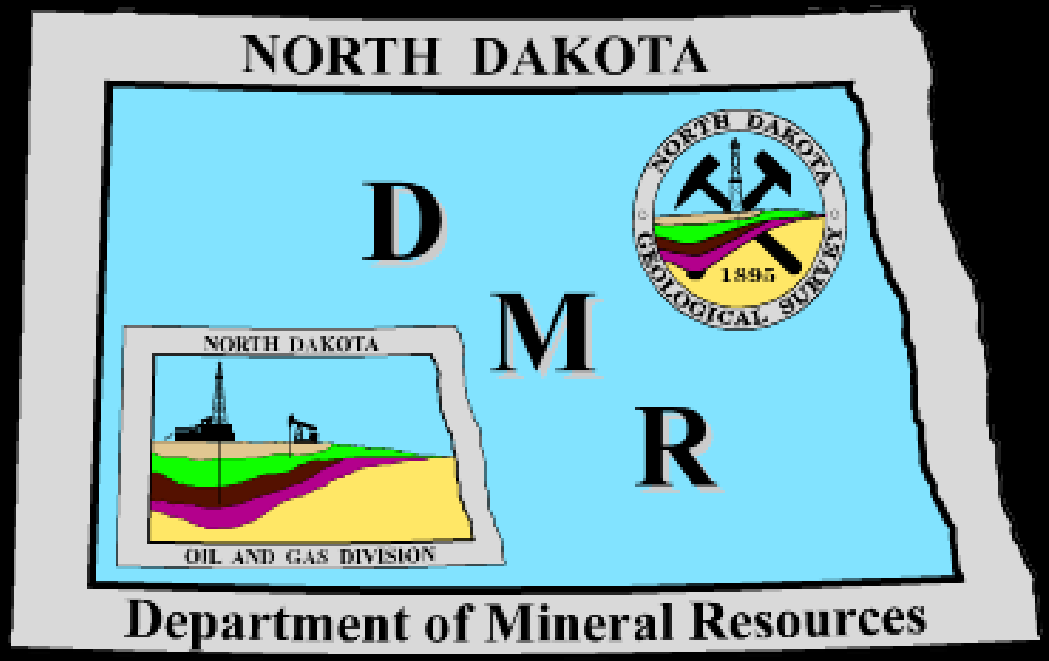
North Dakota Department of Mineral Resources

