North Dakota Department of Transportation

Presentation to the

Interim Taxation Committee

on

Extraordinary Road & Bridge Impacts

Roughrider Room, State Capitol Building

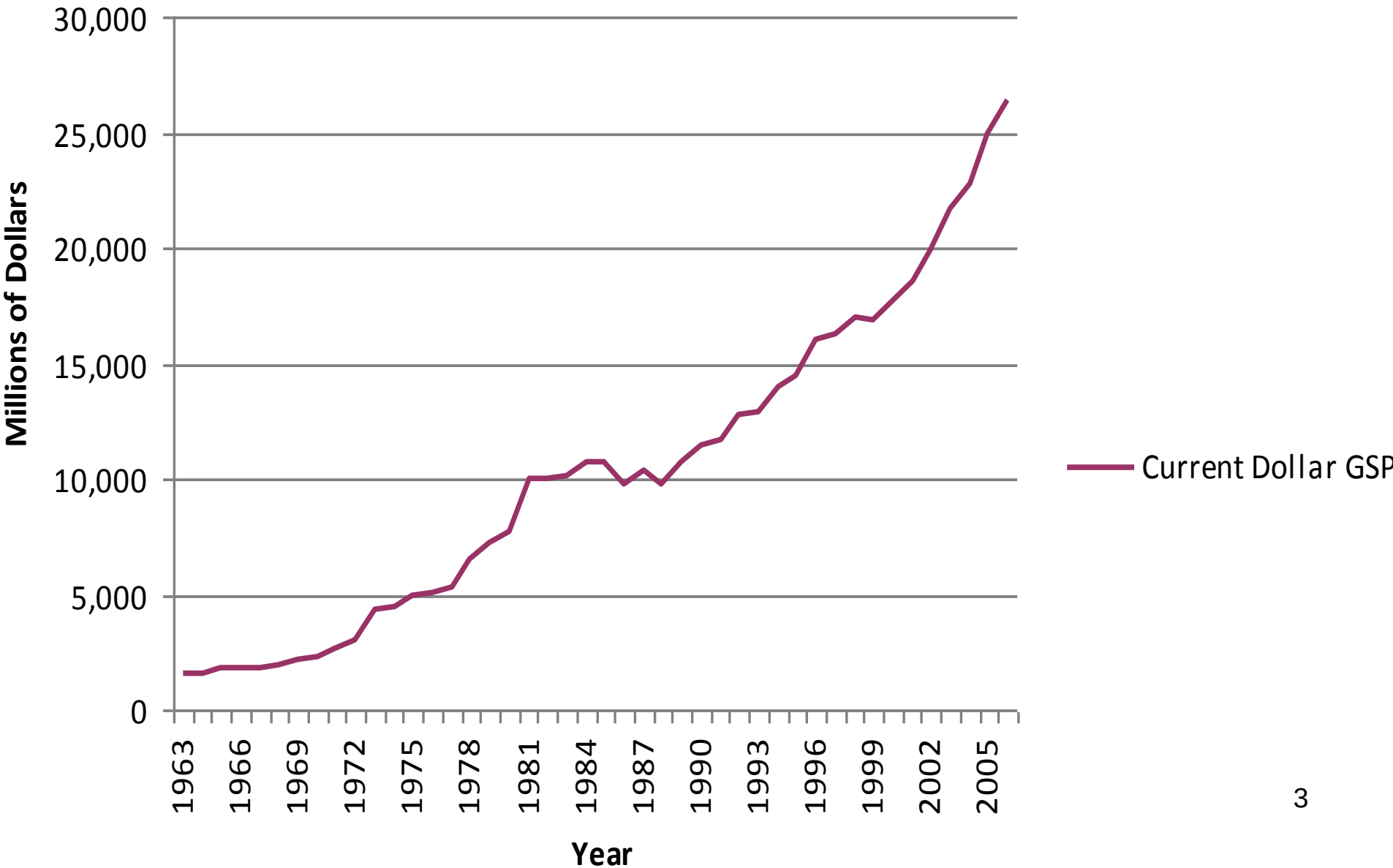
July 2, 2008

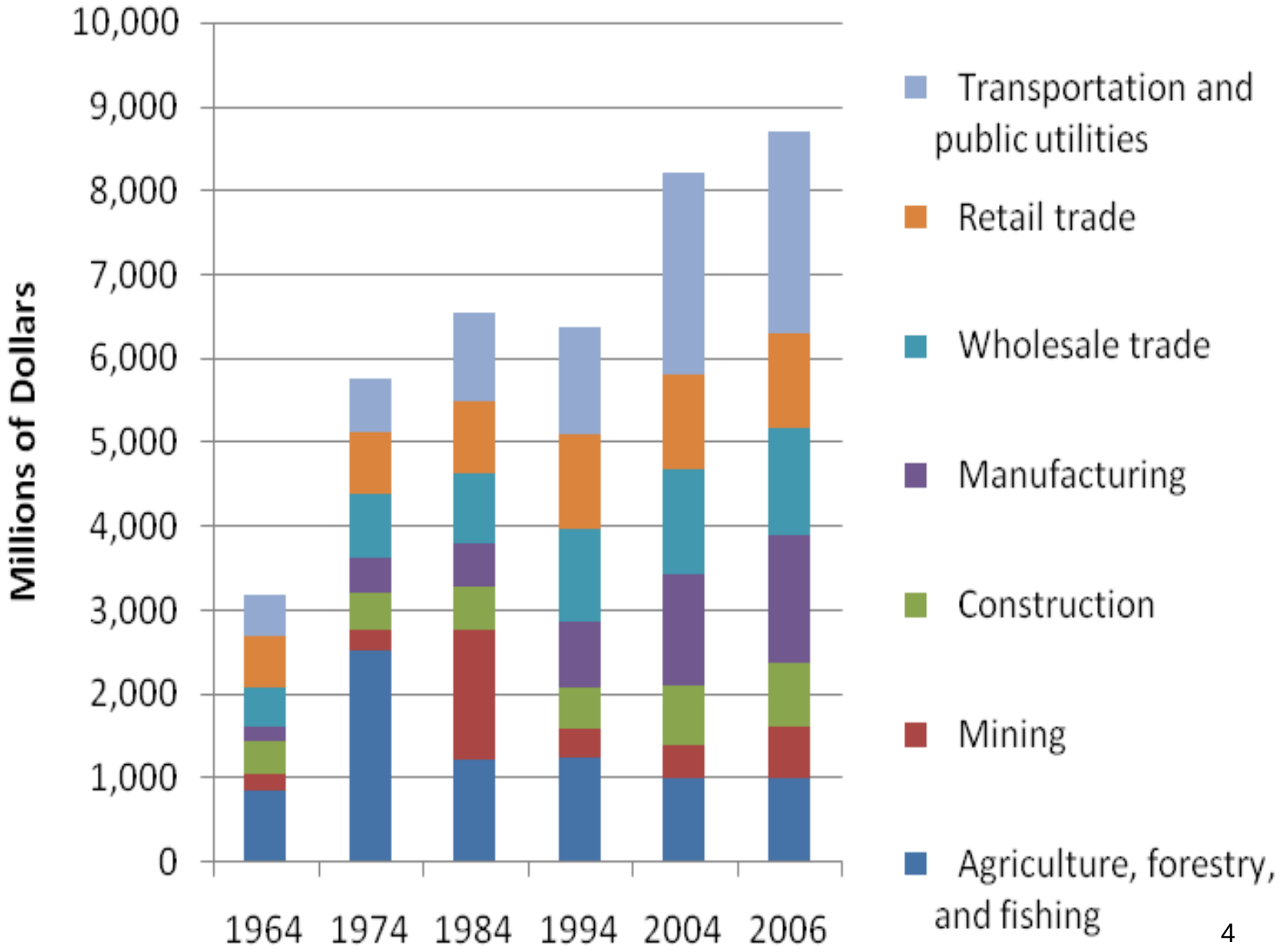
NDDOT

North Dakota Department of Transportation

North Dakota's Economy is Growing and Diversifying

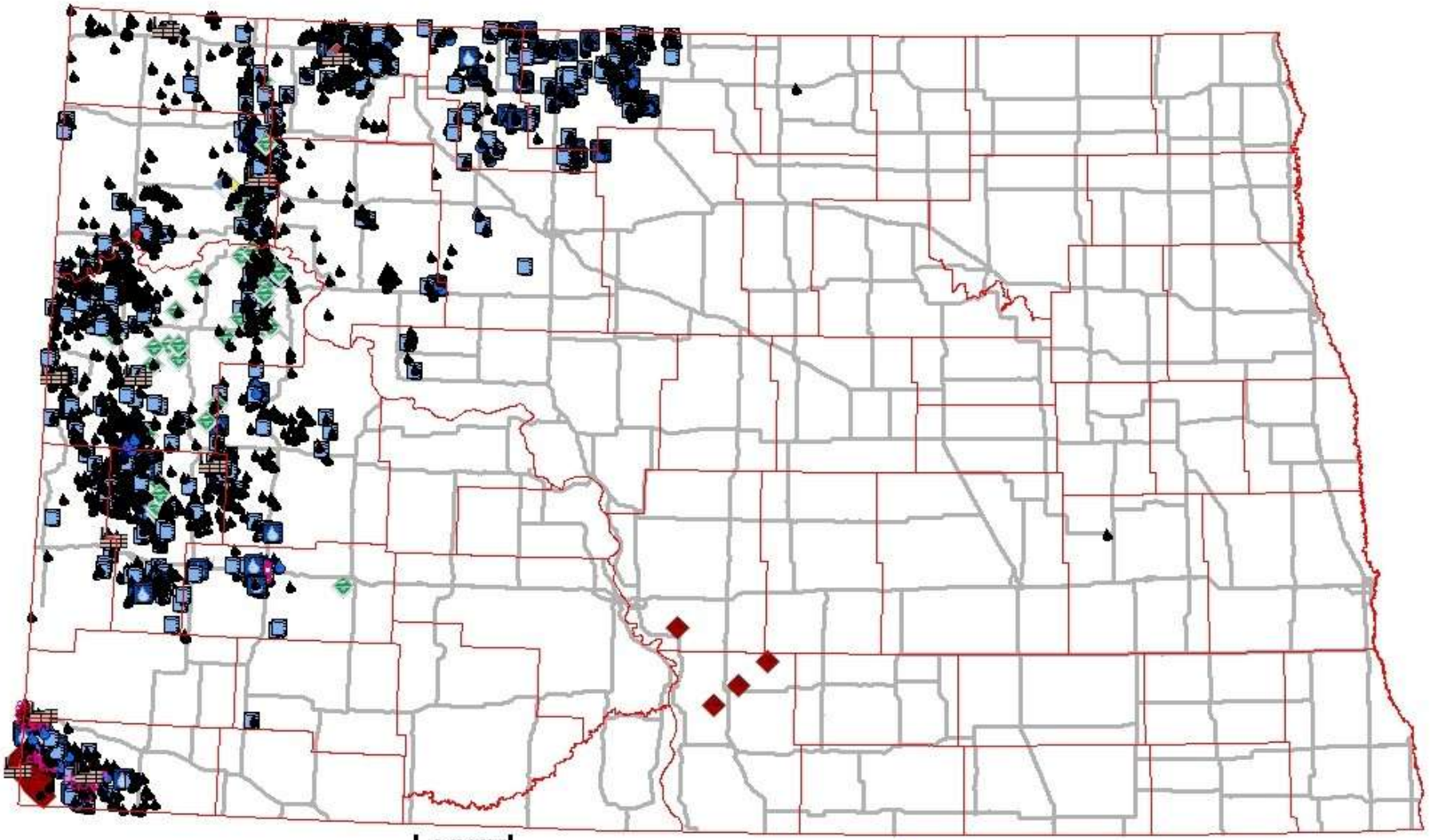
North Dakota Gross State Product





Source: Bureau of Economic Analysis

Oil & Gas Development

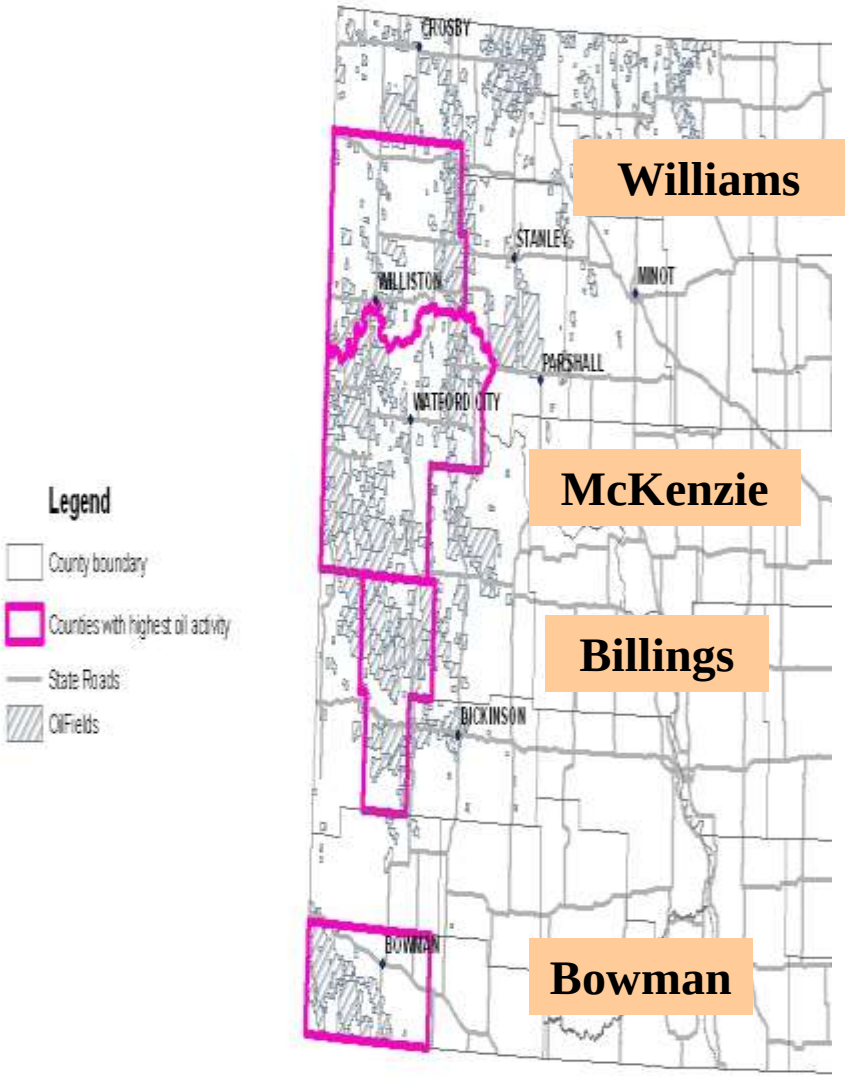


March 2008

County	Ranking	Mar 08 (bbls)	Wells	Avg Prod/Well
Bowman	1	1,484,699	544	2,729
Mountrail	2	661,047	133	4,970
McKenzie	3	576,410	795	725
Williams	4	419,510	430	976
Billings	5	385,086	471	818
Dunn	6	328,360	196	1,675
Bottineau	7	142,709	499	286
Stark	8	126,009	72	1,750
Burke	9	92,552	338	274
Divide	10	72,431	115	630
Renville	11	65,728	267	246
Golden Valley	12	57,025	67	851
Slope	13	35,792	13	2,753
Ward	14	4,414	19	232
McLean	15	3,184	12	265
McHenry	16	2,482	17	146
Hettinger	17	0	0	0
Totals		4,457,438	3,988	1,118

Year	# of Wells
1951	1
1976	1635
2001	3372
2007	3870
2008	?

