

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

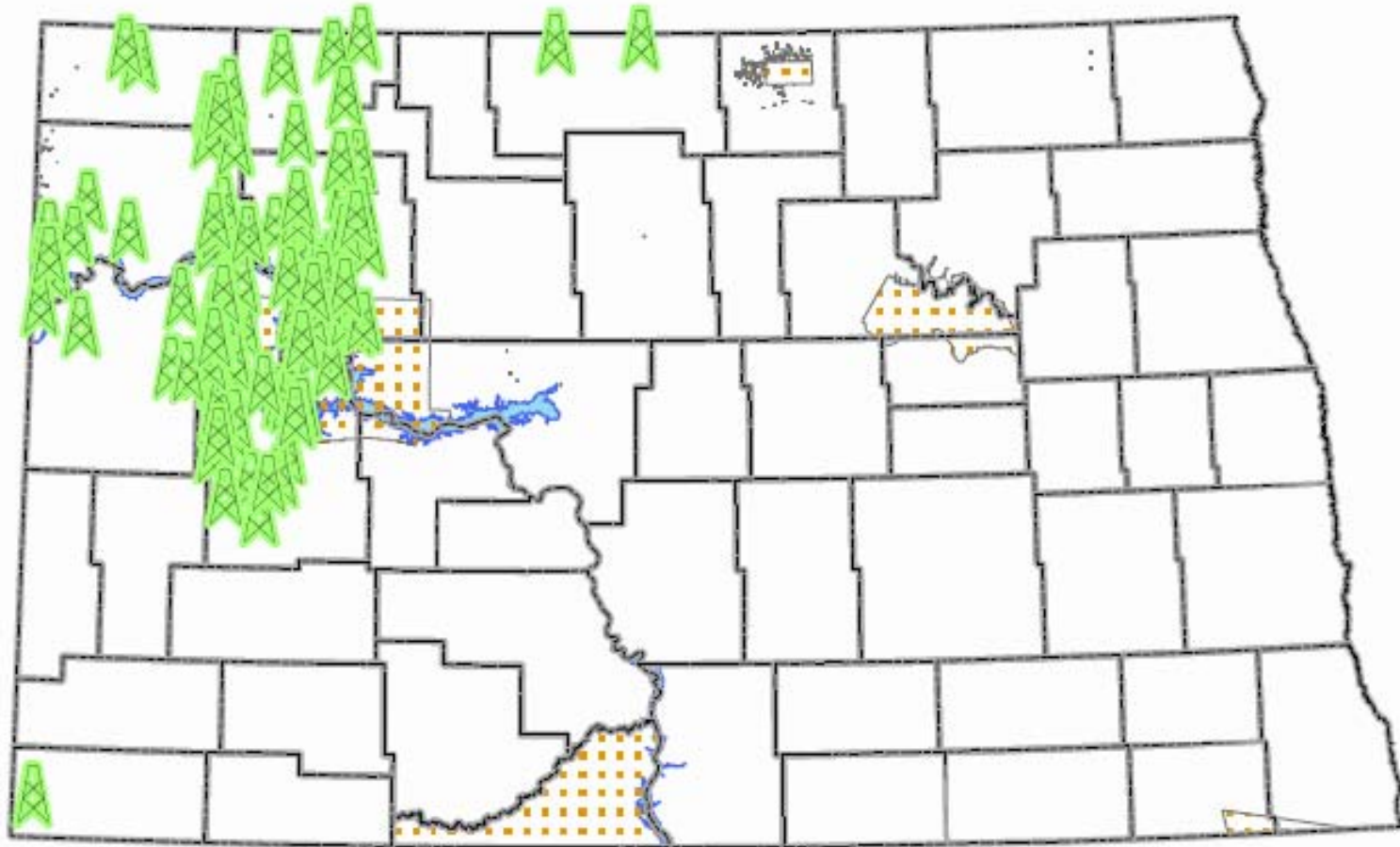
(701) 328-8020

(701) 328-8000

Methodology

- Met with 12 most active Bakken / Three Forks operators
 - 2010 → drilling plans
- Reviewed completion reports
 - Spud to spud time 25 → 20 days
 - Water use 1.5 million – 4.0 million gal / well
 - Drilling year round, fracturing 8 months / year
- Compared drilling, spacing, potential area
 - Reality check on wells / year and duration

102 rigs



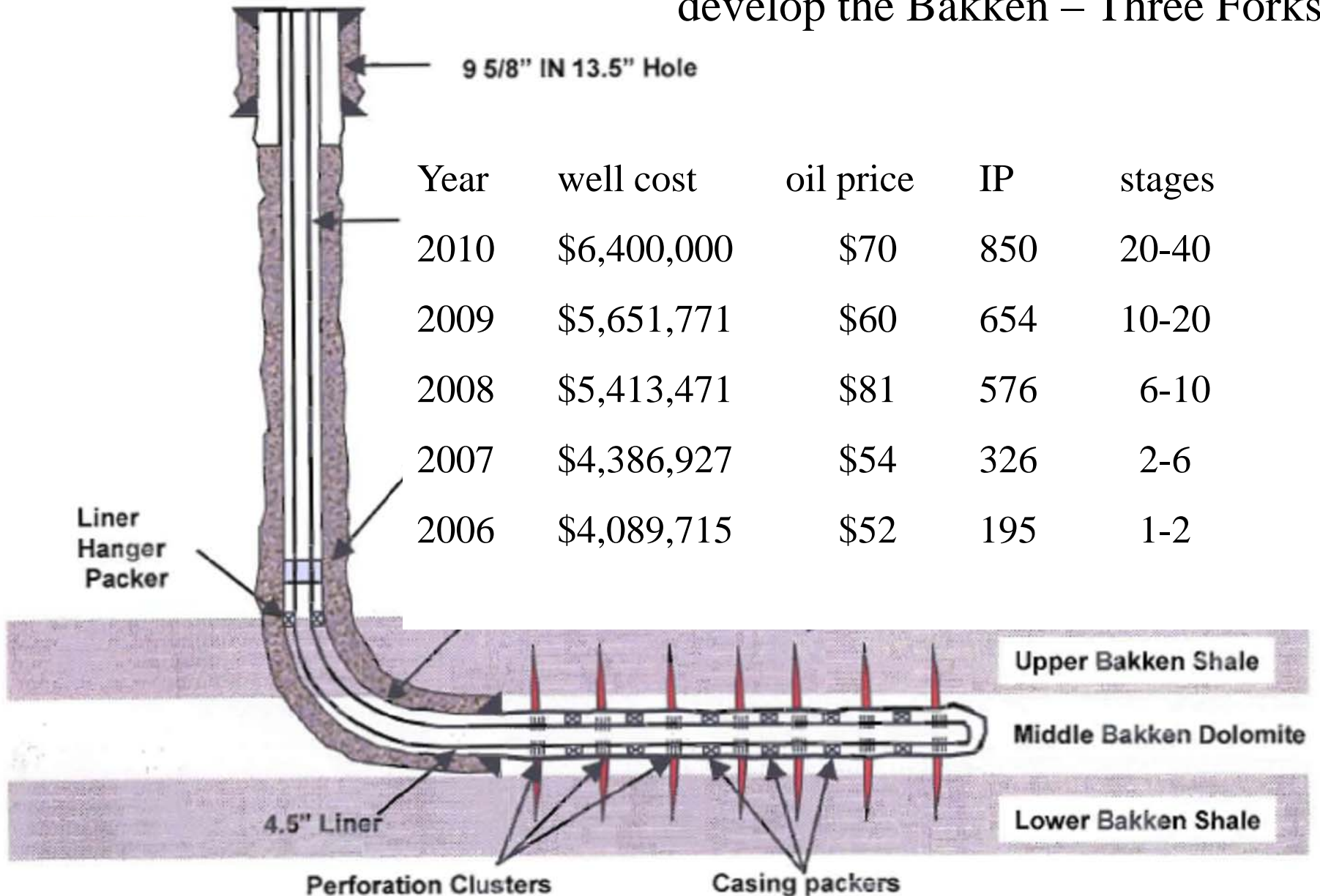
800 semi-loads to drill and frac each well over a 30-35 day time period