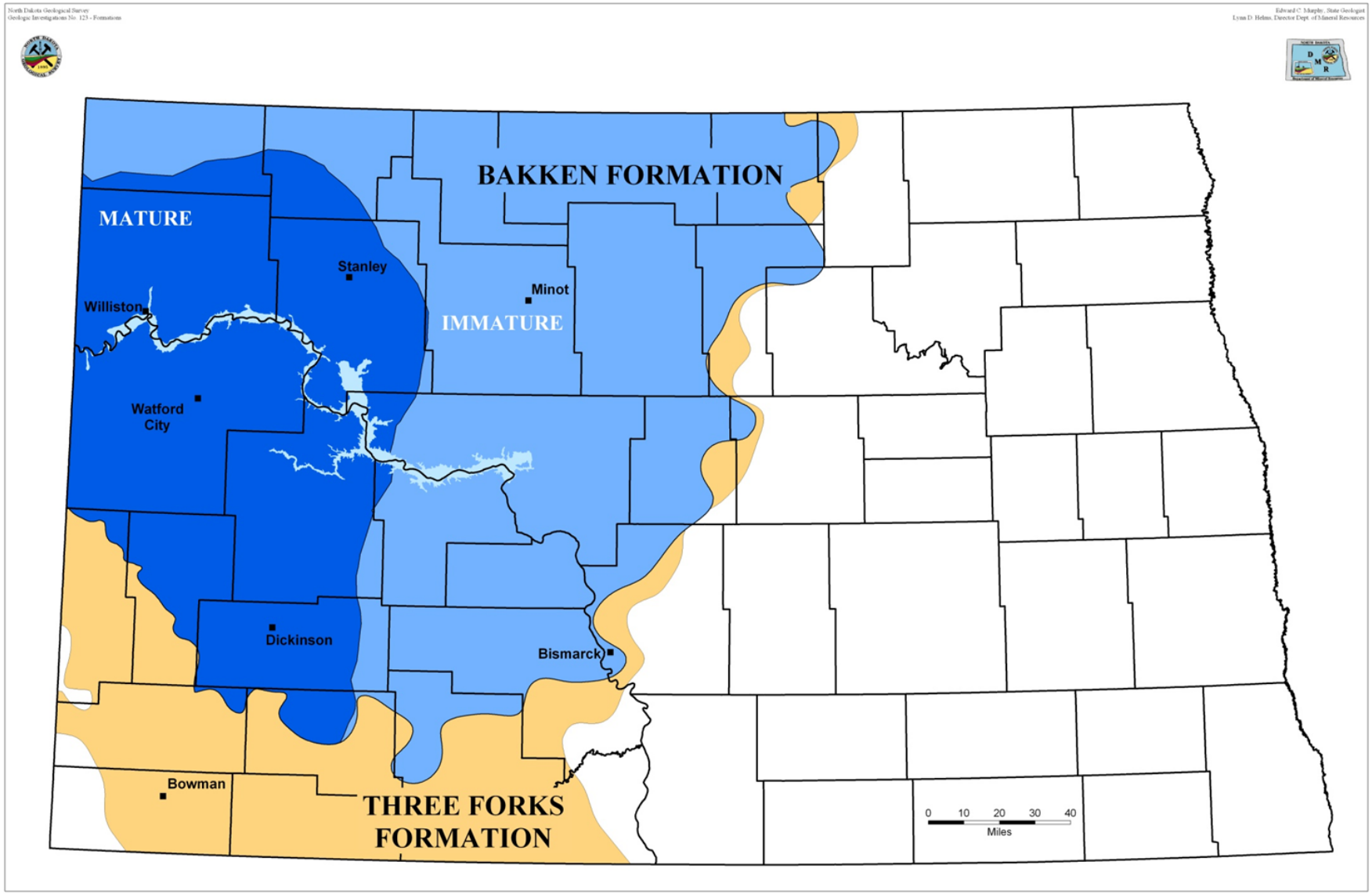


http://www.oilgas.nd.gov

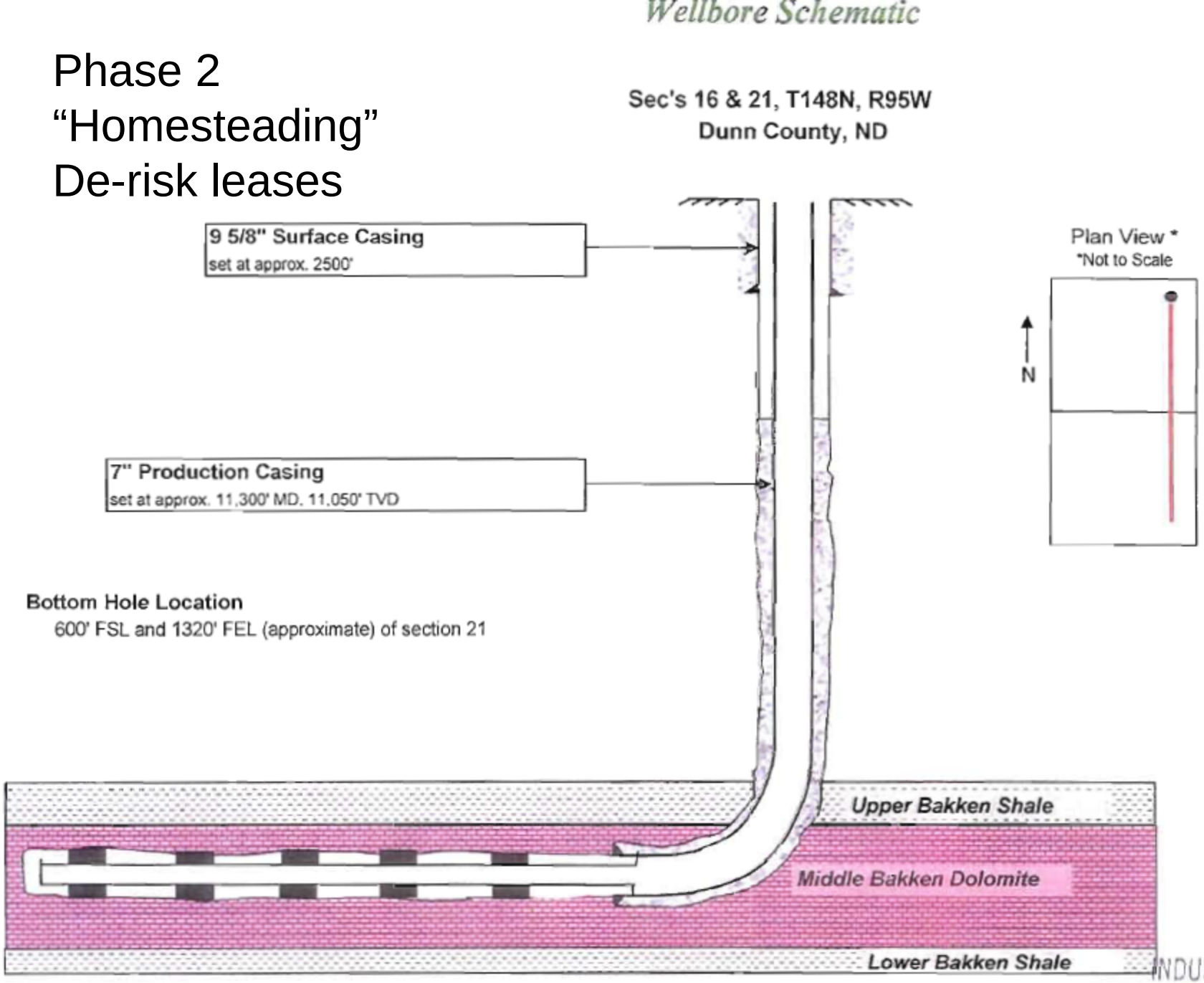
http://www.state.nd.us/ndgs

600 East Boulevard Ave. - Dept 405
Bismarck, ND 58505-0840
(701) 328-8020 (701) 328-8000

Phase 1
“Discovery”
Define the area



Phase 2
“Homesteading”
De-risk leases

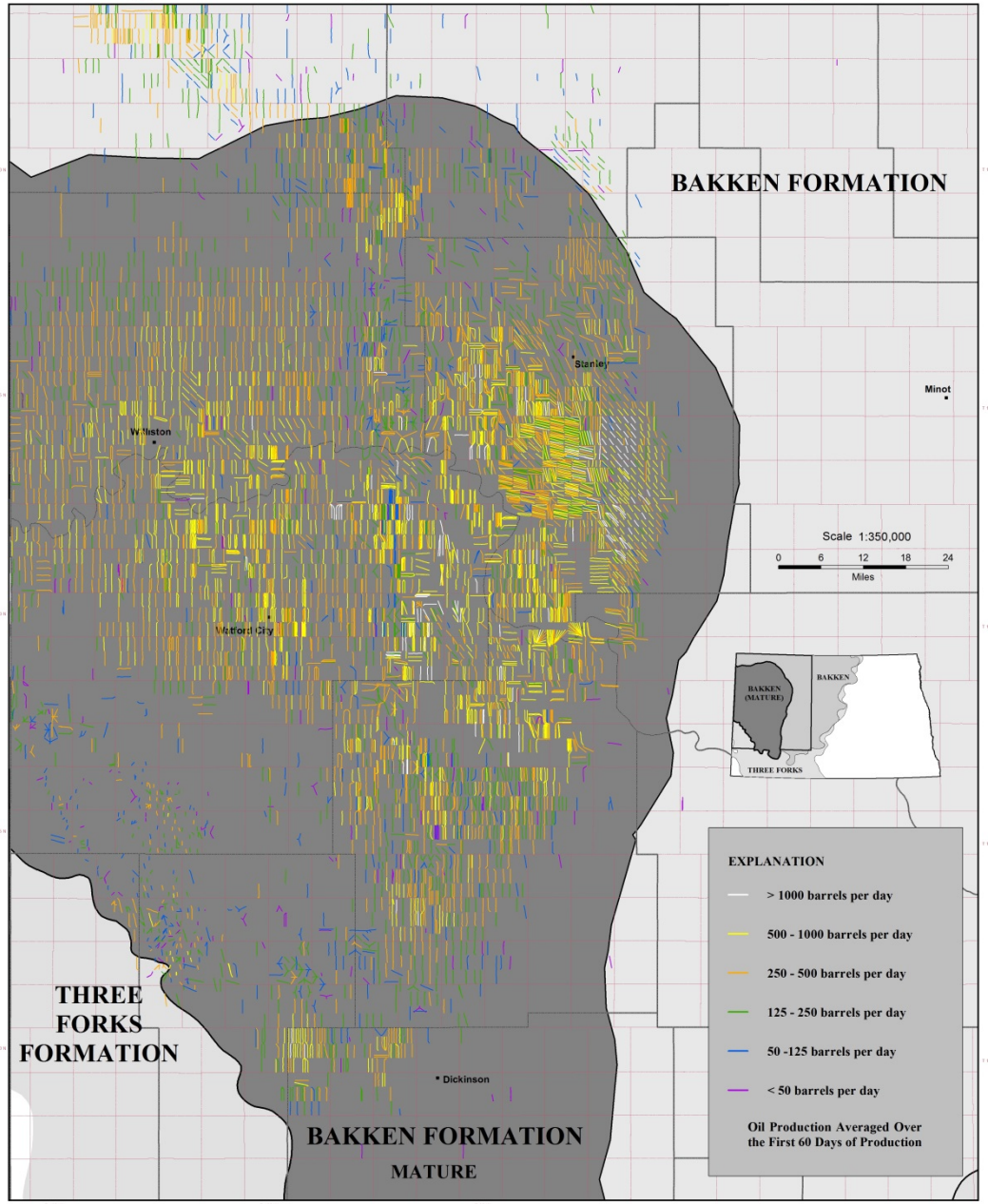


North Dakota Geological Survey