North Dakota Oil Fields



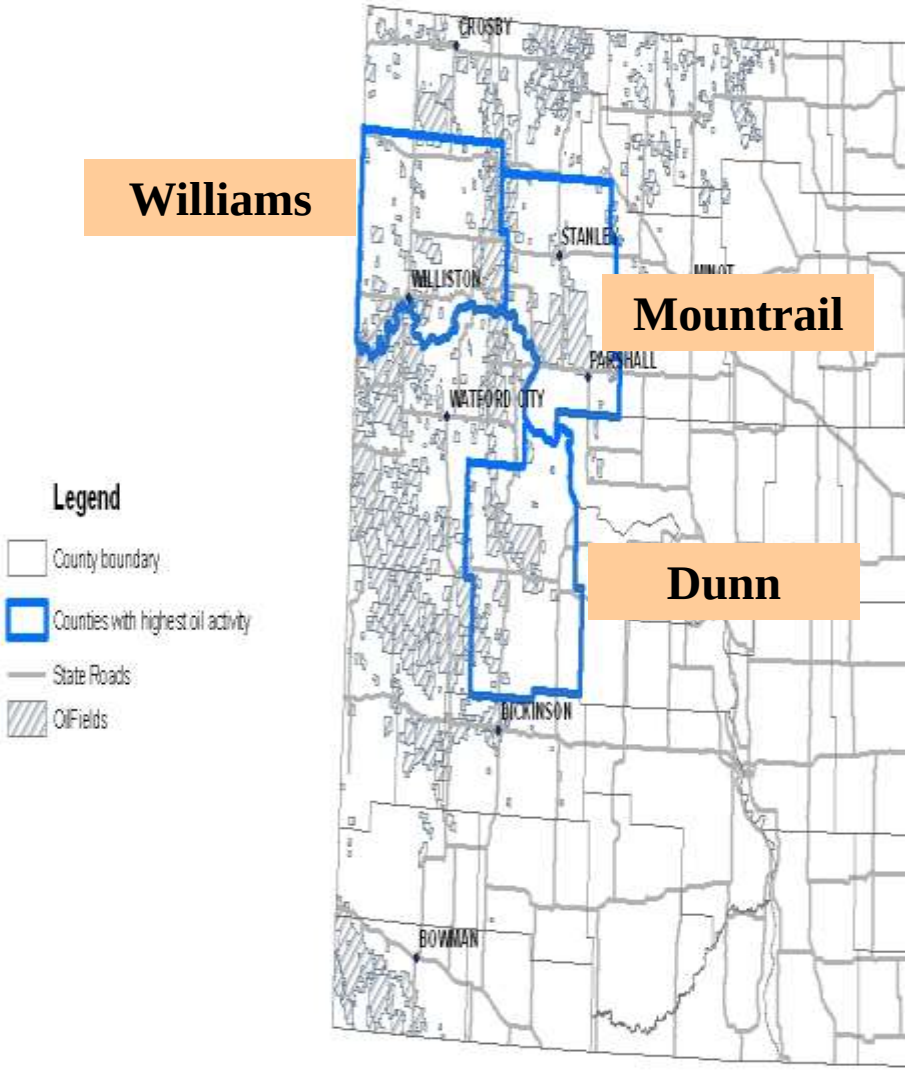
Williams

McKenzie

Billings

Bowman

North Dakota Oil Fields



Williams

Mountrail

Dunn

TYPICAL TRUCK/EQUIPMENT VOLUMES ASSOCIATED WITH OIL & GAS DEVELOPMENT

Early 1990's

Work Over Rig 90,000 Pounds

2007

Work Over Rig 110,000 Pounds

Initially many wells are worked over 3 to 4 times per year

Total Number of Loads

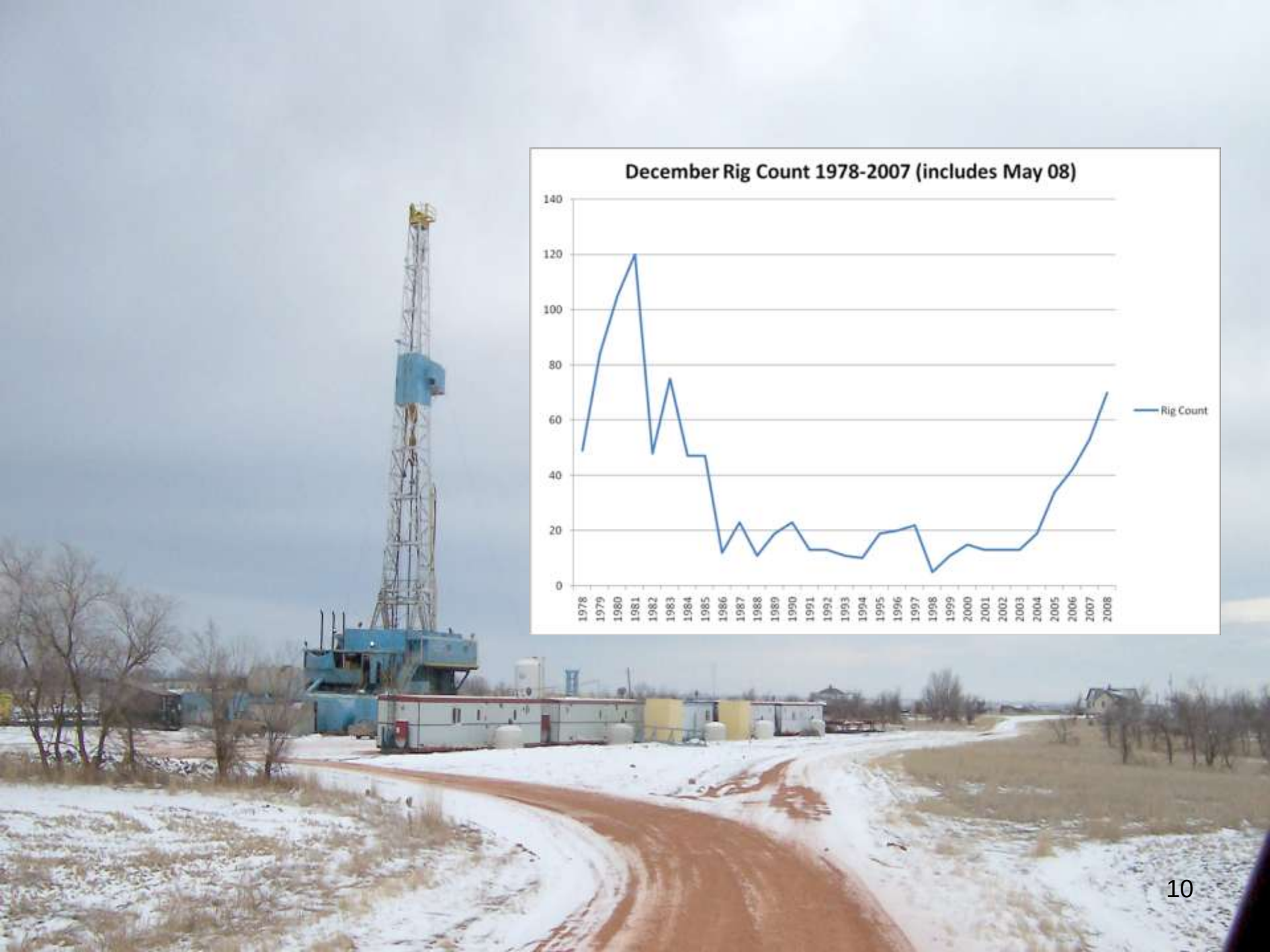
Vertical Well 400

Horizontal Well 600 – 1,000

Gravel Trucks, Transports, Scrapers, Motor Graders, Dozers, Blades, Bed Trucks, Hauling Trucks, Cement Trucks, Wireline Trucks, Coil Tubing Units, Tankers (fresh water, salt water, acid, hot oil, propane, drilling fluids, fracturing fluids, etc.) , Backhoes. Cherry Pickers, Cement Transports, Sand Trucks, Pump Trucks, Roustabouts, Utility Vehicles, Cranes, Fracturing Rigs, Low Boy Trailers, etc.

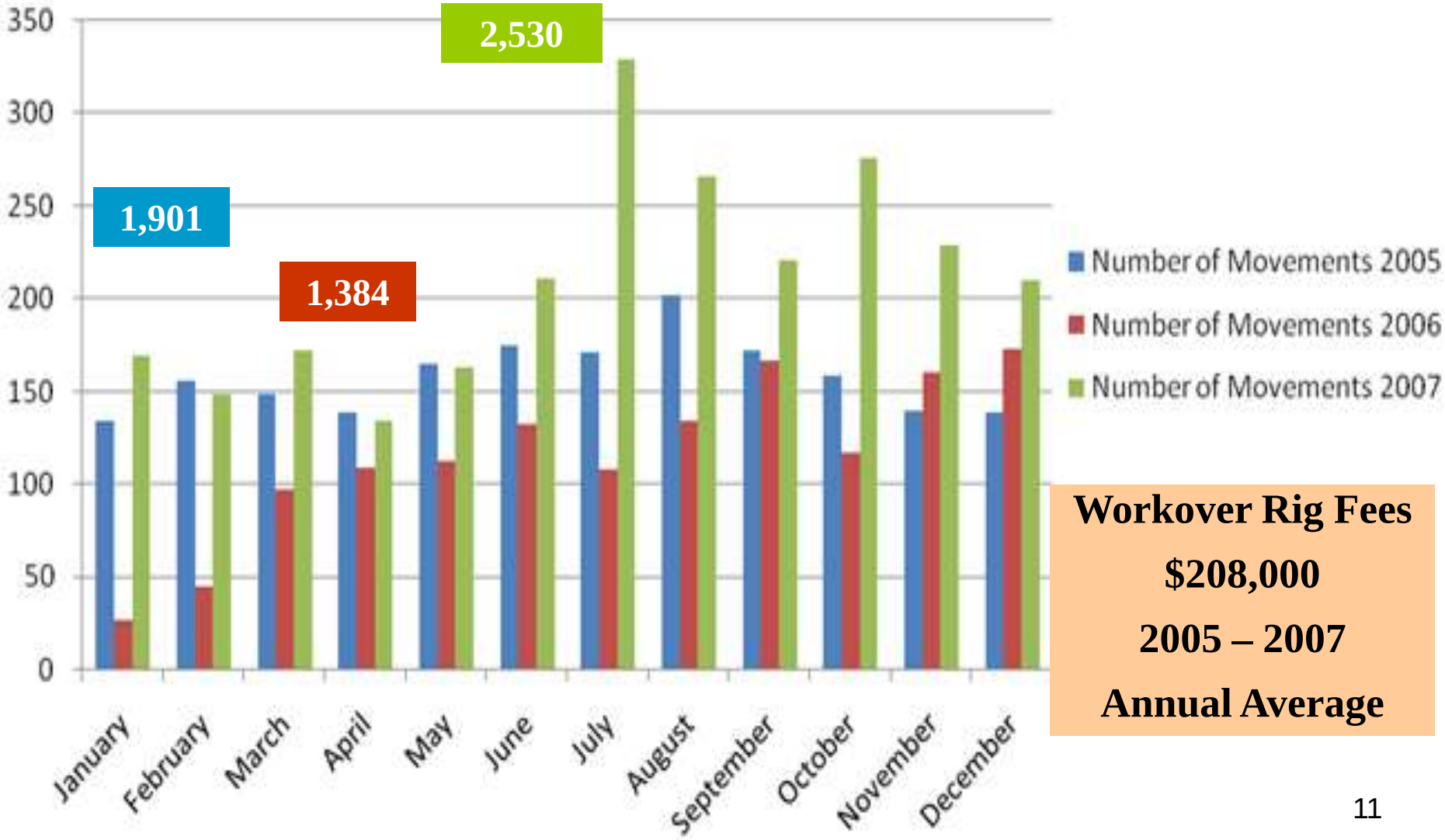
<u>OverWeight Loads - Pounds</u>

Generator House (3) - 111,180
Shaker Tank/Pit - 122,000
Suction Tank - 131,000
Mud Pump (2) - 164,000
Shaker Skid - 111,760
Draw Works - 130,880
Hydraulic Unit - 127,640
Tool Room Junk Box - 124,140
BOP Skid - 138,680
Top Dog House - 117,000
Crown Section - 140,000
Derrick - 159,000
VFD House - 130,100
Mud Boat - 114,380
Substructure (2) - 136,000
Centerpiece - 139,440
Choke Manifold - 126,000
MCC House - 145,160
BOP Setting Machine - 111,000


December Rig Count 1978-2007 (includes May 08)
140
120
100
80
60
40
20
0
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Rig Count

Self-Issued Work Over Rig Permitted Movements

2005-2007



Workover Rig Fees

$208,000

2005 – 2007

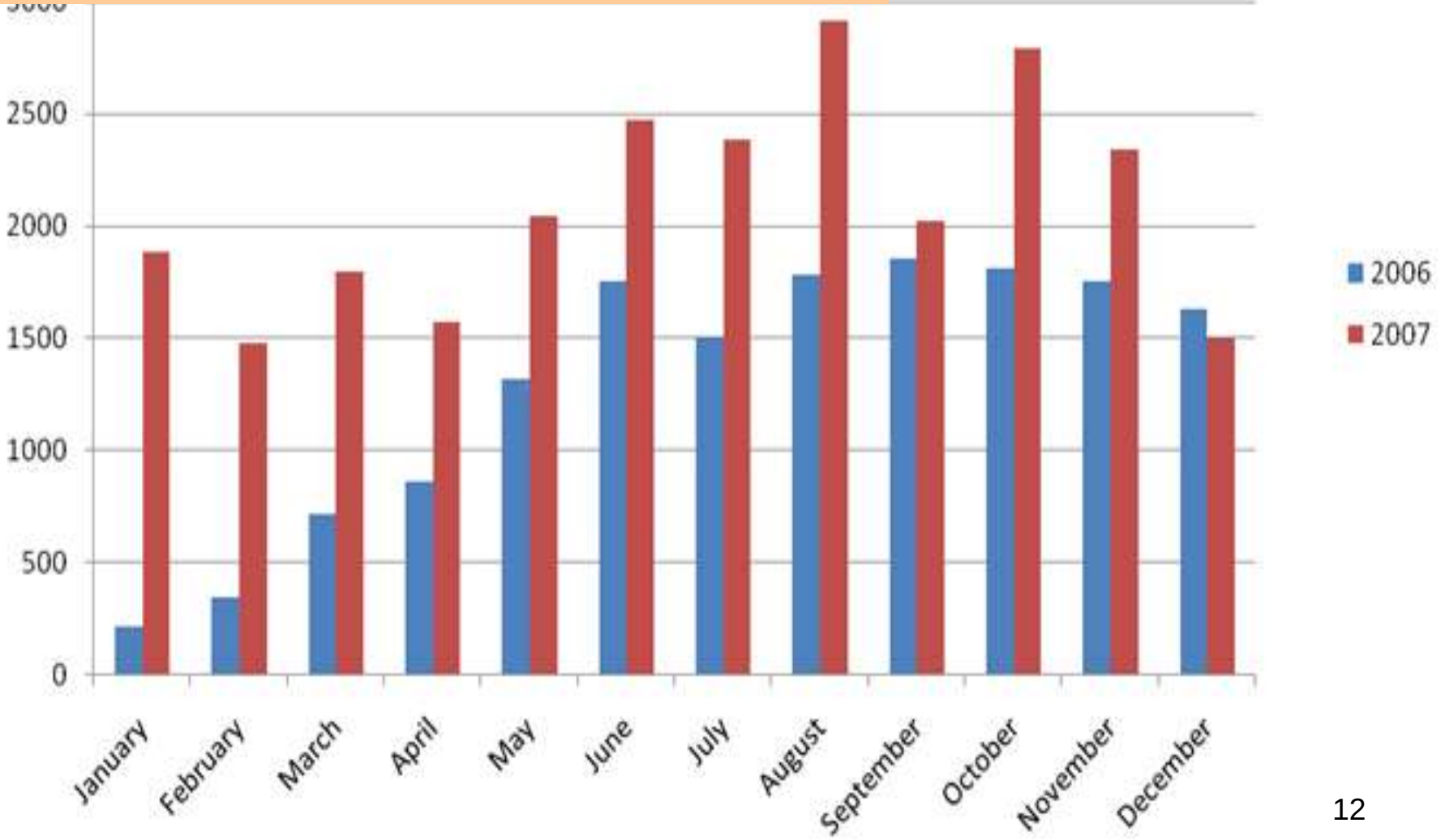
Annual Average

Source: ND Highway Patrol

O/W & O/D and O/D Only Permits (No WOR) (Williston, Minot, Dickinson Districts) 2006 & 2007

Statewide Over Weight/Over Dimension Fees

2006	**$2,043,753**	**# Permits**	**33,348**
2007	**$2,155,835**	**# Permits**	**38,792**



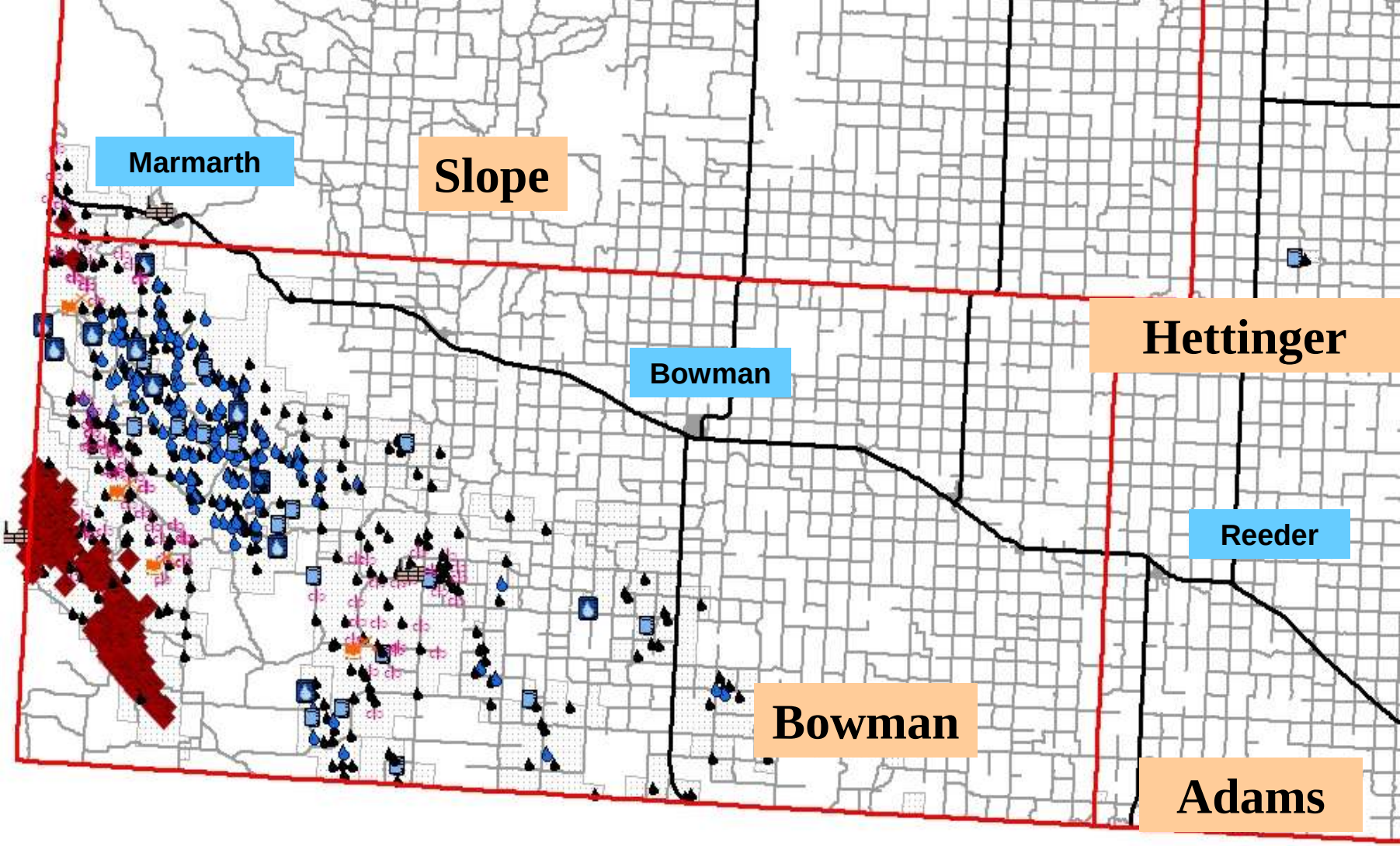
Source: ND Highway Patrol

Oil & Gas Development Sites

County	# All Sites	¼ < Mile State Hwy	% More 1/4 Mile
McKenzie	1081	1009	93.34%
Bowman	907	905	99.78%
Bottineau	760	738	97.11%
Billings	671	657	97.91%
Williams	627	581	92.66%
Burke	447	397	88.81%
Renville	382	376	98.43%
Mountrail	381	356	93.44%
Dunn	322	306	95.03%
Divide	158	148	93.67%
Stark	121	103	85.12%
Golden Valley	85	83	97.65%
Slope	27	23	85.19%
Ward	34	34	100.00%
McLean	27	27	100.00%
McHenry	25	25	100.00%
Hettinger	2	2	100.00%
Totals	6057	5770	95.18%

Systems Impacted

- State Highways
- County Roads
- Township Roads
- City Streets
- Tribal Roads

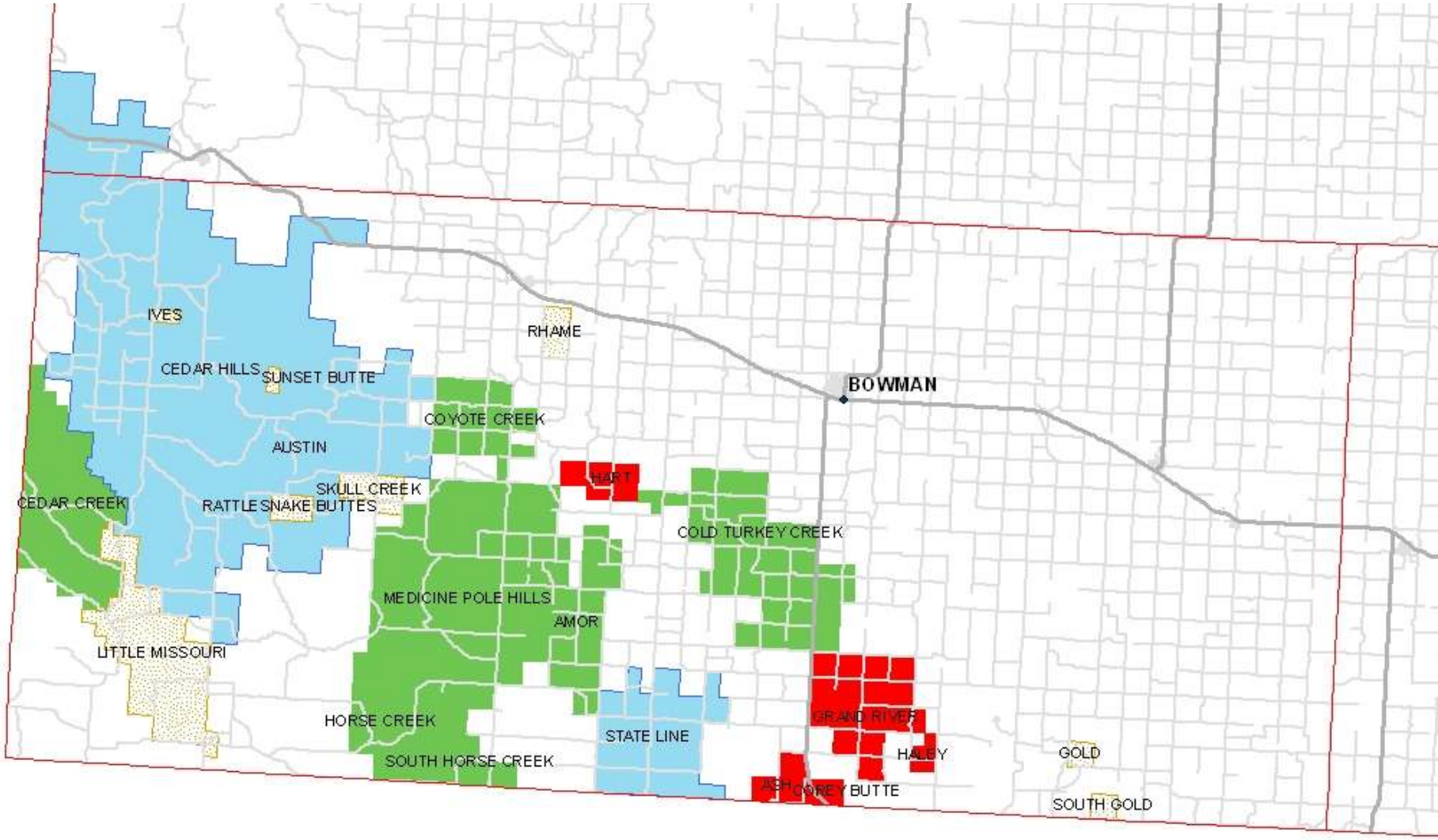


Oil and Gas Activity in Bowman County as of 02/07/08

Legend

- Gas Plant Locations
- Oil Rig Locations
- Oil Fields
- Acid Gas Disposal
- Air Injector
- Dump Flood
- Dump Flood Producer
- Gas Condensate
- Dry Gas
- Gas Injector
- Oil and Gas
- Instructional Well
- Salt Water Disposal
- Water Injector
- Water Supply

Crude oil is transported from individual wells to tank batteries and pipeline transfer stations by trucks.



