

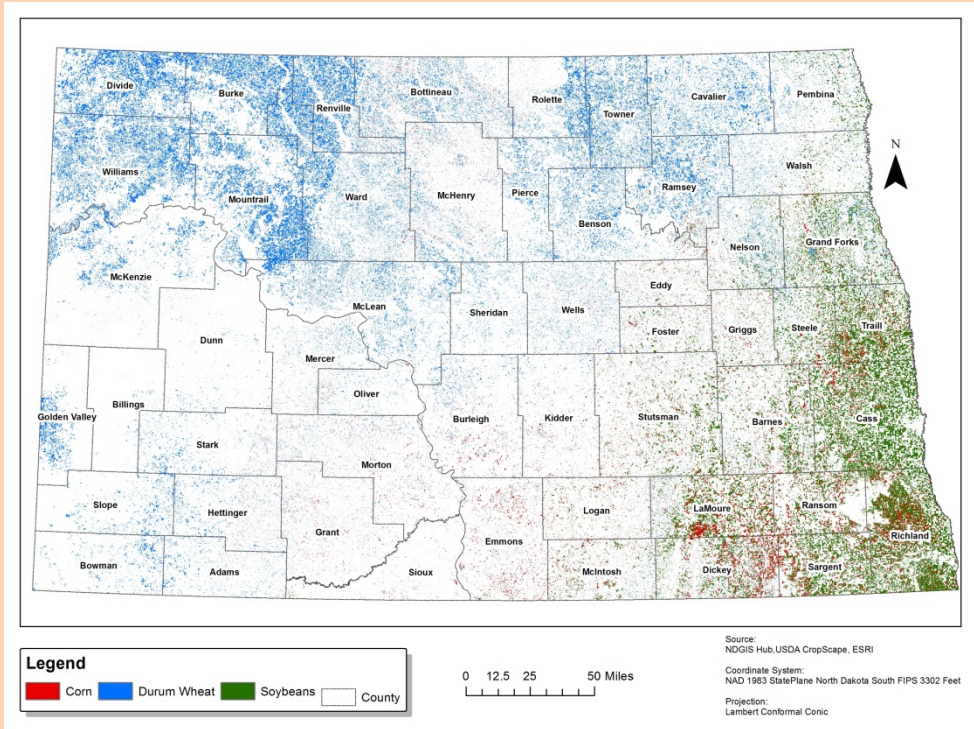
# Freight Truck Traffic Demand Forecasting for Grain Transportation

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**Abstract:** Storing grain beyond harvest has been a common practice in North Dakota. With the oil boom in the region since 2005, the land use patterns have started to show changes. The farmers current interest is in the farmer storage based on the current elevator system. This study investigates the impact of changes of geographic locations and capacity of the existing facilities using scenario analysis: shuttle only and AS-IS considering all existing facilities without any changes for three agriculture commodities: Corn, Wheat and Soybean. The study adopts traditional four-step travel demand model including trip generation, distribution, modal split, and trip assignment for elevators and processing facilities and township-based farmlands as trip generators. The output of the study can be used by grain producing farmers, distributors, logistics, and transportation planners to identify potential locations for grain storage to minimize the growing costs and increase utilization associated with transportation.