Geologic Investigations No. 149 - Jan 2014

Edward C. Murphy, State Geologist
Lynn D. Helms, Director Dept. of Mineral Resources

First 60 Day Average Bakken Horizontal Production by Well

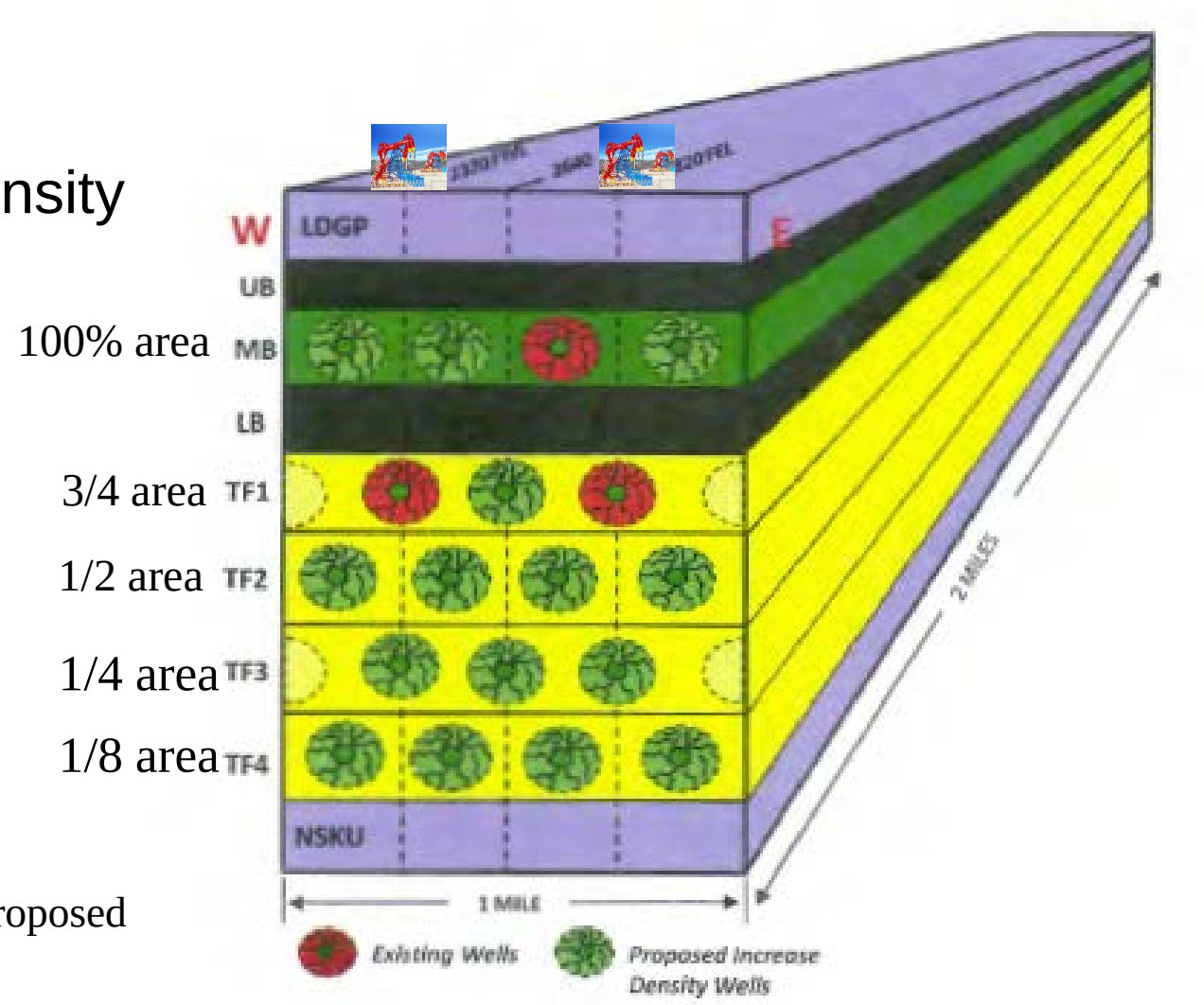
January 2014



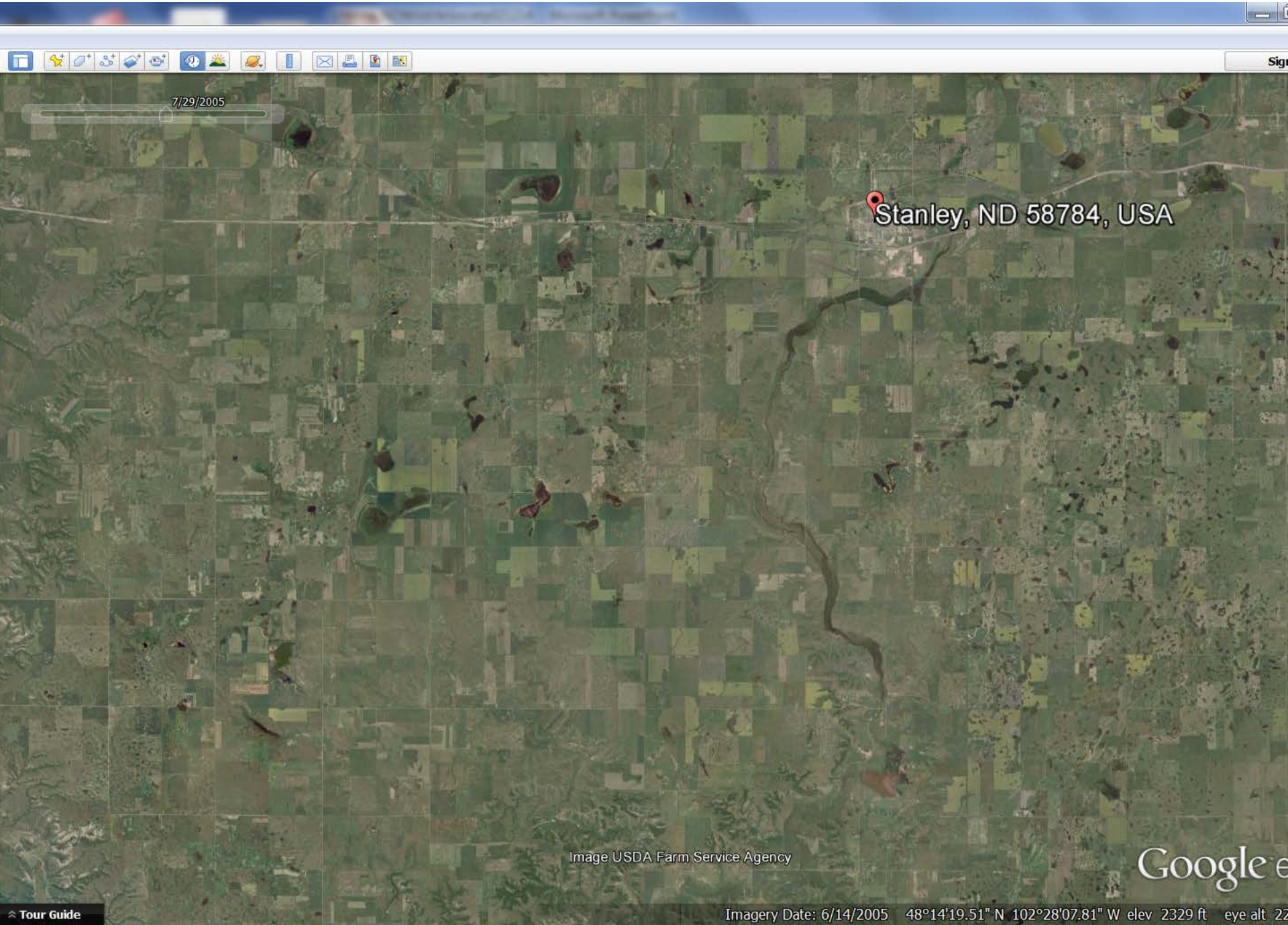
North Dakota Spacing Units and well pads are designed for multiple wells

