

WHERE'S THE OIL?



March 23, 1927

3/23/27

IS THERE OIL IN SOUTH DAKOTA?

Some People Think There Is

If YOU are interested in what the future
of South Dakota may be, come to the

CHAMBER OF COMMERCE

THURSDAY EVENING

MARCH 24---8 O'CLOCK

Hear the true facts of the pioneer
well of our state

WHAT OIL HAS DONE FOR OTHERS
IT MAY DO FOR US

We will never know until we complete the
geological survey that is down 3508 ft. with
6-inch hole at Standing Butte near Ft. Pierre

IS IT WORTH THE EFFORT

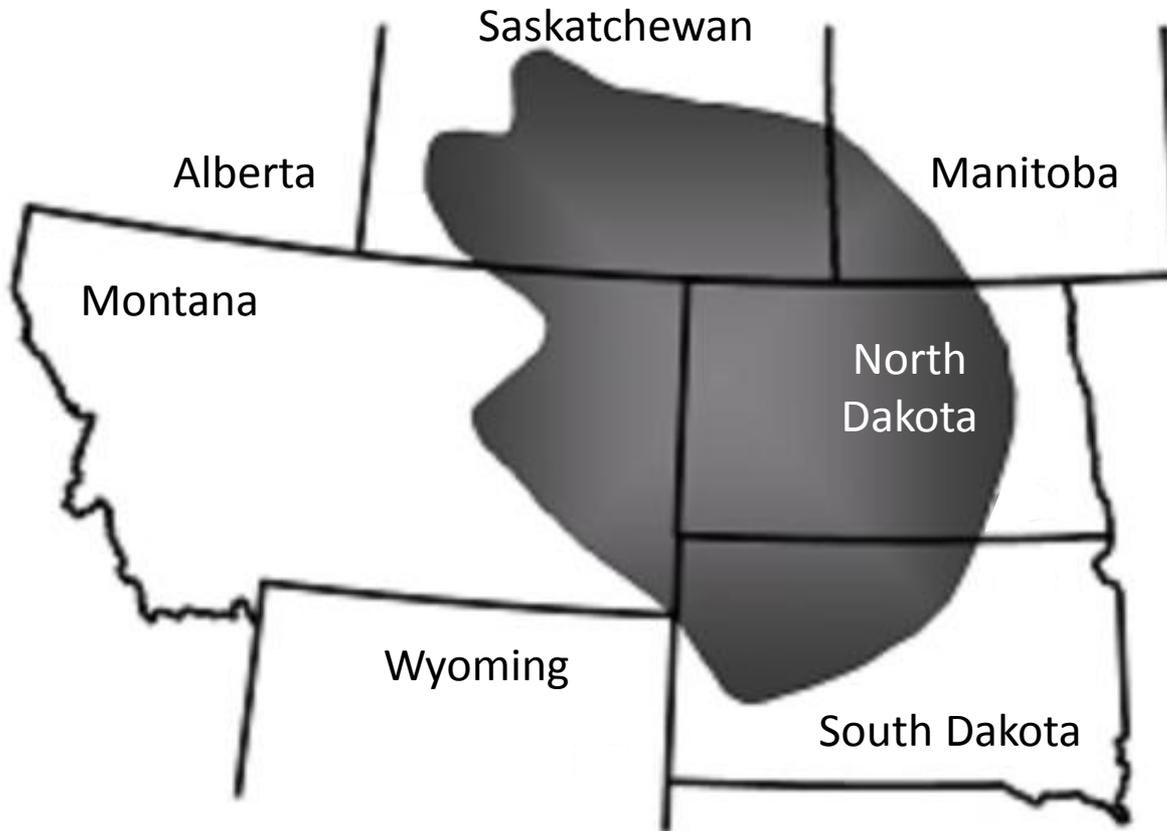
SOME OF US THINK SO

H. R. DENNIS
C. N. McMILLAN
A. F. LARSON

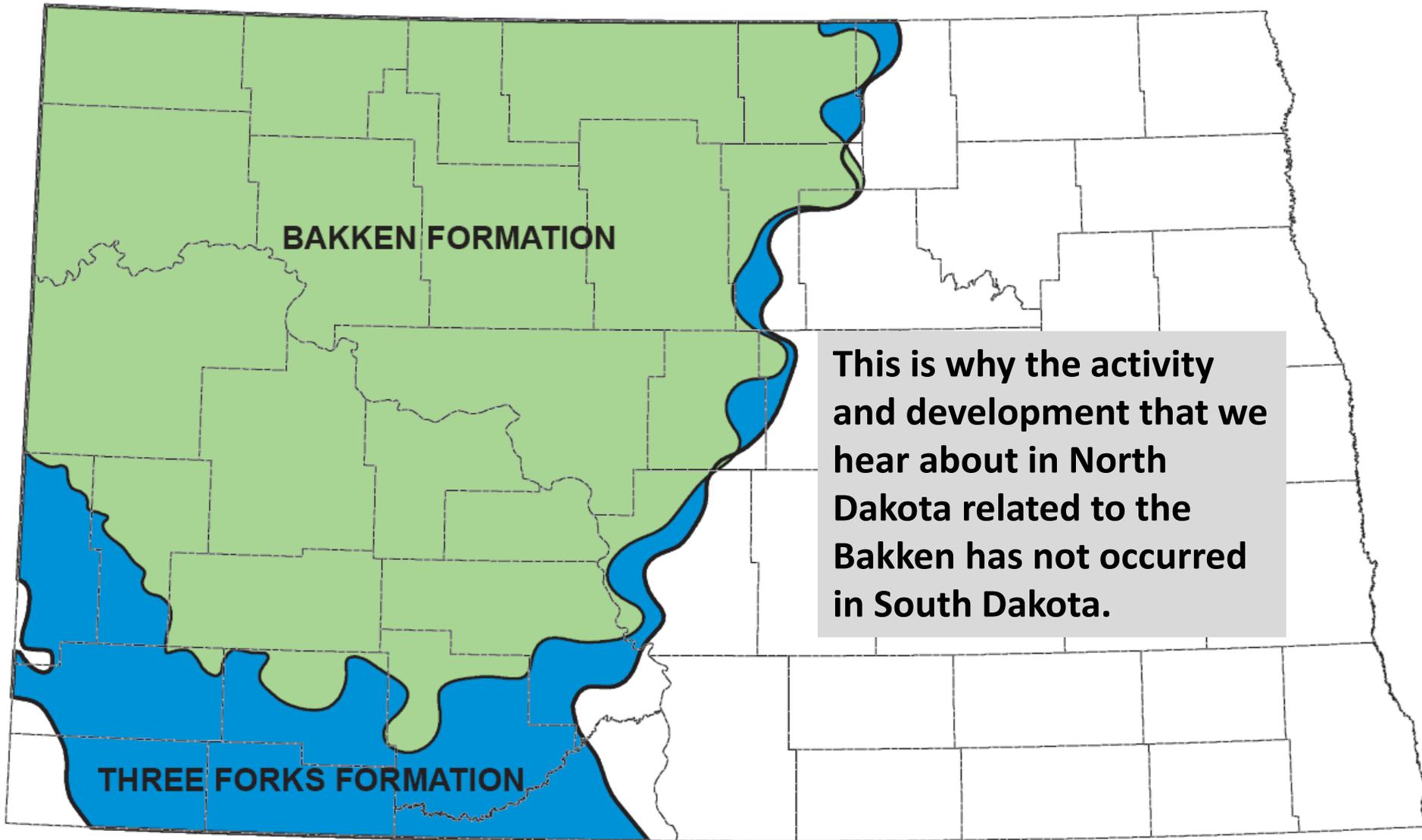
**DON'T MISS THIS MEETING
TOMORROW NIGHT**