Bowman County Oil Transportation

Legend

- TRANSPORT 100% BY TRUCK
- TRANSPORT 100% BY PIPELINE
- TRANSPORT IS A MIX OF TRUCK AND PIPELINE
- TRANSPORT UNKNOWN

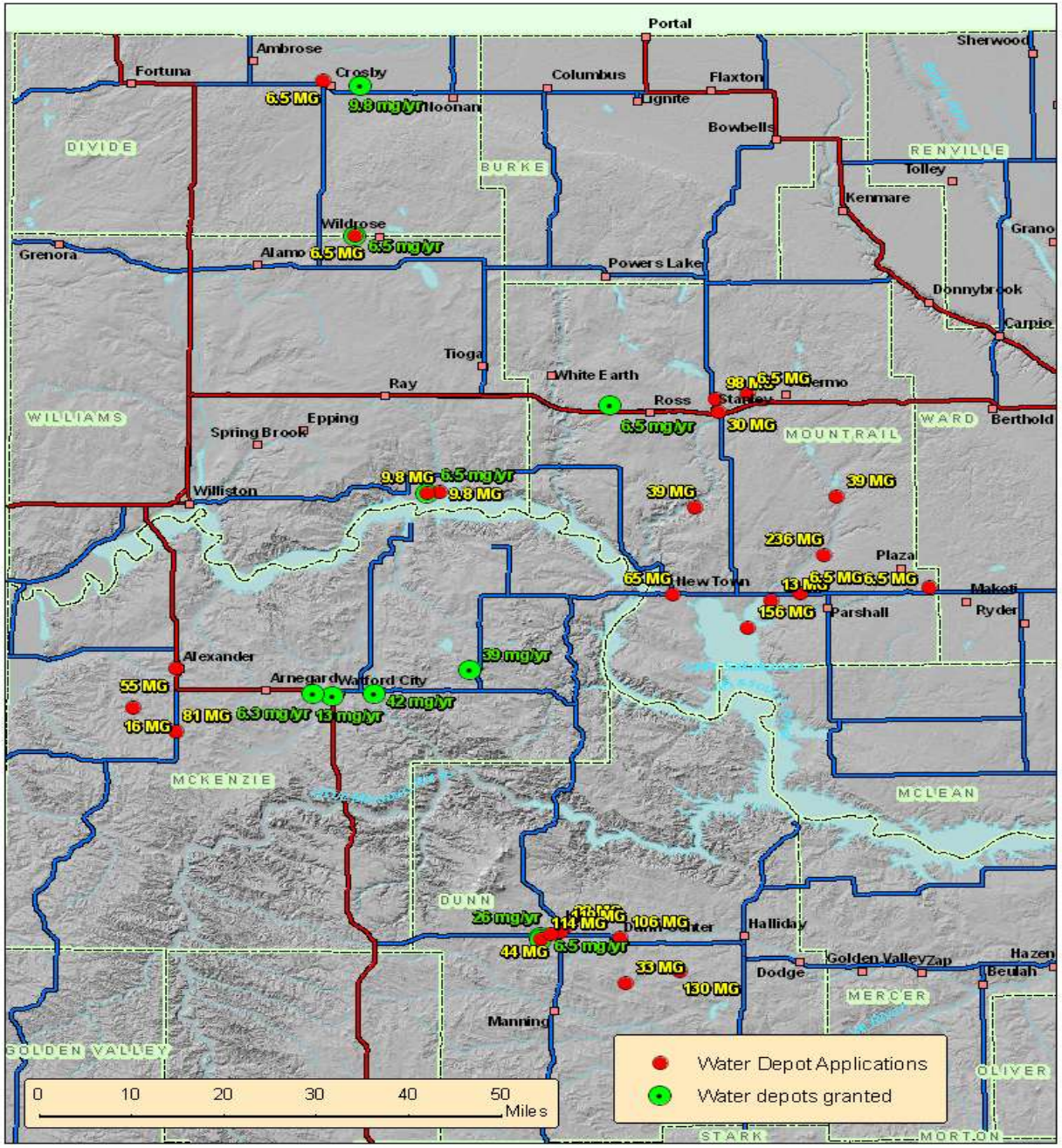
35% of wells pipeline

65% of wells truck

24 to 48 Truckloads

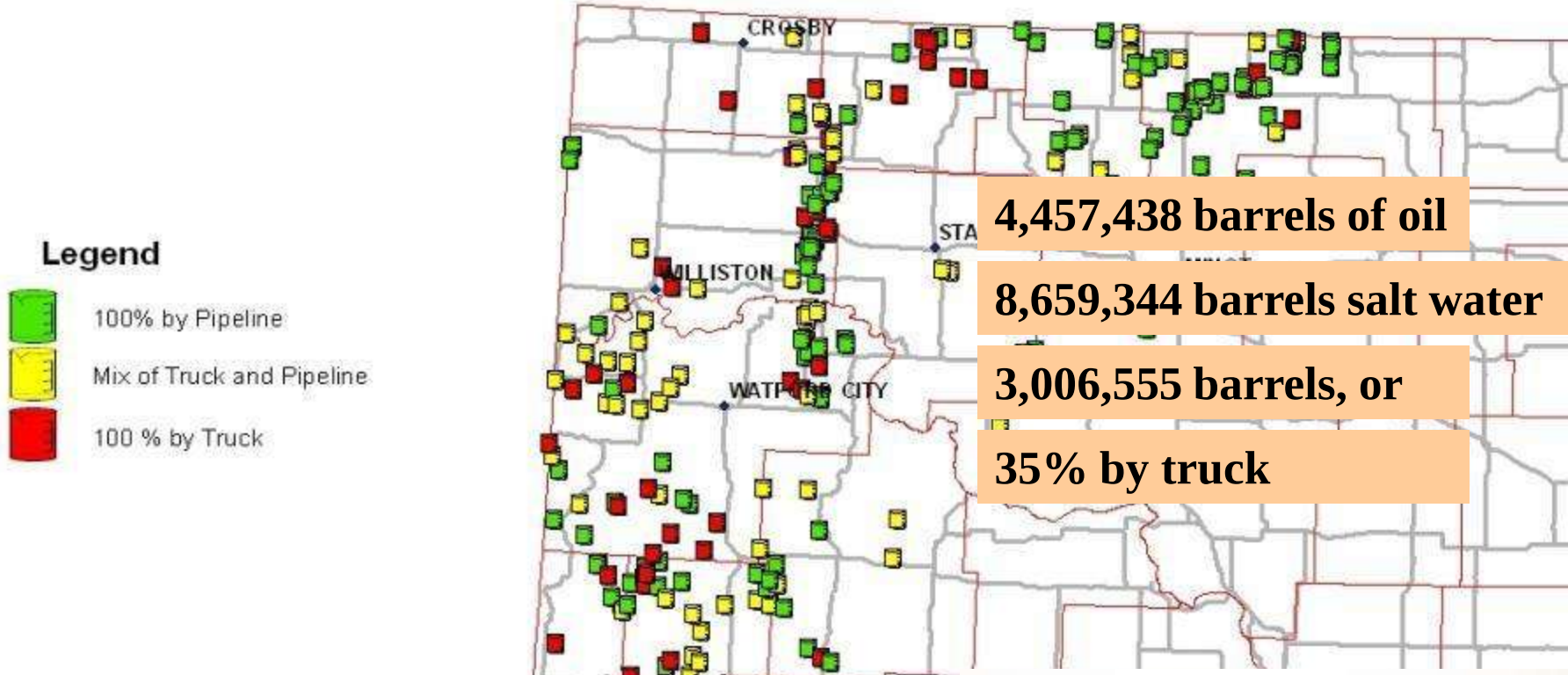
Fracturing Equipment

150 to 230 Truckloads



Water depots and locations of proposed depots (water permit application made)

Salt Water Disposal Site Transportation



4,457,438 barrels of oil

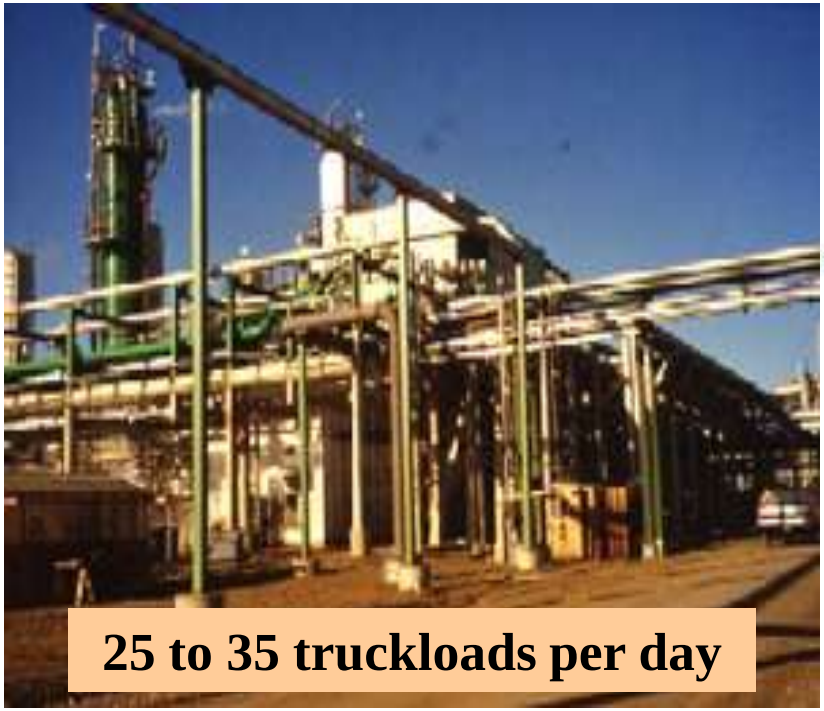
8,659,344 barrels salt water

3,006,555 barrels, or

35% by truck

23,127 truckloads

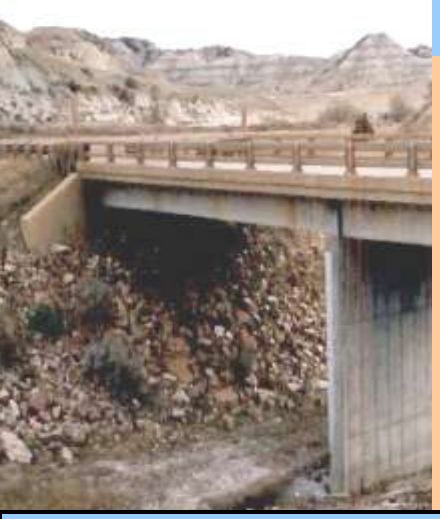
Natural Gas Processing Plants



25 to 35 truckloads per day

	State Highway Miles	Local Road Miles	Federal Lands Road Miles
Billings	48.4	730.4	251.8
Bottineau	173.3	2834.8	8.3
Bowman	79.2	1198.8	0
Burke	126.7	1526.5	21.6
Divide	110.1	1891.9	0
Dunn	146.5	1723.5	119.7
Golden Valley	69.9	1023.6	41.3
Hettinger	99.2	1641.7	0
McHenry	175.1	2839.5	26.7
McKenzie	278.3	2011.2	341.7
McLean	287.4	3088.0	64.8
Mountrail	173.2	2431.8	17.4
Renville	73.0	1493.8	2.6
Slope	71.8	1022.6	21.3
Stark	135.9	1954.9	0
Ward	230.1	3140.0	139.7
Williams	230.7	3176.1	0.2
Totals	2508.8	33729.1	1057.1

State and Local Road Impacts



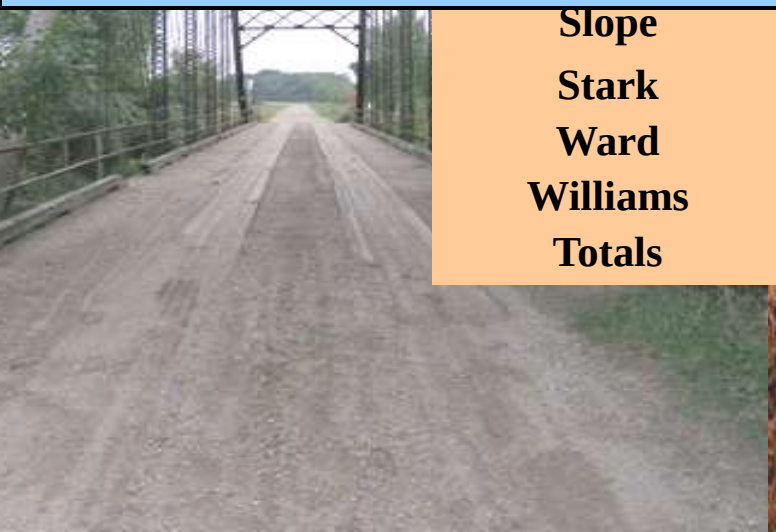
State and County Structures and Status By County 3/4/2008

County	State	FO	SD	County	FO	SD	Total
Billings	25	2	1	31	2	0	56
Bottineau	27	0	0	123	11	45	150
Bowman	25	0	0	49	4	0	74
Burke	24	0	0	16	0	6	40
Divide	7	0	0	10	0	3	17
Dunn	40	0	2	58	1	15	98
		2	0	22	2	5	42
		0	0	60	5	22	87
		0	1	96	14	26	117
		1	5	82	4	6	150
		0	0	32	3	2	63
		0	1	22	1	3	38
		0	0	17	0	1	30
Slope	28	0	1	30	0	4	58
Stark	108	1	5	104	9	32	212
Ward	97	3	3	74	5	6	171
Williams	56	2	1	66	9	29	122
Totals	633	11	20	892	70	205	1525

Structure Replacement Costs
County Roads

$150,000 to $450,000

Average of $400,000



US Highway 12 Bridge
$465,000

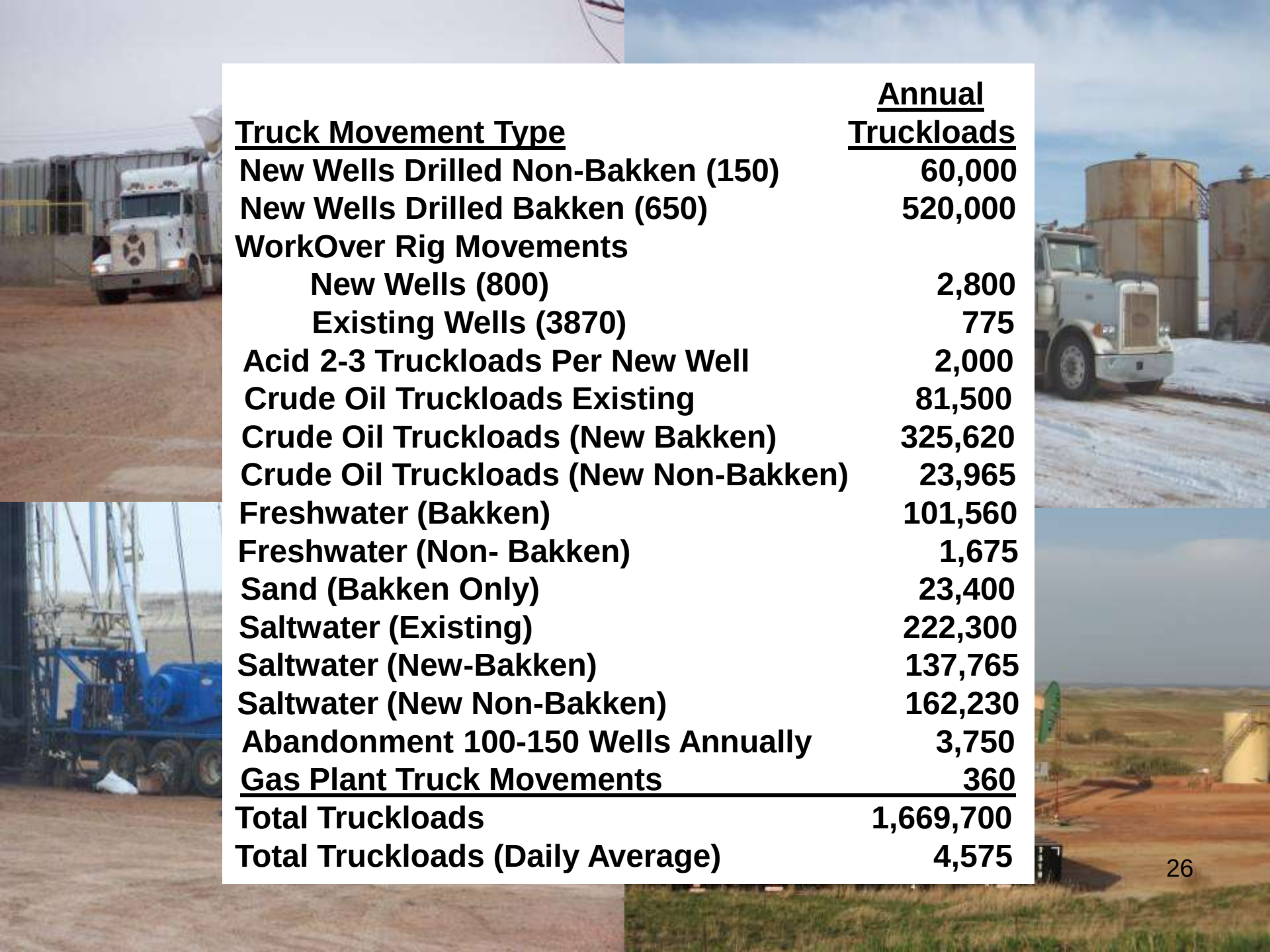
Highway/Rail At-Grade Crossings

County	Signals	Flashers	Xbucks	Stop	No	Totals
Billings	3	-	1	-	-	4
Bottineau	3	-	96	1	-	100
Bowman	3	1	13	2	-	19
Burke	7	1	107	-	1	116
Divide	-	1	54	-	-	55
Dunn	-	-	-	-	-	0
Golden Valley	6	1	5	1	-	13
Hettinger	-	-	-	-	-	0
McHenry	17	1	99	7	-	124
[illegible]e	2	-	8	-	-	10
[illegible]	5	1	93	6	5	110
[illegible]il	9	1	67	1	1	79
[illegible]	1	0	36	-	5	42
[illegible]	-	-	2	1	-	3
[illegible]	15	1	29	1	-	46
[illegible]	49	2	131	3	2	187
Williams	11	1	28	-	8	48
	131	11	769	23	22	956