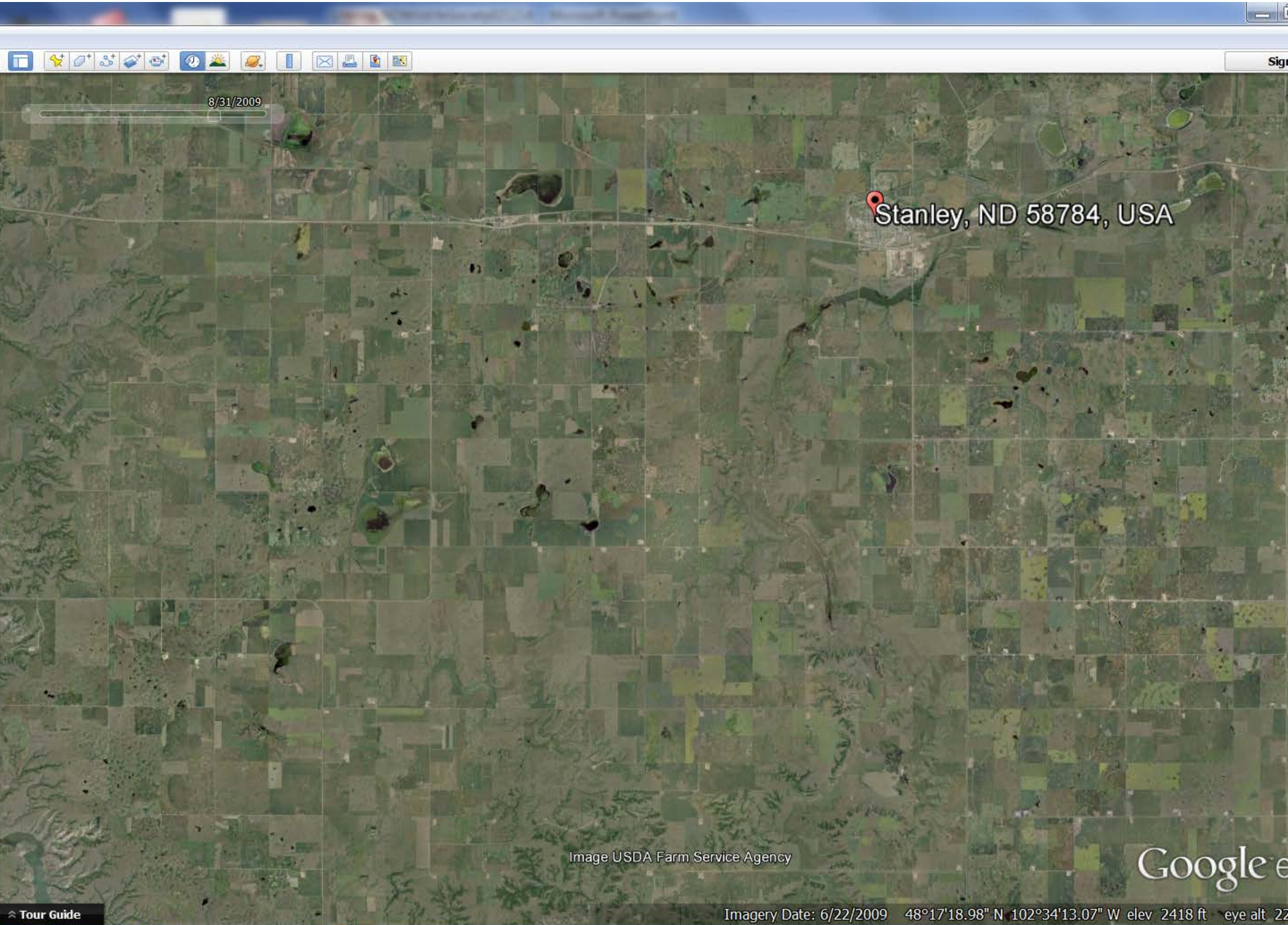
Phase 3
"Harvest"
Increased well density

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



8–20 wells per 1,280 acres proposed


7/29/2005
Stanley, ND 58784, USA
Image USDA Farm Service Agency
Google e
Tour Guide
Imagery Date: 6/14/2005 48°14'19.51" N 102°28'07.81" W elev 2329 ft eye alt 22


8/31/2009
Stanley, ND 58784, USA
Image USDA Farm Service Agency
Google e
Tour Guide
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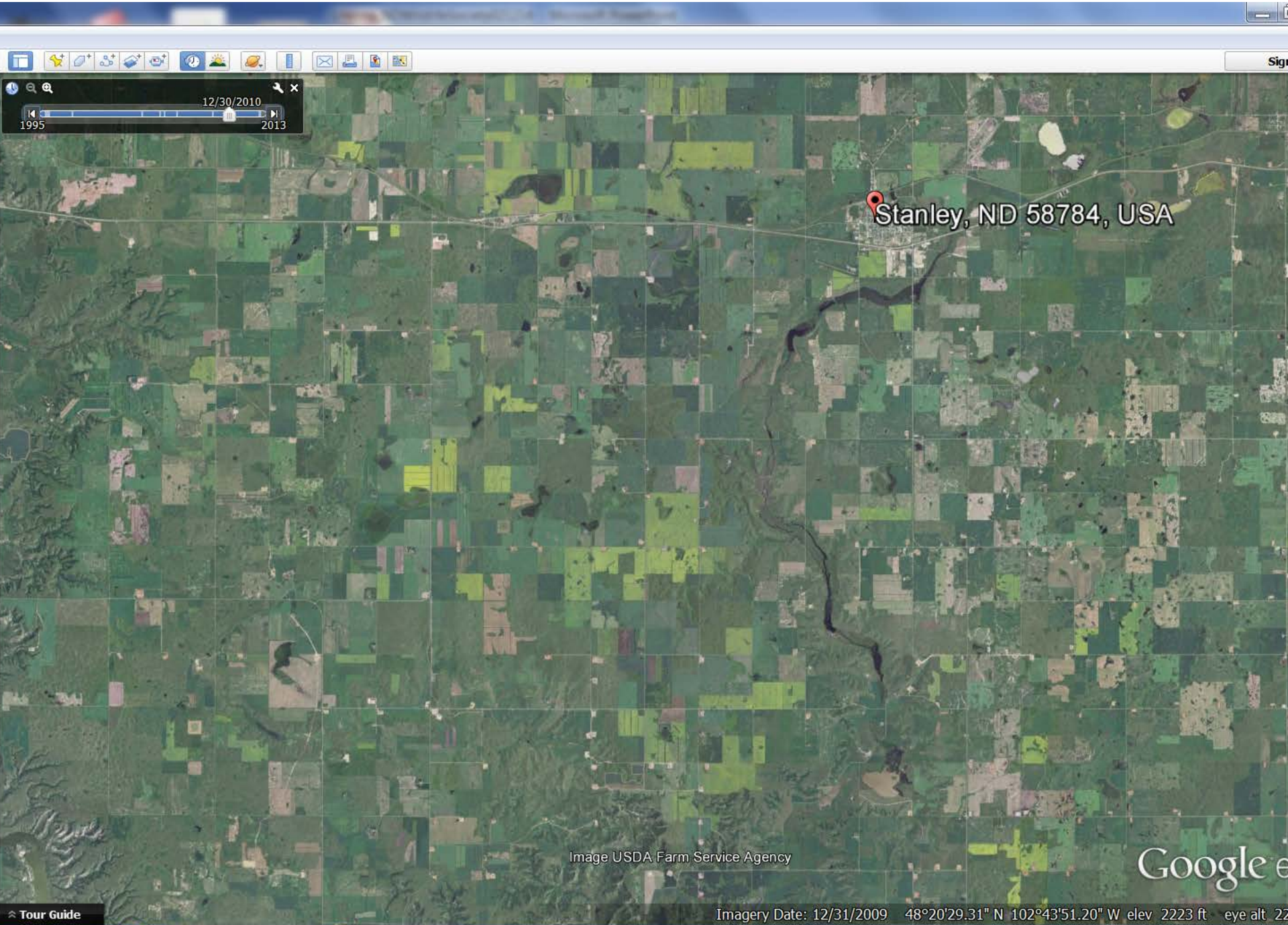
12/30/2010
1995
2013
Stanley, ND 58784, USA
Image USDA Farm Service Agency
Google e
Tour Guide
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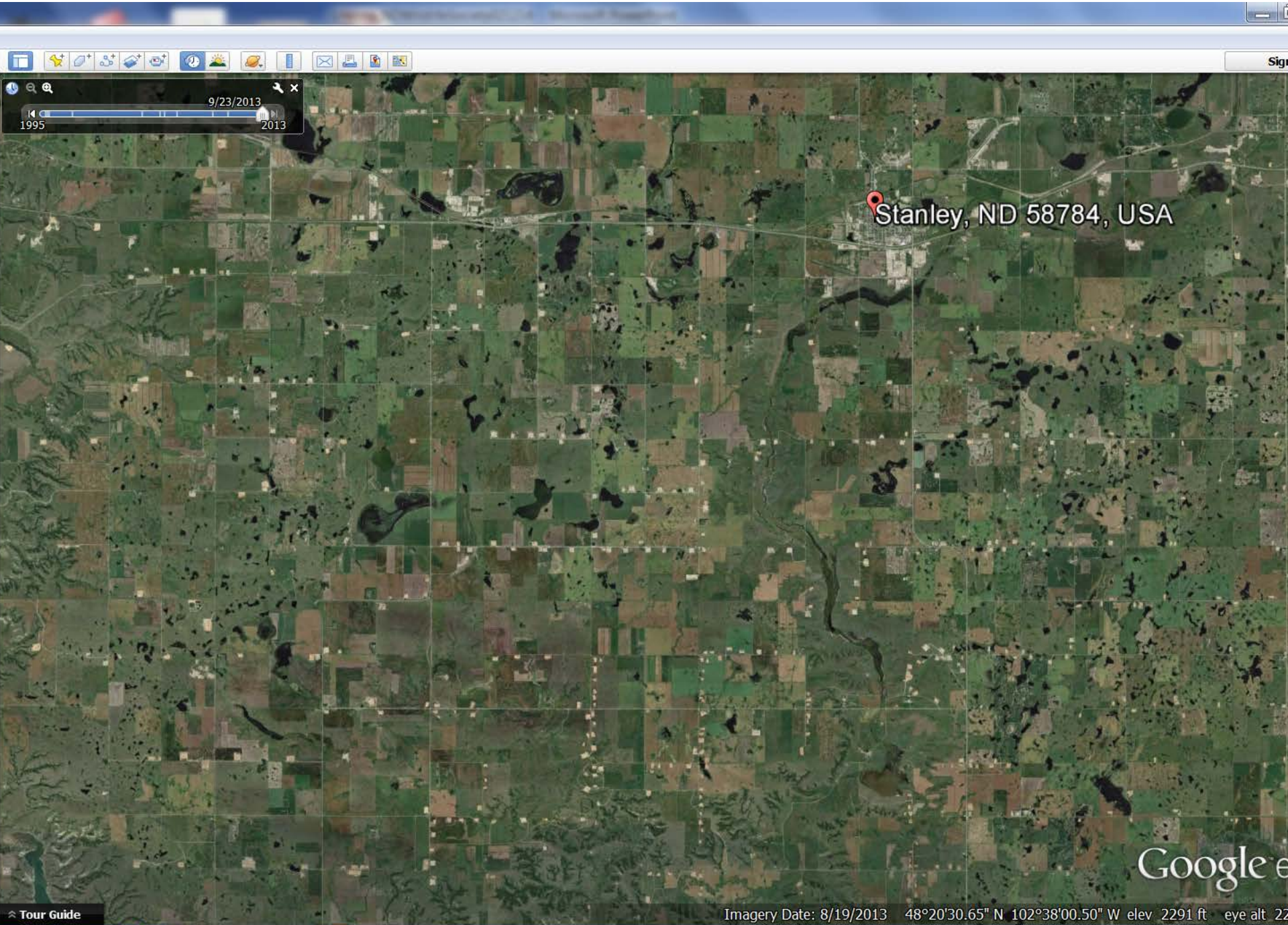