average 1 semi-load per hour for 4-5 weeks



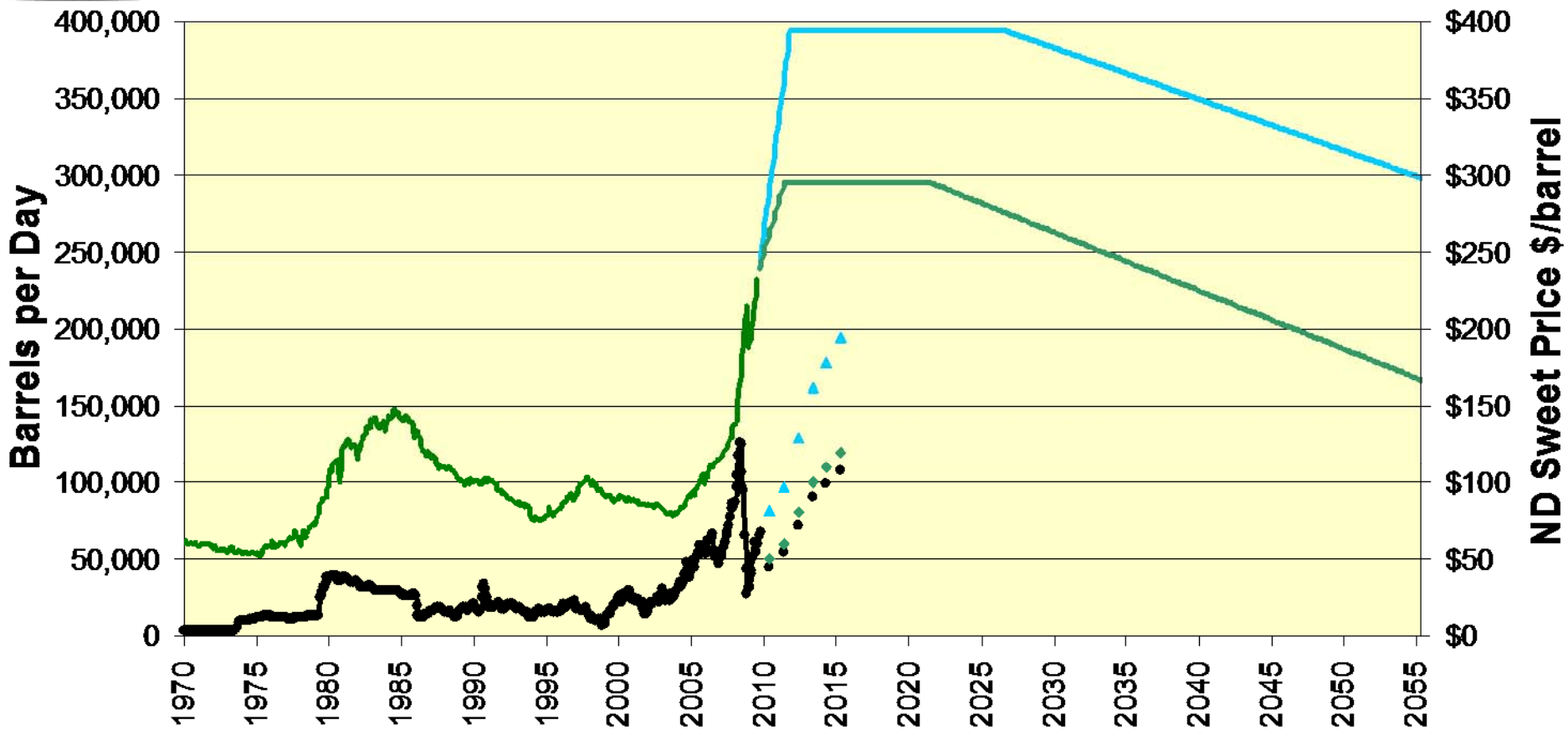


Will take 15,000 – 20,000 to fully develop the Bakken – Three Forks

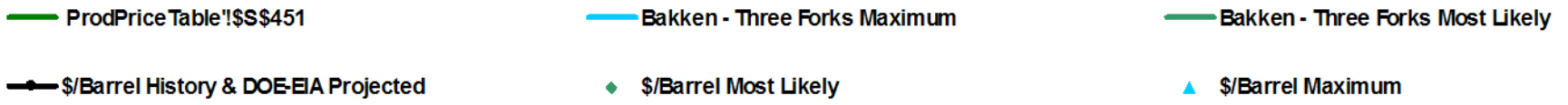




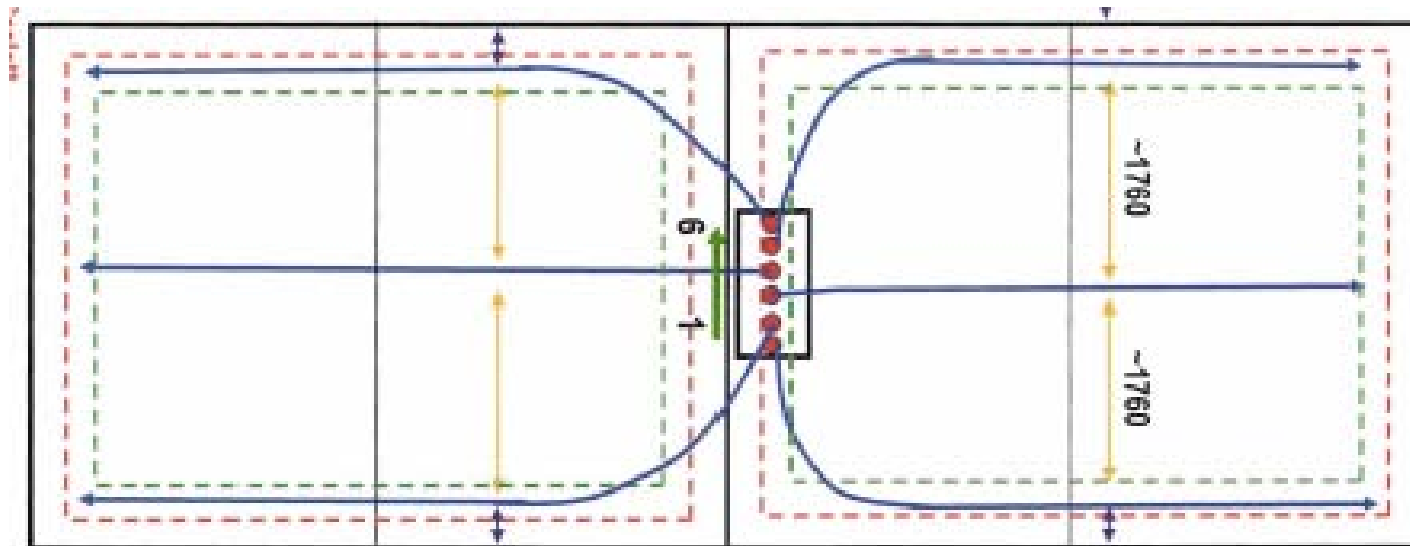
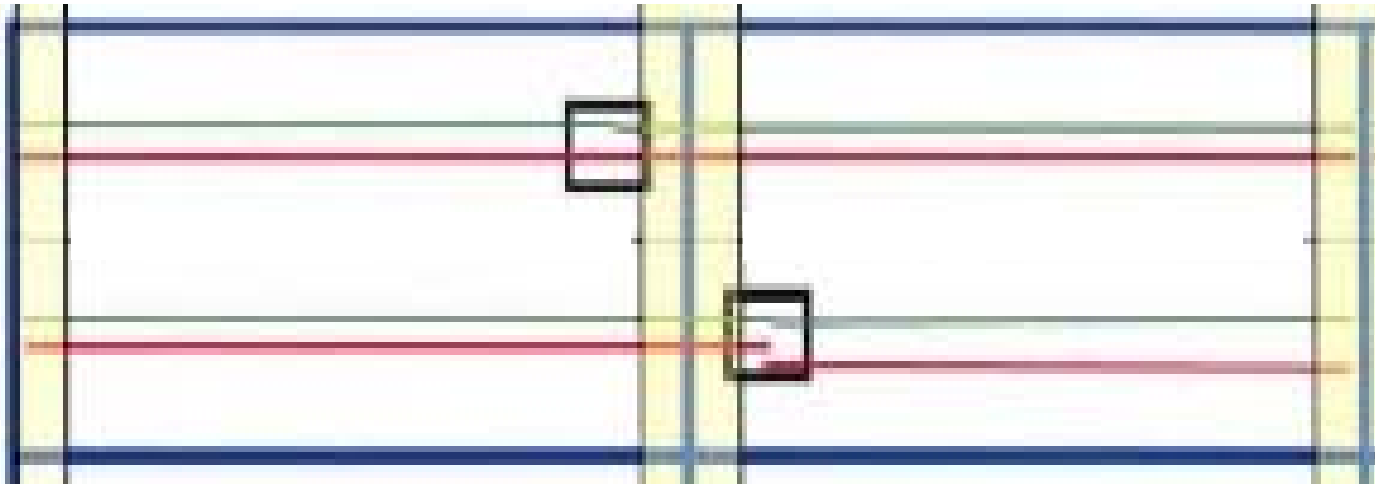
North Dakota Oil Production and Price