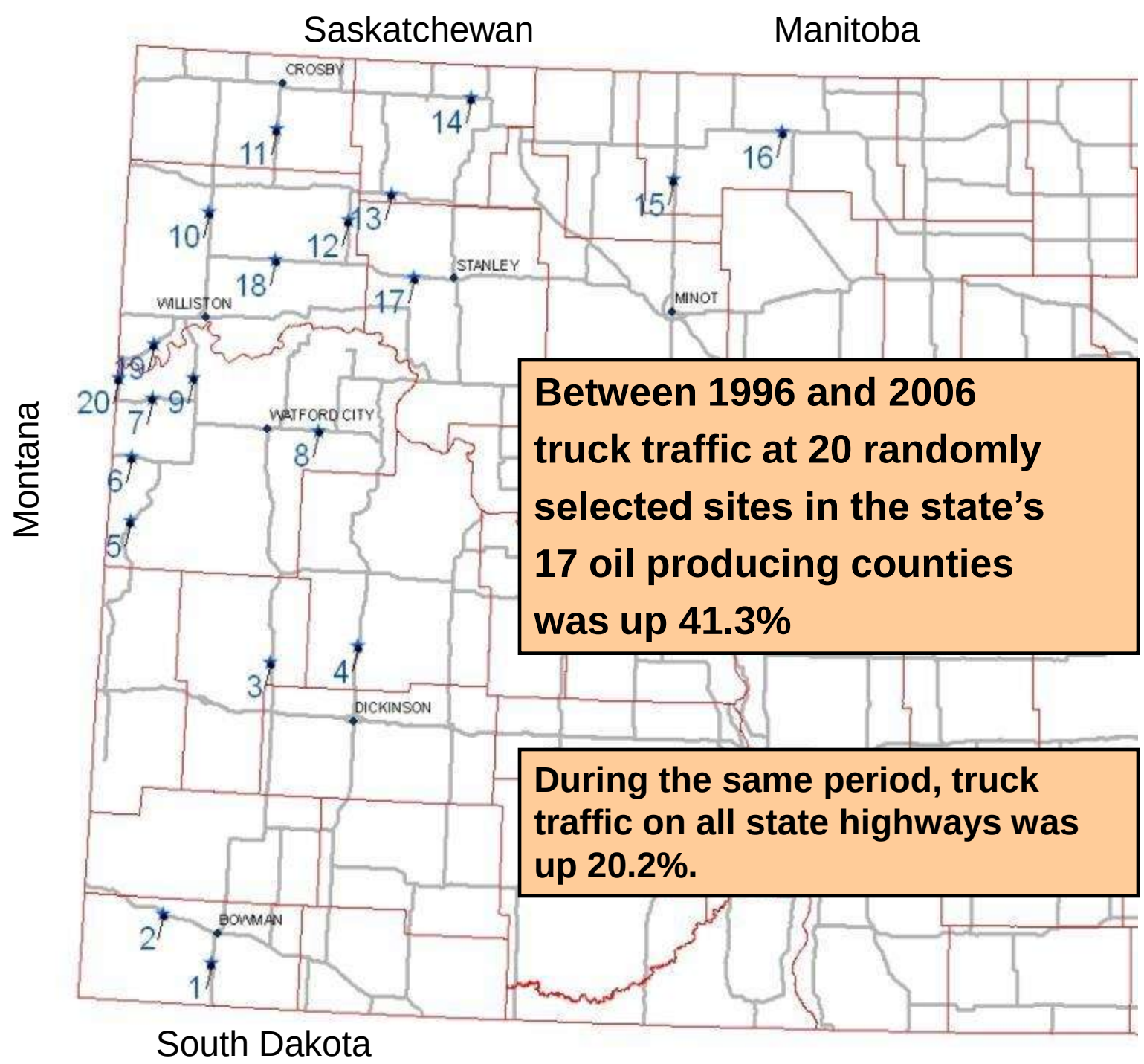
Signals
$165,000

Annual Maintenance
$ 5,000

Surface Replacement
$38,000 to $48,000

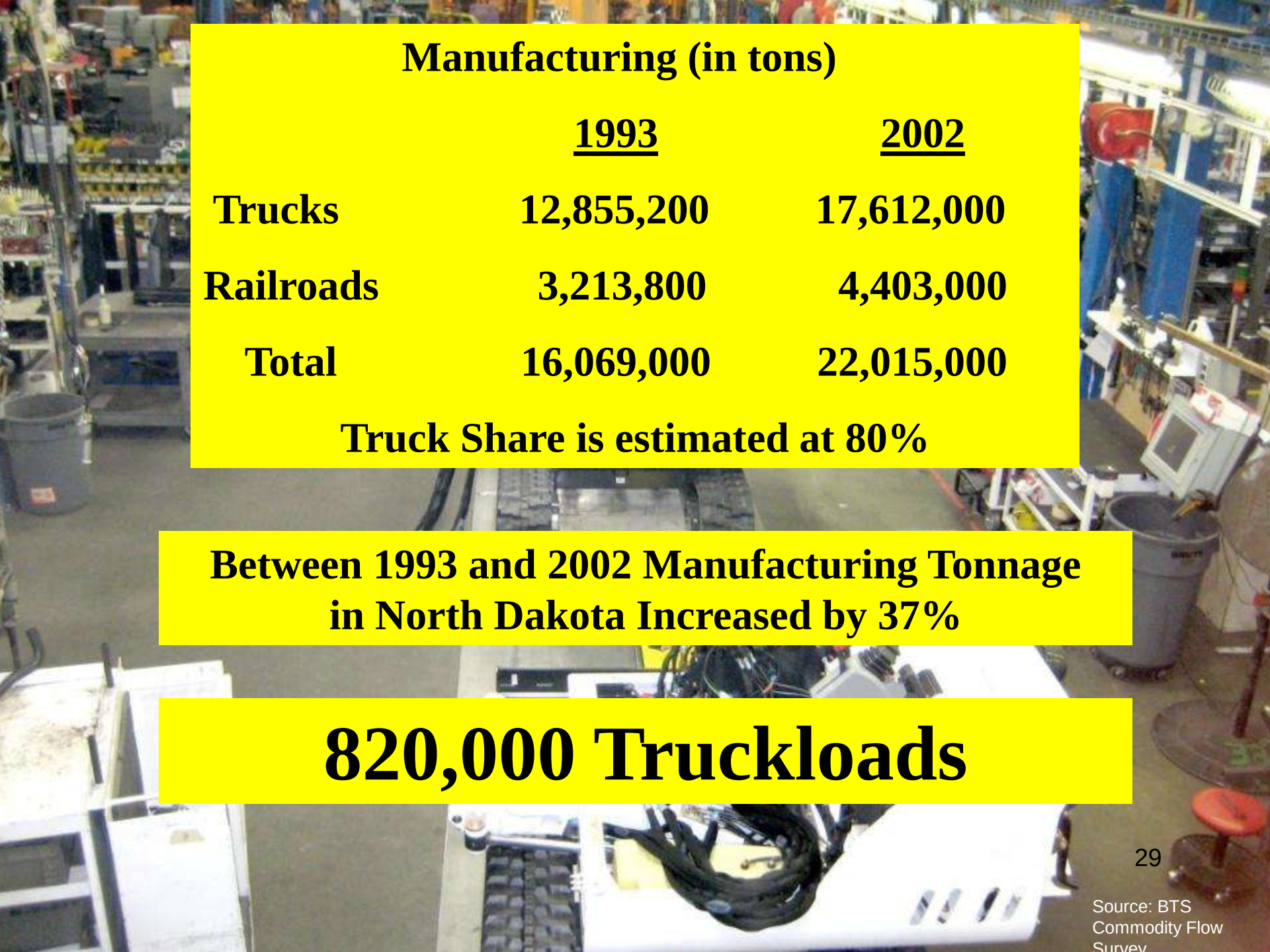


Truck Movement Type	Annual Truckloads
New Wells Drilled Non-Bakken (150)	60,000
New Wells Drilled Bakken (650)	520,000
WorkOver Rig Movements	
New Wells (800)	2,800
Existing Wells (3870)	775
Acid 2-3 Truckloads Per New Well	2,000
Crude Oil Truckloads Existing	81,500
Crude Oil Truckloads (New Bakken)	325,620
Crude Oil Truckloads (New Non-Bakken)	23,965
Freshwater (Bakken)	101,560
Freshwater (Non- Bakken)	1,675
Sand (Bakken Only)	23,400
Saltwater (Existing)	222,300
Saltwater (New-Bakken)	137,765
Saltwater (New Non-Bakken)	162,230
Abandonment 100-150 Wells Annually	3,750
Gas Plant Truck Movements	360
Total Truckloads	1,669,700
Total Truckloads (Daily Average)	4,575


Saskatchewan
Manitoba
Montana
South Dakota
CROSBY
WILLISTON
STANLEY
MINOT
WATFORD CITY
DICKINSON
BOWMAN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Between 1996 and 2006 truck traffic at 20 randomly selected sites in the state's 17 oil producing counties was up 41.3%
During the same period, truck traffic on all state highways was up 20.2%.

Manufacturing

North Dakota is one of only 3 states to experience a growth in manufacturing between 2000 and 2006.



Manufacturing (in tons)

	1993	2002
Trucks	12,855,200	17,612,000
Railroads	3,213,800	4,403,000
Total	16,069,000	22,015,000

Truck Share is estimated at 80%

Between 1993 and 2002 Manufacturing Tonnage in North Dakota Increased by 37%

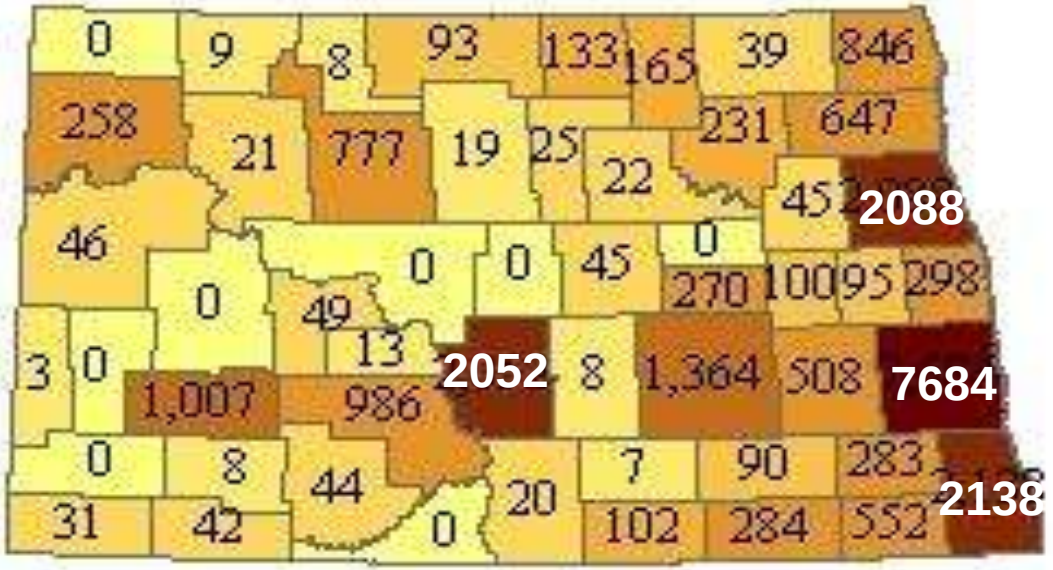
820,000 Truckloads

Source: BTS Commodity Flow Survey

1960s

Comparison of Manufacturing Employees by County

2000s



Source: Bureau of Labor Statistics

Ethanol & Biodiesel

Ethanol Production

5 Plants 235M Gallons
3 Projected 250M Gallons

Biodiesel Production

1 Plant 85 M Gallons
3 Projected 37 M Gallons

Iowa (2006)
26 Ethanol Plants
Total Annual Production 1.448B Gallons

Potential Ethanol Production Truck Traffic

A 100M Gallon Plant will:

Consume 35,600,000 bushels of corn = 44,500 truck loads, 122/day

Consume 300,000 tons of coal = 13,400 truck loads, 37/day

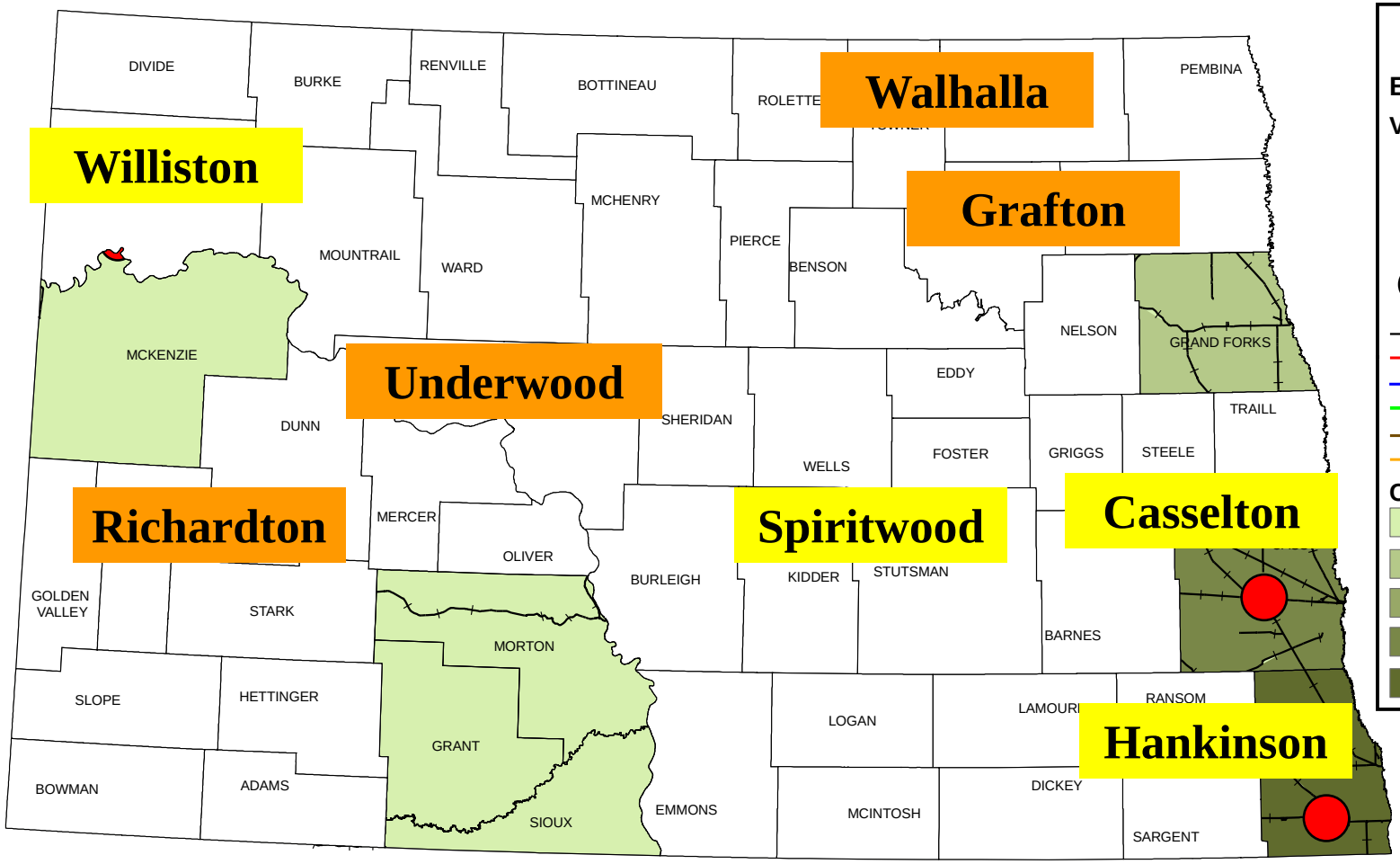
Produce 302,675 tons of distiller grain products = 13,500 truck loads 37/day

Produce 100M gallons of ethanol most of which will be transported by rail, however some may be consumed locally and distributed by truck