9/23/2013
1995
2013
Stanley, ND 58784, USA
Google
Tour Guide
Imagery Date: 8/19/2013 48°20'30.65" N 102°38'00.50" W elev 2291 ft eye alt 22

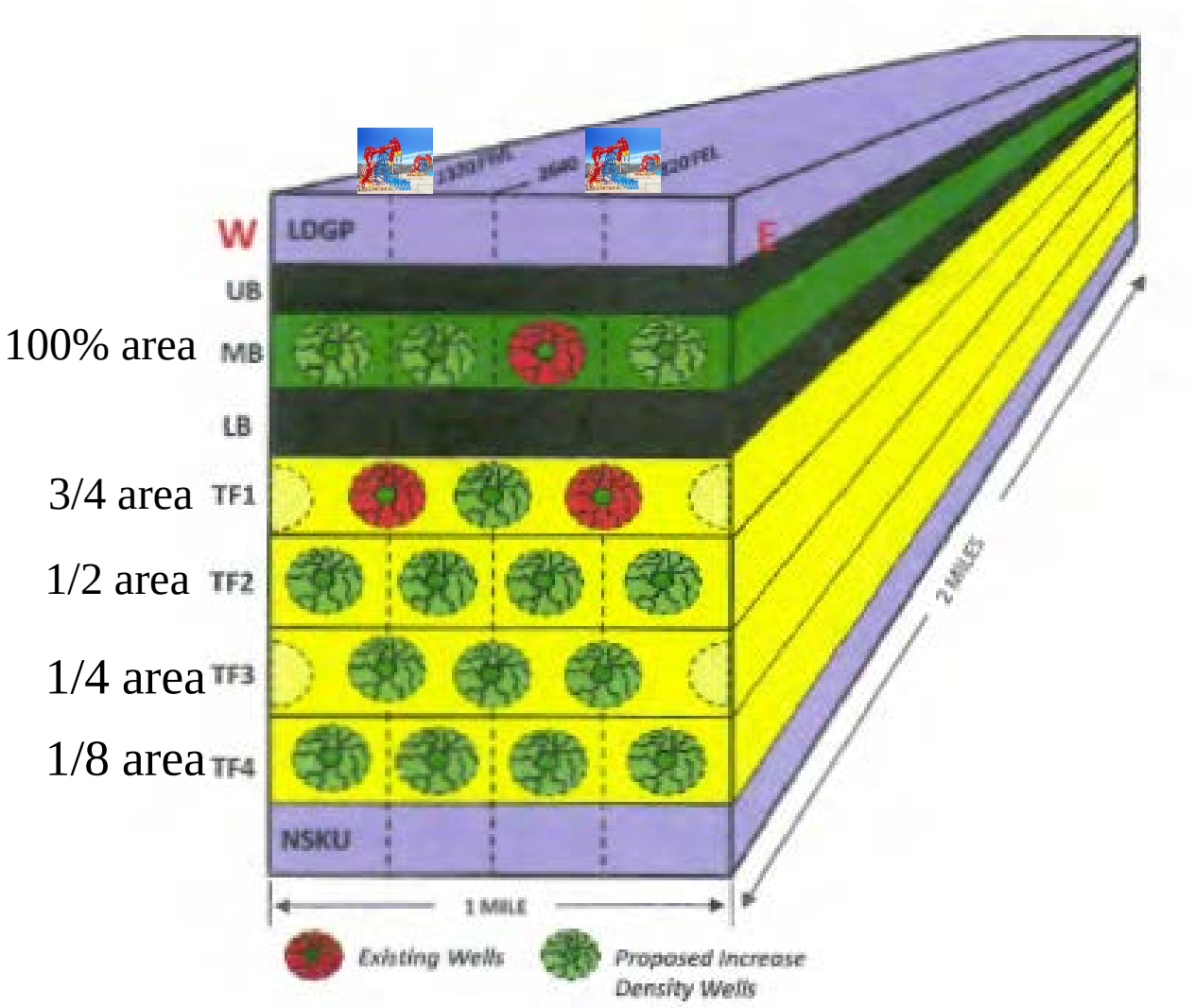
Vern Whitten Photography

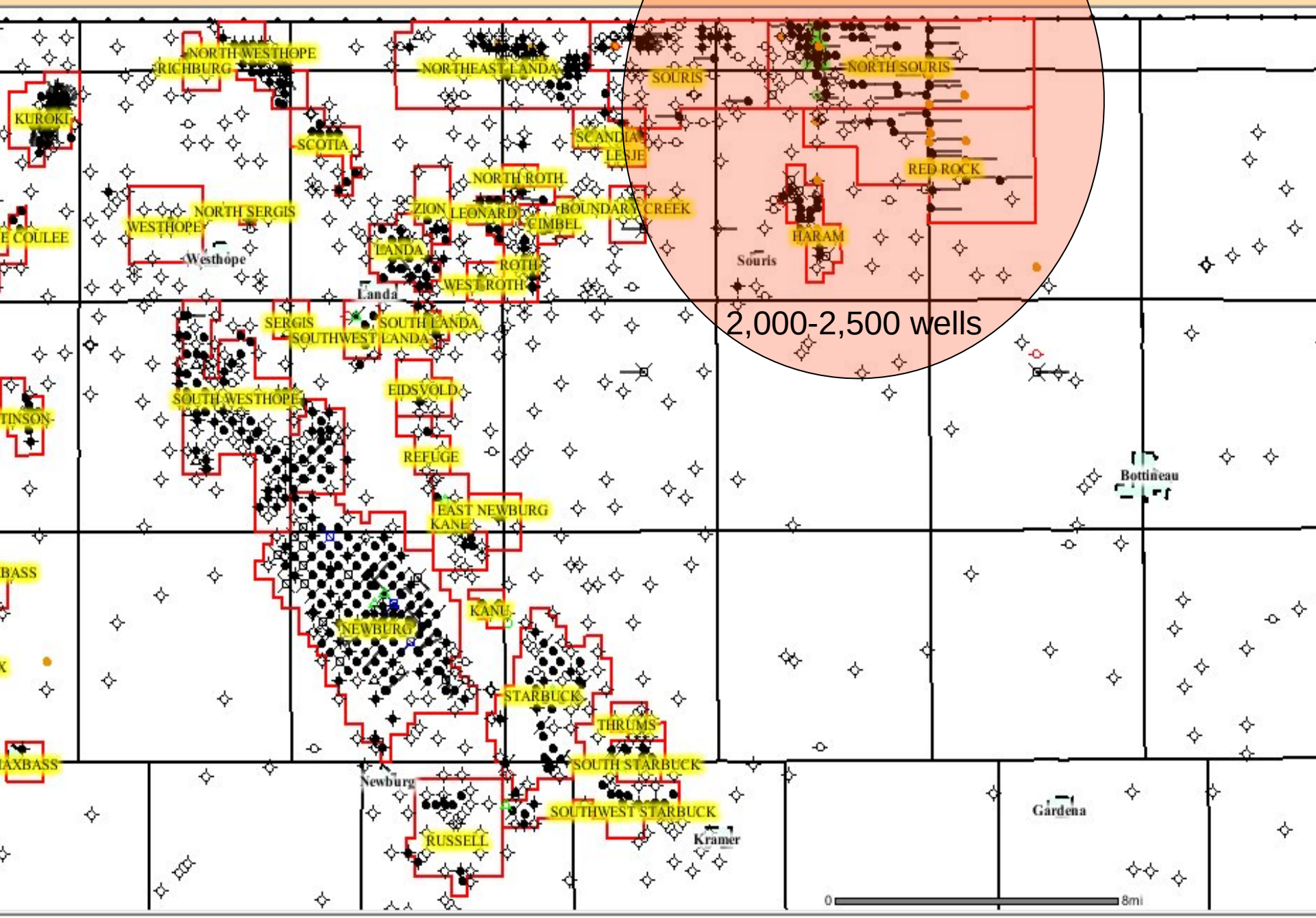
Vern Whitten Photography

6 wells producing - drilling 7-12 - and 11-18 coming soon

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

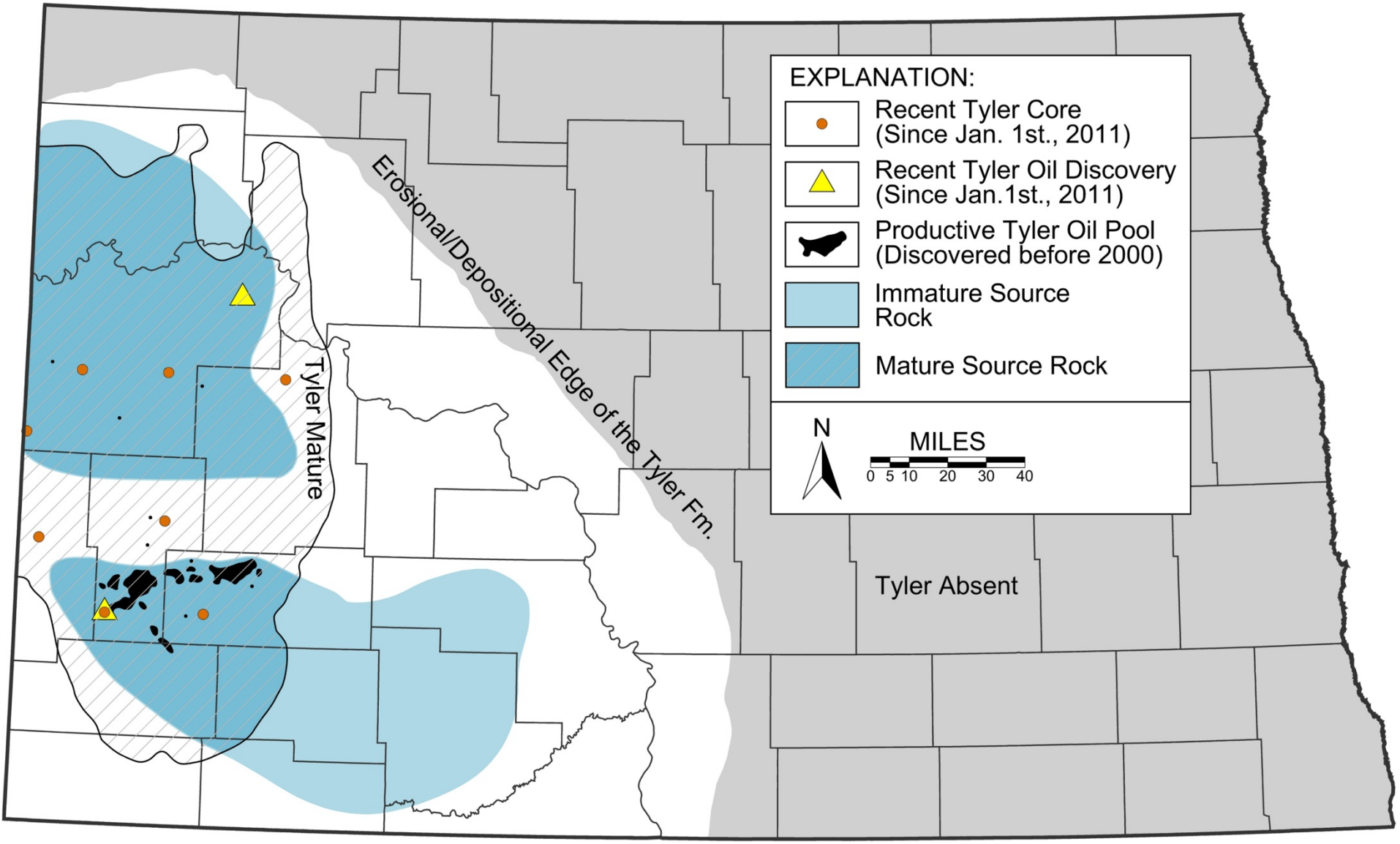
Phase 4?
“EOR”