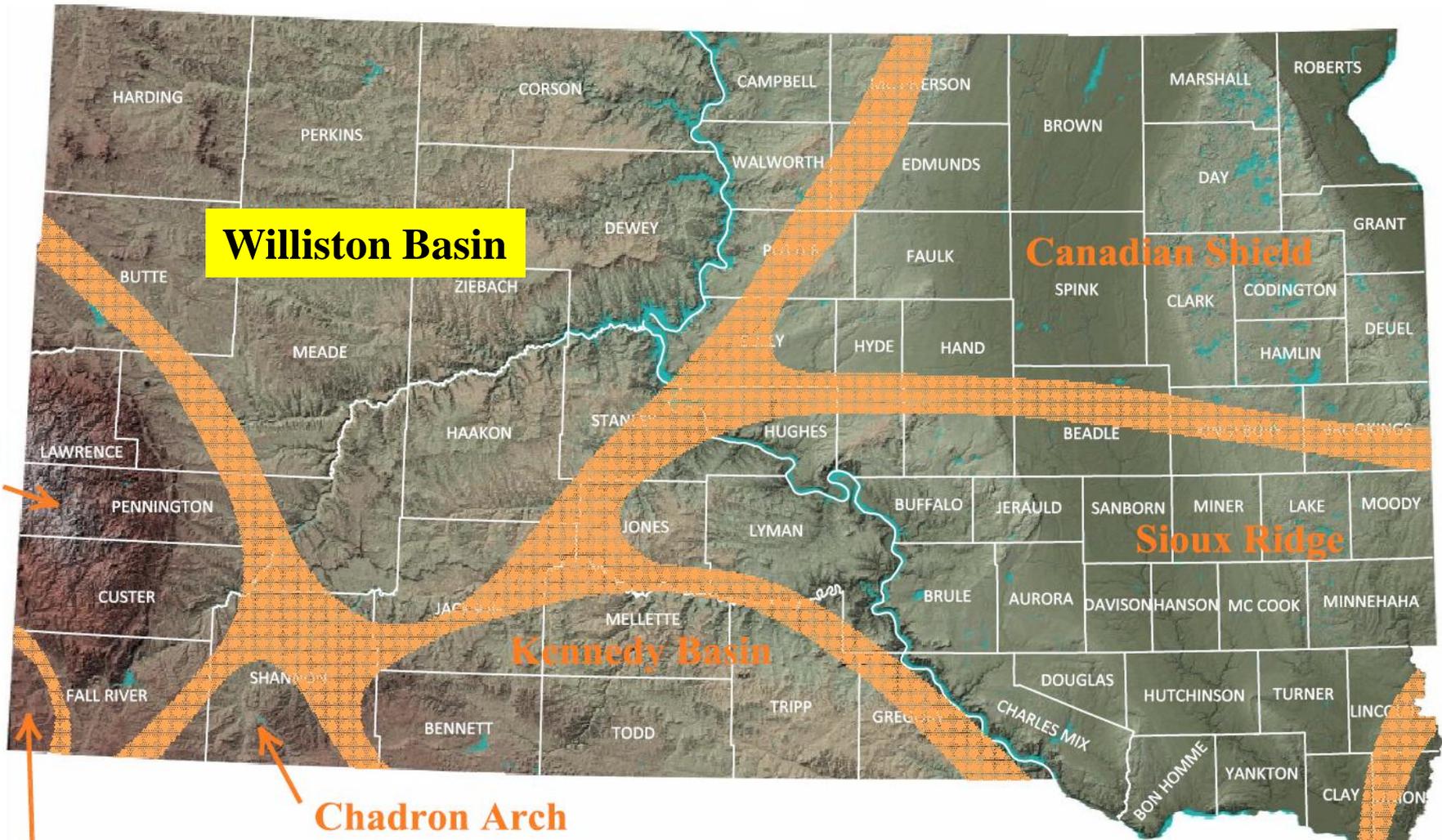
TORIE TIEGEN
WILL A. BEACH
CHAS. ROSS

Williston Basin



Extent of Bakken and Three Forks Formations in North Dakota





Williston Basin

Canadian Shield

Kennedy Basin

Sioux Ridge

Forest City Basin

Black Hills

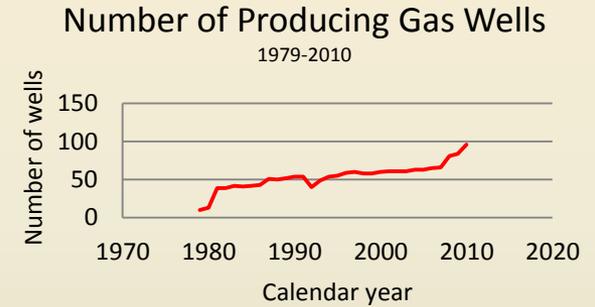
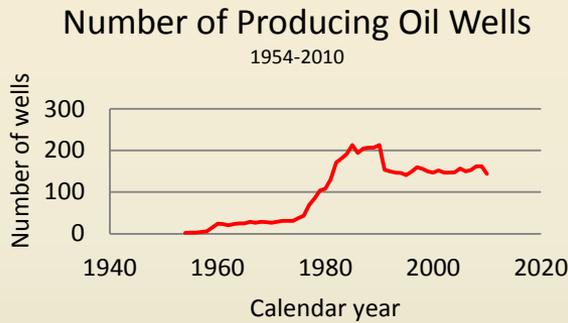
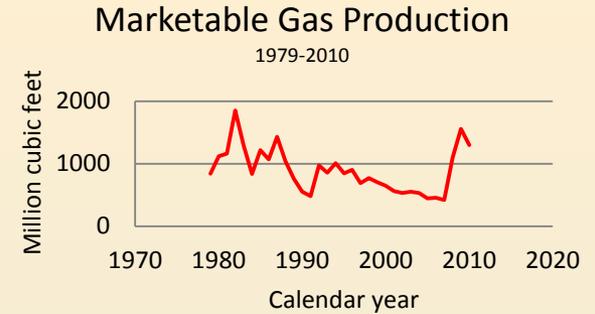
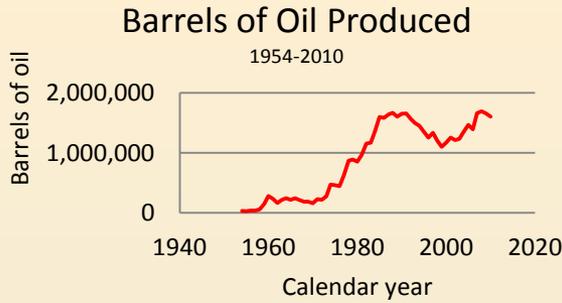
Chadron Arch

**Eastern Powder River Basin -
Western Black Hills**

 Approximate boundary of geologic areas

South Dakota Oil and Gas Facts

- Oil production began in 1954.
- The discovery well was drilled in 1953 in Harding County by Shell Oil Company.
- The well was drilled to a depth of 9,332 feet.
- The producing geologic unit is the Red River Formation.
- The Red River Formation remains South Dakota's most productive geologic unit for oil.
- North Dakota's Bakken Formation does not exist in South Dakota.
- The Tyler Formation and Three Forks Shale being developed in North Dakota do exist in South Dakota but remain effectively unexplored.



State Oil and Gas Revenues

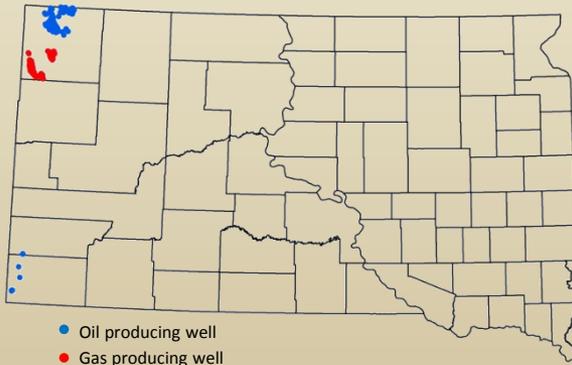
Fiscal year	Conservation tax ¹	Severance tax ²	Permit fees ³
2011	\$281,440	\$5,276,994	\$2,500
2010	\$240,282	\$4,505,530	\$3,100
2009	\$297,771	\$5,596,540	\$7,100
2008	\$294,773	\$5,526,990	\$3,600
2007	\$168,178	\$3,152,890	\$5,000
2006	\$173,710	\$3,255,856	\$2,900

¹ SDCL 10-39B: 0.24% of the value of oil and gas produced; dedicated to DENR to carry out oil and gas activities.

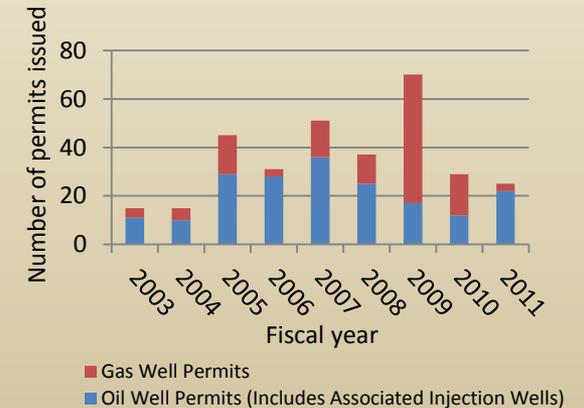
² SDCL 10-39A: 4.5% of the value of oil and gas produced; half goes to the state general fund and half goes to the county in which the production occurred.

³ Application fee of \$100 for a permit to drill an oil or gas well; dedicated to DENR to carry out oil and gas activities.

Areas of Oil and Gas Production

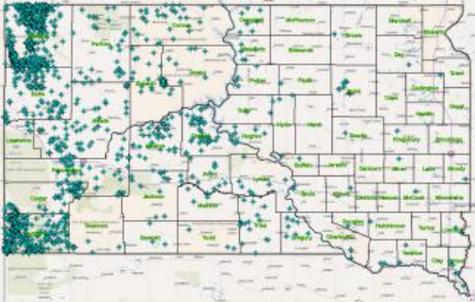


Oil & Gas Drilling Permits Issued

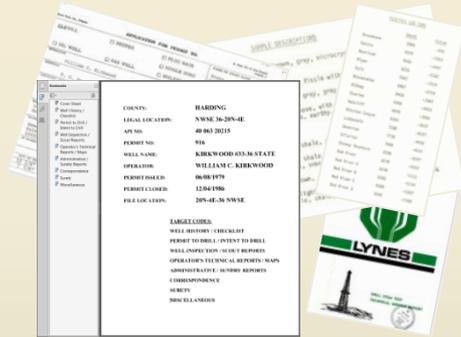


1. Interactive Maps

Available at sddenr.net/sdoil/oilgas_app.html



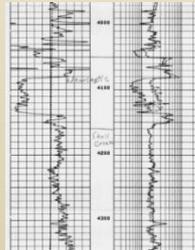
Interactive point-and-click maps for oil and gas permits, geophysical logs, and records of drilling & well completion



Click on a well to instantly get a complete oil and gas permit file, in bookmarked PDF format



Click on a well to instantly get a drilling record



Click on a well to instantly get geophysical logs

- Various **base maps** showing street, aerial, terrain, and topography are provided by ESRI's online mapping service and are readily changeable.
- There are several **data layers** that can be turned on and off.

Department of Environment and Natural Resources (DENR)

Oil and Gas Initiative

Promoting Exploration and Development of South Dakota's Oil and Gas Resources

DENR's One-Stop Shop for Oil and Gas Information

Available at sddenr.net/sdoil

Three ways to get information!

