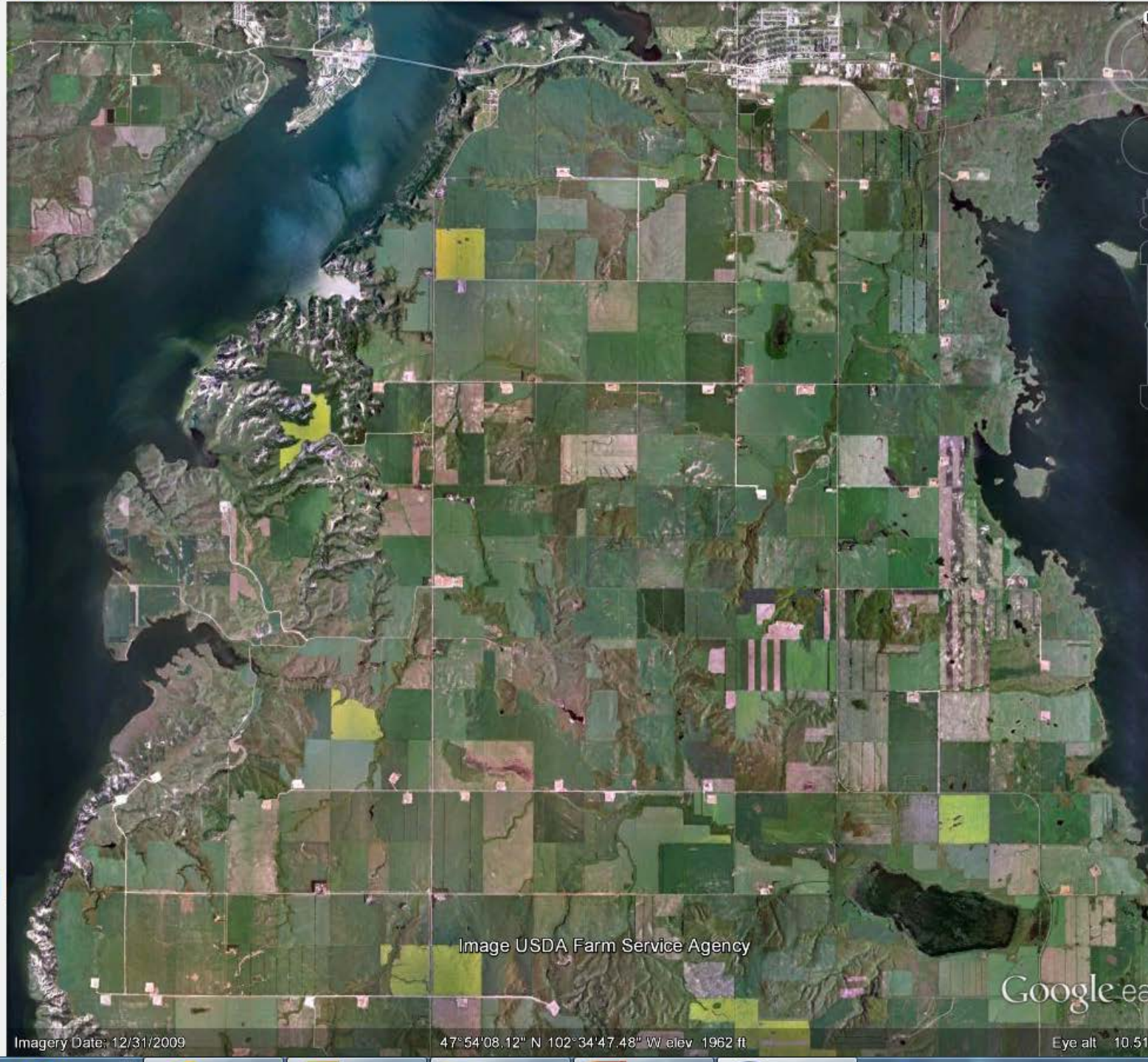
Places

- My Places
- [Sightseeing Tour](#)
Make sure 3D Buildings layer is checked
- Temporary Places

miles of pipeline
needed reduced
10 fold

Layers

- Primary Database
- Borders and Labels
- Places
- Photos
- Roads
- 3D Buildings
- Ocean
- Weather
- Gallery
- Global Awareness
- More



Imagery Date: 12/31/2009

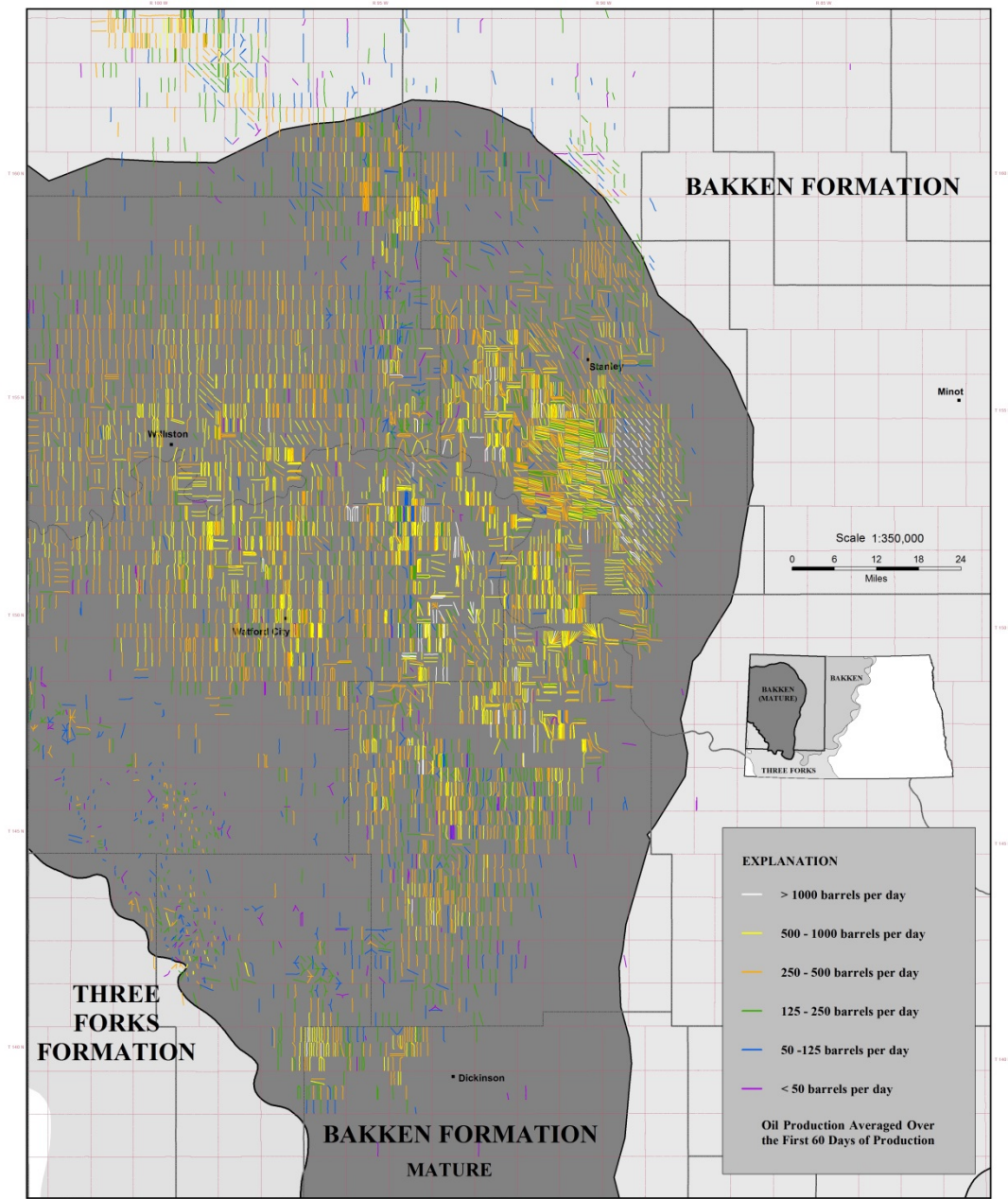
47°54'08.12" N 102°34'47.48" W elev 1962 ft