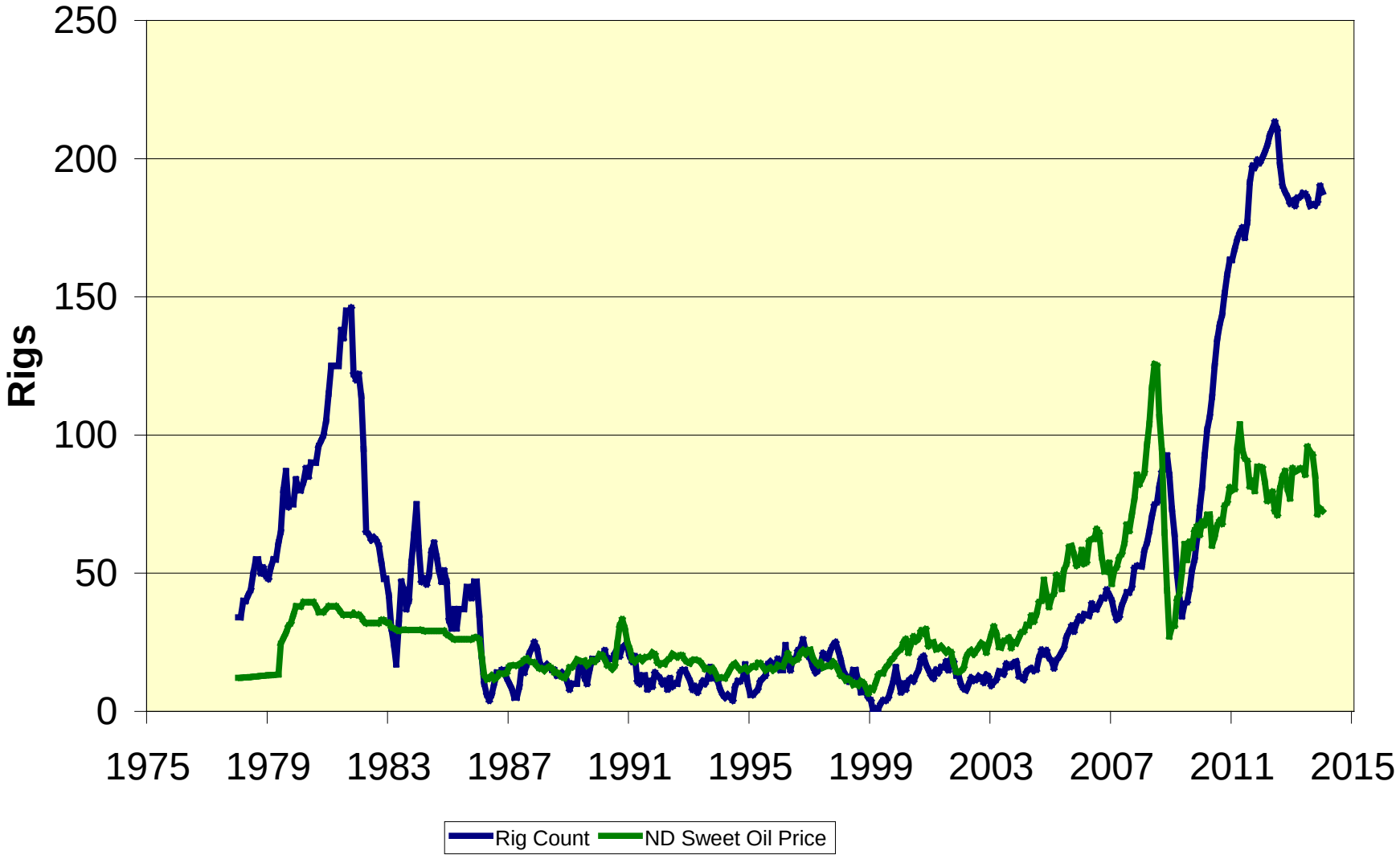
Entering Phase 2

3 rigs = 3-6 years



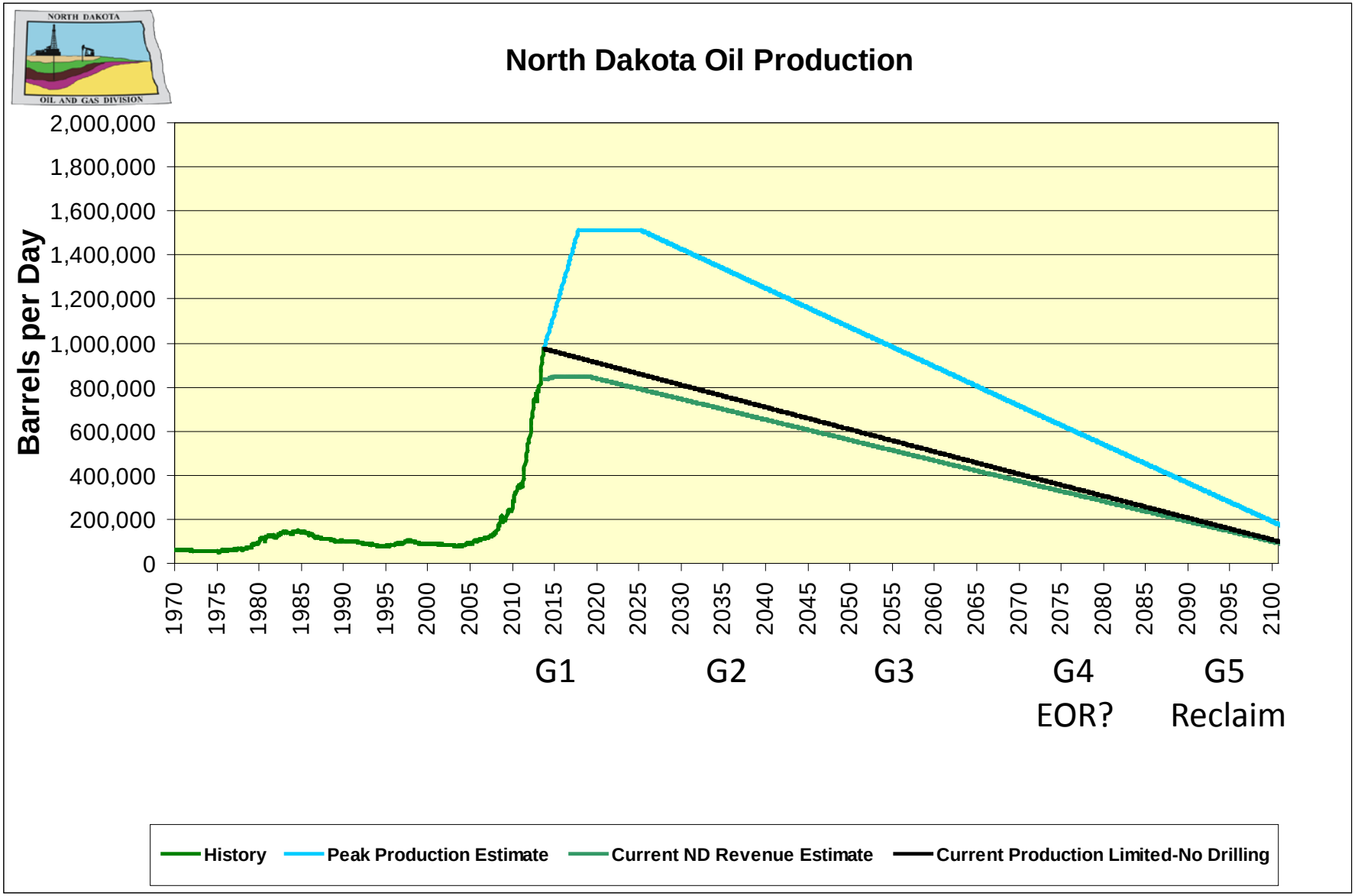
Starting Phase 1

North Dakota Average Monthly Rig Count



Western North Dakota

- 1,100 to 2,700 wells/year = 2,000 expected
  - 190 rigs = 2,280 wells per year
  - 218 rigs in May 2012 completed first phase of drilling mid 2012
  - 190 rigs will complete the second phase of drilling in 6-12 months
  - 190 rigs will require about 20 years to complete phase 3 drilling
  - 40,000 / 60,000 / 70,000 new wells


NORTH DAKOTA
OIL AND GAS DIVISION
North Dakota Oil Production
Barrels per Day
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
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2065
2070
2075
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2085
2090
2095
2100
G1
G2
G3
G4
EOR?
G5
Reclaim
History
Peak Production Estimate
Current ND Revenue Estimate
Current Production Limited-No Drilling

43-02-03-19. SITE CONSTRUCTION.

In the construction of a site, access road, and all associated facilities, the topsoil shall be removed, stockpiled, and stabilized or otherwise reserved for use when the area is reclaimed. "Topsoil" means the suitable plant growth material on the surface; however, in no event shall this be deemed to be more than the top eight inches [20.32 centimeters] of soil. Soil stabilization additives, liners, fabrics, and other materials to be used onsite, access roads, or associated facilities must be reported on a sundry notice (form 4) to the director within thirty days after application. The reclamation plan of such materials shall also be included.

When necessary to prevent pollution of the land surface and freshwaters, the director may require the site to be sloped and diked.

Well sites and associated facilities shall not be located in, or hazardously near, bodies of water, nor shall they block natural drainages. Sites and associated facilities shall be designed to divert surface drainage from entering the site.

Well sites and associated facilities or appropriate parts thereof shall be fenced if required by the director.

Within six months after the completion of a well, the portion of the well site not used for well operations shall be reclaimed, unless waived by the director. Well sites and all associated facilities shall be stabilized to prevent erosion.

History: Amended effective March 1, 1982; January 1, 1983; May 1, 1992; July 1, 2002; January 1, 2008; April 1, 2010; April 1, 2012.

General Authority
NDCC 38-08-04

Law Implemented
NDCC 38-08-04

43-02-03-19.4. DRILLING PITS.

A pit may be utilized to bury drill cuttings and solids generated during well drilling and completion operations, providing the pit can be constructed, used, and reclaimed in a manner that will prevent pollution of the land surface and freshwaters. In special circumstances, the director may prohibit construction of a cuttings pit or may impose more stringent pit construction and reclamation requirements. Reserve and circulation of mud system through earthen pits are prohibited unless a waiver is granted by the director. All pits shall be inspected by an authorized representative of the director prior to lining and use. Under no circumstances shall pits be used for disposal, dumping, or storage of fluids, wastes, and debris other than drill cuttings and solids recovered while drilling and completing the well.

Drill cuttings and solids must be stabilized in a manner approved by the director prior to placement in a cuttings pit. Any liquid accumulating in the cuttings pit shall be promptly removed. The pit shall be diked in a manner to prevent surface water from running into the pit.

A small lined pit can be authorized by the director for the temporary containment of incidental fluids such as trench water and rig wash, if emptied and covered prior to the rig leaving the site.

Pits shall not be located in, or hazardously near, bodies of water, nor shall they block natural drainages. No pit shall be wholly or partially constructed in fill dirt unless approved by the director.

When required by the director, the drilling pit or appropriate parts thereof shall be fenced.

43-02-03-19.4. DRILLING PITS.

Within thirty days after the drilling of a well or expiration of a drilling permit, drilling pits shall be reclaimed. The director may grant an extension of the thirty-day time period to no more than one year for good reason. Prior to reclaiming the pit, the operator or the operator's agent shall obtain verbal approval from the director of a pit reclamation plan.

A subsequent sundry notice (form 4) shall be filed detailing the pit reclamation and shall include:

1. The name and address of the reclamation contractor;
2. The name and address of the surface owner; and
3. A description of the work completed, including details on treatment and disposition of the drilling waste.

Any water or oil accumulated on the pit must be removed prior to reclamation. **Drilling waste shall be encapsulated in the pit and covered with at least four feet [1.22 meters] of backfill and topsoil and surface sloped, when practicable, to promote surface drainage away from the reclaimed pit area.**

History: Effective April 1, 2012.

General Authority
NDCC 38-08-04

Law Implemented
NDCC 38-08-04

Western North Dakota

- 2012 – present
  - 6,388 wells drilled
  - 2,129 lined cuttings pits
  - 98% drilled with oil based mud
  - Cuttings stabilized, encapsulated, and buried

43-02-03-29. WELL AND LEASE EQUIPMENT.

Wellhead and lease equipment with a working pressure at least equivalent to the calculated or known pressure to which the equipment may be subjected shall be installed and maintained. Equipment on producing wells shall be installed to facilitate gas-oil ratio tests, and static bottom hole or other pressure tests. Valves shall be installed and maintained in good working order to permit pressure readings to be obtained on both casing and tubing.

All newly constructed underground gathering pipelines must be devoid of leaks and constructed of materials resistant to external corrosion and to the effects of transported fluids. **All such pipelines installed in a trench must be installed in a manner that minimizes interference with agriculture, road and utility construction, the introduction of secondary stresses, the possibility of damage to the pipe, and tracer wire shall be buried with any nonconductive pipe installed. When a trench for an oil and gas underground gathering pipeline is backfilled, it must be backfilled in a manner that provides firm support under the pipe and prevents damage to the pipe and pipe coating from equipment or from the backfill material.**

43-02-03-29. WELL AND LEASE EQUIPMENT.

The operator of any underground gathering pipeline placed into service on August 1, 2011 to June 30, 2013, shall file with the director, by January 1, 2015, a geographical information system layer utilizing North American Datum 83 Geographic Coordinate System (GCS) and in an Environmental Systems Research Institute (Esri) Shape File format showing the location of the pipeline centerline.

The operator of any underground gathering pipeline placed into service after June 30, 2013, shall file with the director, within one hundred and eighty days of placing into service, a geographical information system layer utilizing North American Datum 83 Geographic Coordinate System (GCS) and in an Environmental Systems Research Institute (Esri) Shape File format showing the location of the pipeline centerline.

An affidavit of completion shall accompany each layer containing the following information:

1. A statement that the pipeline was constructed and installed in compliance with section 43-02-03-29.
2. The pipeline specifications.
3. The anticipated operating pressure of the pipeline.
4. The type of fluid that will be transported in the pipeline and direction of flow.
5. Pressure to which the pipeline was tested prior to placing in service.
6. The minimum pipeline depth of burial.
7. Leak detection and monitoring methods that will be utilized after in service date.
8. In service date.
9. Pipeline name.
10. Accuracy of the geographical information system layer.

43-02-03-29. WELL AND LEASE EQUIPMENT.

When an oil and gas underground gathering pipeline or any part of such ~~a~~ pipeline is abandoned, the operator shall leave such pipeline in a safe condition by conducting the following:

1. Disconnect and physically isolate the pipeline from any operating facility or other pipeline.

2. Cut off the pipeline or the part of the pipeline to be abandoned below surface at pipeline level.

3. Purge the pipeline with fresh water, air or inert gas in a manner that effectively removes fluid contaminates.

4. Remove cathodic protection from the pipeline.

5. Permanently plug or cap all open ends by mechanical means or welded means.

43-02-03-29. WELL AND LEASE EQUIPMENT.

Within one hundred eighty days of completing the abandonment of an underground gathering pipeline the operator of the pipeline shall file with the director a geographical information system layer utilizing North American Datum 83 Geographic Coordinate System (GCS) and in an Environmental Systems Research Institute (Esri) Shape File format showing the location of the pipeline centerline and an affidavit of completion containing the following information:

1. A statement that the pipeline was abandoned in compliance with section 43-02-03-29.

2. The type of fluid used to purge the pipeline.

The requirement to submit a geographical information system layer is not to be construed to be required on buried piping utilized to connect flares, tanks, treaters, or other equipment located entirely within the boundary of a well site or production facility.

Western North Dakota

Estimate 12,700 miles pre-2011 + 4,300 miles August 2011-June 2013 + 2,200 miles per year July 2013-Dec 2020 = 35,700 miles

43-02-03-34.1. RECLAMATION OF SURFACE.