1. Browse, view, and download data using interactive maps.
2. Use online databases to search for and download data.
3. Download publications.

Plus

Regulations Streamlined in 2011

Unnecessary rules were eliminated and others were changed to expedite industry activity.

2. Online Databases for nearly 100,000 drill holes

- Records of oil and gas drilling from ≈1,900 locations at sddenr.net/oil_gas/
- Records of water well completion from ≈62,245 locations at denr.sd.gov/des/wr/dblogsearch.aspx
- Other records of test hole and well drilling from ≈34,350 locations at sddenr.net/liithdb/
- Records of DENR's observation well measurements from 1,555 wells at denr.sd.gov/des/wr/dbobsearch.aspx

3. Examples of Publications

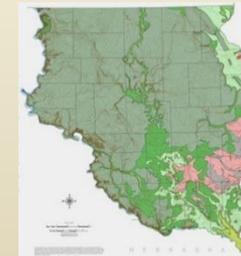
Order hard copy or get free downloads at www.sdgs.usd.edu



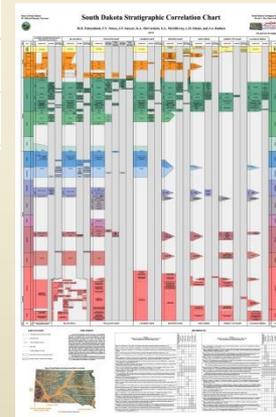
Statewide cross sections



Surface geologic maps



Bedrock geologic map



Names and distribution of geologic units



Subdivisions of the Precambrian surface

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Promoting Exploration and Development of
South Dakota's Oil and Gas Resources

DENR's One-Stop Shop for Oil and Gas Information

Three ways to get information!

- 3**  Browse, view, and download data using interactive maps
- 2**  Use online databases to search for and download data for a single location or larger areas
- 1**  Download publications

How to get information from the data layers

1. Click on a data point to retrieve information for that location.

Well Name: KIRKWOOD
Permit Number: 916
API Number: 40 063 20215

Well Name: SHELL 32-31B NIEMI
Permit Number: 270
API Number: 40 063 05015

Oil and Gas Wells : KIRKWOOD 33-36 STATE [Permit# 916]	
API Number	40 063 20215
Permit	916
Operator	WILLIAM C KIRKWOOD
Well Name	KIRKWOOD 33-36 STATE
Well Field	BUFFALO
Location	20N-4E-36 NWSE
County	HARDING
Cores Available	N
Kelly Bushing Elevation	3,043.00
Ground Surface Elevation	3,032.00
Total Depth	8,500.00
Class	DRY HOLE
Well Type	DRY HOLE
Status	P&A
Bottom Hole Formation	Red River Formation
Database Record	http://sddenr.net/oil_gas/ind
Scanned Permit File	http://www.sddenr.net/ogfile
Scanned Elogs	http://www.sddenr.net/oglog
Date Issued	6/8/1979 12:00:00 AM
Date Spudded	9/18/1979 12:00:00 AM
Date Plugged	10/13/1979 12:00:00 AM

Zoom To

Data layers are also searchable

2. Click on available links to access more information.

Example of a record from the online oil and gas database



Oil and Gas Search for: *api_no_ like '40 063 20215'*

Page 1 of 1

[Download Database](#)
(Excel spreadsheet format)

Page: 1

Record 1 of 1

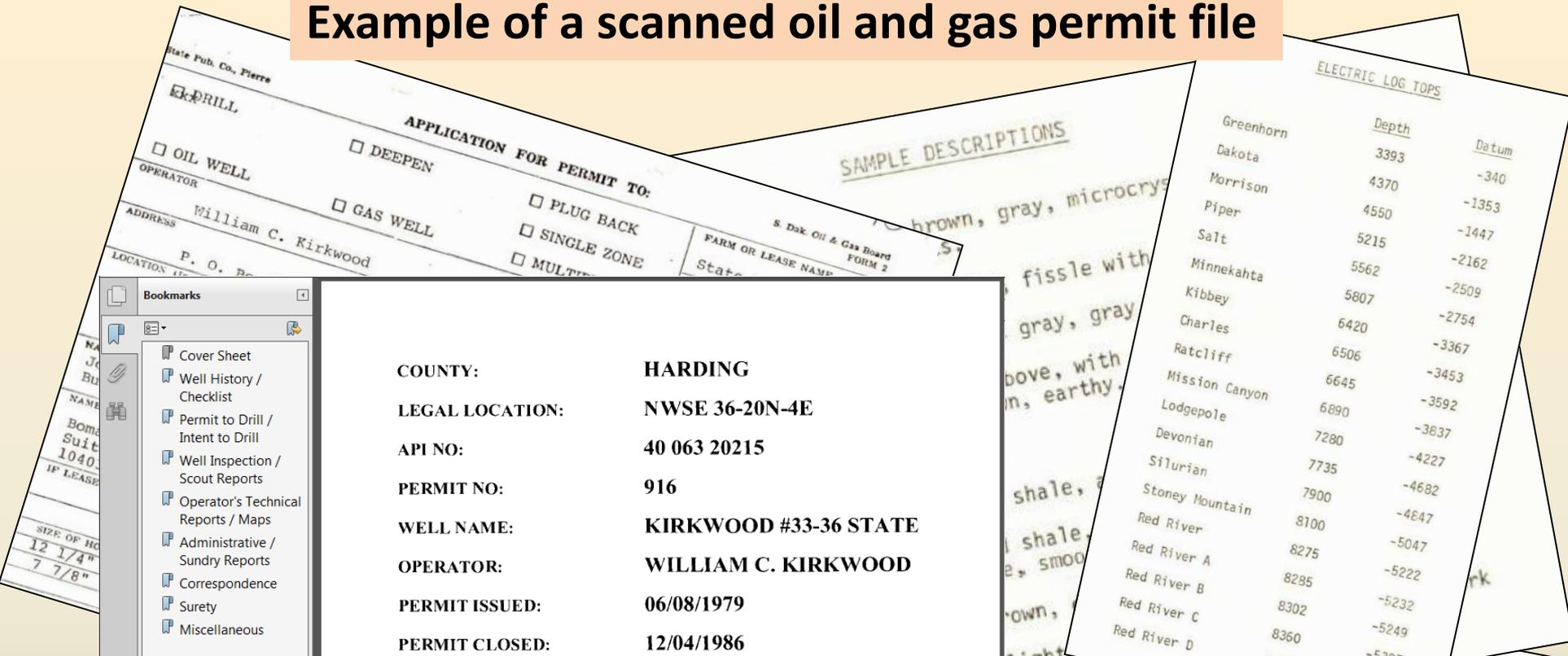
Well Information

API No:	40 063 20215	County:	HARDING
Well Name:	KIRKWOOD 33-36 STATE	Location:	NWSE 36-20N-4E
Permit No:	916	Total Depth:	8500
Operator Name:	WILLIAM C KIRKWOOD	Bottom Hole:	Red River
Permit Date:	06-08-1979	KB Elevation:	3043
Spud Date:	09-18-1979	Ground Elevation:	3032
Plug Date:	10-13-1979	Latitude:	45.651992
		Longitude:	-103.573089
Well Field	BUFFALO	Status	P&A
Class:	DRY HOLE	Type:	DRY HOLE

Formation Tops

<u>Formation</u>	<u>Depth (ft.)</u>
Greenhorn	3393
Dakota Mud	4370
Fall River	4550
Piper	5215
Pine Salt	5562
Minnekahta	5807
Charles	6506
Mission Canyon	6890
Lodge Pole	7280
Duperow	7735
Interlake	7900
Stoney Mountain	8100
Red River	8275
Red River1	8285
Red River2	8302
Red River3	8360
Red River4	8422

Example of a scanned oil and gas permit file



COUNTY: HARDING
LEGAL LOCATION: NWSE 36-20N-4E
API NO: 40 063 20215
PERMIT NO: 916
WELL NAME: KIRKWOOD #33-36 STATE
OPERATOR: WILLIAM C. KIRKWOOD
PERMIT ISSUED: 06/08/1979
PERMIT CLOSED: 12/04/1986
FILE LOCATION: 20N-4E-36 NWSE