Eye alt 10.51



First 60 Day Average Bakken Horizontal Production by Well

January 2014



North Dakota Spacing Units and well pads are designed for multiple wells

Phase 3

“Harvest”

Increased well density

190 rigs will take
20 years to
complete phase 3
of drilling

100% area

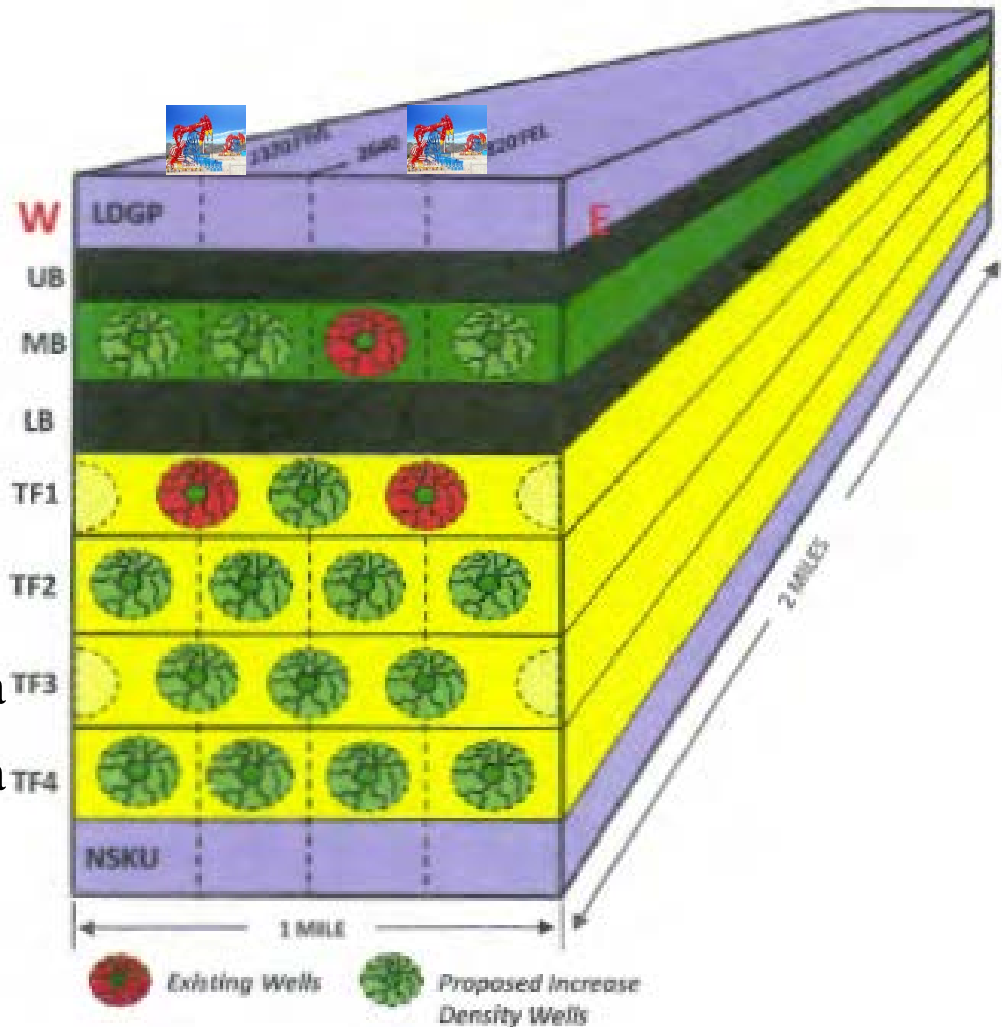
3/4 area

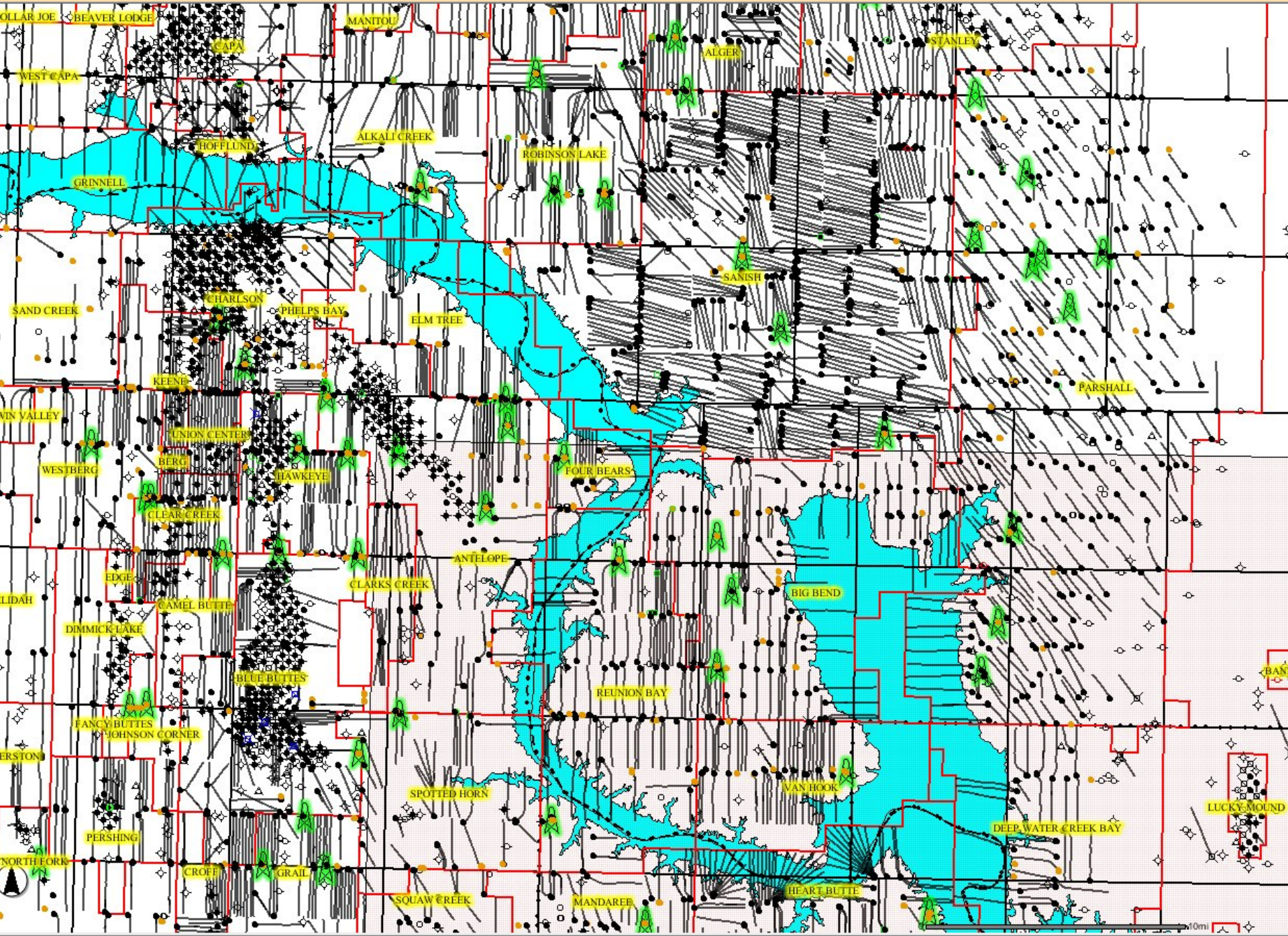
1/2 area

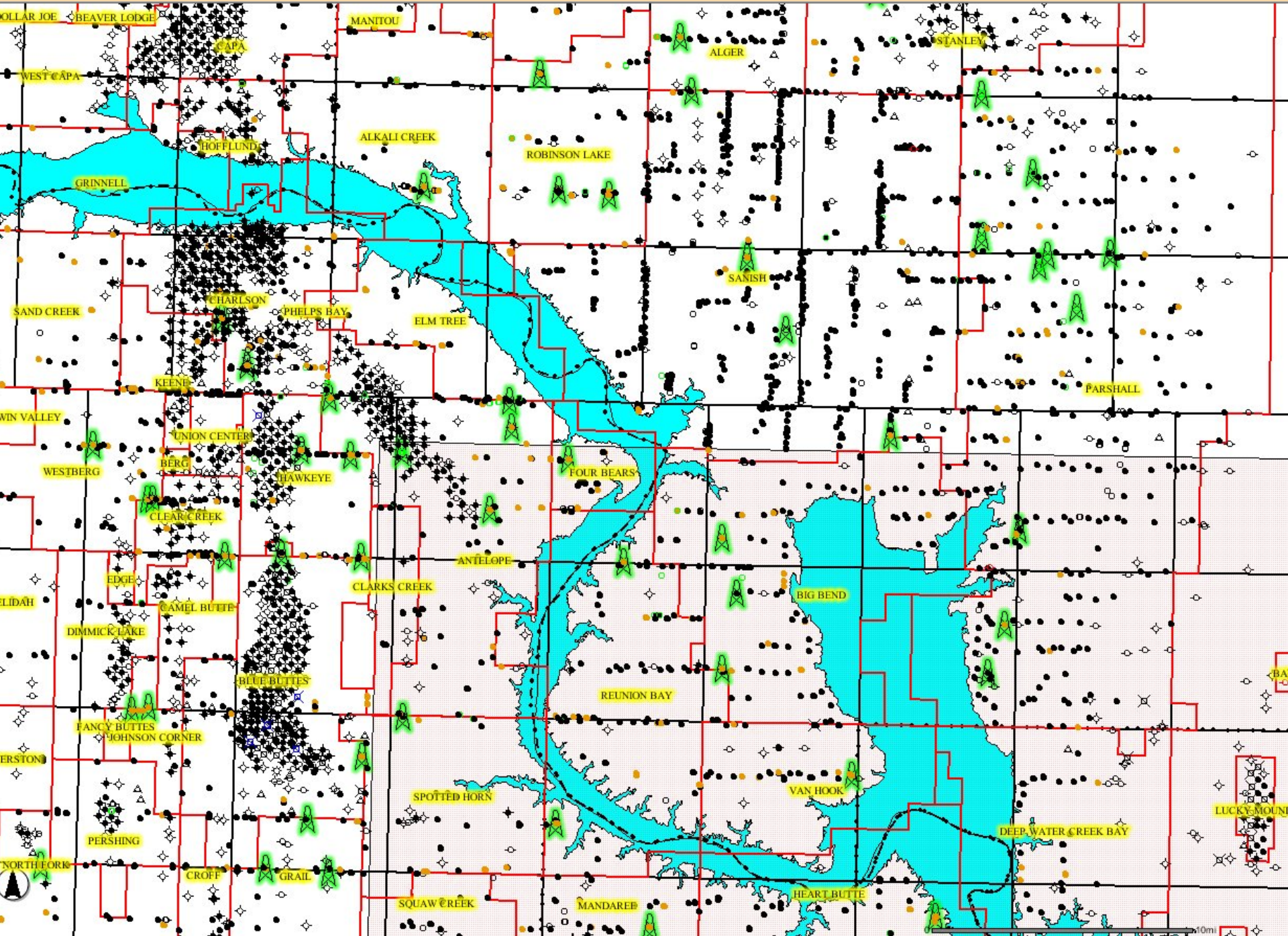
1/3 area

1/4 area

8–20 wells per 1,280 acres proposed