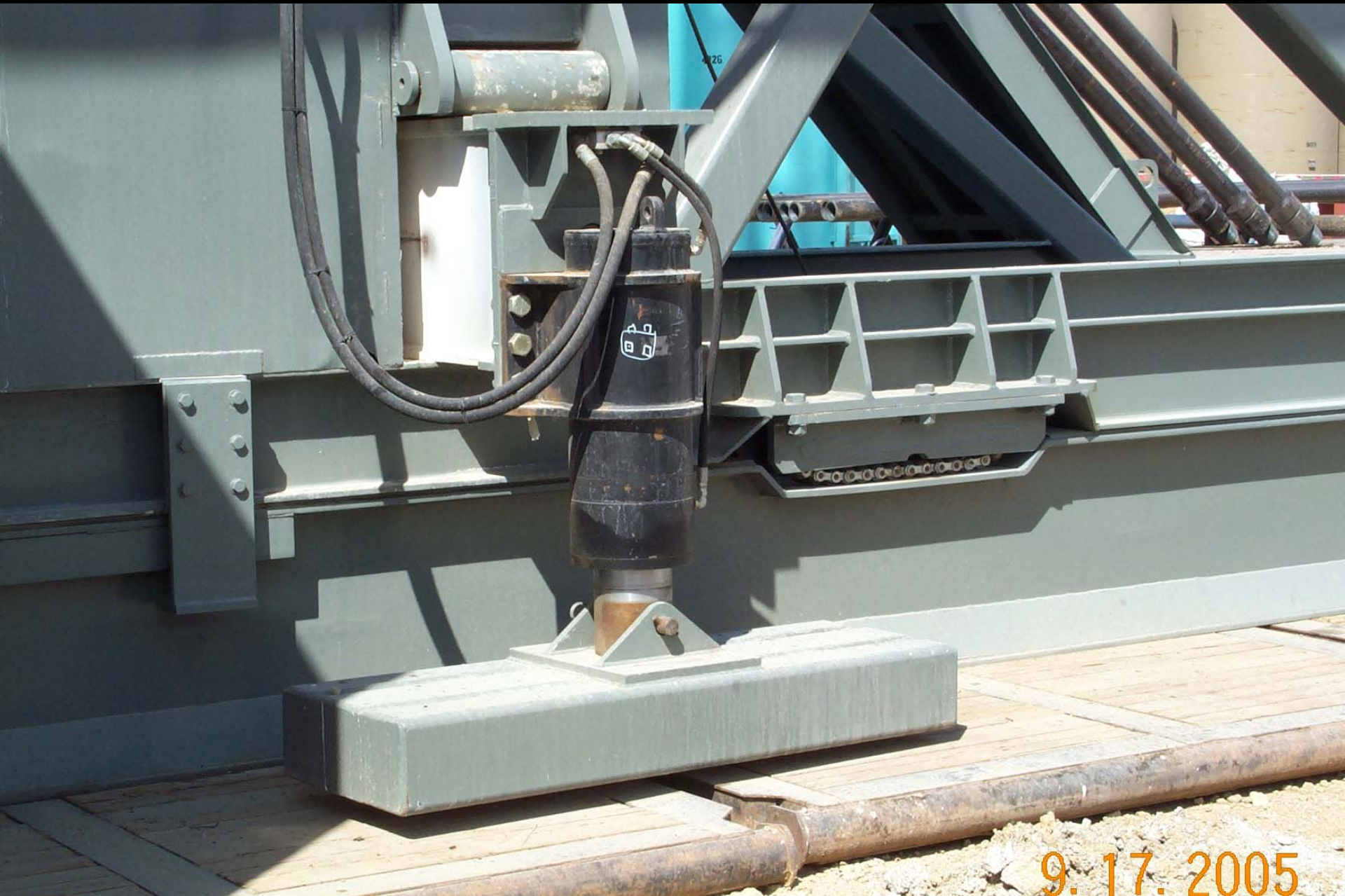


1,700 Bakken and Three Forks wells drilled and completed
4,000 drilling and spacing units approved to date
10,000 drilling and spacing units possible in thermal mature area