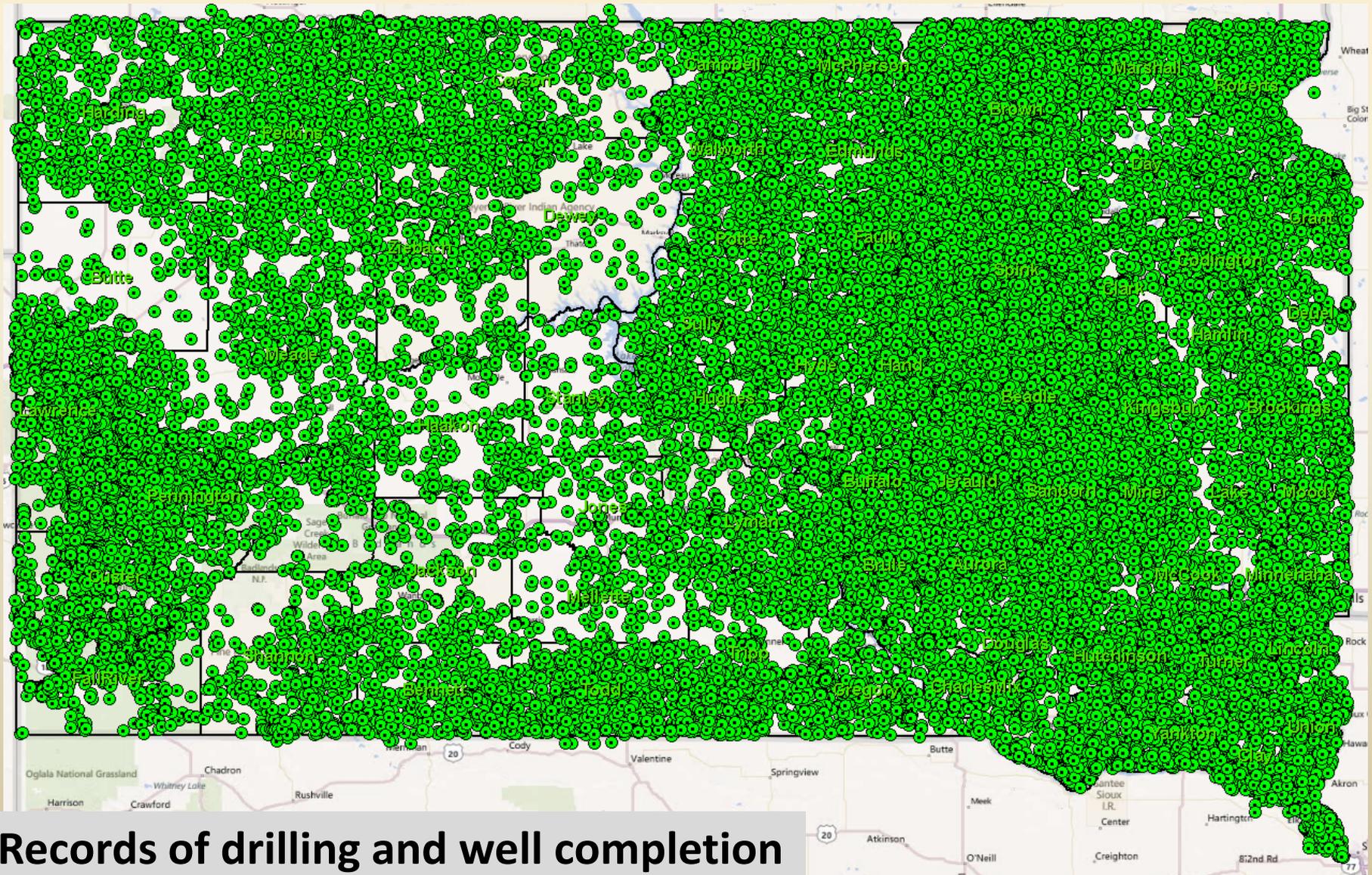
TARGET CODES:

WELL HISTORY / CHECKLIST
PERMIT TO DRILL / INTENT TO DRILL
WELL INSPECTION / SCOUT REPORTS
OPERATOR'S TECHNICAL REPORTS / MAPS
ADMINISTRATIVE / SUNDRY REPORTS
CORRESPONDENCE
SURETY
MISCELLANEOUS

- The complete oil and gas permit file

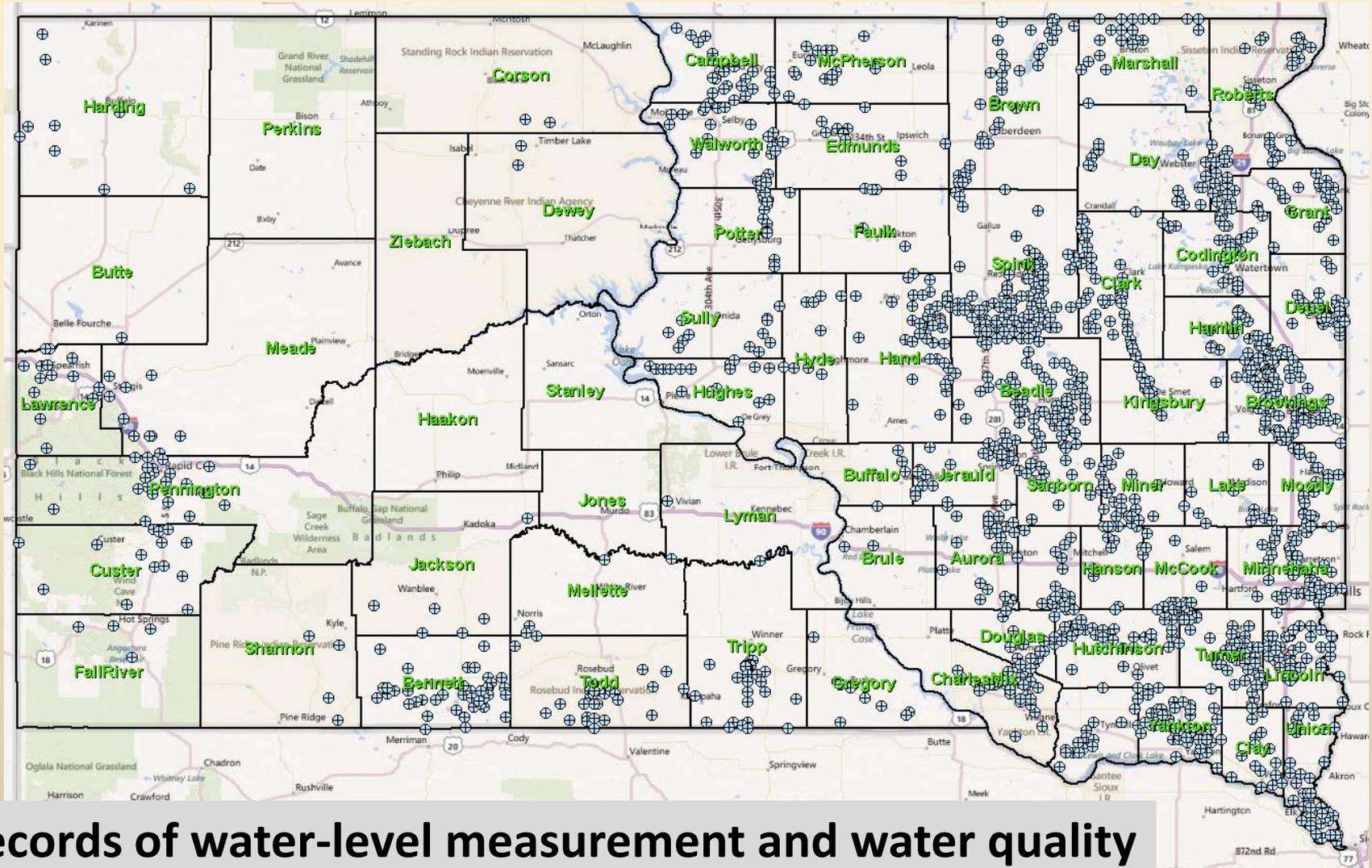
- Bookmarked for easy access to information

“Water Rights Water Well Completion Reports” data layer showing approximately 62,245 locations for which the Water Rights Program has a water well completion report.



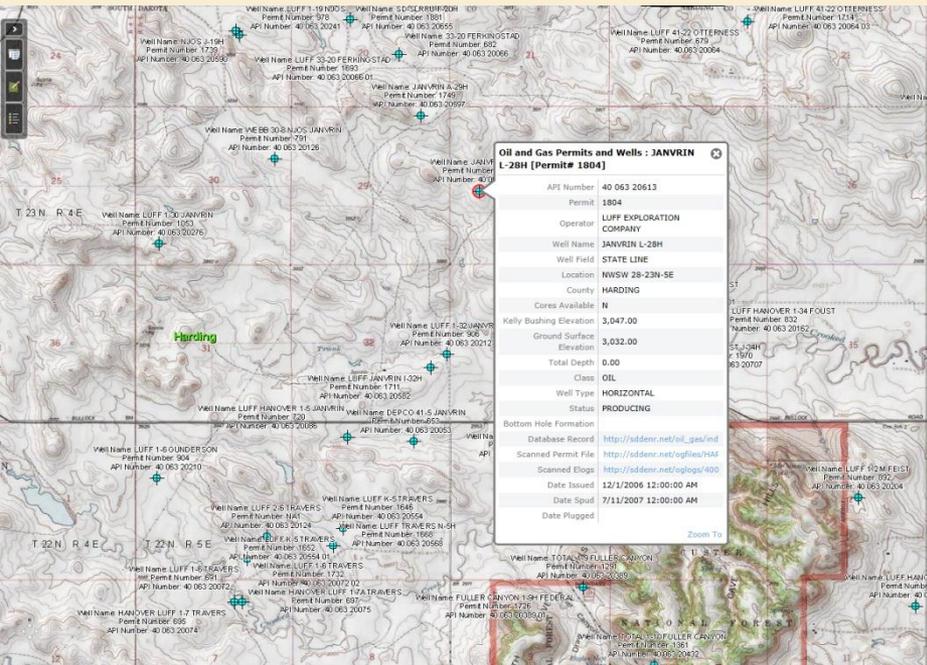
• Records of drilling and well completion

“Water Rights Observation Wells” data layer showing approximately 1,555 locations at which the Water Rights Program has an observation well.