1. Within a reasonable time, but not more than one year, after a well is plugged, or if a permit expires, has been canceled or revoked, the well site, access road, and other associated facilities constructed for the well shall be **reclaimed as closely as practicable to original condition**. Prior to site reclamation, the operator or the operator's agent shall file a sundry notice (form 4) with the director and obtain approval of a reclamation plan. **The operator or operator's agent shall provide a copy of the proposed reclamation plan to the surface owner at least ten days prior to commencing the work unless waived by the surface owner.** Verbal approval to reclaim the site may be given. The notice shall include:

    a. The name and address of the reclamation contractor;

    b. The name and address of the surface owner and the date when a copy of the proposed reclamation plan was provided to the surface owner;

    c. A description of the proposed work, including topsoil redistribution and reclamation plans for the access road and other associated facilities; and

    d. Reseeding plans, if applicable.

The commission will mail a copy of the approved notice to the surface owner.

43-02-03-34.1. RECLAMATION OF SURFACE.

1. All equipment, waste, and debris shall be removed from the site. Flow lines shall be purged in a manner approved by the director. Flow lines shall be removed if buried less than three feet [91.44 centimeters] below final contour.

2. Gravel or other surfacing material shall be removed, stabilized soil shall be remediated, and the well site, access road, and other associated facilities constructed for the well shall be reshaped as near as is practicable to original contour.

3. The stockpiled topsoil shall be evenly distributed over the disturbed area and, where applicable, the area re-vegetated with native species or according to the reasonable specifications of the appropriate government land manager or surface owner.

4. Within thirty days after completing any reclamation, the operator shall file a sundry notice with the director reporting the work performed.

5. **The director, with the consent of the appropriate government land manager or surface owner, may waive the requirement of reclamation of the site and access road after a well is plugged.**

History: Effective April 1, 2012 General Authority Law Implemented NDCC 38-08-04

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
29


8070
9078
8234
13309
10935
9515
MORGAN DRAW
T144N R102W
9803
13228
9766

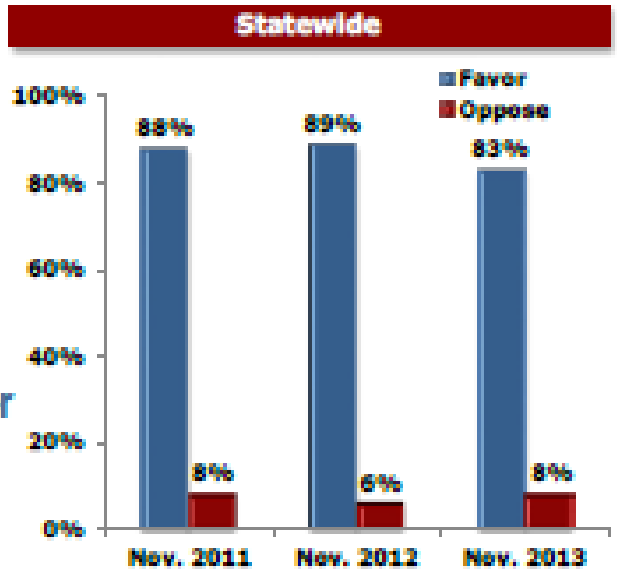

MORGAN DRAW
T144N R102W
29

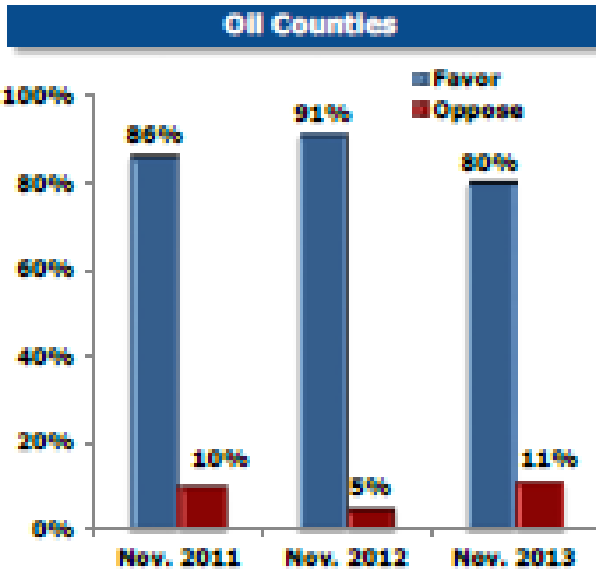
Widespread support for oil development in North Dakota

"Do you favor or oppose oil development in North Dakota?"

» **83%** Statewide favor
  » 49% Strongly favor

» **80%** Oil counties favor
  » 50% strongly favor



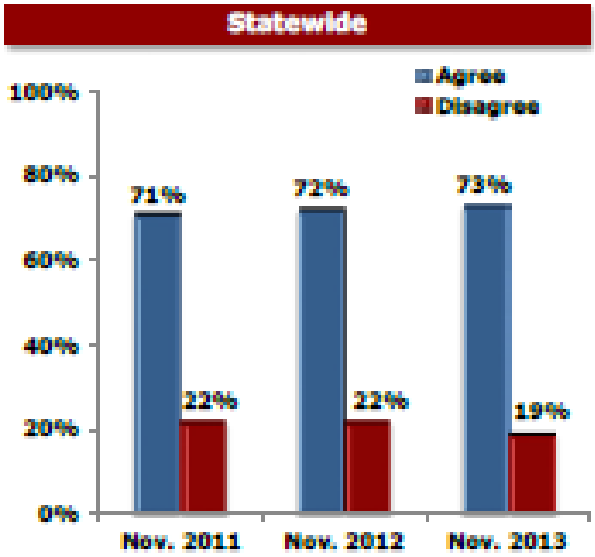


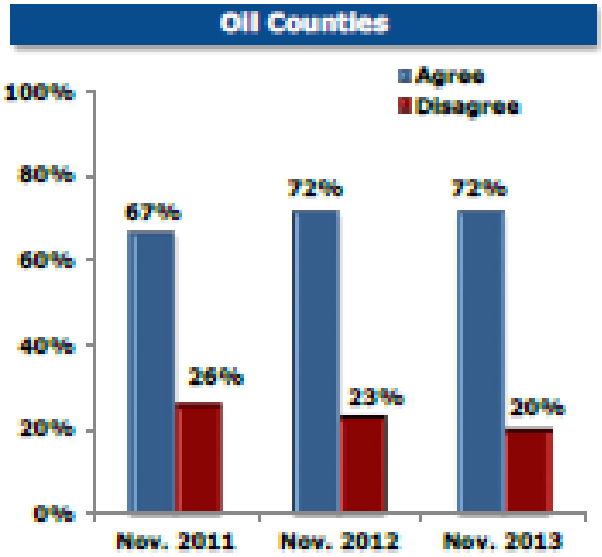
Benefits of oil development outweigh risks

"Do you agree or disagree that the benefits of oil development outweigh the risks?"

» 73% Statewide agree

» 72% Oil counties agree





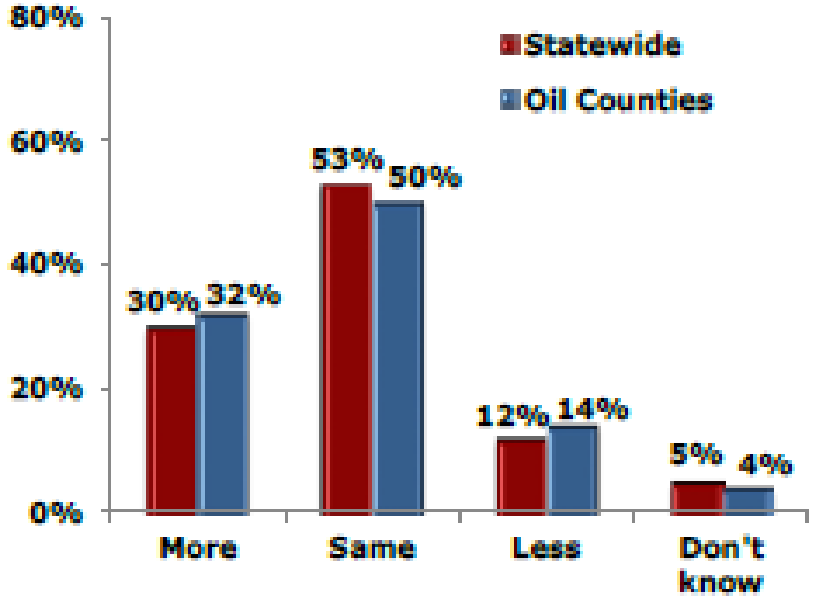
Wide majority wants to maintain or increase production

"Do you think there should be more oil and natural gas production in the state, the same amount, or less?"

» **83%** statewide &

» **82%** in oil counties

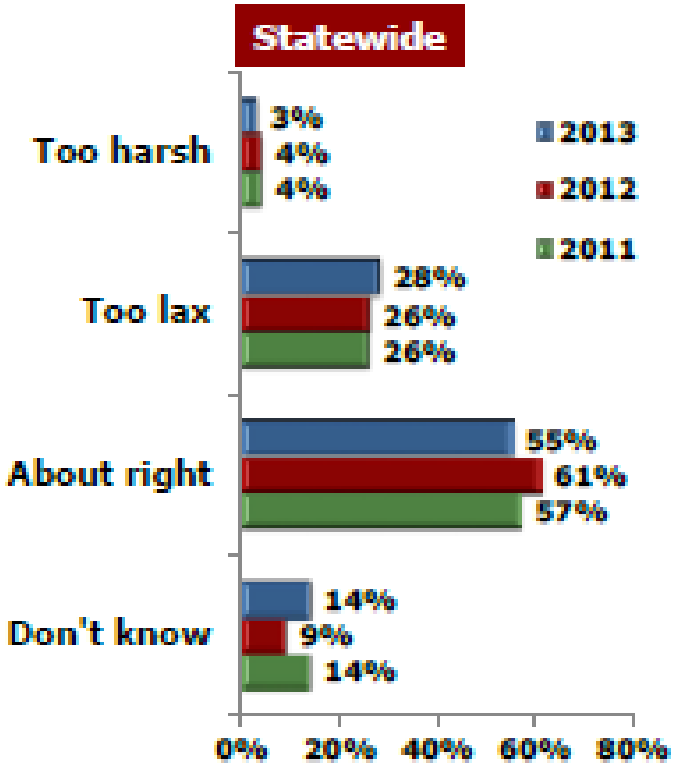
think production should increase or stay the same.