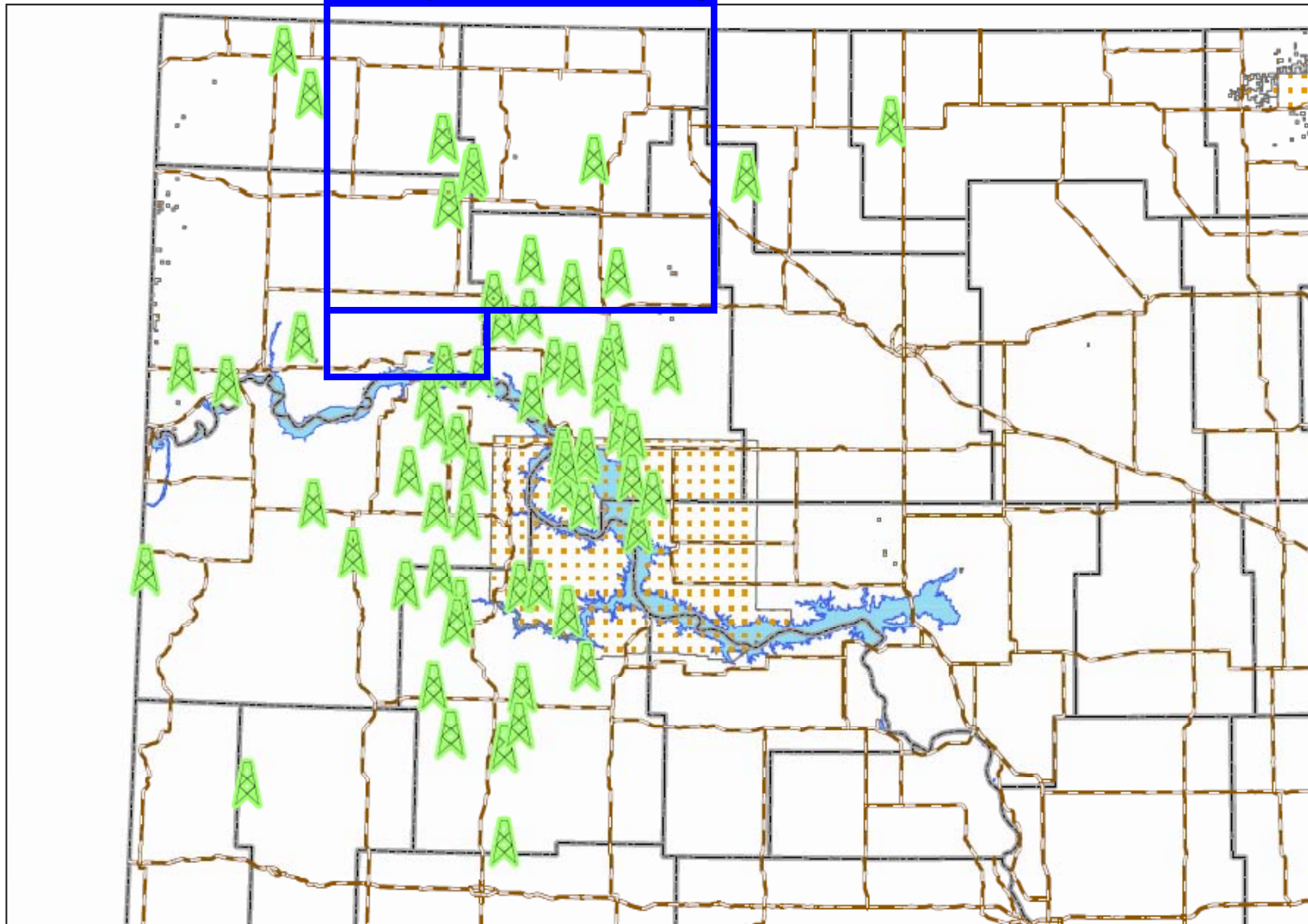
Pad Drilling





9.17.2005

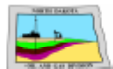
Ray - Tioga Area



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0 15 30 60 Miles

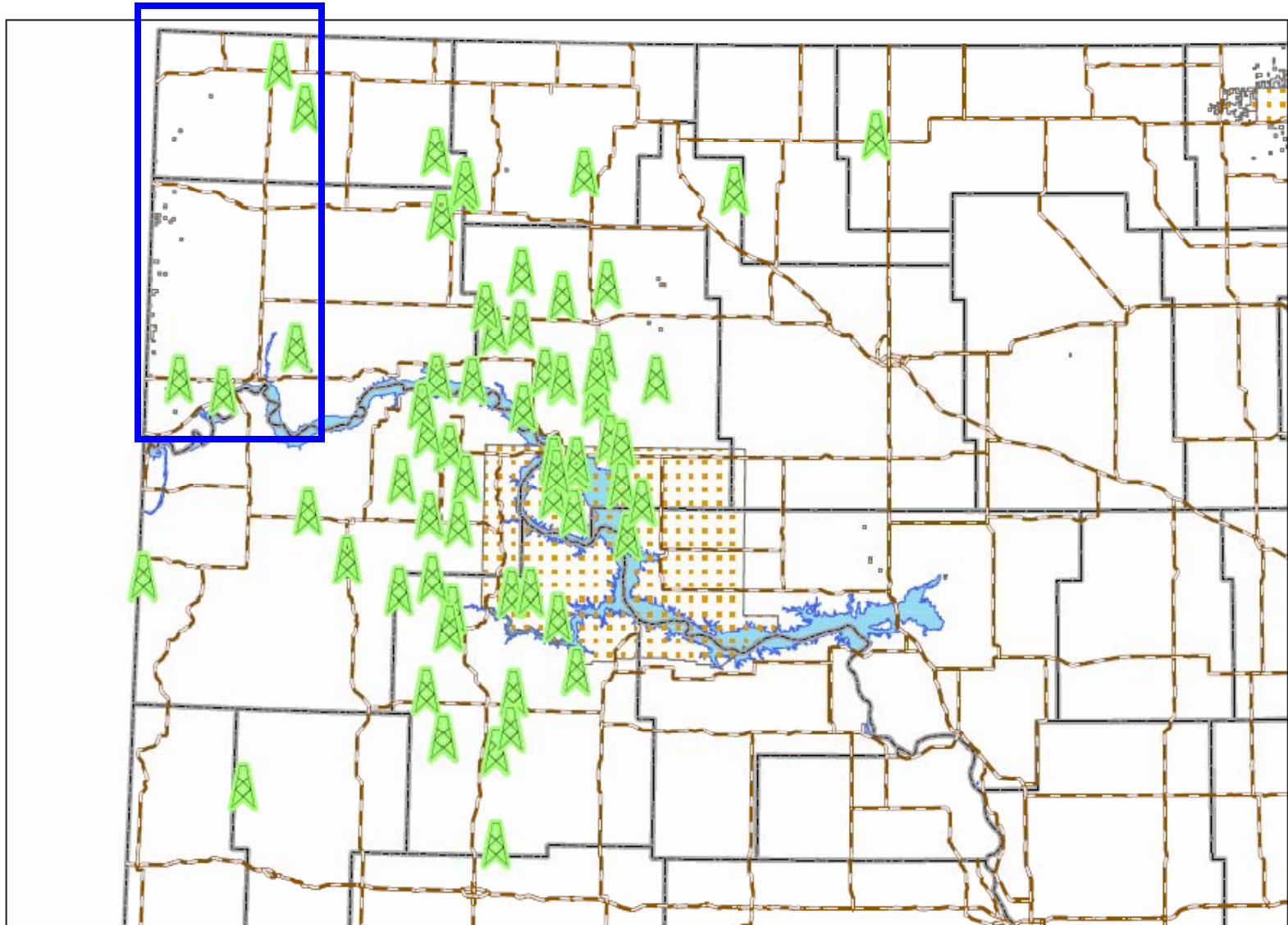
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Oil and Gas Division
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Ray-Tioga Area

- 430 to 540 wells per year
- 4 million gallons fracturing water and 8 million pounds of proppant per day
- 11 to 14 years