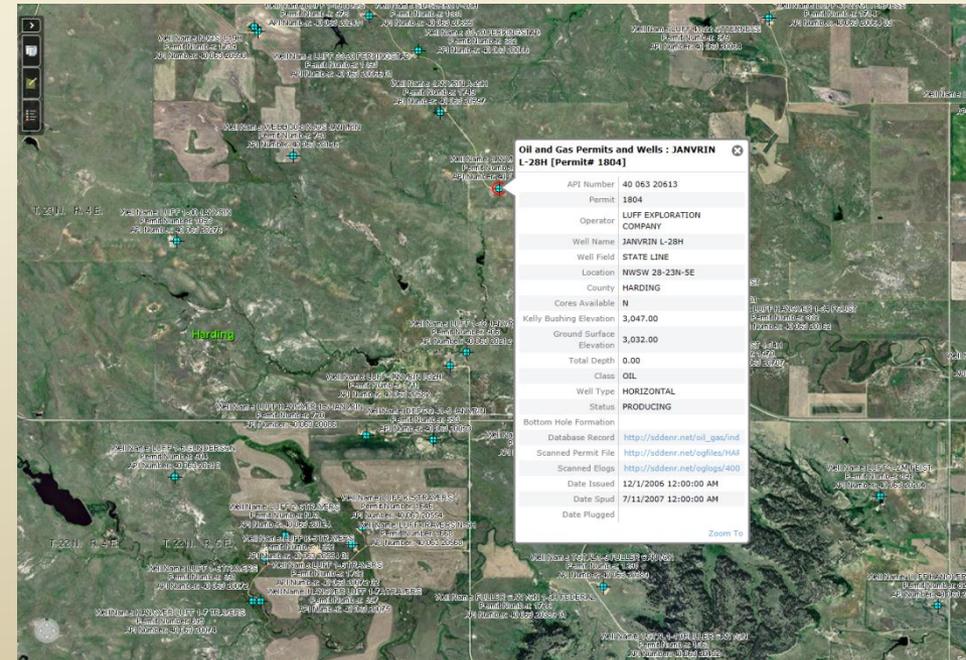


- Records of water-level measurement and water quality
- Database records of drilling and well completion

Examples of some of the available base layers for the map that can be turned on and off



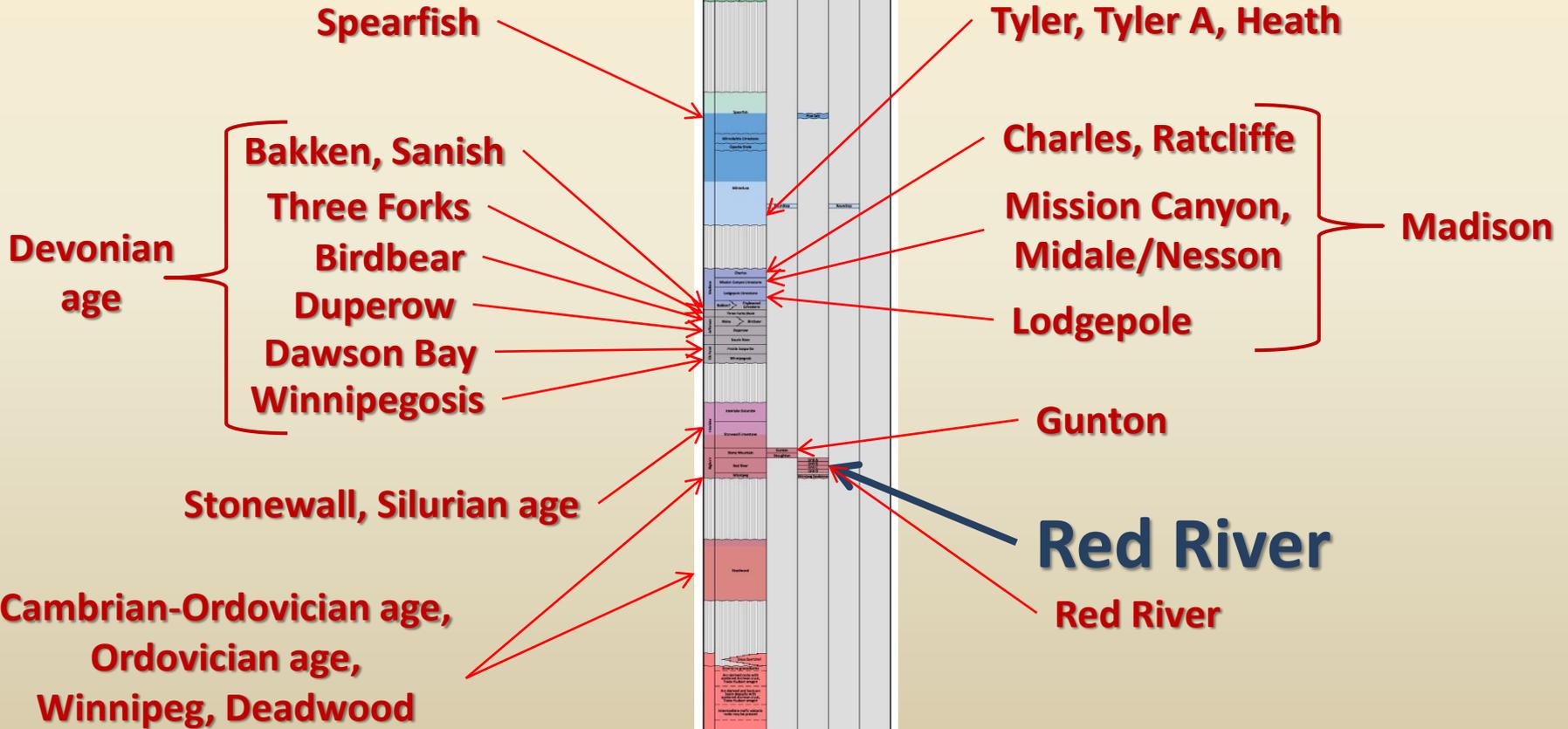
4 different "air photo" map bases are available



3 different scales of topographic maps can be viewed and are dependent on the level of zoom

North Dakota's oil-producing units in 2011

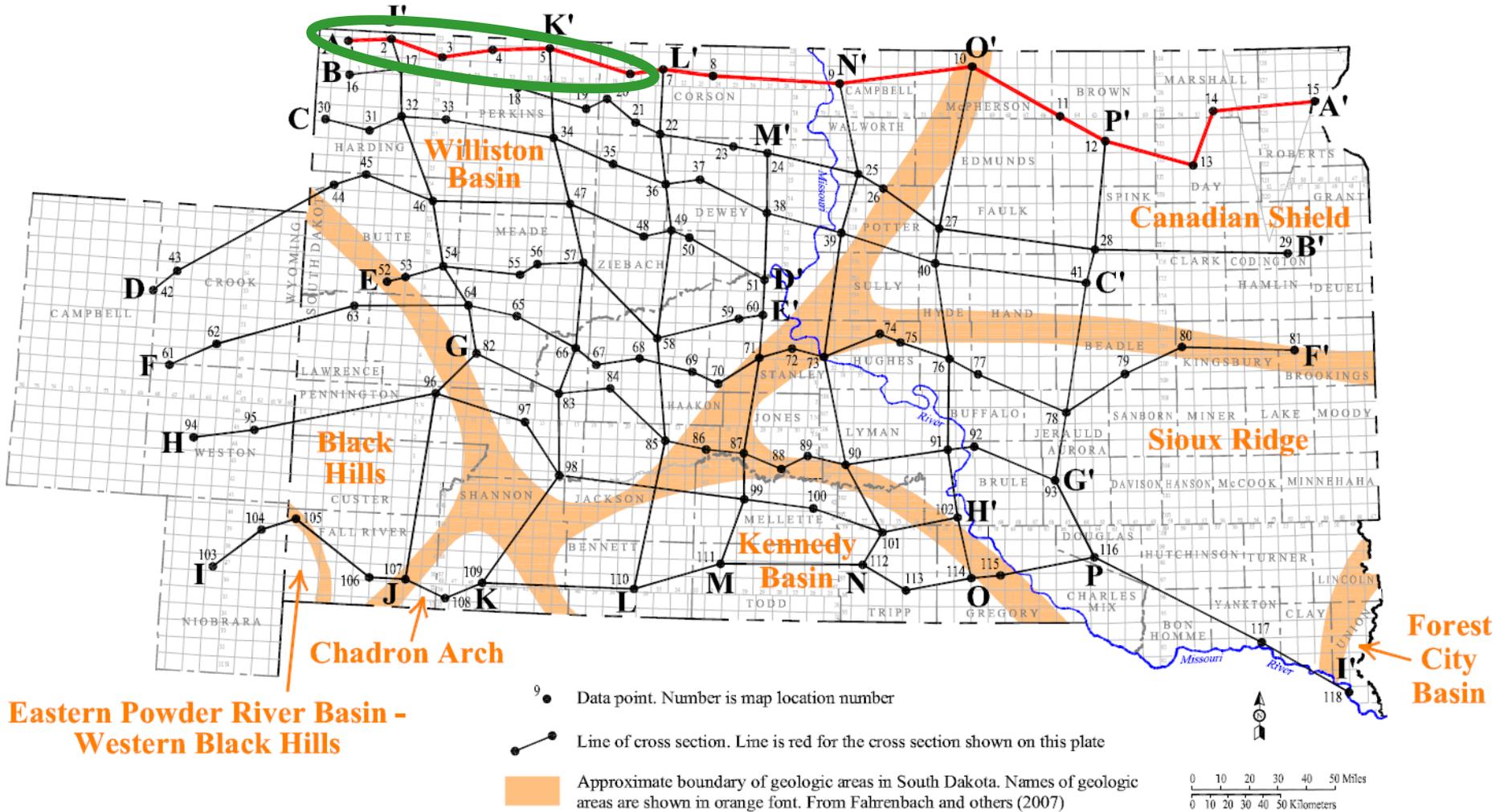
South Dakota's oil-producing unit in 2011, in Harding County