Total Potential Annual Truck Volume =

71,400 truck loads, 196/day

North Dakota Existing & Proposed Ethanol Plant Locations and Corn Production



Legend

Ethanol Plants

Volume Million Gallons

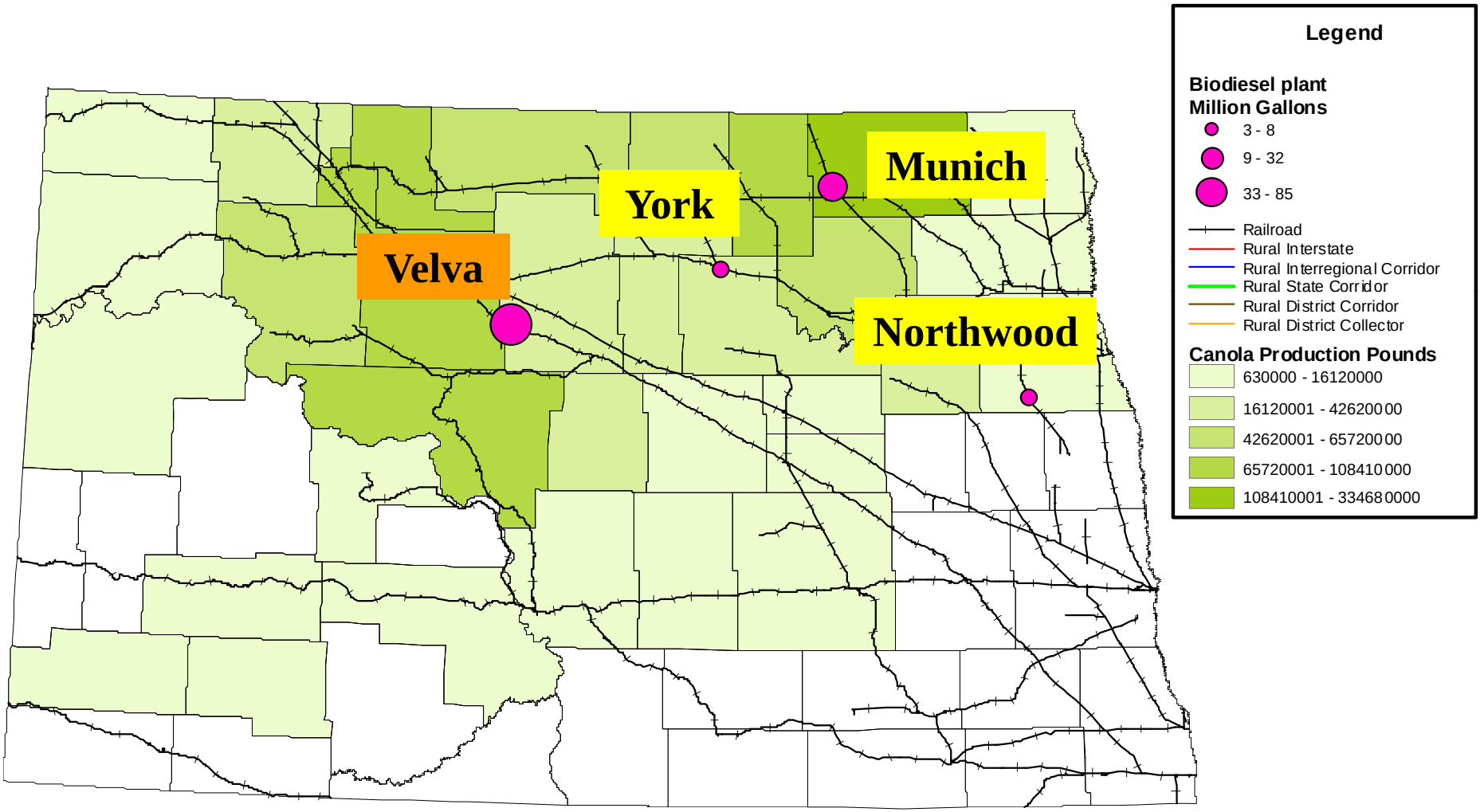
- 10
- 11 - 25
- 26 - 50
- 51 - 100

- Railroad
- Rural Interstate
- Rural Interregional Corridor
- Rural State Corridor
- Rural District Corridor
- Rural District Collector

Corn Production Bushels

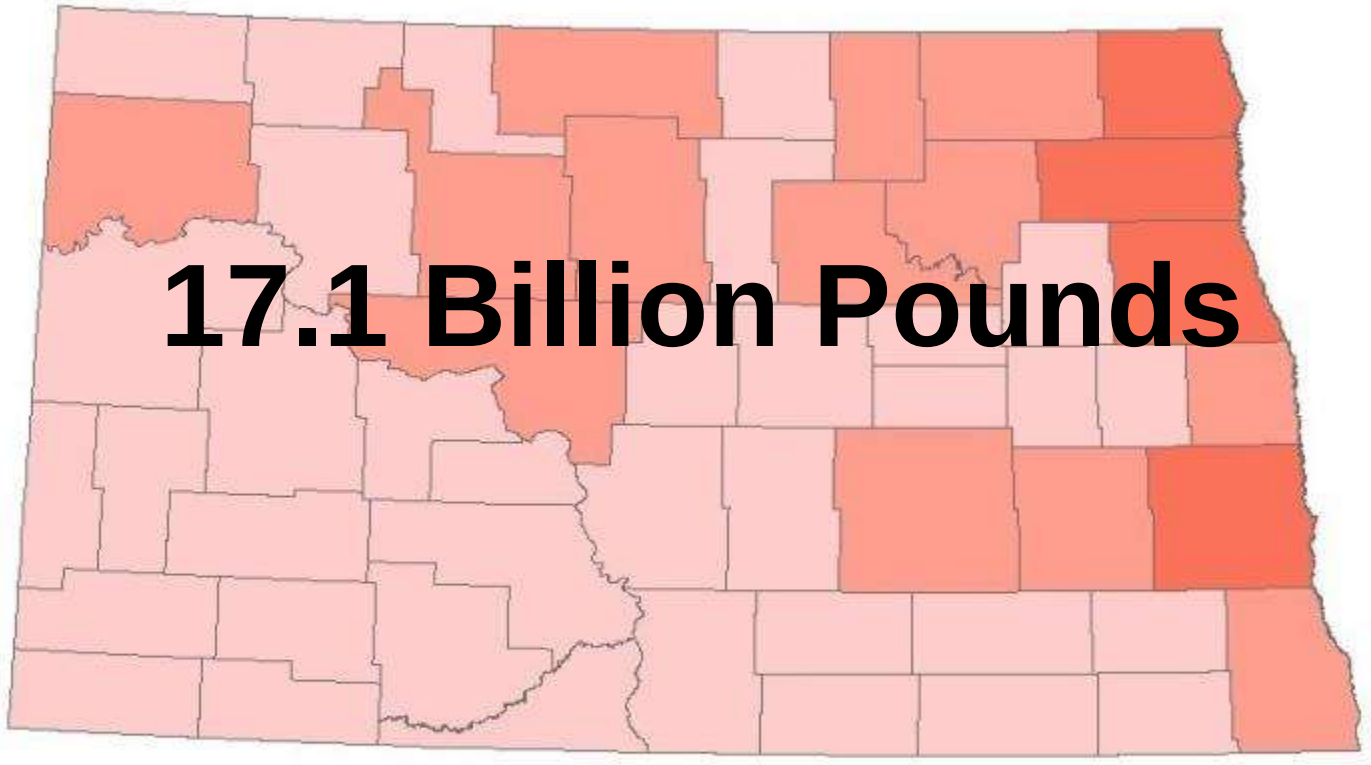
- 0 - 1835000
- 1835001 - 4230000
- 4230001 - 10320000
- 10320001 - 16055000
- 16055001 - 28475000

North Dakota Proposed
Biodiesel Plant Locations and Canola Production



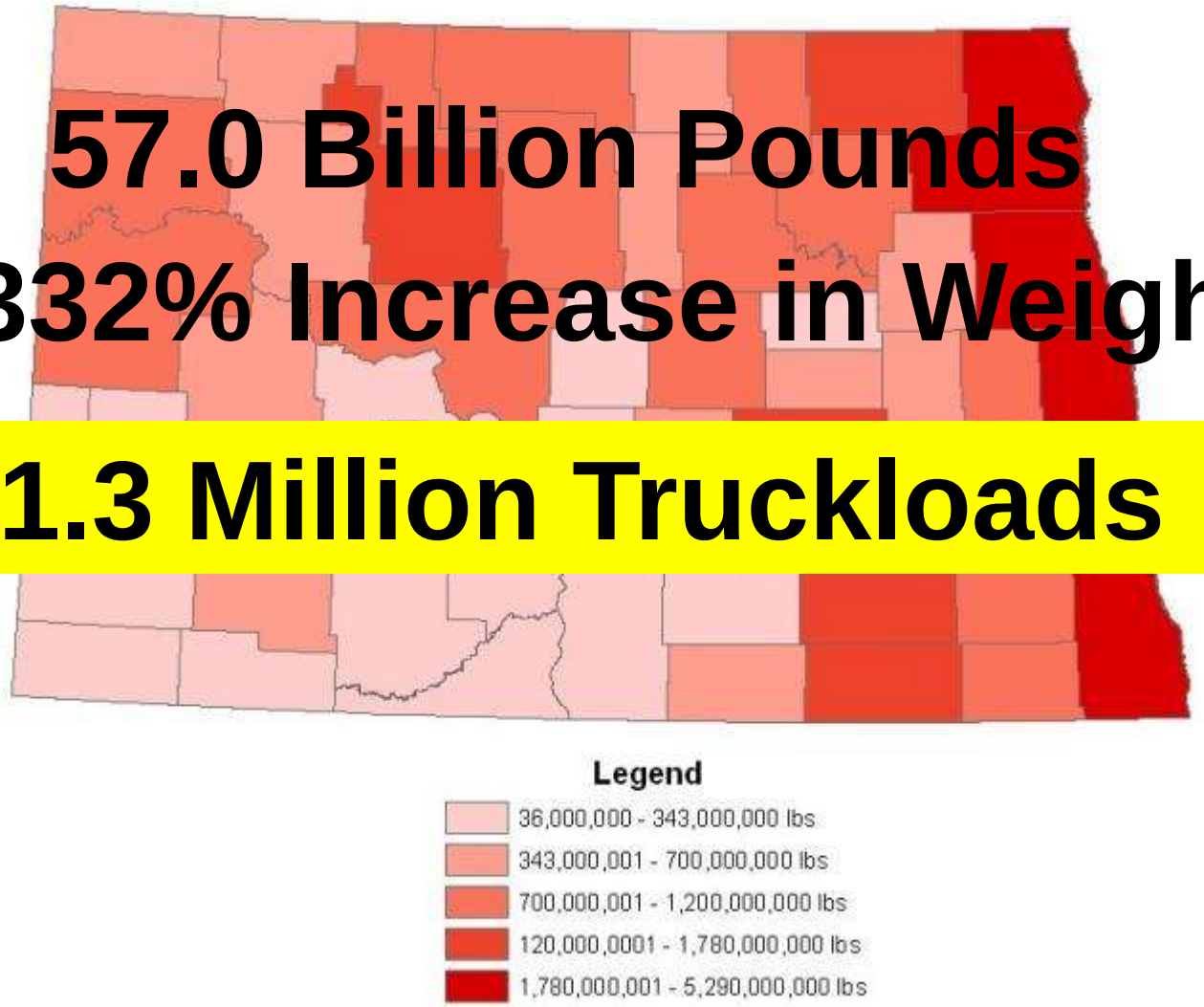
Agriculture

All Crops in Pounds
1950



Source: National Agricultural Statistics Service

All Crops in Pounds
2006



57.0 Billion Pounds

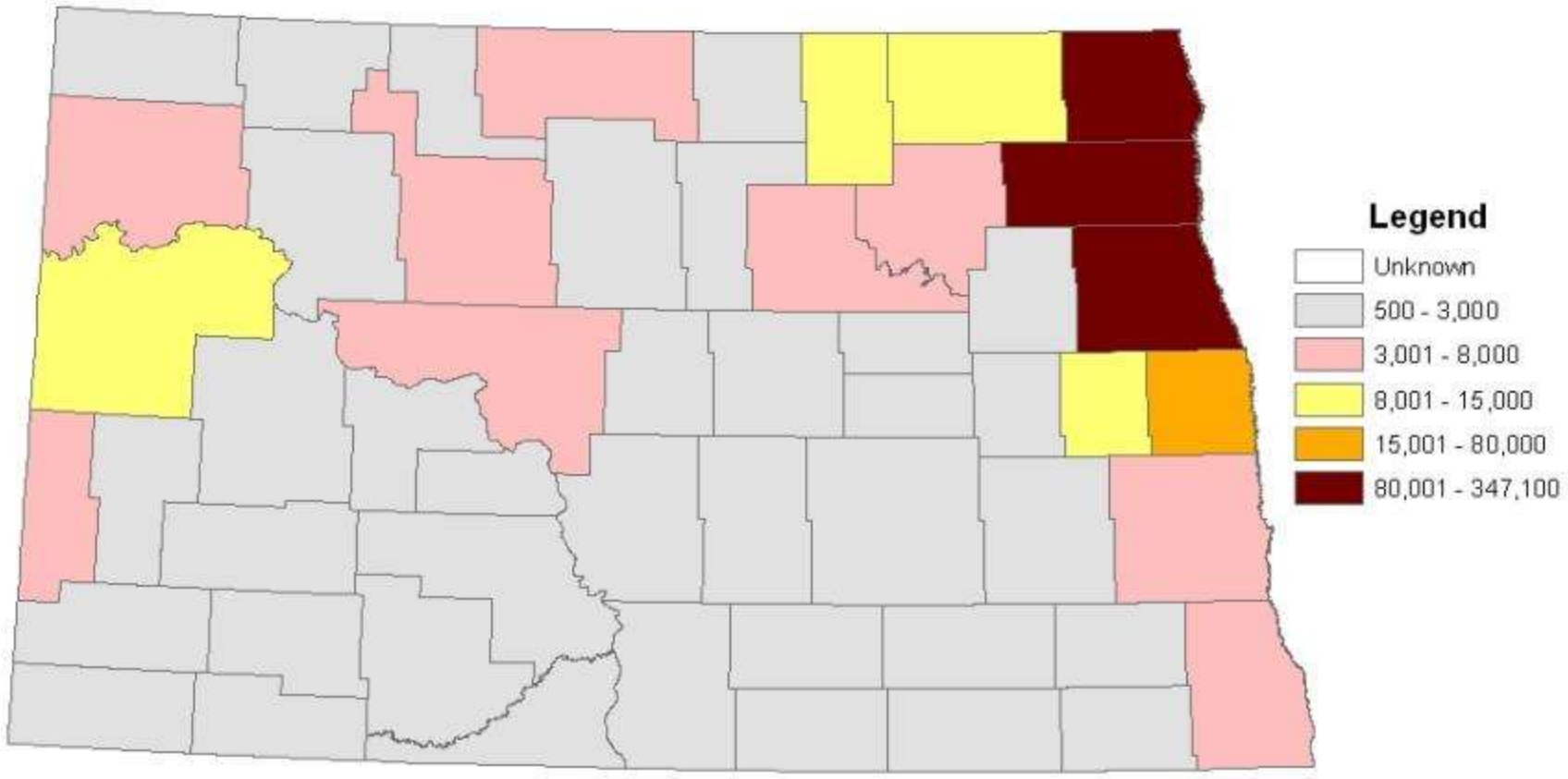
332% Increase in Weight

1.3 Million Truckloads

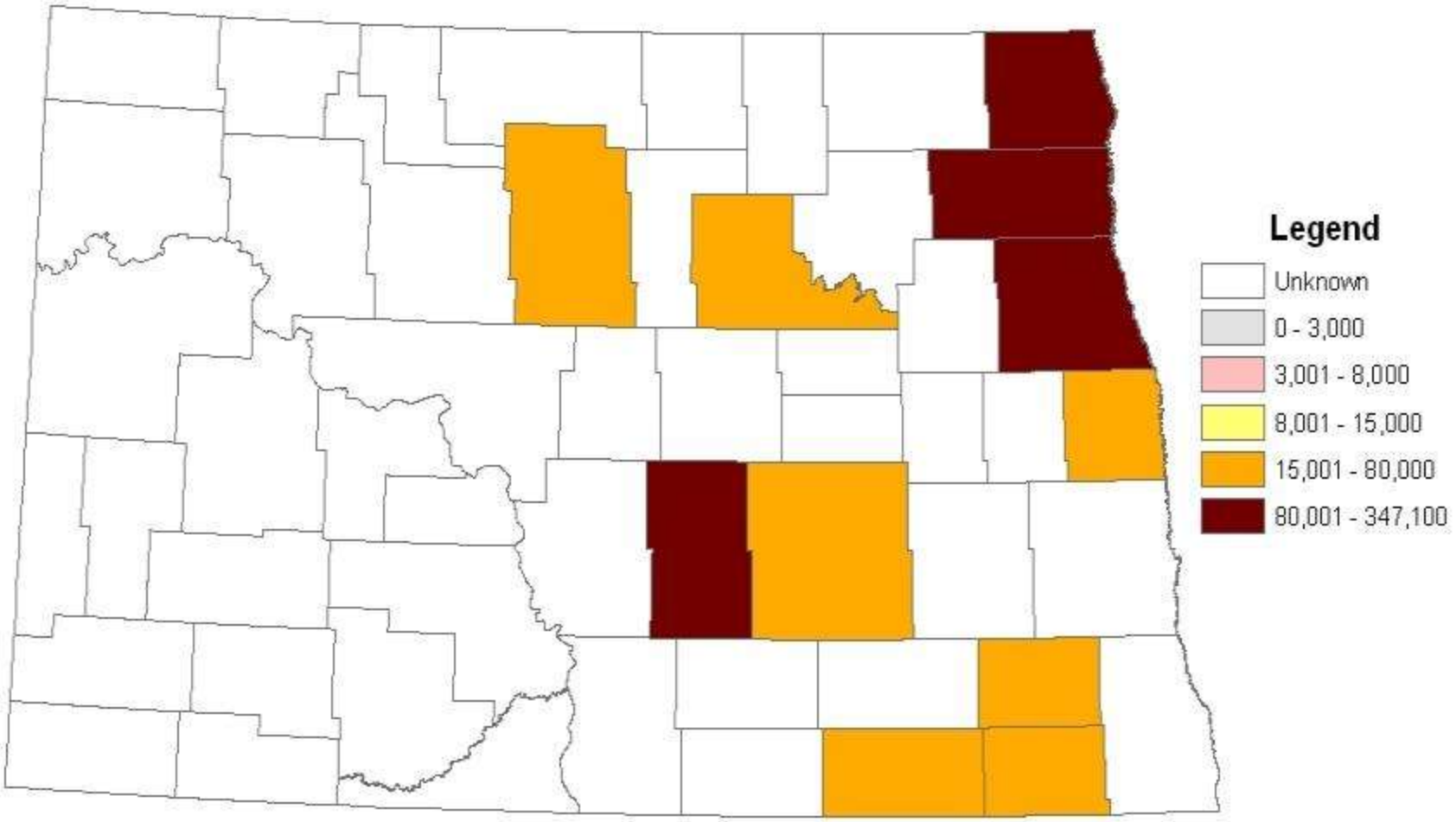
Source: National Agricultural Statistics Service