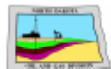
Williston Area



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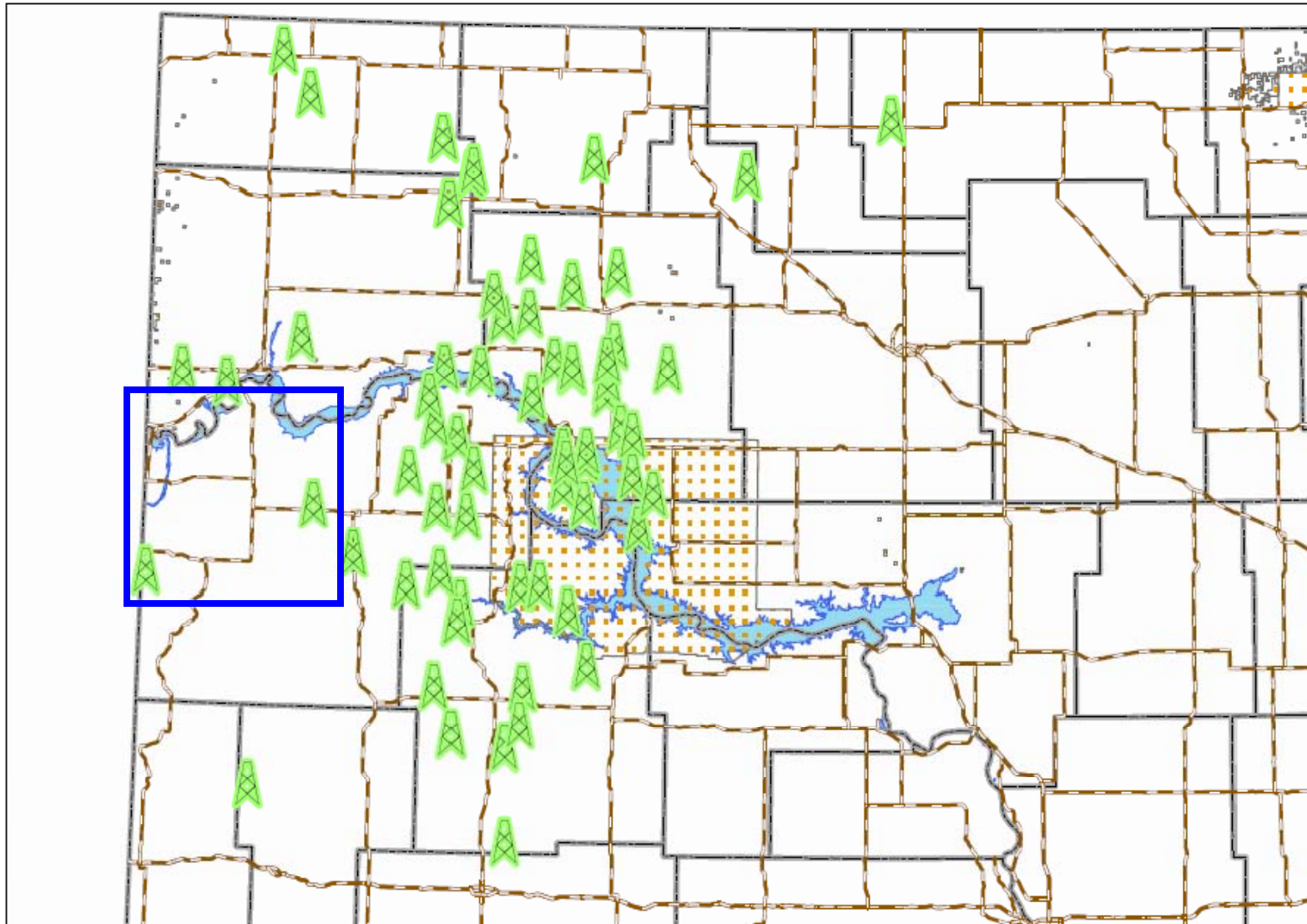
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Williston Area

- 70 to 90 wells per year
- 1 million gallons fracturing water and 2 million pounds of proppant per day
- 8 to 20 years

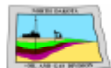
Alexander Area



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0 15 30 60 Miles

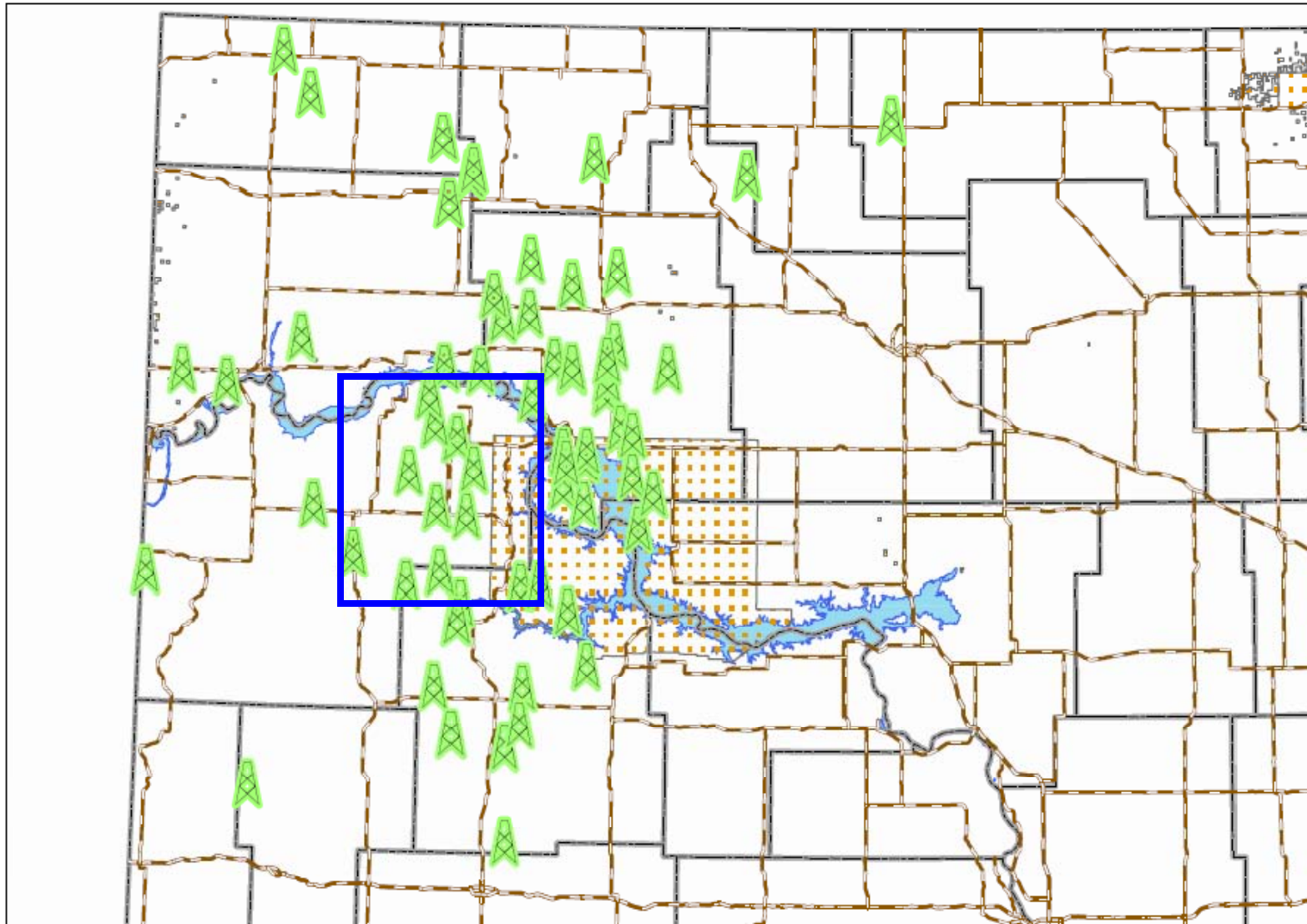
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Alexander Area

- 120 to 150 wells per year
- 2 million gallons fracturing water and 4 million pounds of proppant per day
- 12 to 15 years