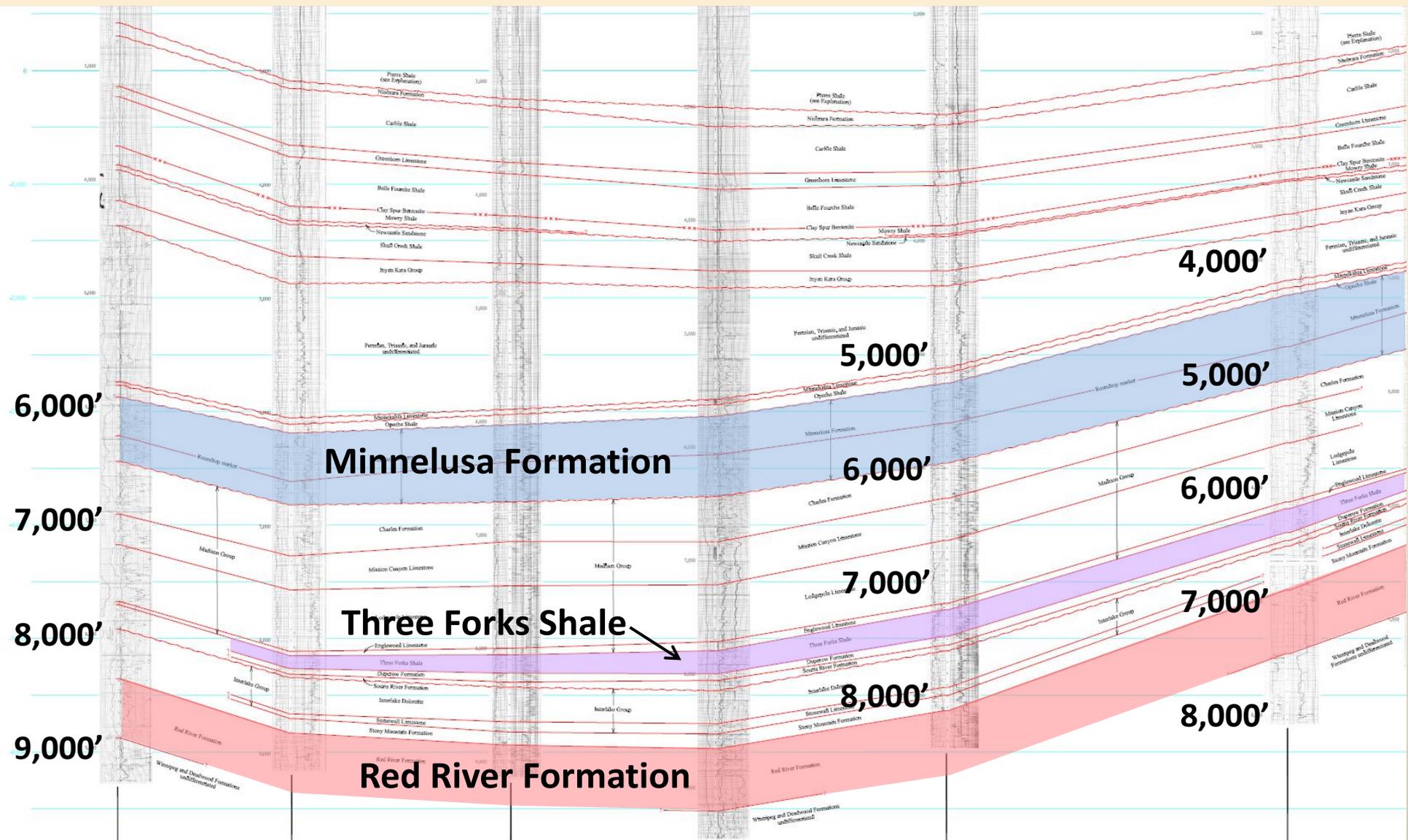
North Dakota production statistics:
<https://www.dmr.nd.gov/oilgas/stats/statisticsvw.asp>

Geologic column excerpted from SD Geological Survey Oil and Gas Investigation 3

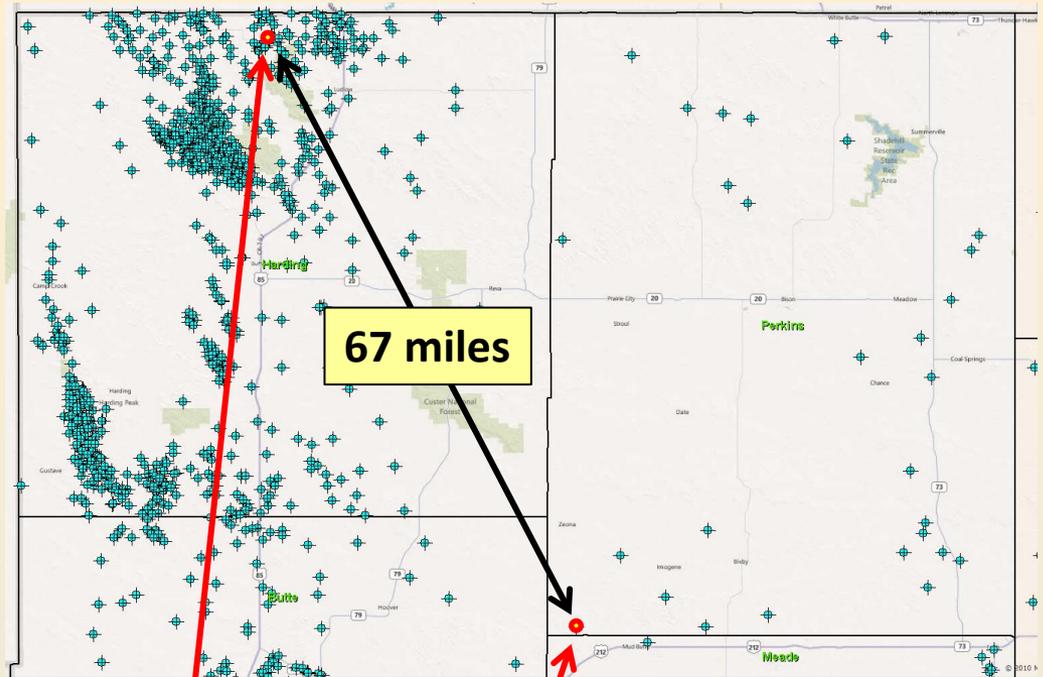
Index map showing locations of data points used for construction of cross sections



Depths of the Red River Formation, Three Forks Shale, and Minnelusa Formation along part of the North Dakota-South Dakota border