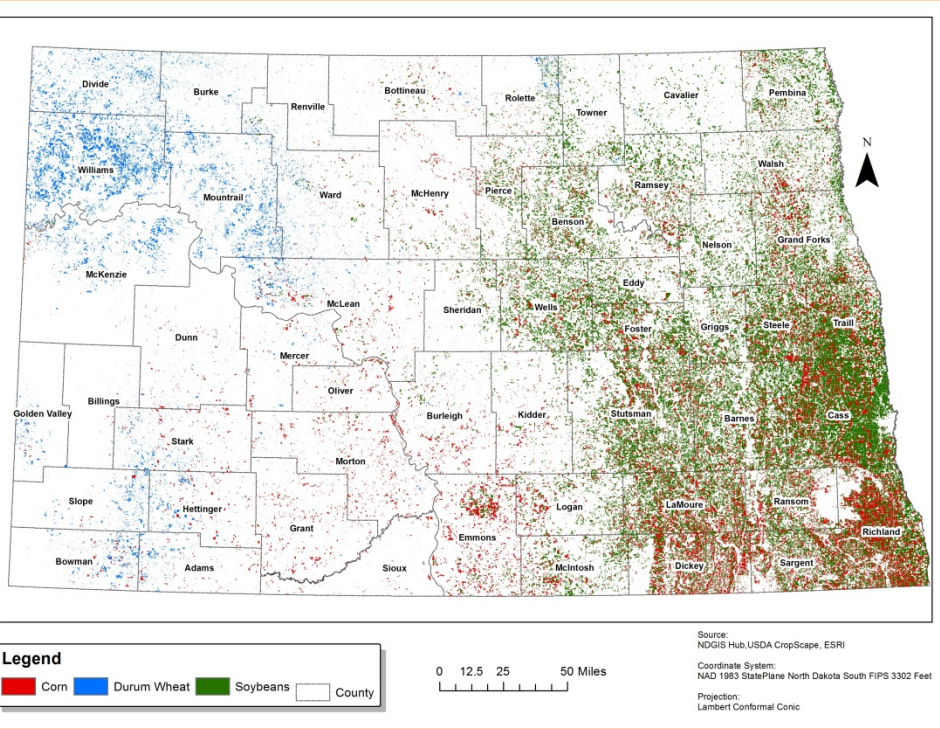
## Land Use

Year 2000



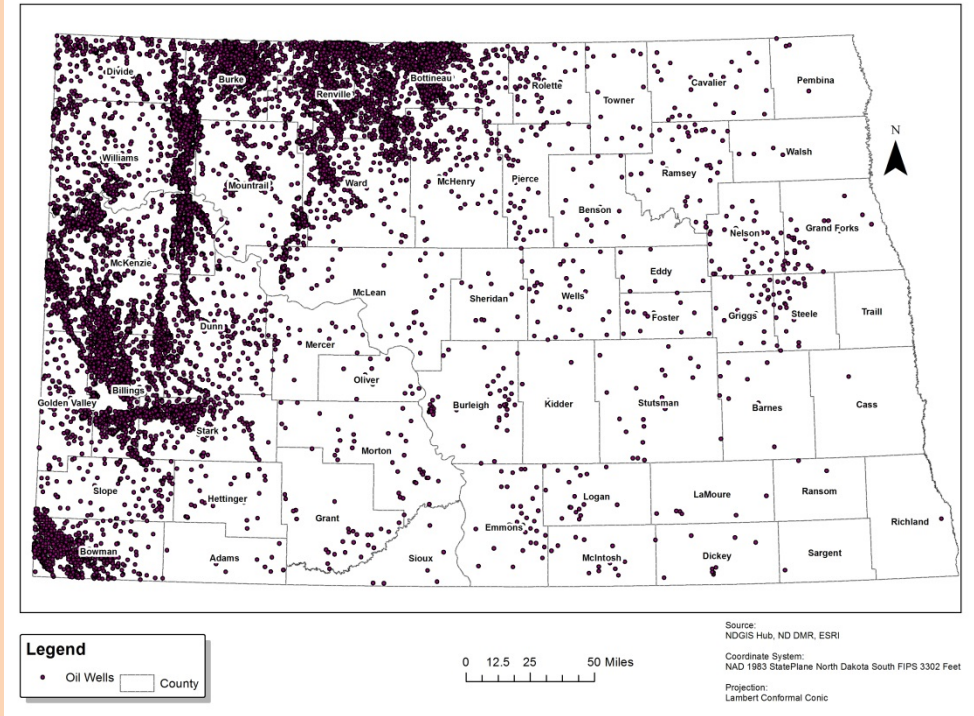
## Land Use

Year 2011



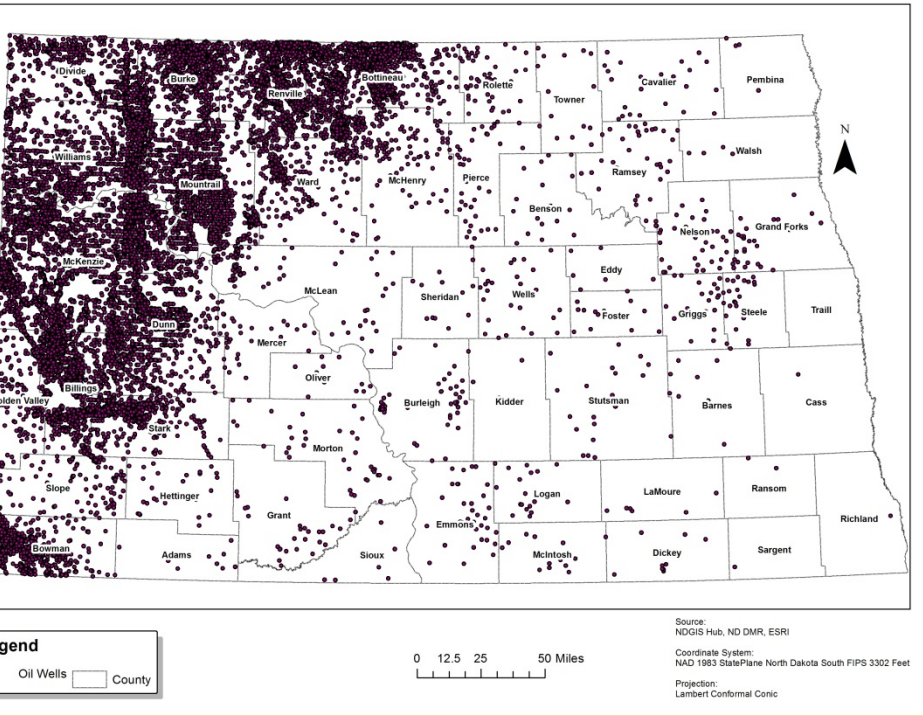
## Oil Wells

Year 2000

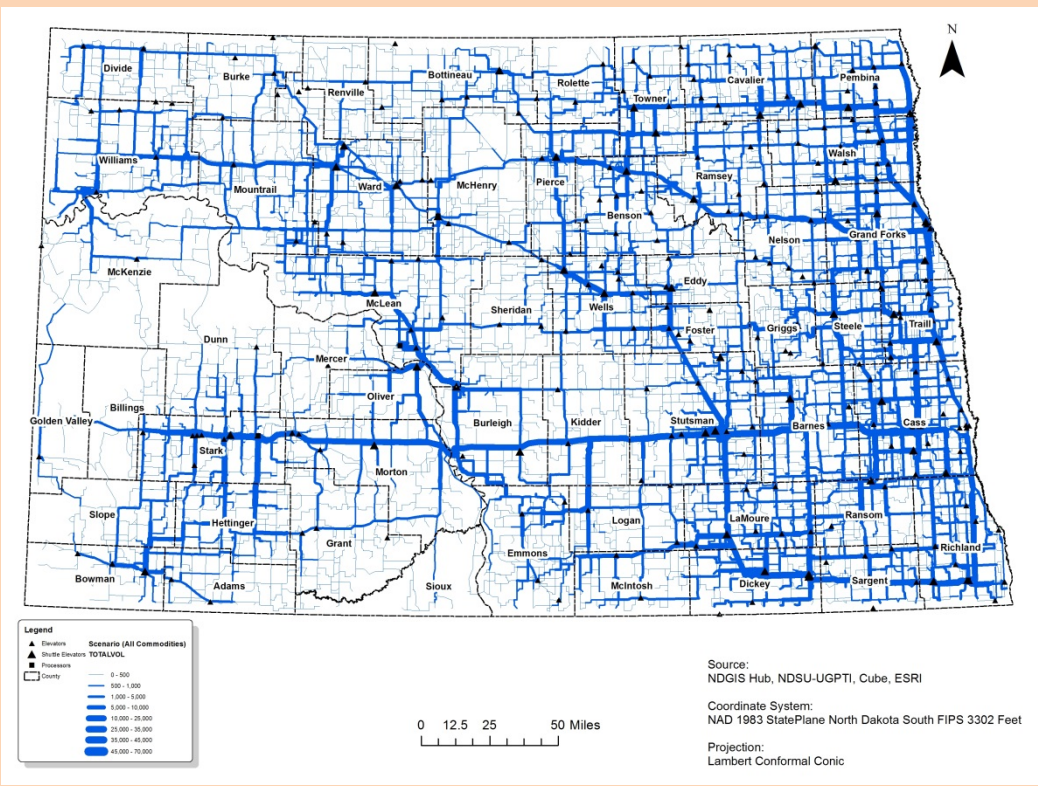


## Oil Wells

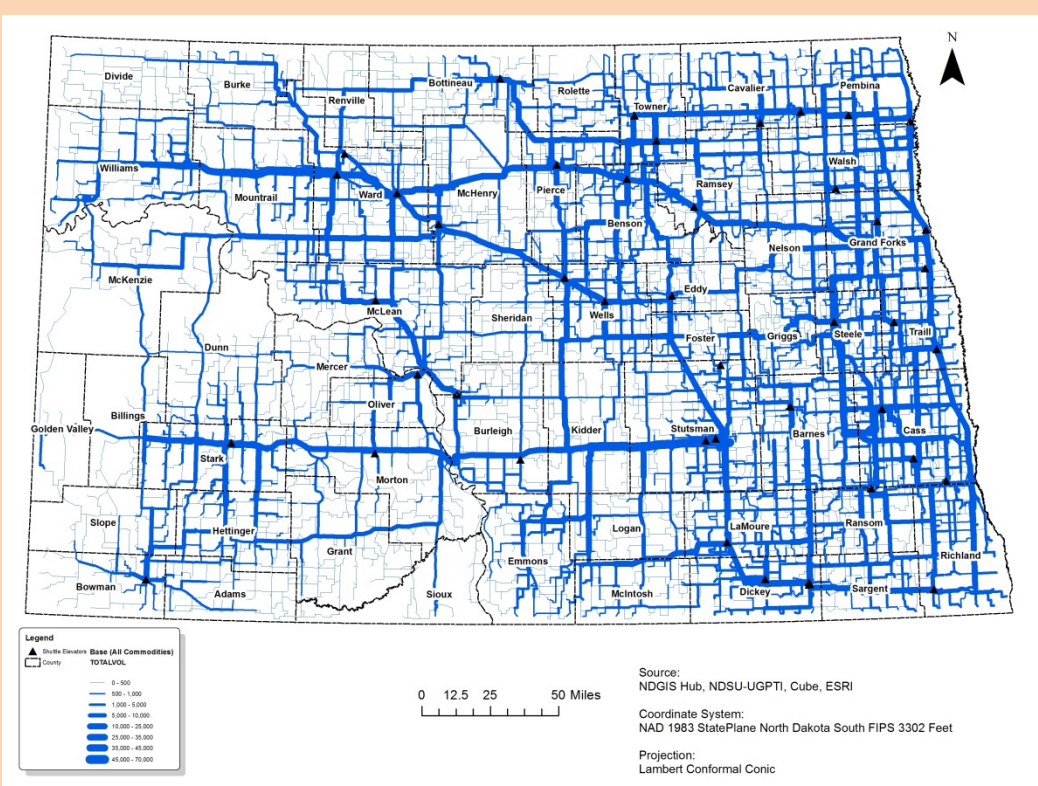
Year 2011



Annual trip volumes generated by corn, wheat, and soybeans (AS-IS: a scenario of shipments to elevators, shuttle elevators, and processing centers)



Annual trip volumes generated by corn, wheat, and soybeans (Shuttle: A scenario of shipments only to shuttle elevators).



## Result:

Vehicle Hours Travelled (VHT) and Vehicle Miles Travelled (VMT), Transportation cost

	Vehicle Hours Travelled				Vehicle Miles Travelled				Total Cost (K\$)
	Shuttle	AS-IS	Difference	Cost (K\$)	Shuttle	AS-IS	Difference	Cost (K\$)	
Surface type									
Graded & Drained	9	7	2.2	0.51	312	234	77.6	37.19	37.7
Gravel	478	348	129.8	29.85	24735	18021	6713.8	3215.90	3245.75
Paved	400	290	109.9	25.28	23897	17304	6592.8	3157.94	3183.22
Trail	6	4	2.4	0.54	96	61	35.4	16.98	17.52
Unimproved	1	1	0.1	0.03	11	10	1.4	0.66	0.69
Total	894	649	244.42	56.22	49,051	35,630	13,421.01	6,428.66	6484.88

## Average Travel Time

Commodity	Shuttle (minutes)	AS-IS (minutes)
Corn	69.75	41.21
Wheat	63.22	35.92
Soybean	37.15	30.75