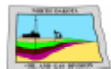
Watford City - Keene Area



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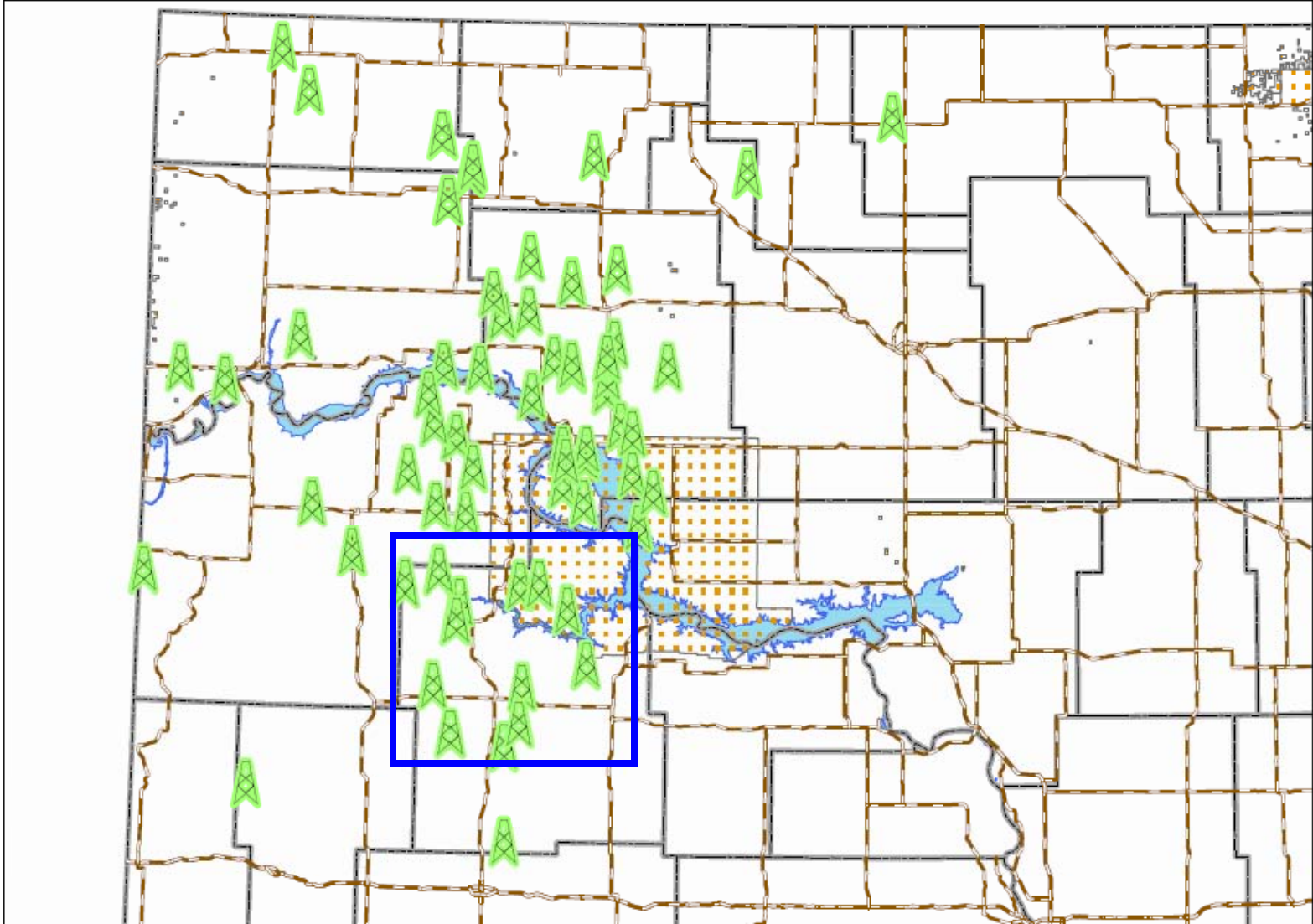
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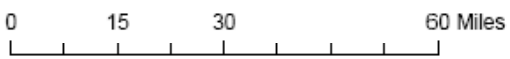
Watford City - Keene Area

- 250 to 310 wells per year
- 2 million gallons fracturing water and 4 million pounds of proppant per day
- 5 to 7 years

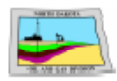
Killdeer Area



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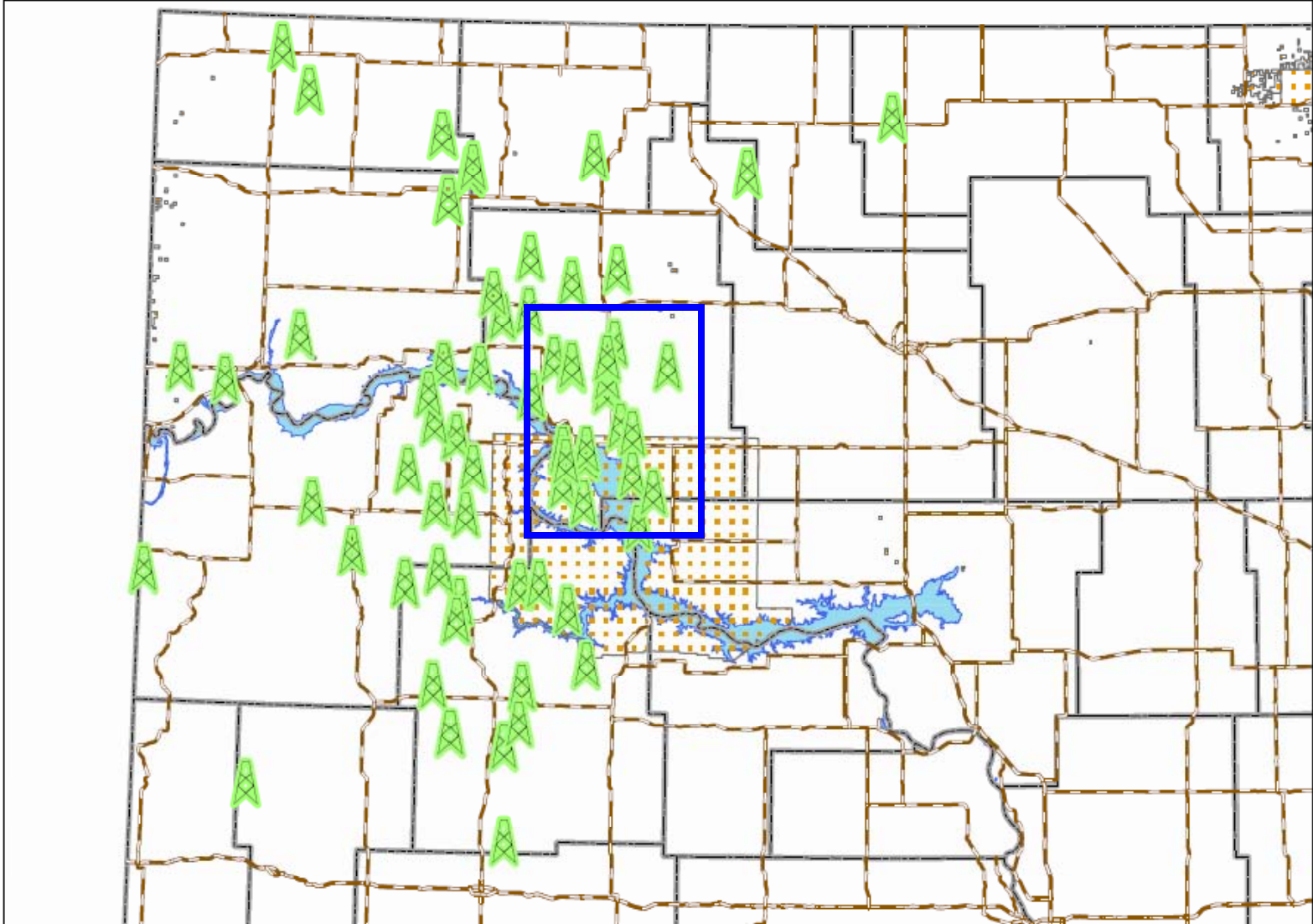
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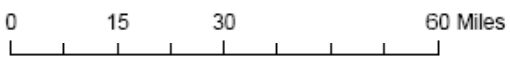
Killdeer Area

- 235 to 290 wells per year
- 1 million gallons fracturing water and 2 million pounds of proppant per day
- 6 to 8 years