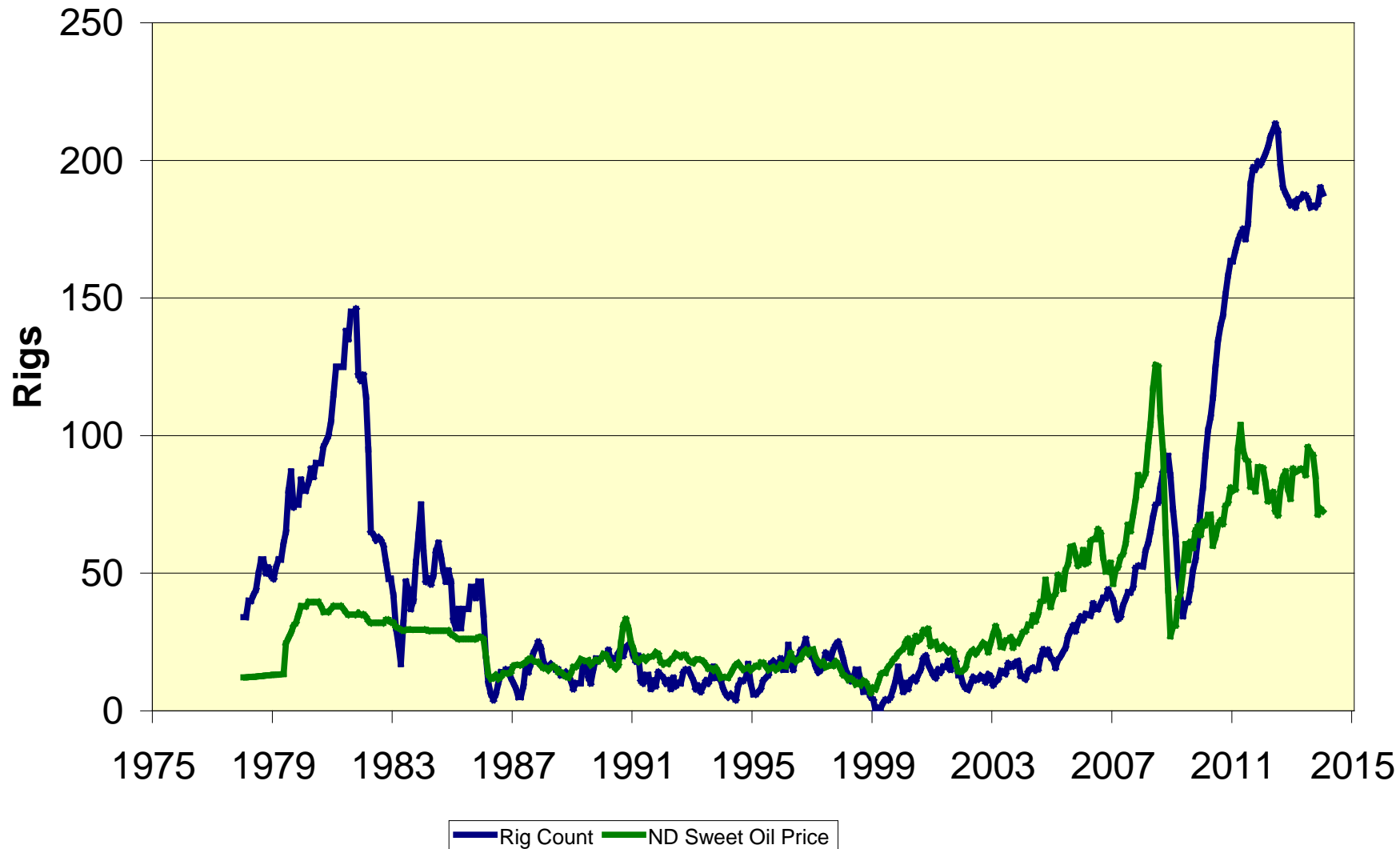








North Dakota Average Monthly Rig Count



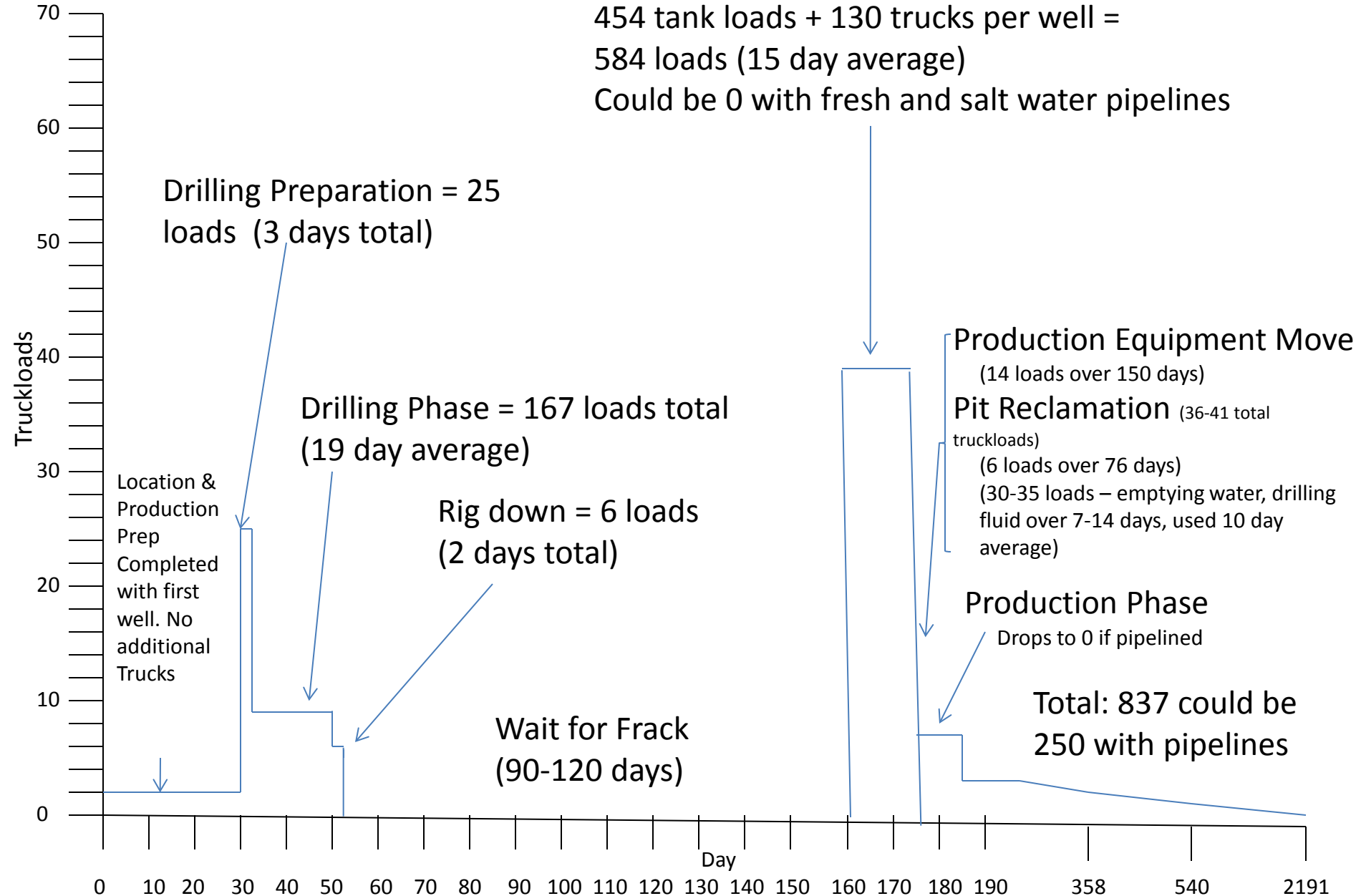
Bakken Wells 2-4 – Truckload Timeline

Fracturing Phase – (250 less loads)

454 tank loads + 130 trucks per well =

584 loads (15 day average)