Shifting Crop Patterns

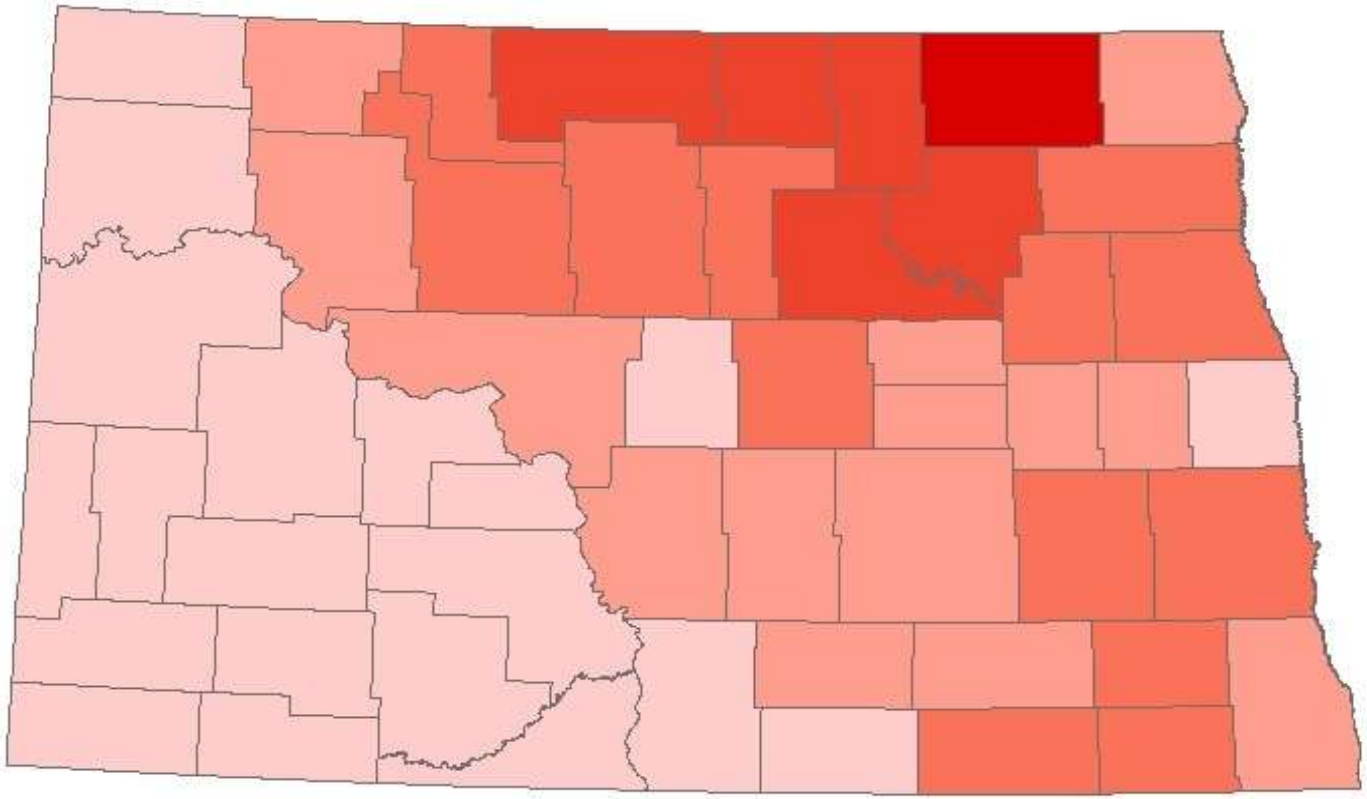
North Dakota Potatoes Harvested in 1950
In Tons



North Dakota Potatoes Harvested in 2006
In Tons



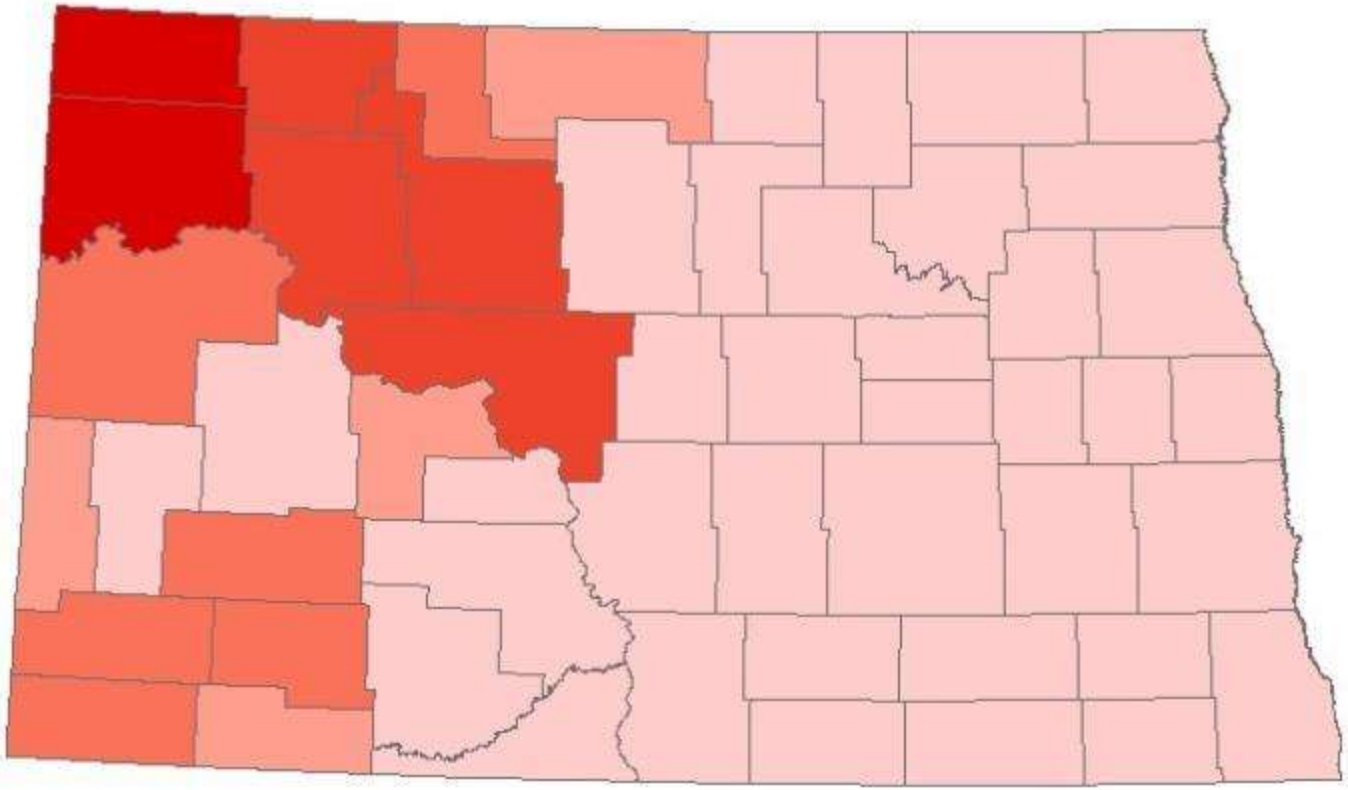
North Dakota Durum Wheat Production in Bushels -- 1950



Legend

- 0 - 155,000 bushels
- 155,001 - 461,000 bushels
- 461,001 - 1,721,000 bushels
- 1,721,001 - 3,877,000 bushels
- 3,877,001 - 6,900,000 bushels

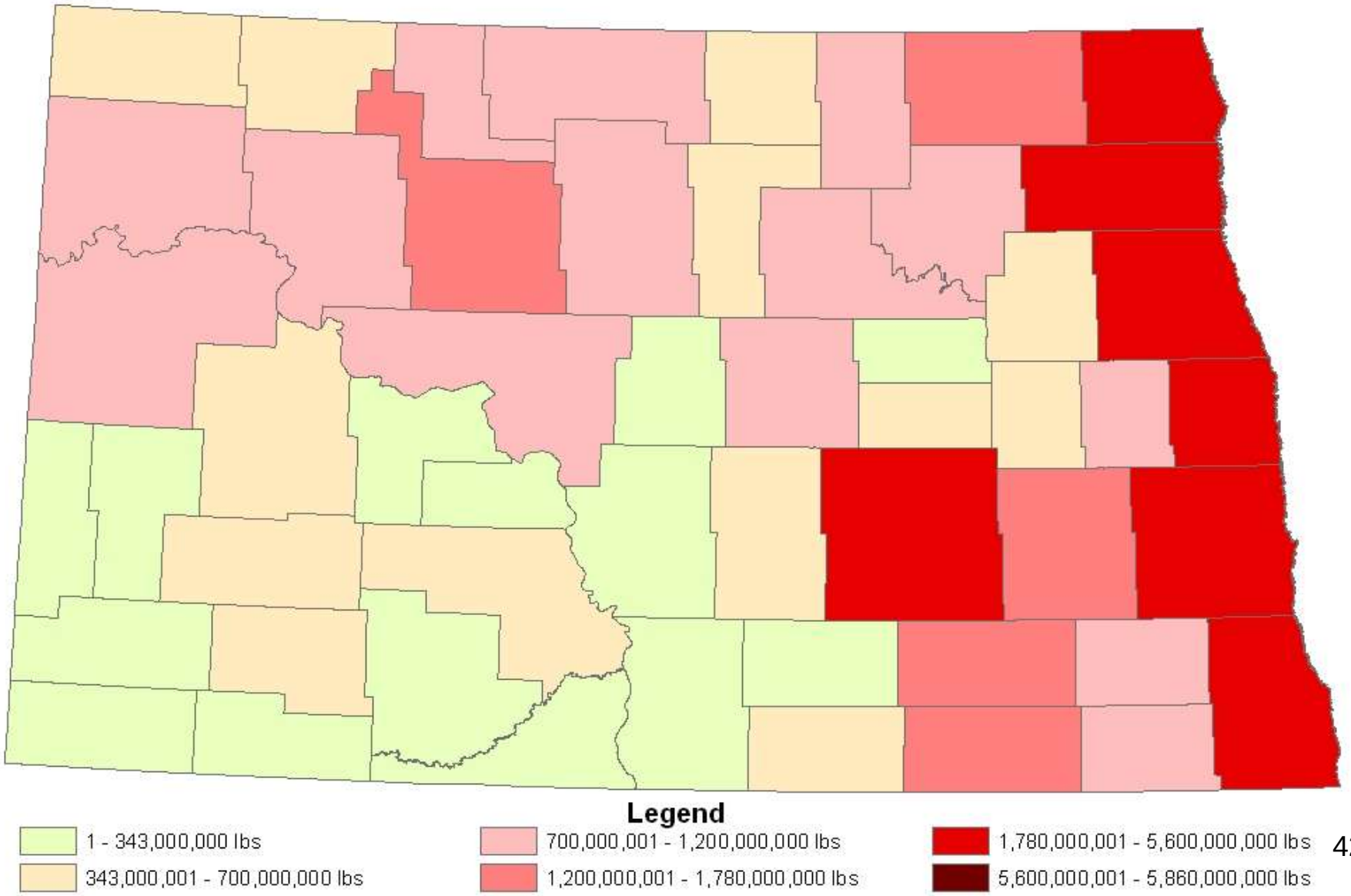
North Dakota Durum Wheat Production in Bushels -- 2006



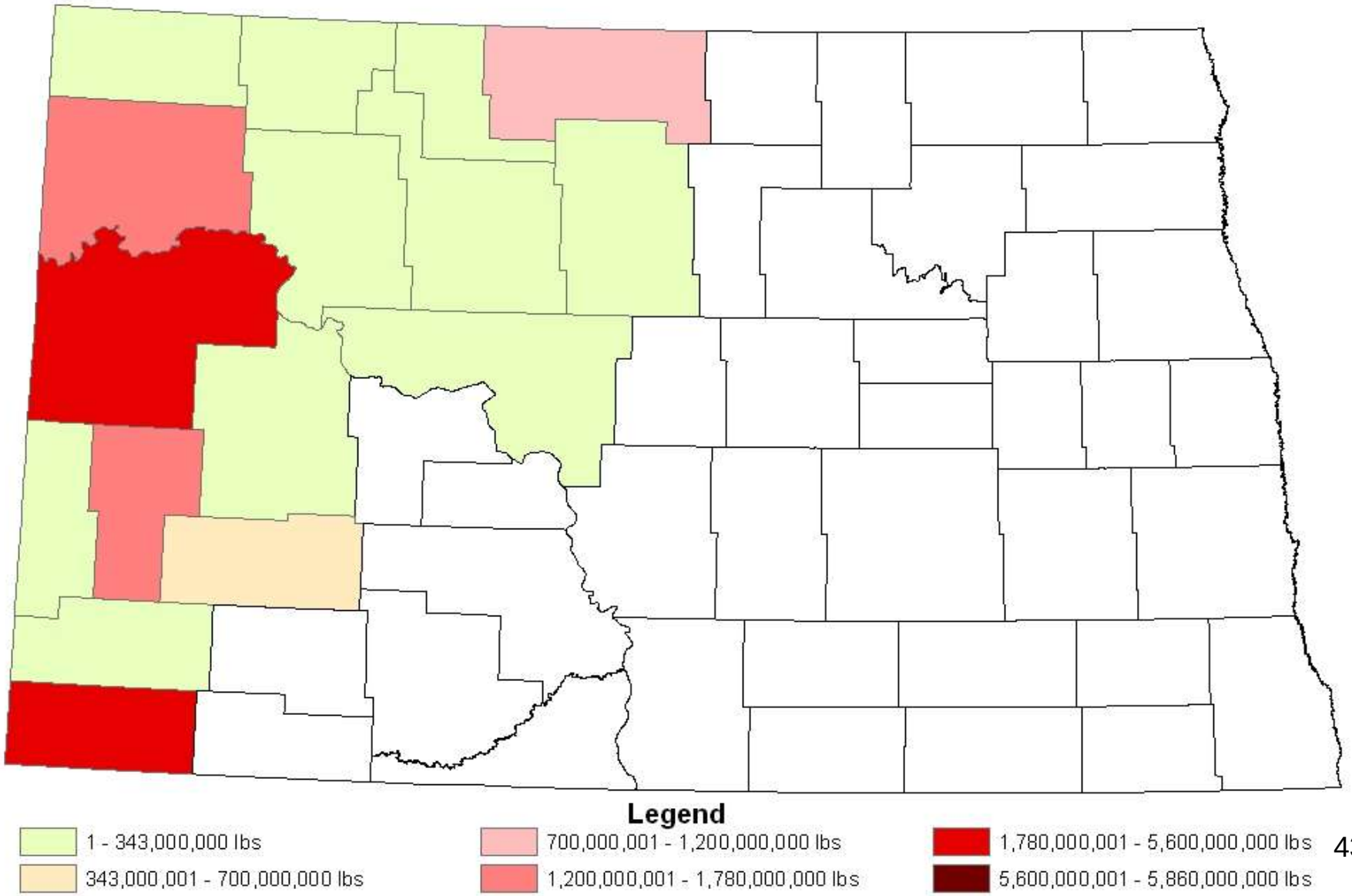
Average Yield Statewide in Pounds for 2006 Per Harvested Acre of Land

Wheat	**1,860**
Corn	**6,216**
Potatoes	**26,000**
Sugar Beets	**52,000**

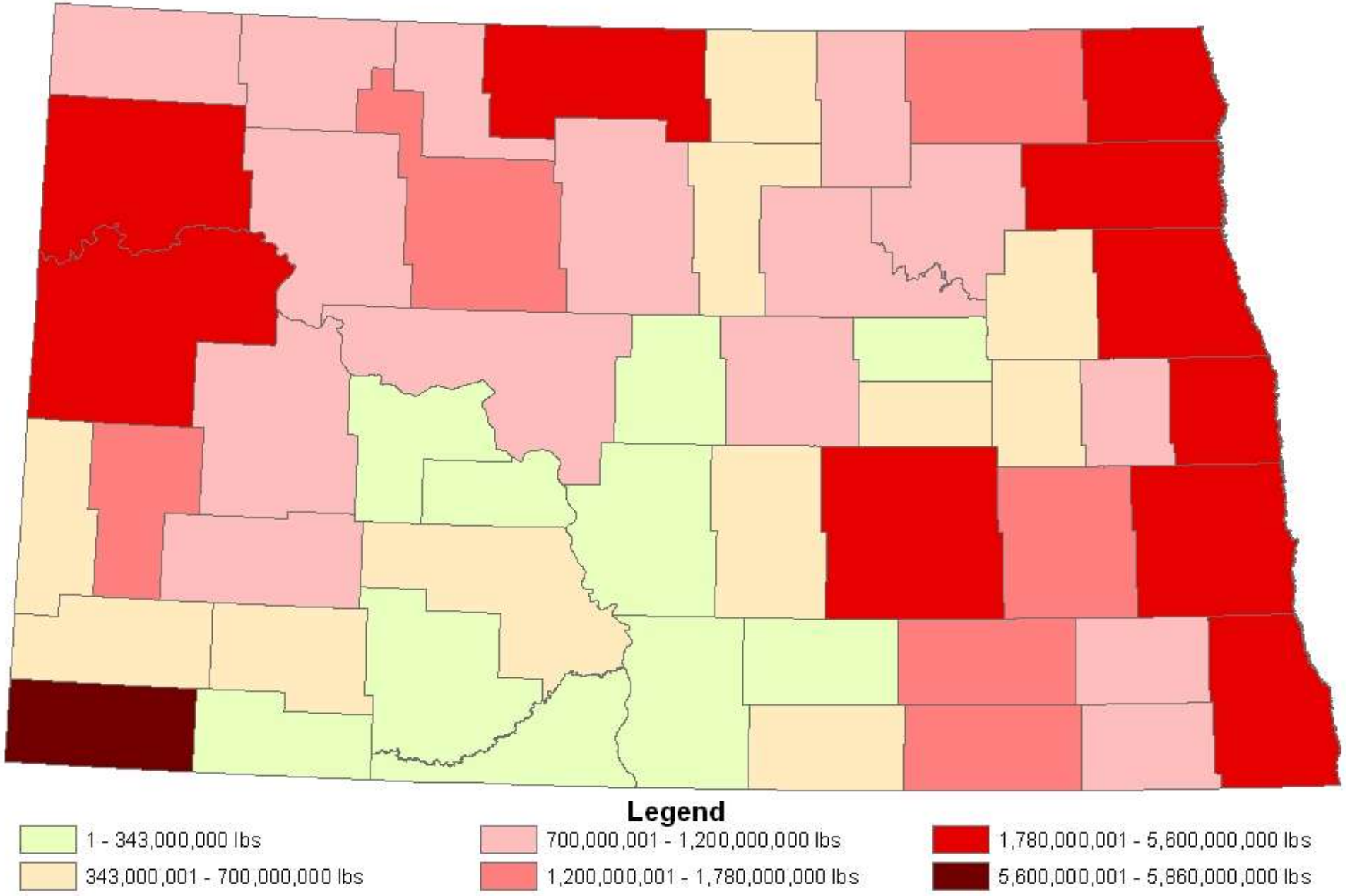
Crops and Livestock Production in Pounds -- 2006