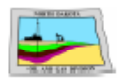
Parshall Area



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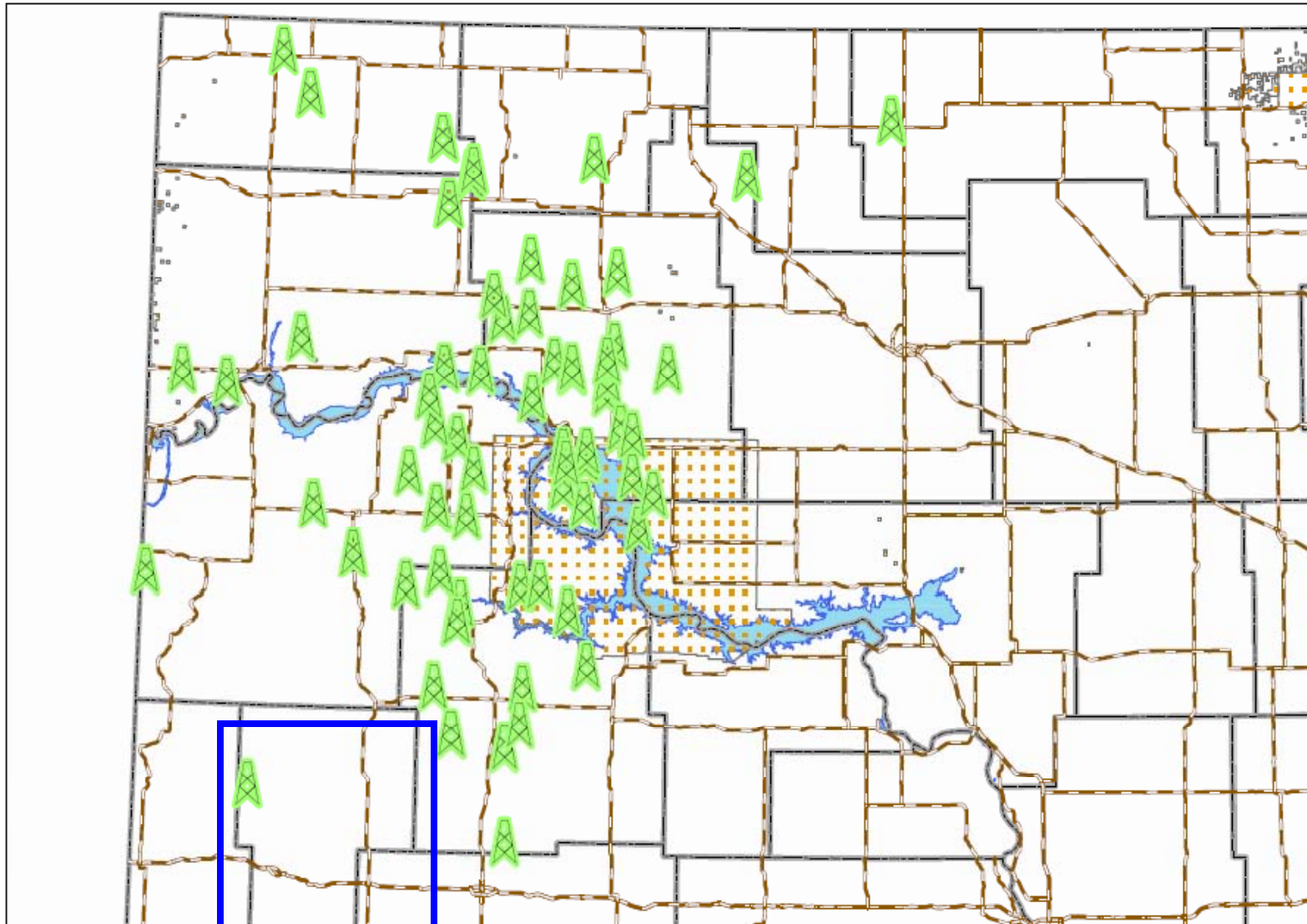
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Parshall Area

- 375 to 470 wells per year
- 2 million gallons fracturing water and 4 million pounds of proppant per day
- 7 to 8 years

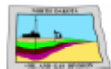
Belfield Area



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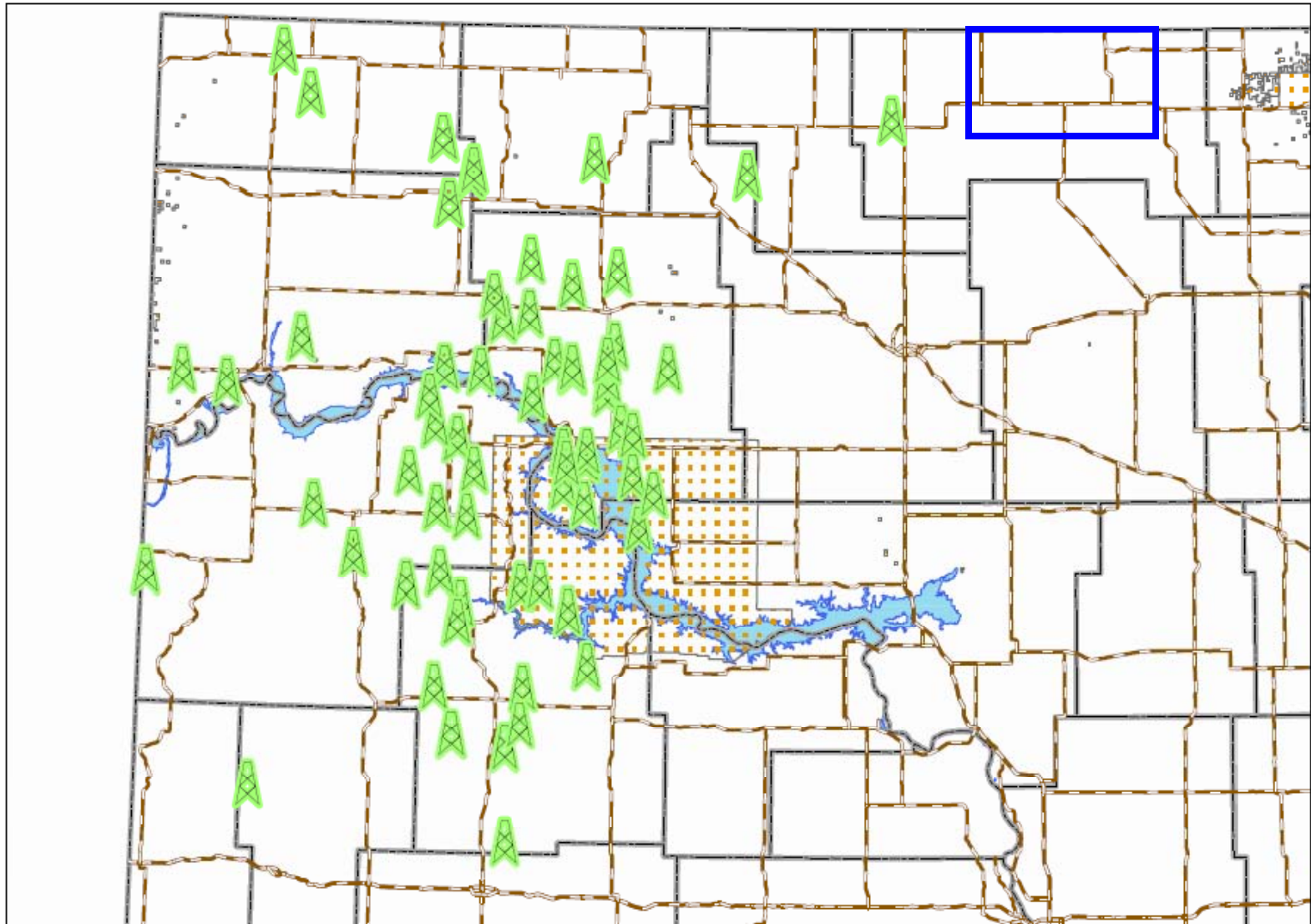
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Belfield Area

- 50 to 100 wells per year
- 1 million gallons fracturing water and 2 million pounds of proppant per day
- 10 to 15 years