Could be 0 with fresh and salt water pipelines



Six Wells on a Single Pad

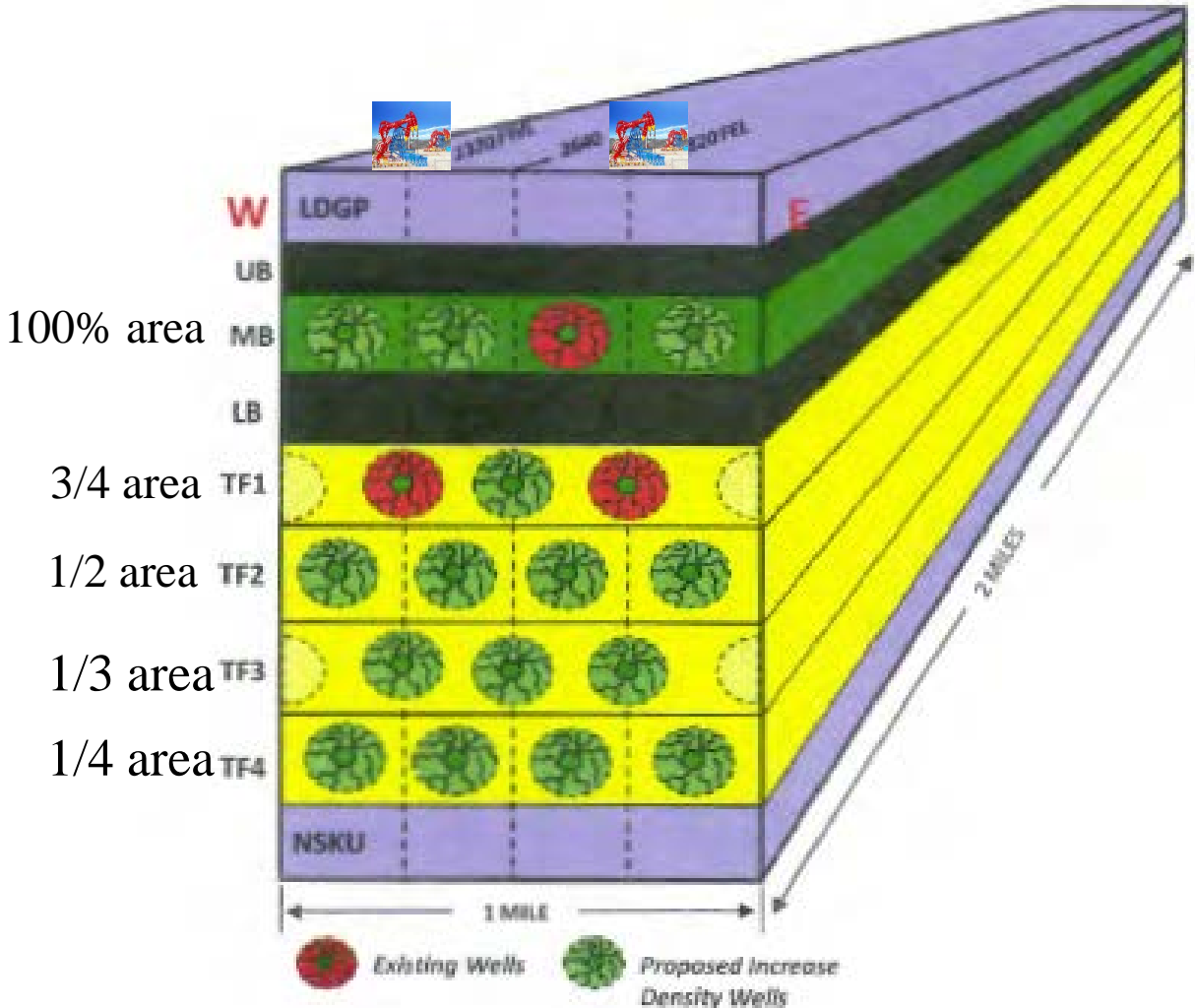


Vern Whitten Photography

Now drilling 14 and 18 well pads