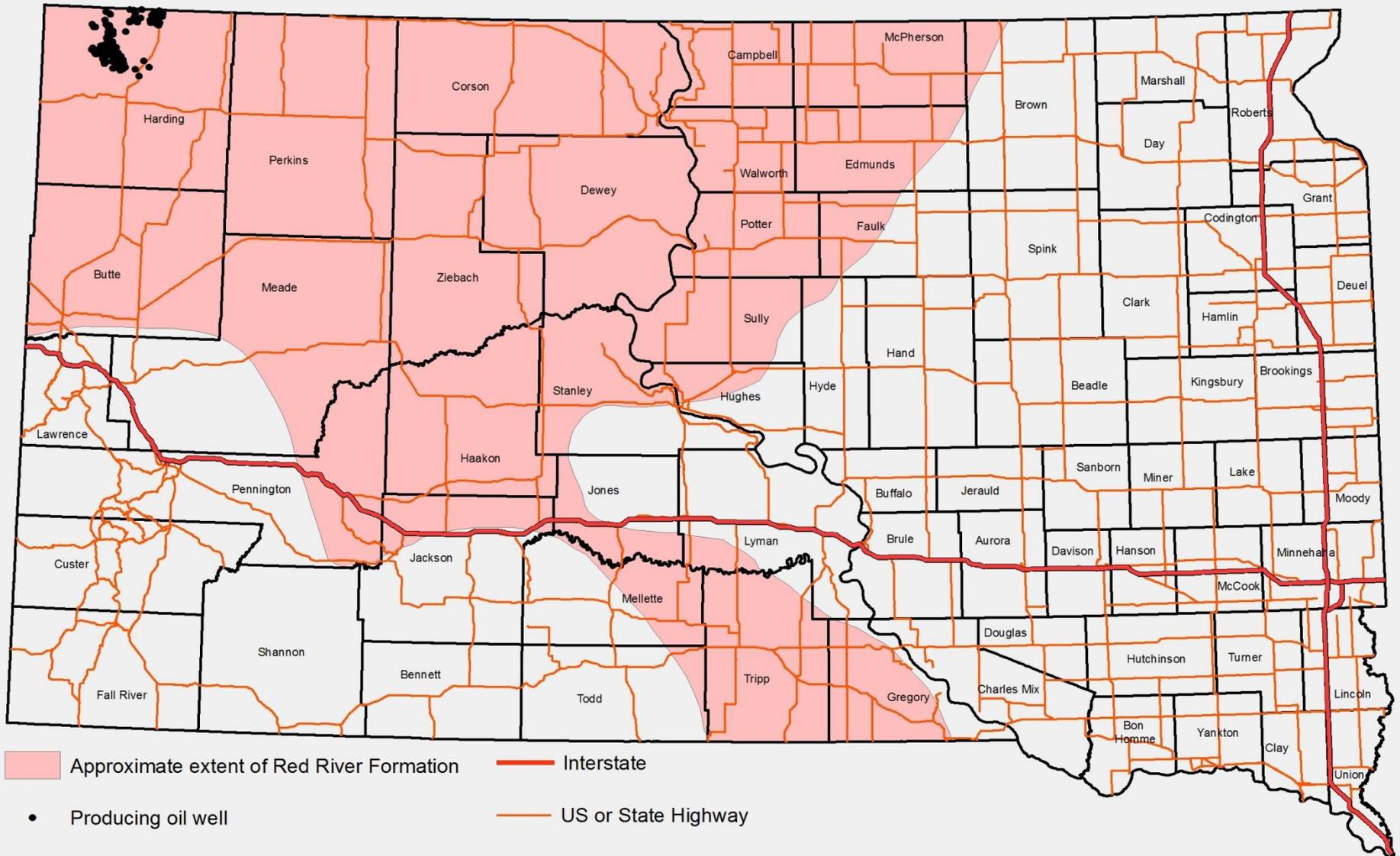


Examples of differences in depths of selected geologic units

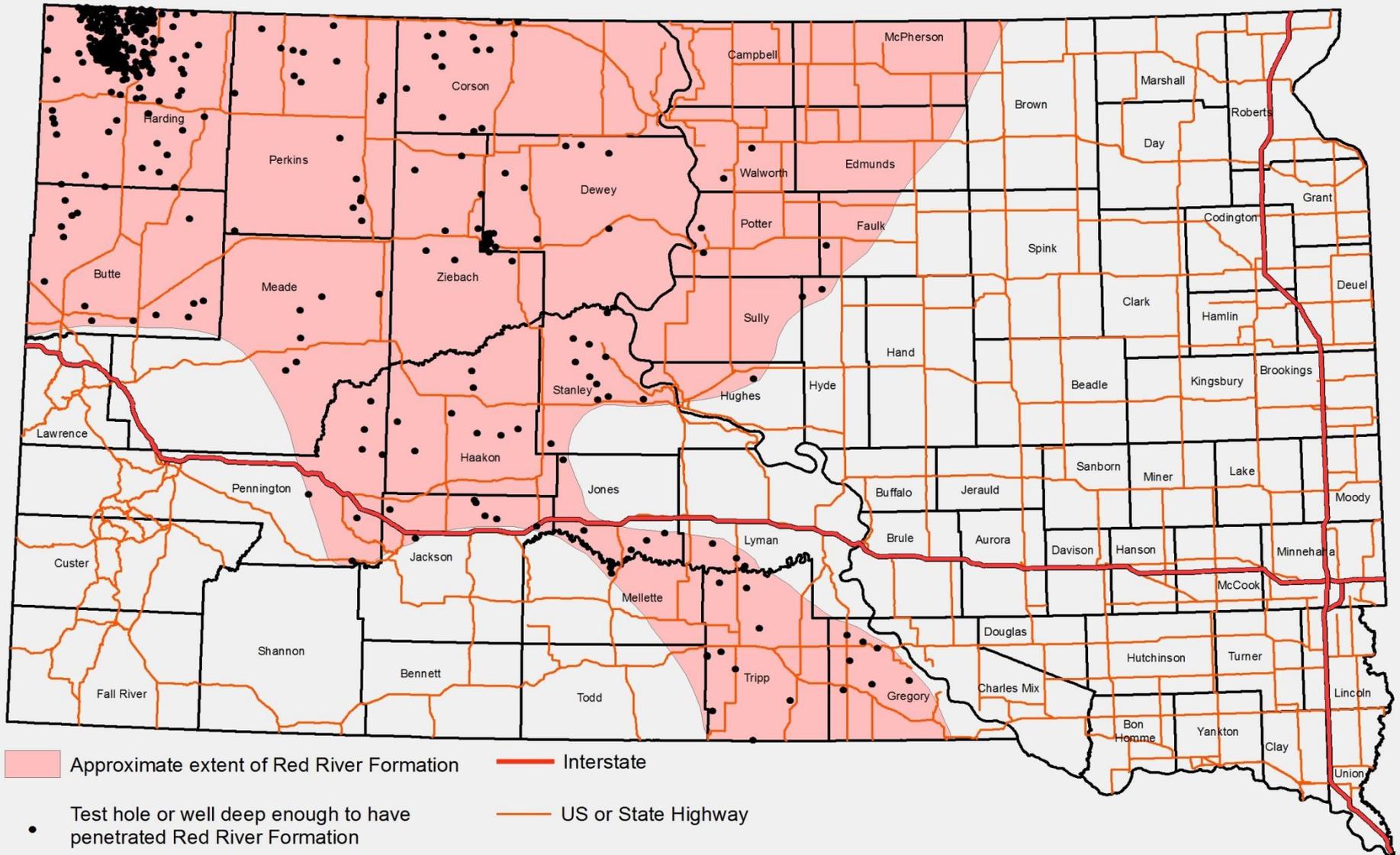


Formation	North Dakota	Harding Co.	Perkins Co.
	Depth (ft)		
Minnelusa (Tyler)	7,500-8,200	6,170	4,642
Bakken	9,000-10,000	Not present	
Three Forks Shale	10,000-10,500	8,228	6,310
Red River	14,000	8,826	6,752

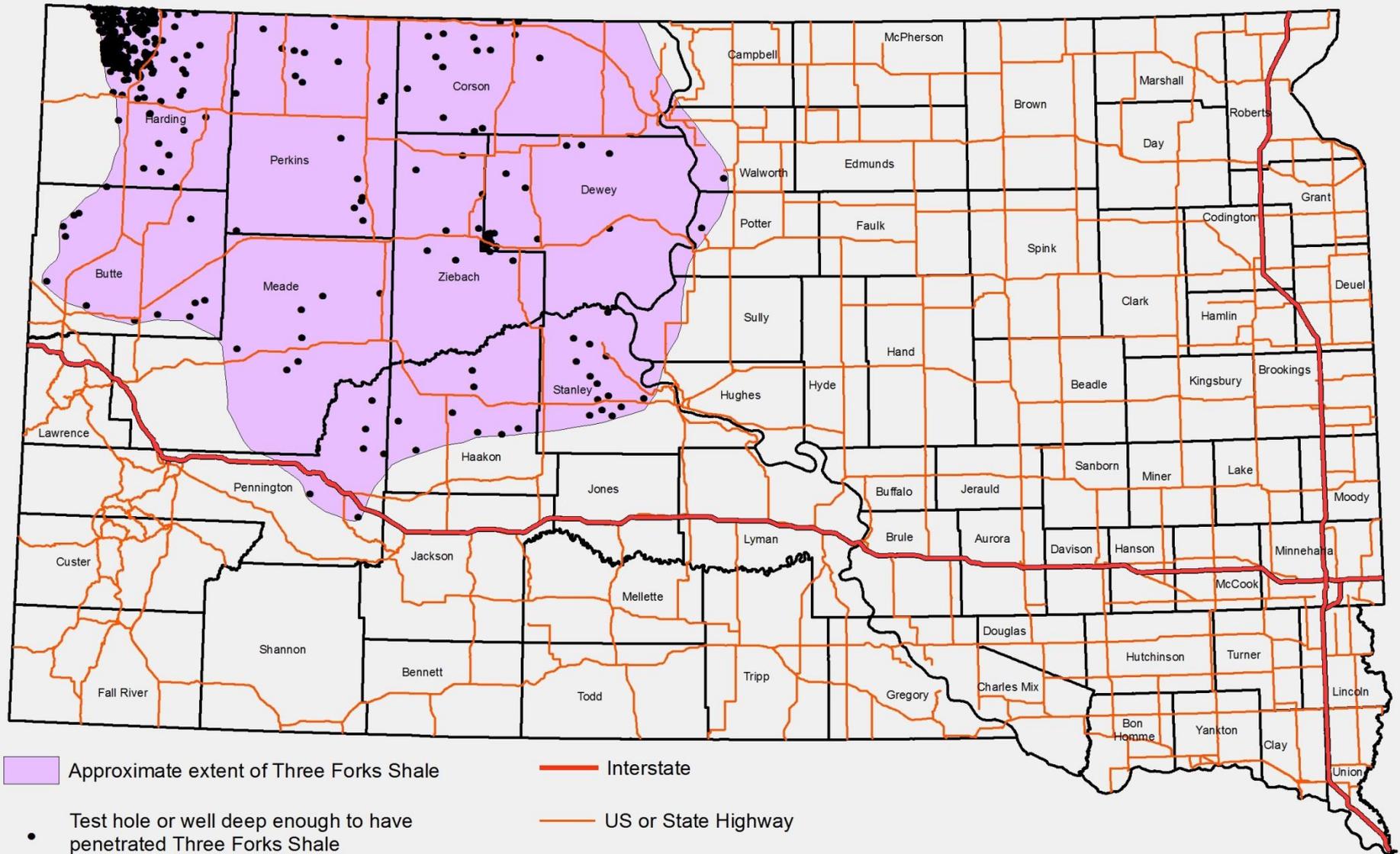
Approximate extent of the Red River Formation and wells producing from it