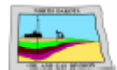
Bottineau Area



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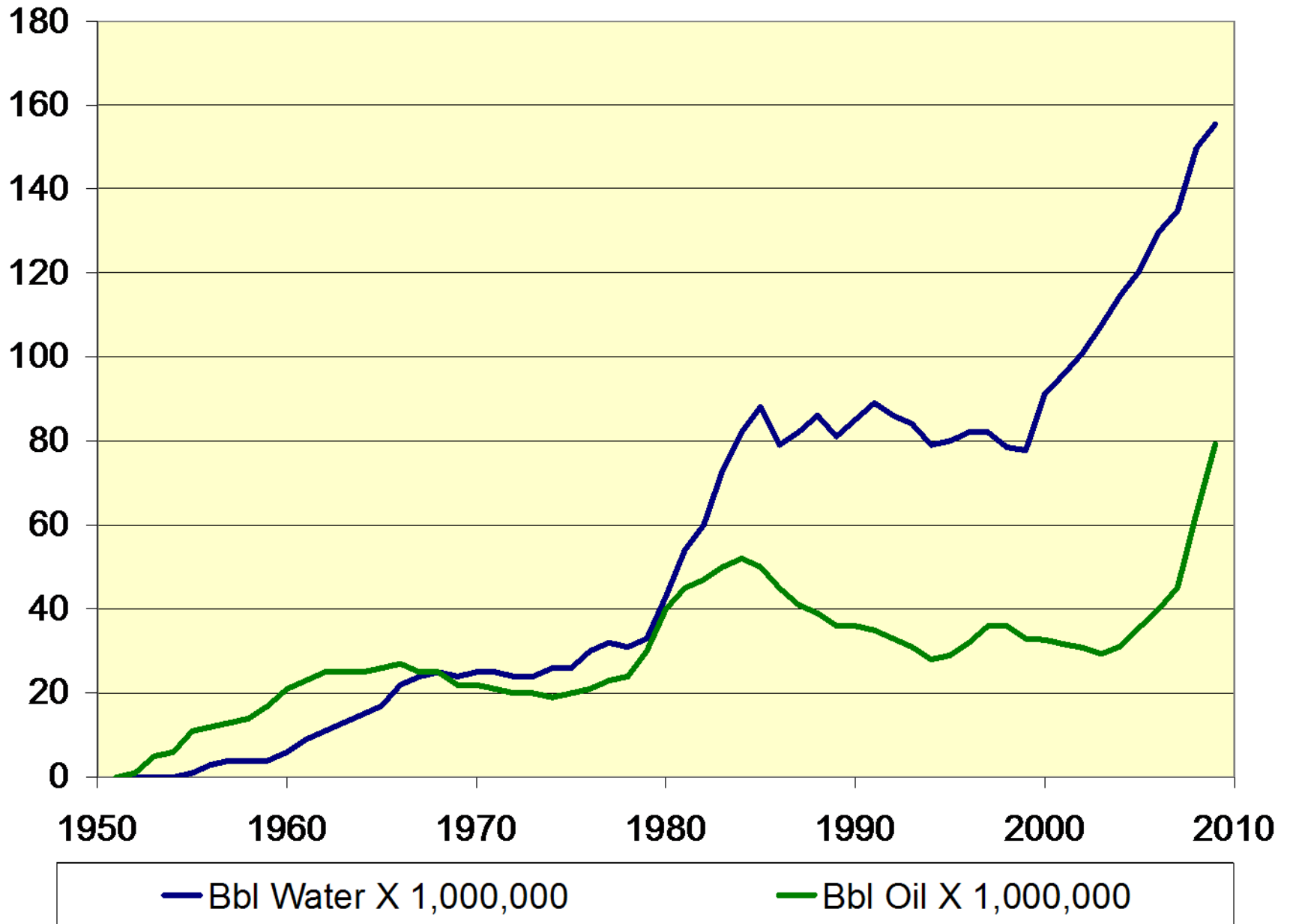


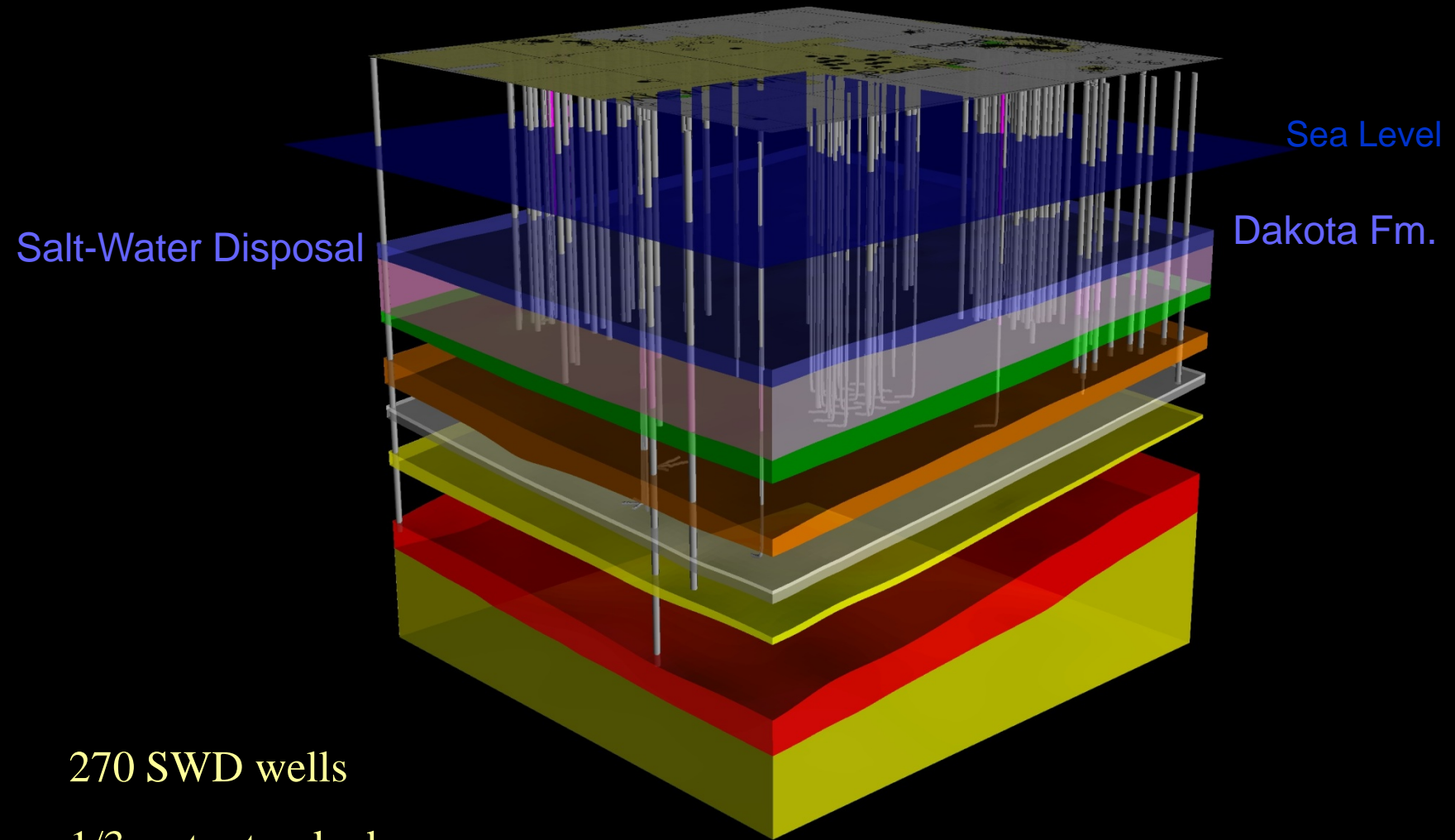
Bottineau Area

- 50 to 100 wells per year
- 0.5 million gallons fracturing water and 1 million pounds of proppant per day
- 8 to 10 years



North Dakota Oil vs Water Production





Sea Level

Dakota Fm.

Salt-Water Disposal

270 SWD wells

1/3 water trucked

700 Semi-loads / day

North Dakota Oil Export

2/3 of ND oil moves from well to pipeline or rail by truck
725 semi loads per day

- Bridger
- Enbridge ND
- Tesoro
- Plains
- Butte
- Belle Fourche