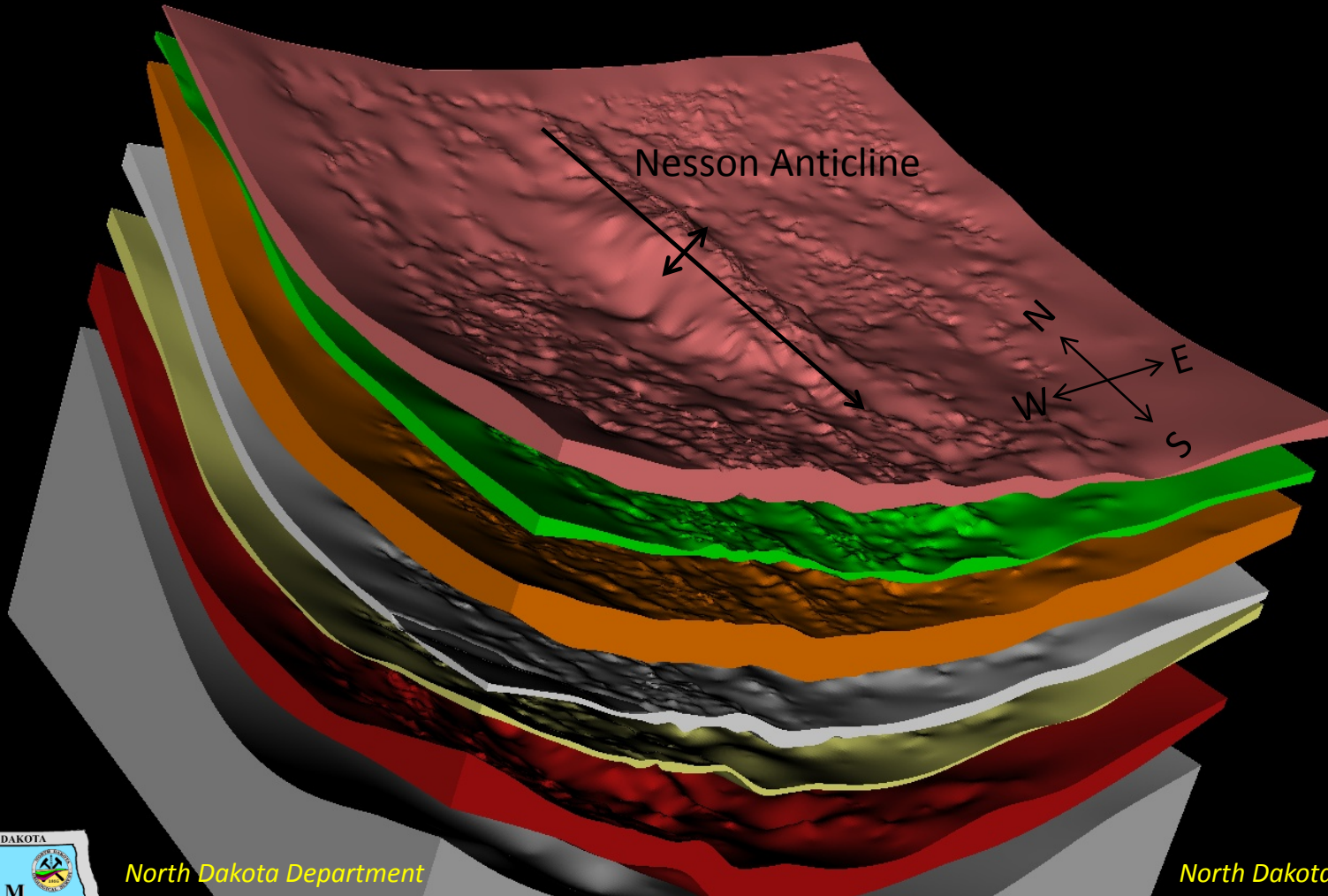
North Dakota Spacing Units and well pads are designed for multiple wells

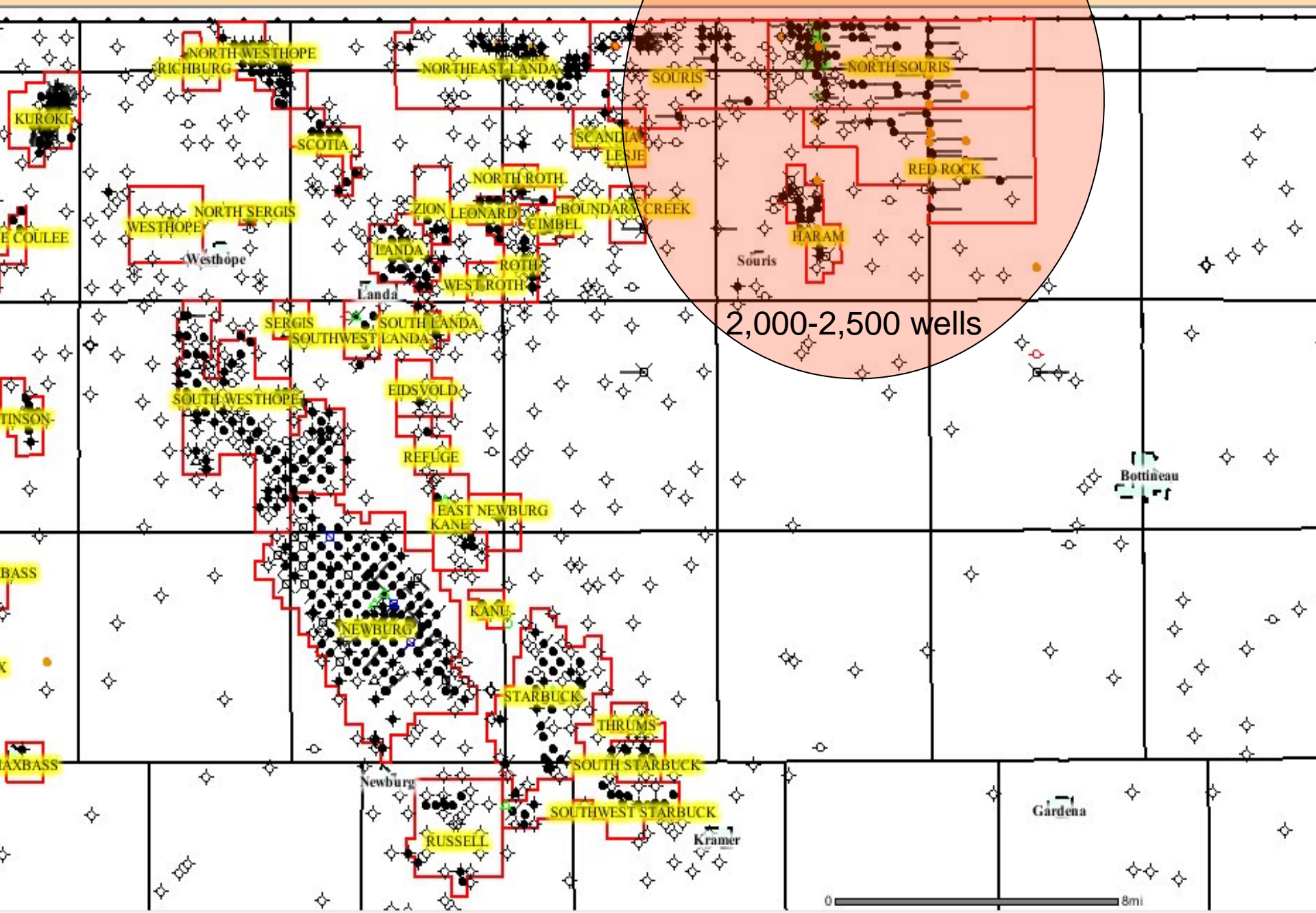
Phase 4?
“EOR”