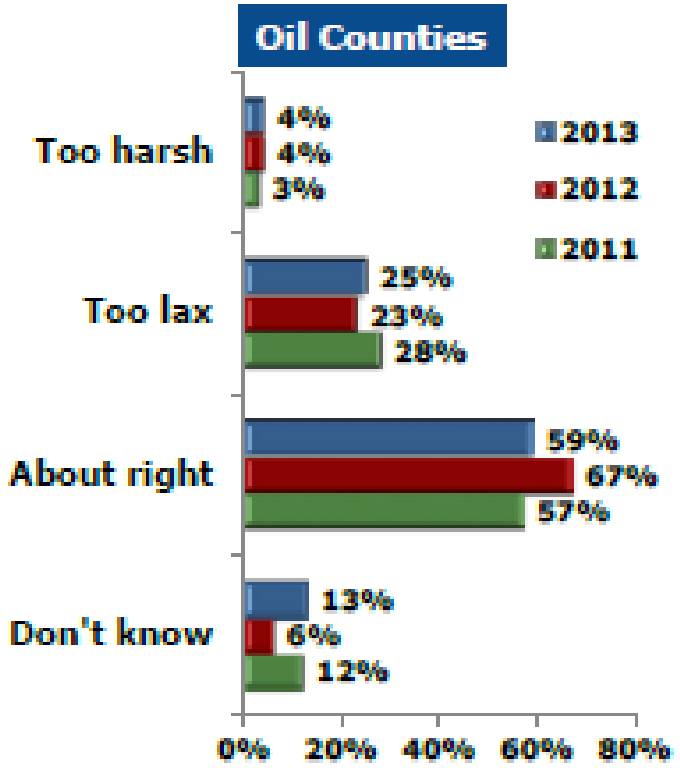
State regulations on oil and gas are about right

"Would you say the state regulations on oil and natural gas development are...?"

» 55% statewide say about right

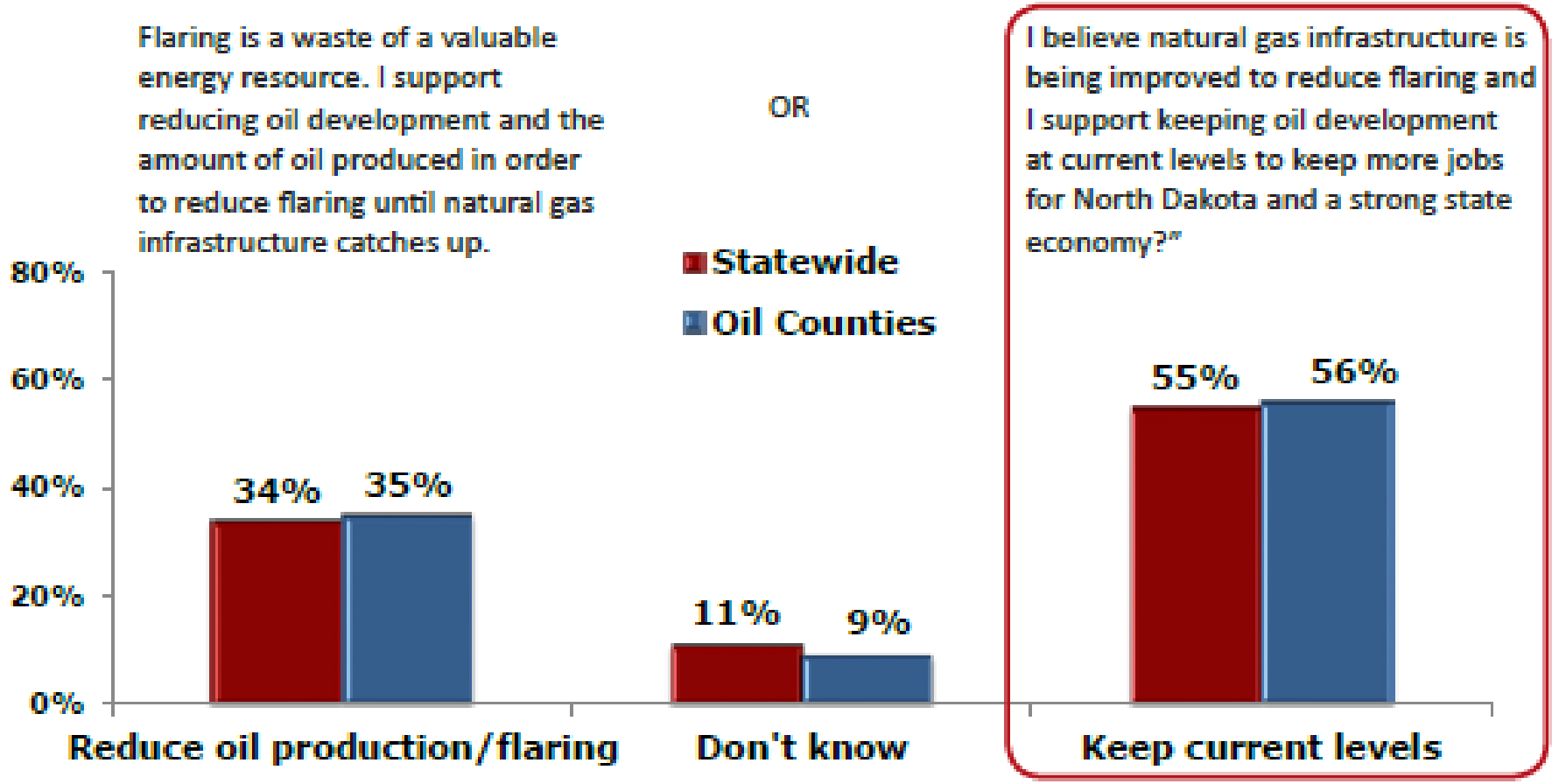


» 59% in oil counties say about right



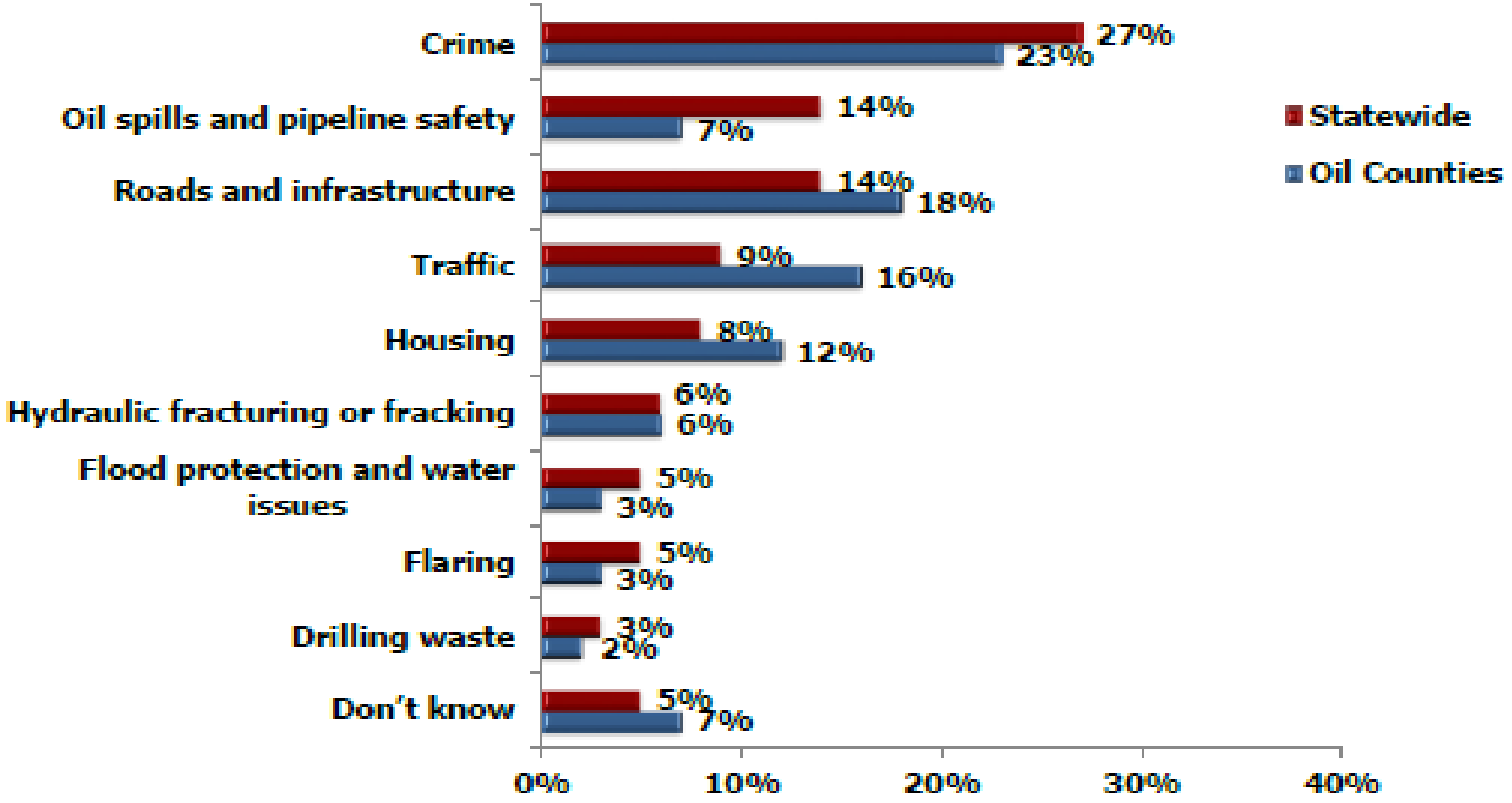
More than half support current oil and gas production levels despite flaring

"Which one of the following statements comes closest to your view?



Social issues & infrastructure remain primary concerns

"Which one of the following concerns you most about oil and natural gas development in North Dakota?"



Majority do not blame oil industry for decrease in wildlife

"As you may know, some wildlife populations in North Dakota have declined in recent years. Here are two views on this issue, we will call them Smith and Jones. Smith blames the oil and natural gas industry for the decline, saying that as oil and natural gas well sites and roads to these sites continue to be built, some wildlife is being pushed away from its prime habitat and food sources. Jones says the oil and natural gas industry is not the cause but blames the decline in some wildlife populations on declining acreage in the Conservation Reserve Program, or CRP and three brutal winters starting in 2008. Which view comes closest to your own?"