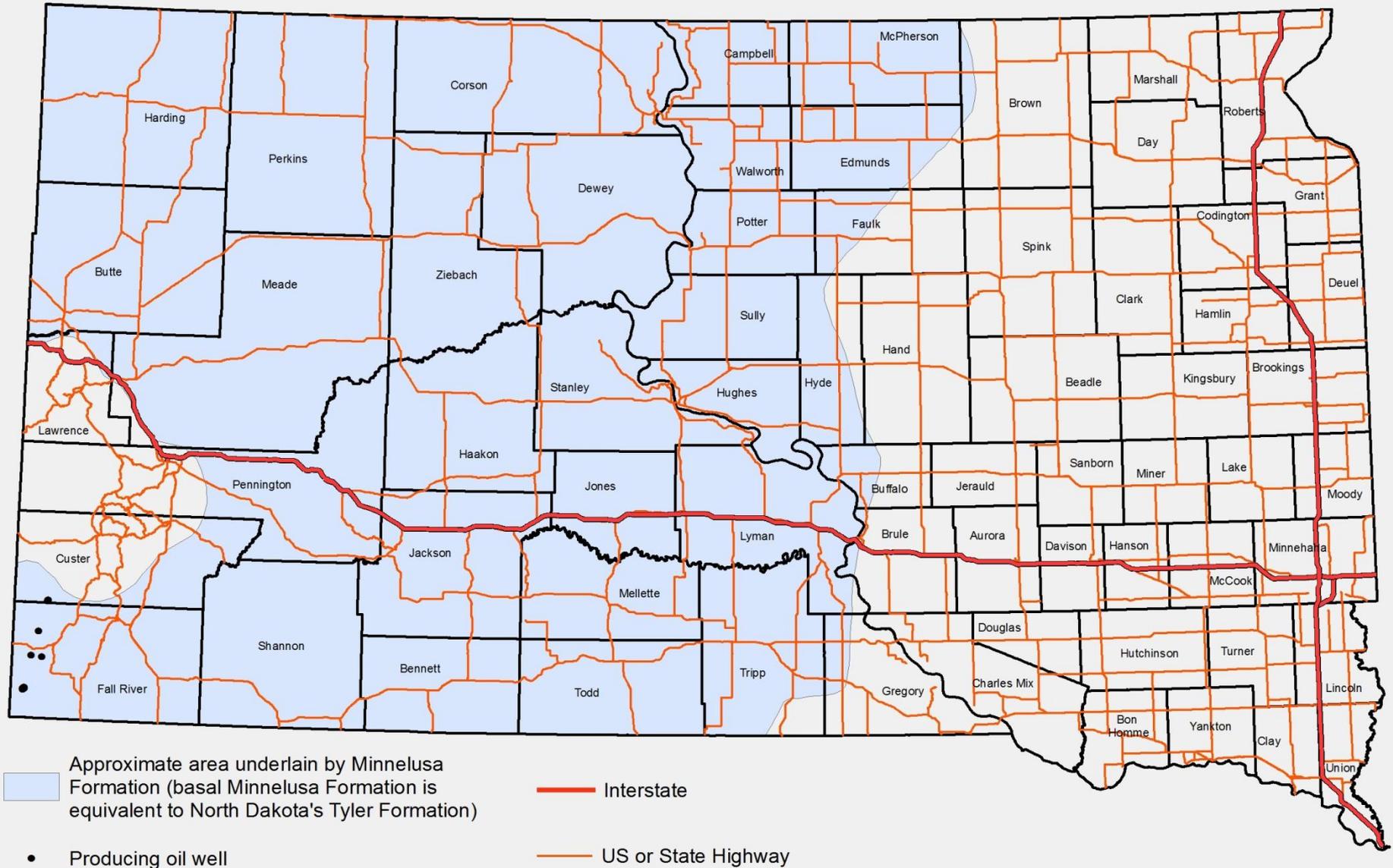
Approximate extent of the Red River Formation and locations of ≈ 540 test holes and wells deep enough to have penetrated it



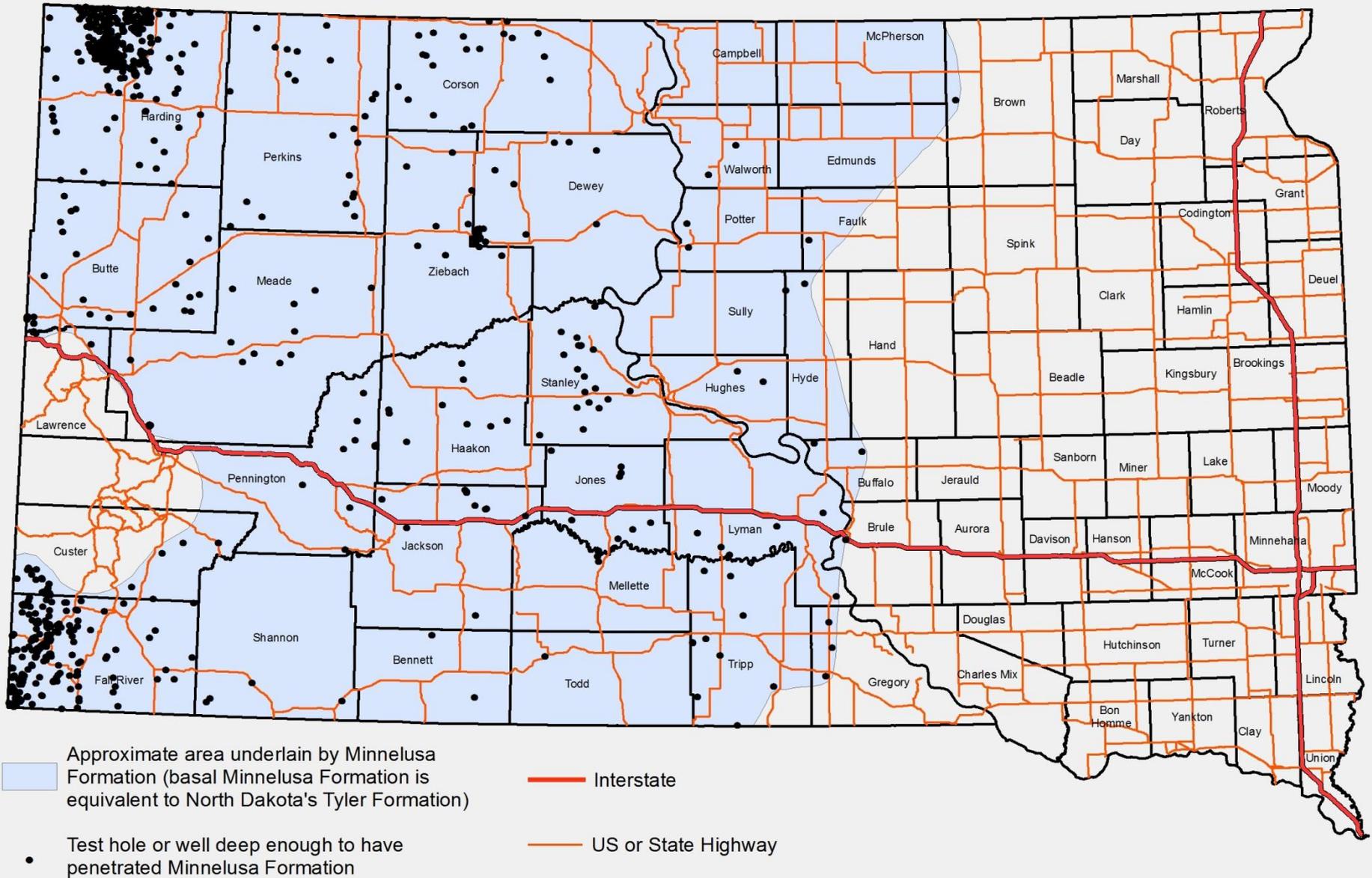
Approximate extent of the Three Forks Shale and ≈ 438 test holes or wells deep enough to have penetrated it



Approximate extent of the Minnelusa Formation and wells producing from it



Approximate extent of the Minnelusa Formation and ≈ 904 test holes or wells deep enough to have penetrated it



Oil staining in the basal Minnelusa Formation

Drilled in 1957

Central Meade County



Phillips 1 Ferguson A oil test
API No. 40 093 05032

Approximate area underlain by Minnelusa Formation (basal Minnelusa Formation is equivalent to North Dakota's Tyler Formation)

— Interstate

— US or State Highway

• Test hole or well deep enough to have penetrated Minnelusa Formation

CONCLUSIONS

1. Red River – source of KNOWN oil reserves in South Dakota
2. Other formations remain under-explored
3. Red River – for now, most likely target for future development

Public Drinking Water Systems in Butte, Harding, Meade, and Perkins Counties

Municipal System/Rural Water System	Drinking Water Capacity
City of Belle Fourche	Excess capacity with upgrades to system
Town of Bison	Little or no excess capacity
Town of Buffalo	Little or no excess capacity
City of Faith	Little or no excess capacity
City of Lemmon	Little or no excess capacity with Perkins County source Excess capacity with old city wells but water quality is poor
City of Newell	Excess capacity with upgrades to system
Town of Nisland	Excess capacity with upgrades to system
Butte/Meade Rural Water	Excess capacity with upgrades to system
Perkins County Rural Water (purchases water from North Dakota)	Little or no excess capacity with current source from ND Potential excess capacity with new treatment plant

Municipal Wastewater Systems in Butte, Harding, Meade, and Perkins Counties

Municipal System	Wastewater Capacity
City of Belle Fourche	Little or no excess capacity
Town of Bison	Little or no excess capacity currently
Town of Buffalo	May have some excess capacity with operational changes
Town of Camp Crook	Likely some excess capacity
City of Faith	May have excess capacity but needs to evaluate inflows during heavy precipitation
City of Lemmon	Likely has excess capacity, but would need to be confirmed with the city or the state of North Dakota
City of Newell	May have some additional capacity with operational changes
Town of Nisland	No excess capacity

State and Federal Financial Assistance Programs for Water, Wastewater, and Solid Waste Facilities

Agency	Program
Revenue and Regulation	County in which production occurs gets 50% of severance tax
DENR	Small community planning grants
DENR	Consolidated Water Facilities Construction Program
DENR	State Water Resources Management System
DENR	Drinking Water State Revolving Loan Fund Program
DENR	Clean Water State Revolving Loan Fund Program
DENR	Solid Waste Management Program
GOED	Community Development Block Grants
USDA	Rural Development Program

DENR's Oil and Gas Initiative – Making South Dakota Open for Drilling