Spearfish Formation

2,575 Barrels oil per day





Entering Phase 2

3 rigs = 3-6 years

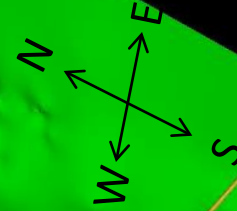
Tyler Formation

1,050 Barrels oil per day

Northern
depositional
boundary

3 Wells have produced oil from the
Tyler in west-central ND, north of
the area of current Tyler production

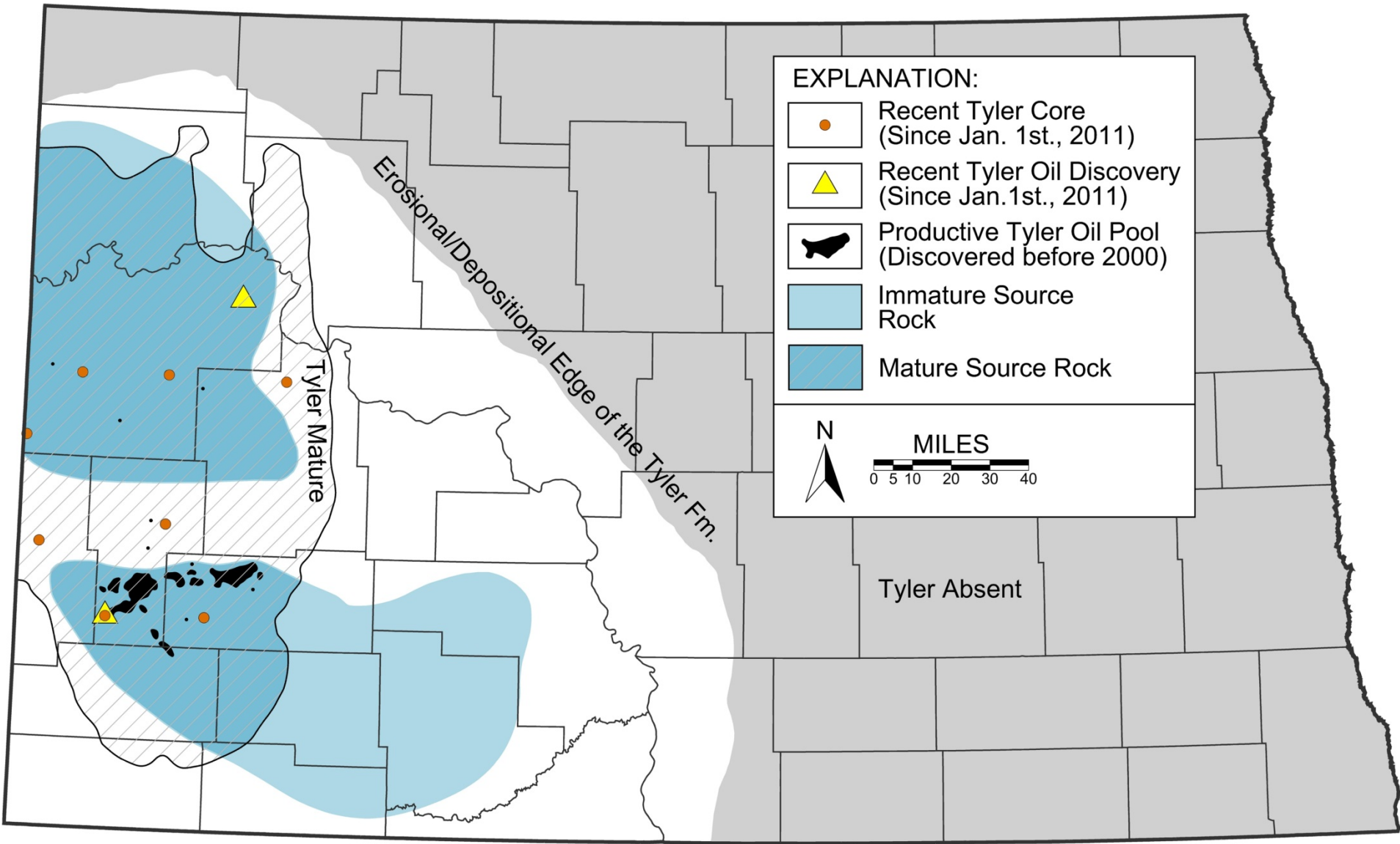
Nesson Anticline



North Dakota
Department
of Mineral Resources

North Dakota
Geological Survey





Starting Phase 1

Reclamation

- 26,346 wells permitted as of 9/1/13
- 1,291 approved locations
- 1,136 drilling and completing
- 9,096 producing