Oil Production in Pounds -- 2006

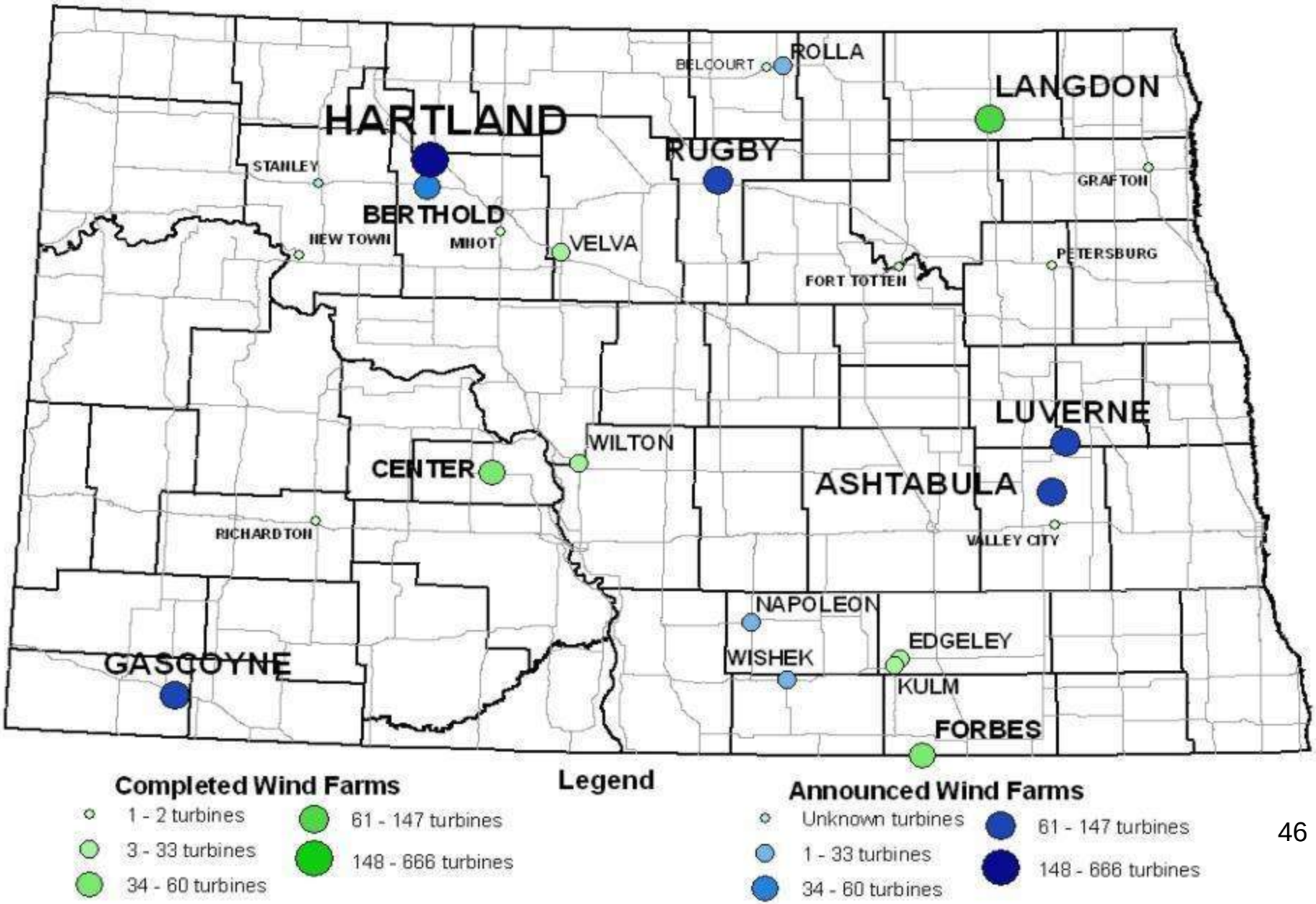


Combined Agricultural, Livestock and Oil Production in Pounds 2006



New & Changing Industries

North Dakota Wind Farm Locations

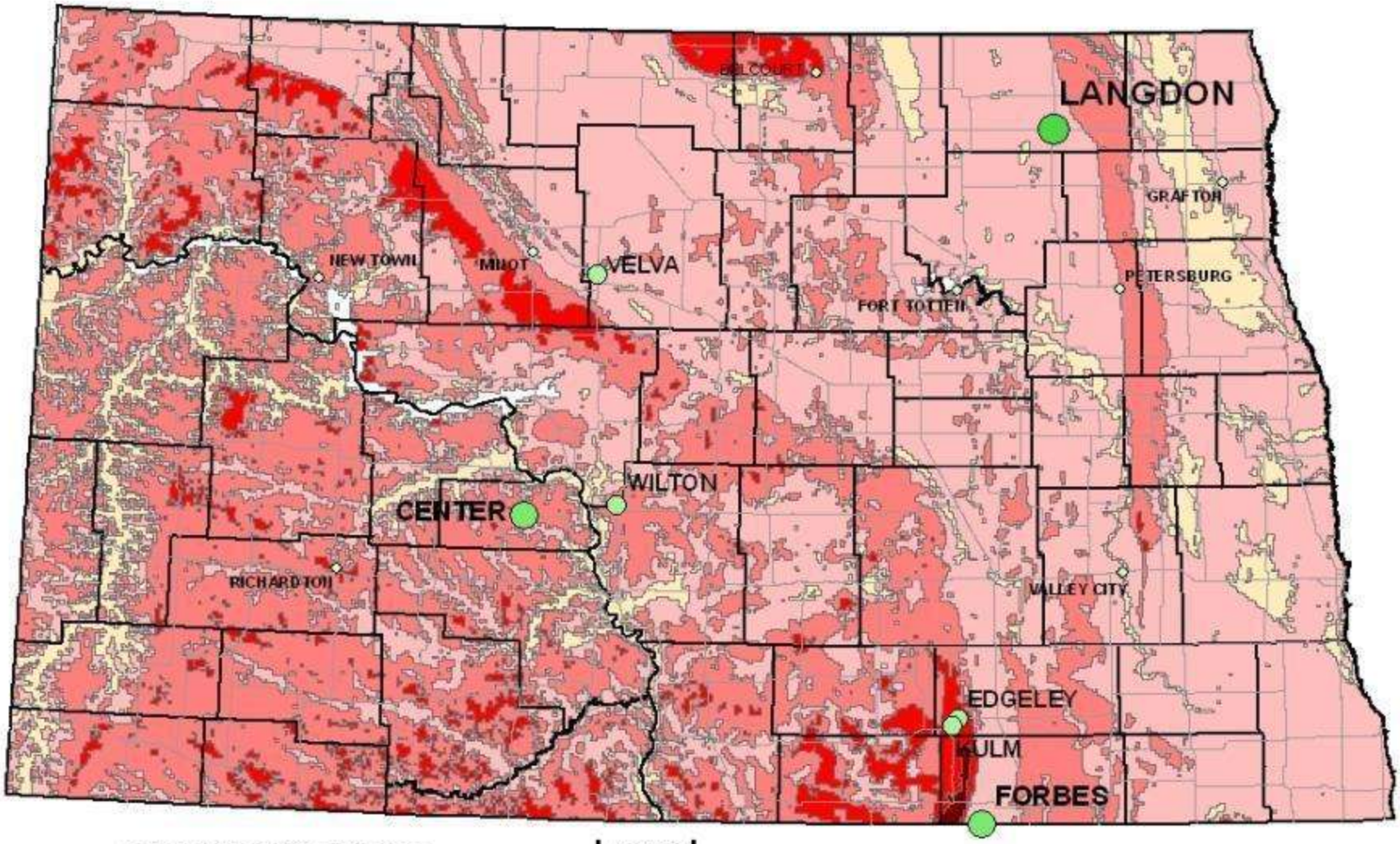


Equipment	Pounds	L x W x H (ft)	Associated Truck Loads
Nacelle	150,000-218,000	36.5-120.6 x 11.5-12.6 x 12.3-14.6	One to Two 19 Axle Trucks per nacelle with permits, restrictions and Escorts
Hub	57,099	14 x 14 x 9.9	One legal lowboy load – just oversized
Spinner	1,103	9.4 x 9.4 x 12.6	One legal lowboy load – just oversized
Blades (3 each)	26,456-80,000	131-170 x 7.2-8.6 x 12.2-14.6	Two to Three specialized blade trailer loads with permits and escorts
Tower Base design "E"	84,000-232,000	36-177 x 12.6-15.1 x 13-15.11	One Schnable trailer load with permits and escorts
Tower Mid design "E"	59,250-176,000	72.3-156.5 x 11.6-14.2 x 10.10-15.6	One Schnable trailer load with permits and escorts
Tower Top design "E"	44,500-134,000	78.6-124 x 7.8-11.6 x 7.8-14.2	One extended Schnable trailer load permits and escorts
Power Unit	17,639	12.5 x 10 x 11.4	One combined for a legal lowboy load – no restrictions
Container	39,683	40	One legal load
Ancillary Equip	228,496		Two combined permit and legal loads
Generator Power Unit	5,512	8.3 x 6.6 x 7.4	One combined for a legal lowboy load – no restrictions
TOTALS	**766,650-1,349,532**		**8-10 Permitted and escorted loads 5 legal loads 13-15 total truck loads per wind tower**

Source: ND Highway Patrol

North Dakota Wind Farm Locations

Wind Energy Classification Resource Map provided by U.S. Department of Energy



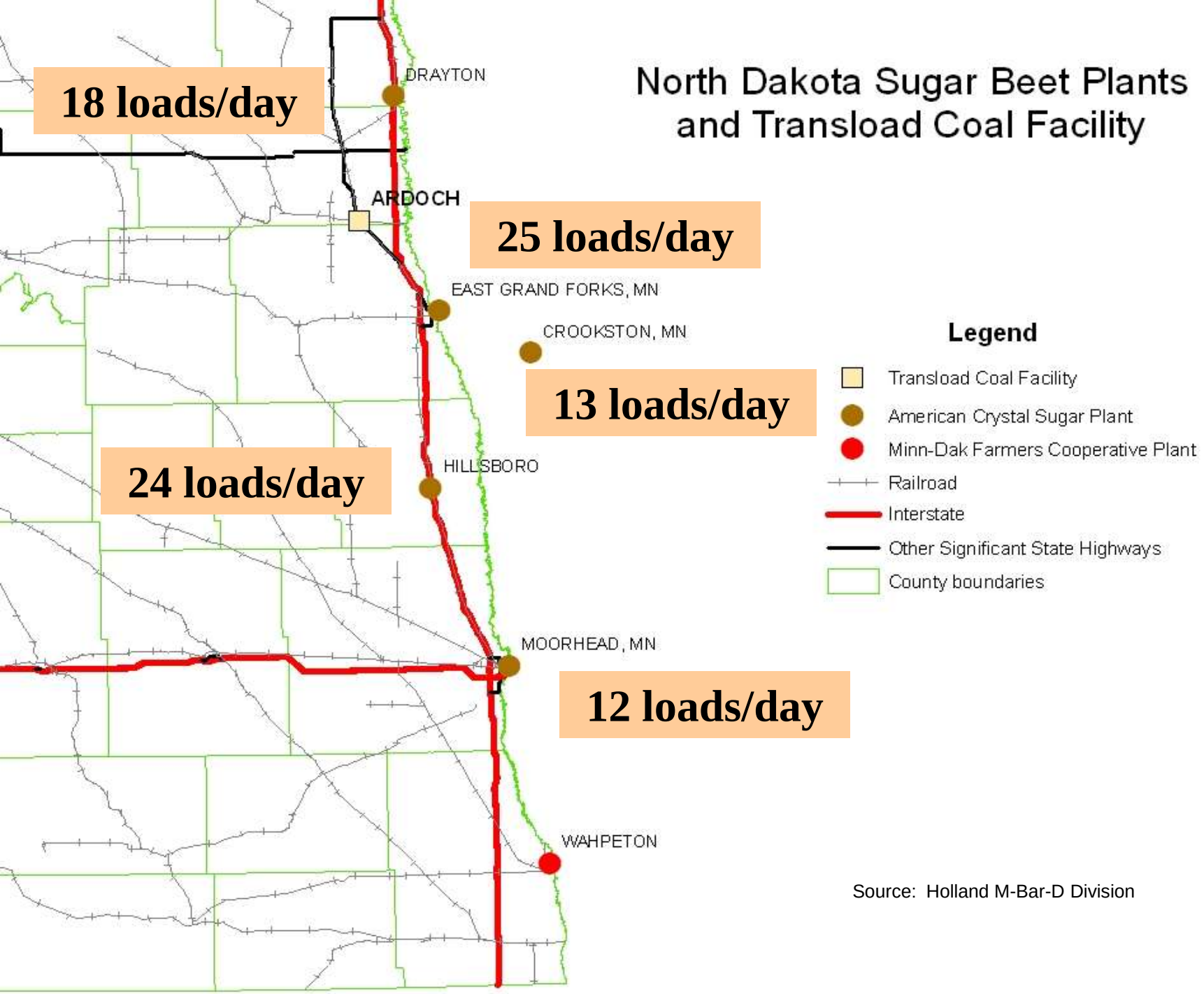
Completed Wind Farms

- 1 - 2 turbines
- 3 - 33 turbines
- 34 - 60 turbines
- 61 - 147 turbines
- 148 - 666 turbines

Legend

Poor	Below 12.5 mph		Good	15.7 - 16.8 mph
Marginal	12.5 -14.3 mph		Excellent	16.8 - 17.9 mph
Fair	14.3 - 15.7 mph		Outstanding	17.9 - 19.7 mph


Ardoch Coal Transload Site
720,000 tons
24/7
August to May
Source: Holland M-Bar-D Division
RailPictures.Net - Image Copyright © Chris Paulhamus



Source: Holland M-Bar-D Division

1950

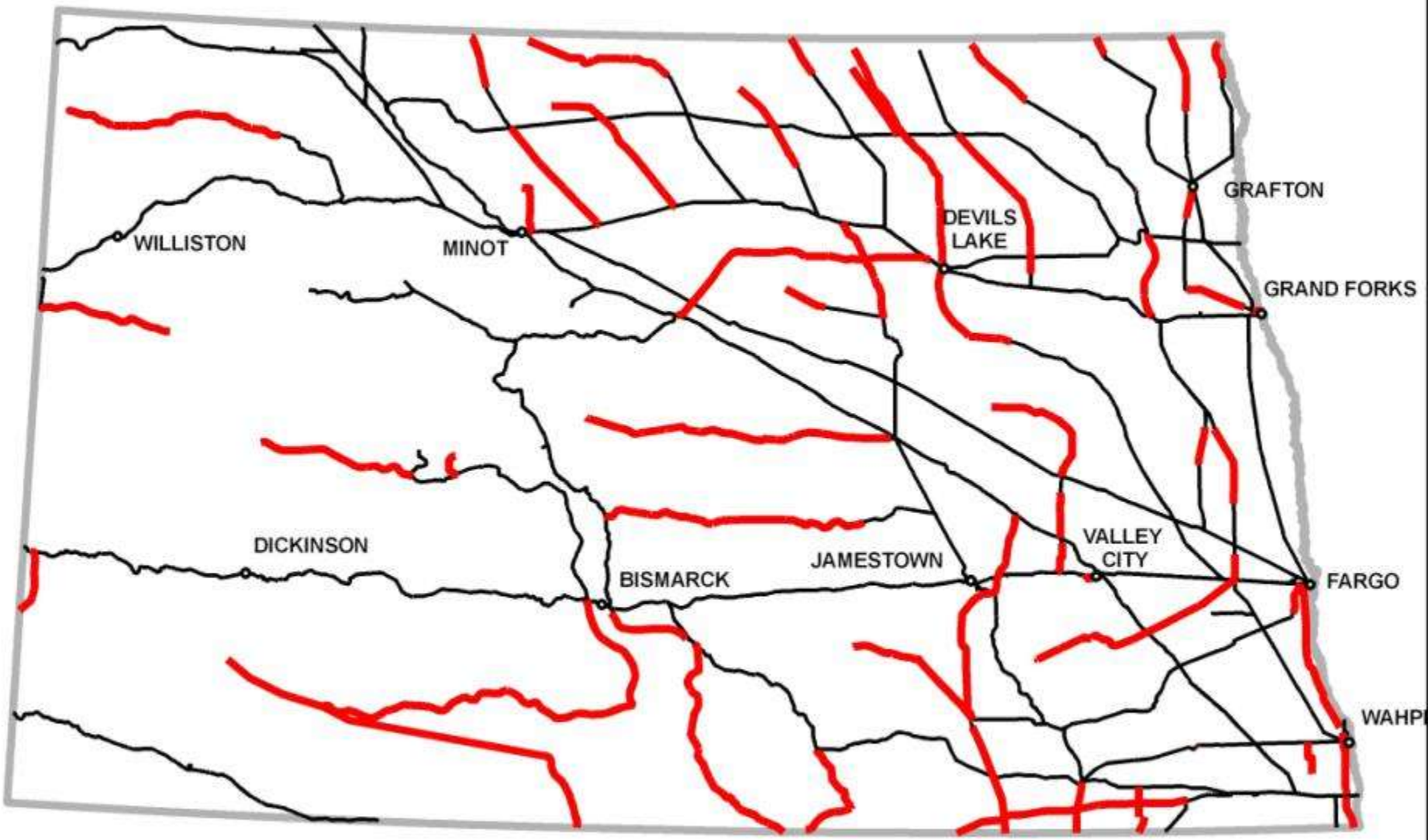
Five Class 1 Railroads
5,243 Miles

2008

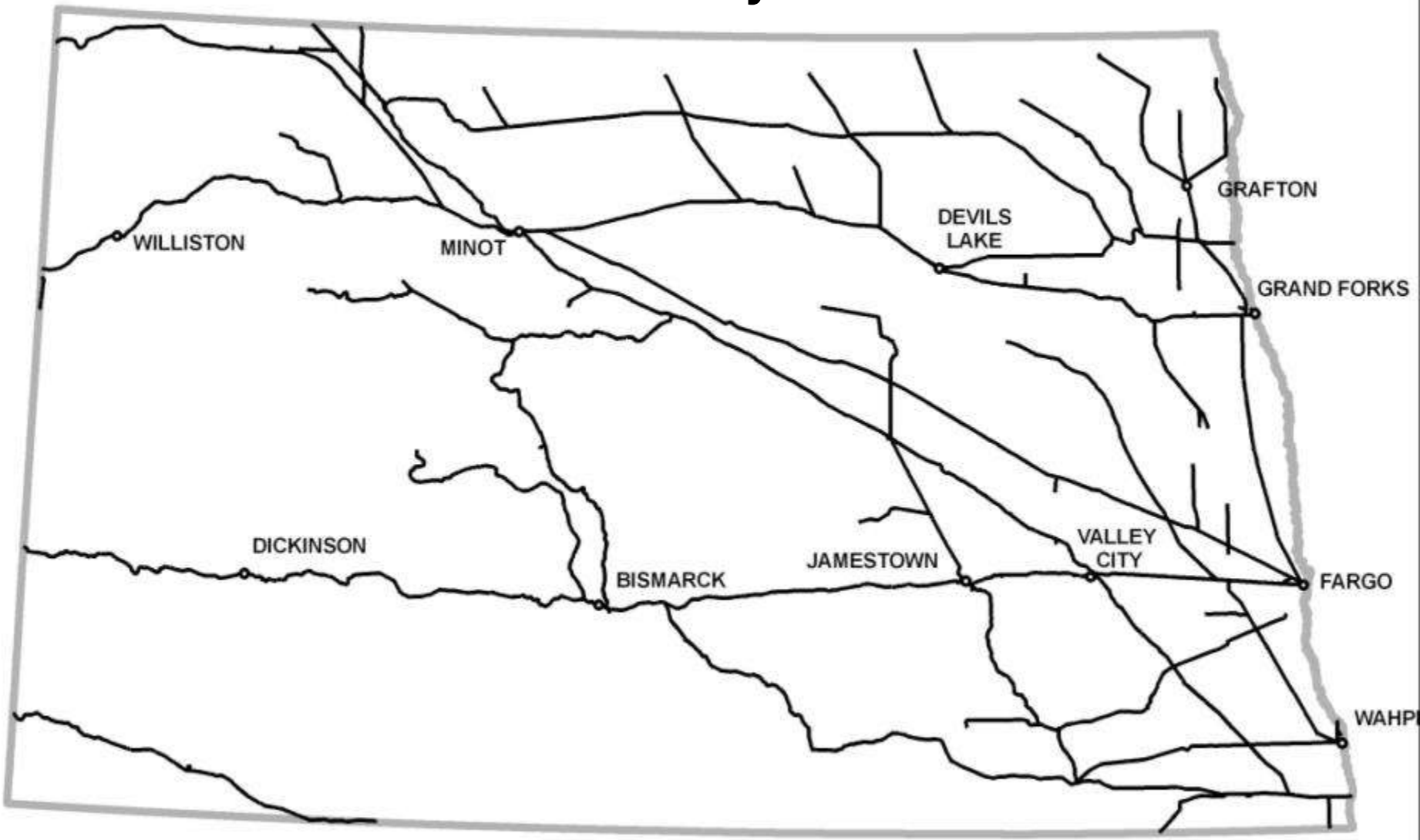
Two Class 1 Railroads
Five Shortlines
3,609 Miles

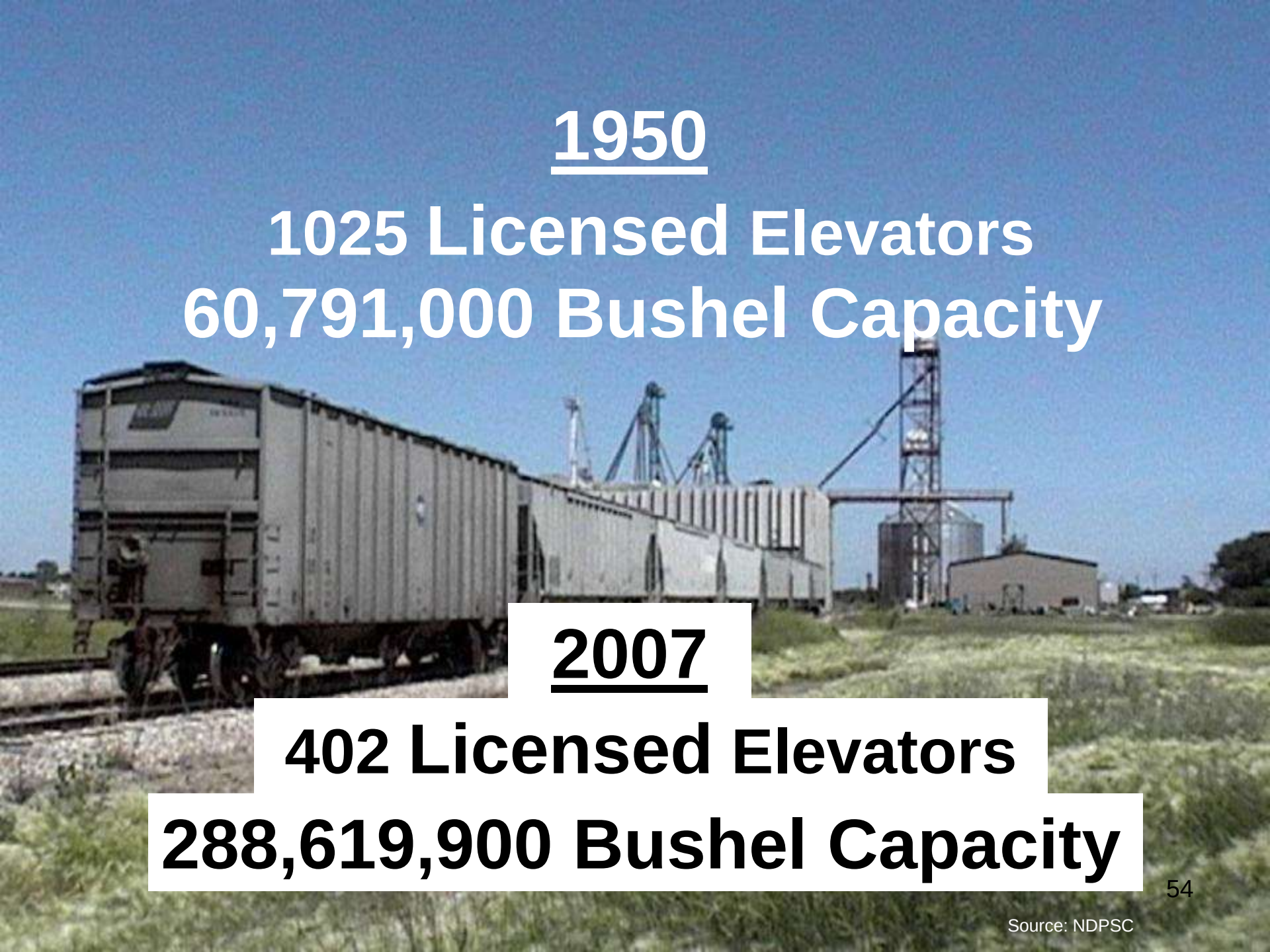
Source: NDPSC

1950 to 2008 Branchline Abandonments



2008 Rail System





1950

1025 Licensed Elevators

60,791,000 Bushel Capacity

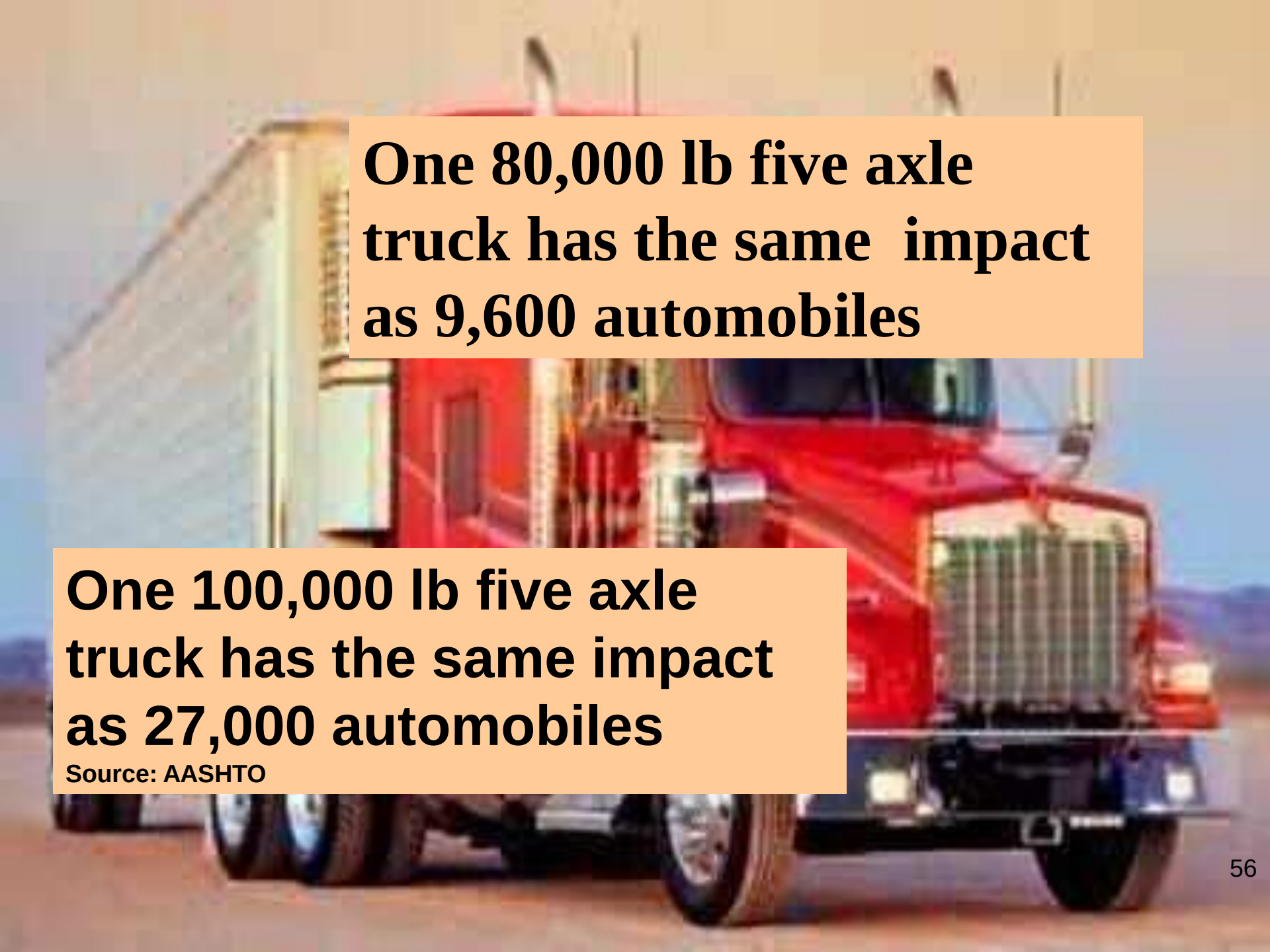
2007

402 Licensed Elevators

288,619,900 Bushel Capacity

Source: NDPSC


1950
2,102 Centerline Miles of
Paved State Highways
73,280 GVW
2,838 Miles of Paved County Highways
2008
7,384 Centerline Miles of
Paved State Highways
105,500 GVW
6,814 Miles of Paved County Highways
Source: NDDOT



One 80,000 lb five axle truck has the same impact as 9,600 automobiles

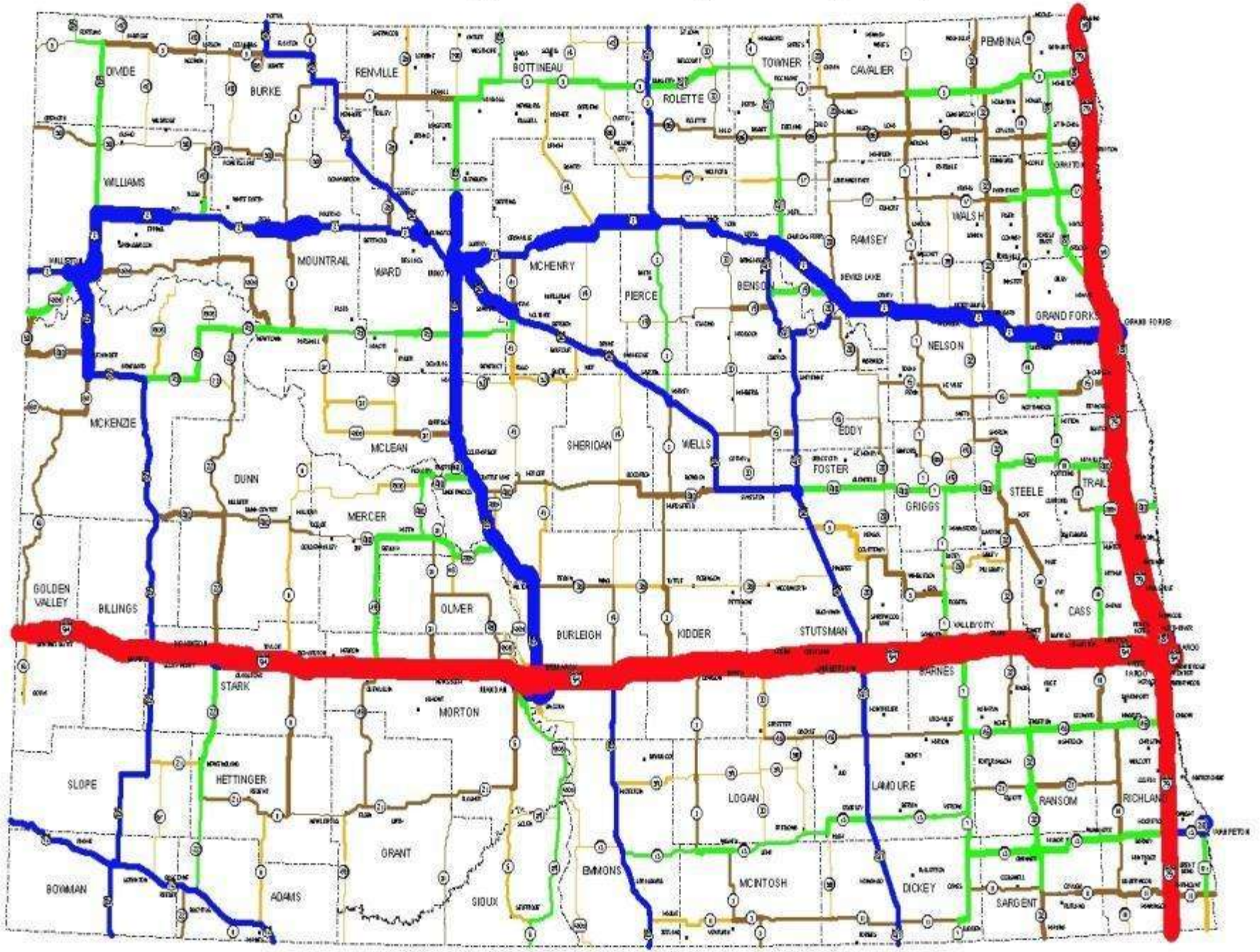
One 100,000 lb five axle truck has the same impact as 27,000 automobiles

Source: AASHTO

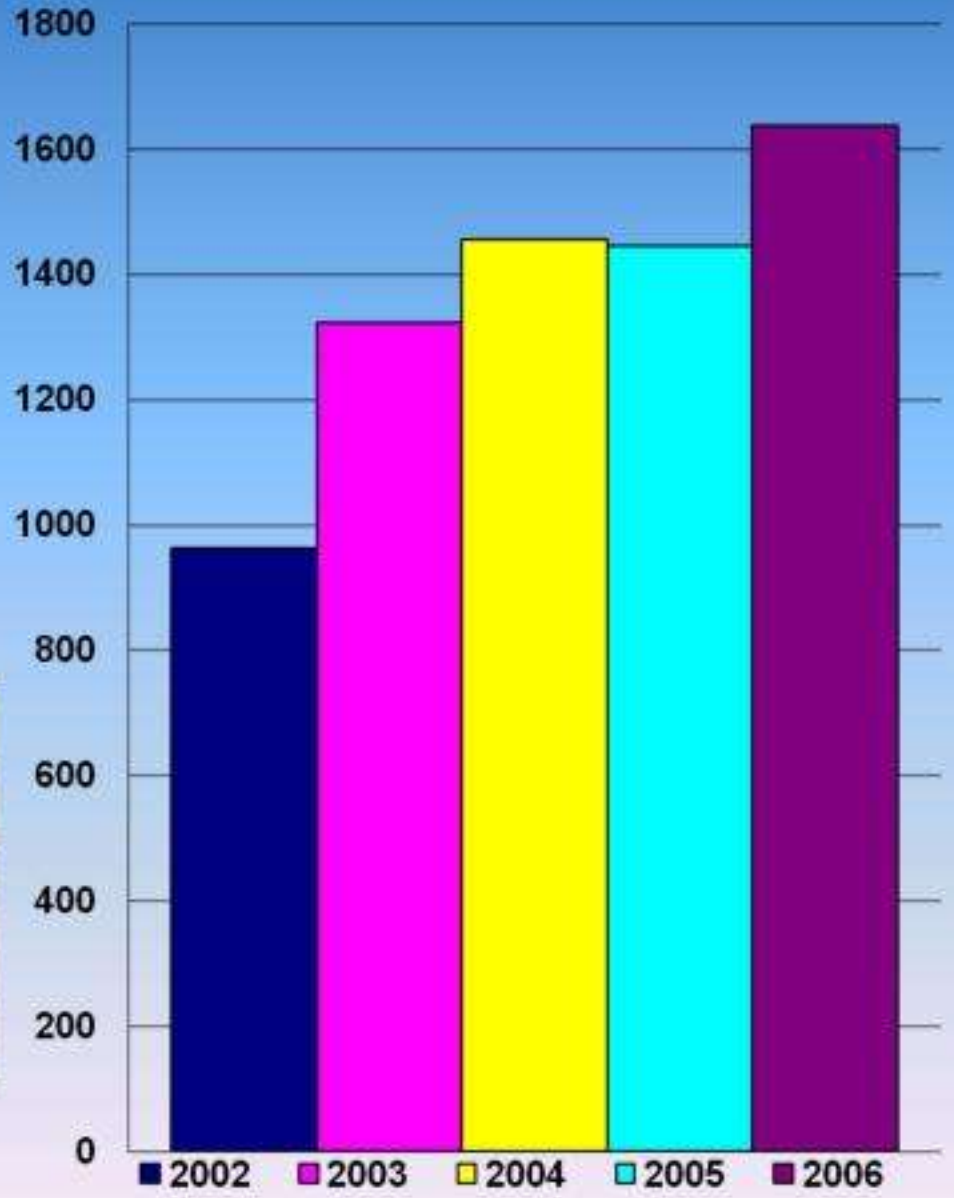
Current Annual Estimated Truckloads by Economic Activity

Oil & Gas Development	1,669,700
Agriculture	1,300,000
Manufacturing	820,000
Total	3,789,700

Truck Average Annual Daily Traffic (2006)



State Highway Mileage Distress



NDDOT will continue to work cooperatively and collaboratively with local and tribal governmental entities, the legislature, congressional delegation, and the private sector to the best of our ability to provide an integrated transportation system that safely moves people and goods.

NDDOT
North Dakota
Department of Transportation

Thank you to the following for their invaluable assistance

- North Dakota Oil and Gas Division
- Amerada Hess Corporation
- Holland M-Bar-D Division
- S&S Sales, Inc.
- Power Fuels
- Belle Fourche Pipeline
- Enbridge Pipeline Inc.
- Tesoro Corporation
- Upper Great Plains Transportation Institute
- North Dakota Department of Commerce
- North Dakota Highway Patrol
- North Dakota State Water Commission
- Bobcat Company
- Anderson Trucking Service, Inc.
- Chris Paulhamus

Roadway & Bridge Investment Needs in North Dakota

Upper Great Plains Transportation Institute

North Dakota State University - Spring 2008

Full Research Results at www.ugpti.org

Study Overview

- Estimate funding needs to maintain existing roadways and bridges
- Update studies done earlier in this decade
- Does not include normal maintenance activities (mowing, snow removal, signing, etc.)
- Maintain existing systems – no expansion or major upgrades

Road Authorities

- NDDOT
- Counties
- Urban Centers (13 largest cities)
- Smaller Cities
- Townships

Annual State Roadway and Bridge Investment Needs ($000)

Highway Performance Classification	$ 2008/Year
Interstate	$43,490
Interregional	$49,636
State Corridor	$41,212
District Corridor	$55,613
District Collector	$26,630
Total	$216,583

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

Paved County Roads Construction and Maintenance

- Based on survey; estimated expenditures for next 10 years
- 42 counties responded; survey findings expanded to state using miles of road
- Estimated 10-year construction cost = $306.1 million
- Estimated 10-year maintenance cost = $398 million
- Extrapolation = $1.408 billion for 20 years

County Roadway & Bridge Needs ($000)

	$ 2008/Year		
Paved Roads	$30,610		
Gravel Roads	$69,680		
Maintenance	$39,800		
Bridges	$19,815		
Total	$159,905		

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

Highway Funding Needs of 13 Urban Centers

- Estimated based on long range plans and past survey responses from “Urban Street and County Road Funding Needs Assessment for 13 North Dakota Cities and 53 North Dakota Counties”
- Amount of detail varies from city to city
- Each plan includes lists of expected improvements for next 15 to 20 years
- Some plans include expected maintenance costs
- When maintenance costs could not be determined, the survey results from the 2000 study were used and indexed
- Estimated funding need in 2008 dollars for all 13 cities is $70.7 million

Estimated Funding Needs Townships and Small Cities ($000)

- Update of 2002 study

	$ 2008/Year		
Townships	$36,250		
Small Cities	$29,725		

*Figures reflect improvement needs in 2008 dollars if inflation trend continues into the future

Estimated Roadway and Bridge Funding Needs (Millions / Year)		
Jurisdiction/Agency	**Highways**	**Bridges**
State	$216.6	$26.3
County	$140.0	$19.8
Small Cities	$29.7	*
Townships	$36.3	*
Urban Centers	$70.7	*
Total	$493.4	$46.1
Total Highways & Bridges		$539.5
*Not estimated		