- 8,432 reclaimed locations



MORGAN DRAW

T144N R102W



8070

9078

8234

10935

MORGAN DRAW

T144N R102W

13309

9515

9803

13228

9766

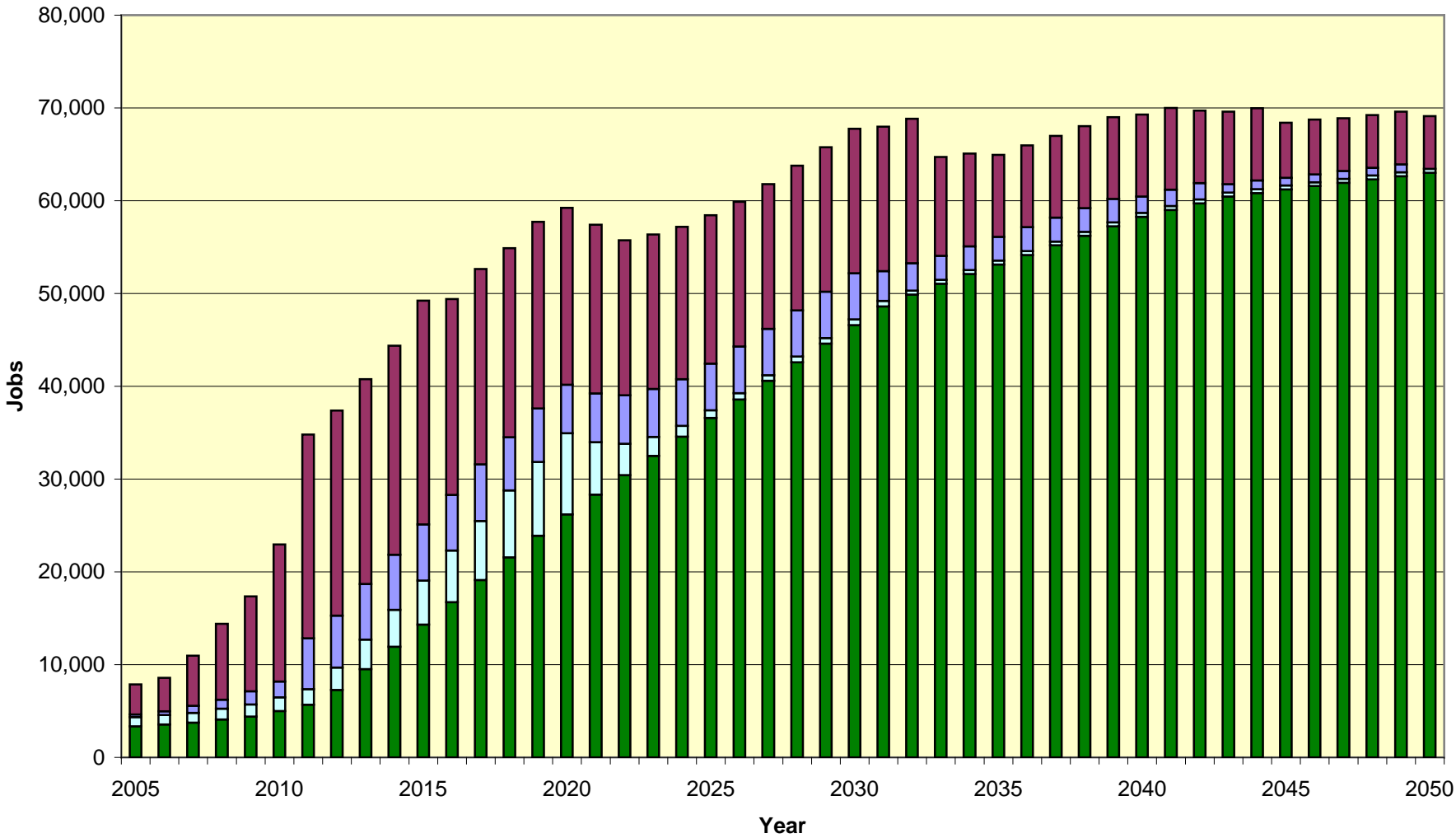


MORGAN DRAW

T144N R102W

Expected Case

North Dakota Oil Industry Jobs

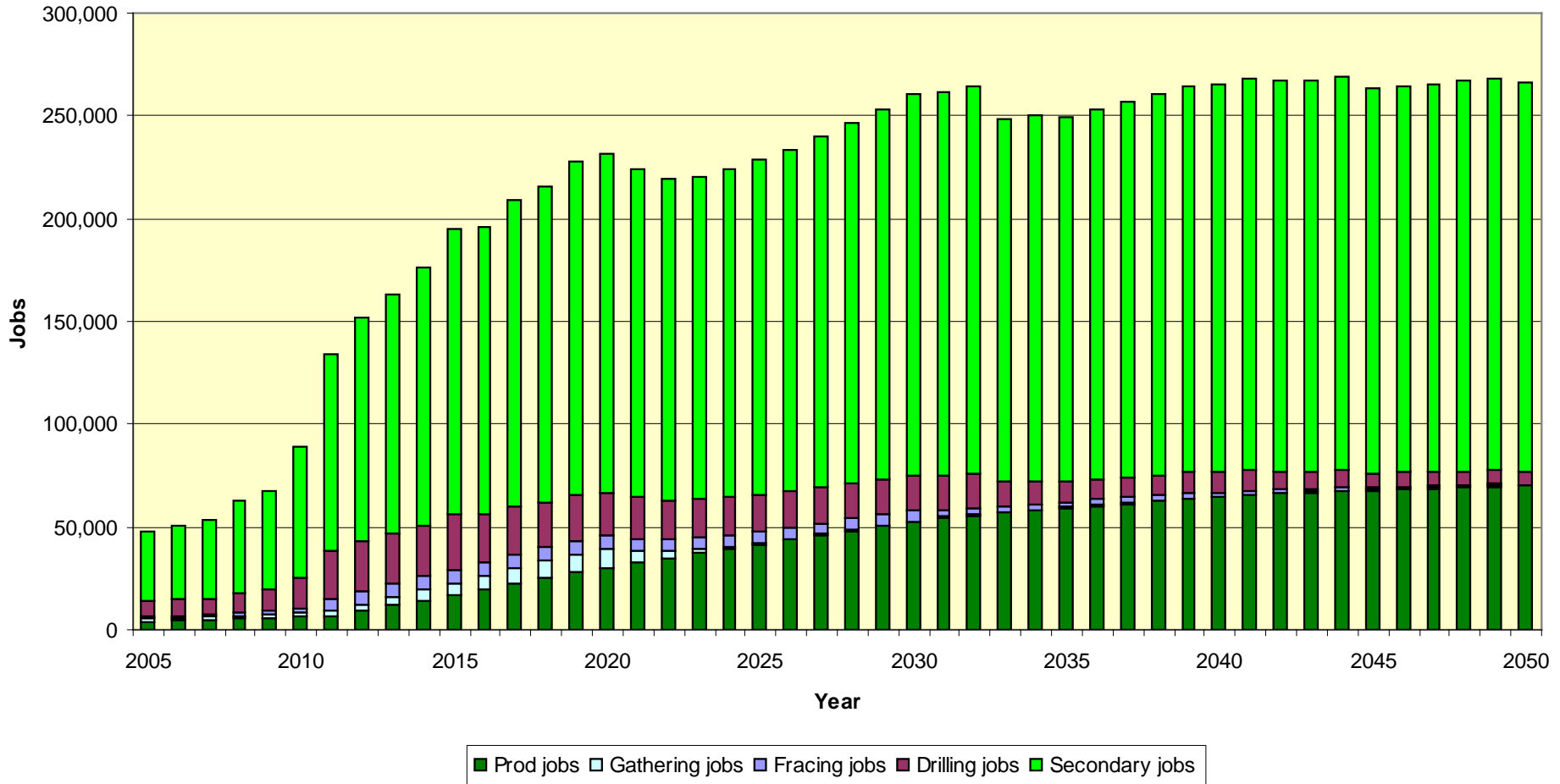


■ Prod jobs ■ Gathering jobs ■ Fracing jobs ■ Drilling jobs

Historical 2.5 multiplier

Actual multiplier currently 0.7-1.0

North Dakota



Mature petrochemical area - 3.5 multiplier

North Dakota

