A Method for Estimating Statewide Rural and Small Urban Transit Needs and Investment Priorities

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Objectives

Identify transit needs and gaps

Prioritize investment needs for statewide transit planning

Collect better data for demand-response transit level of service

Estimate costs of needed improvements

Project future need for services based on projected population growth

Methods

- Conducted statewide study of North Dakota
- Conducted survey of transit agencies
- Compared current levels of service to benchmark values
- Calculated Mobility Needs Index
- Analyzed different scenarios and calculated the increase in service and funding needed

Survey of Transit Agencies

Data needs

- Span of service data for rural agencies
- Geographic coverage
- Type of service provided
- Advance reservation requirements

Data collection

- Survey sent to all transit agencies in North Dakota
- Online survey tool designed to collect detailed service data

Agencies also asked opinions on

- Need for new services
- Capacity to meet service requests
- Needed facility upgrades
- Staffing Needs

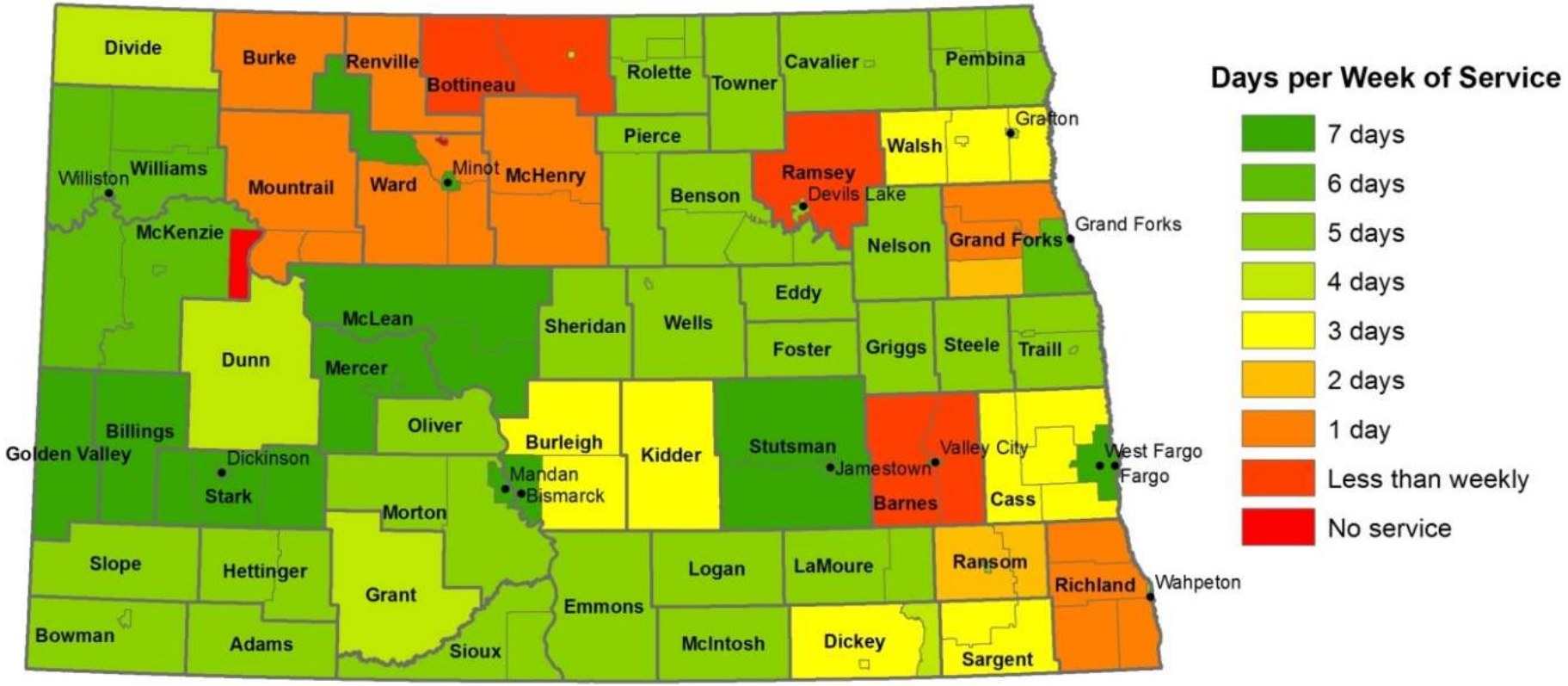
Transit Level of Service

Framework for Measuring Service Span Level of Service

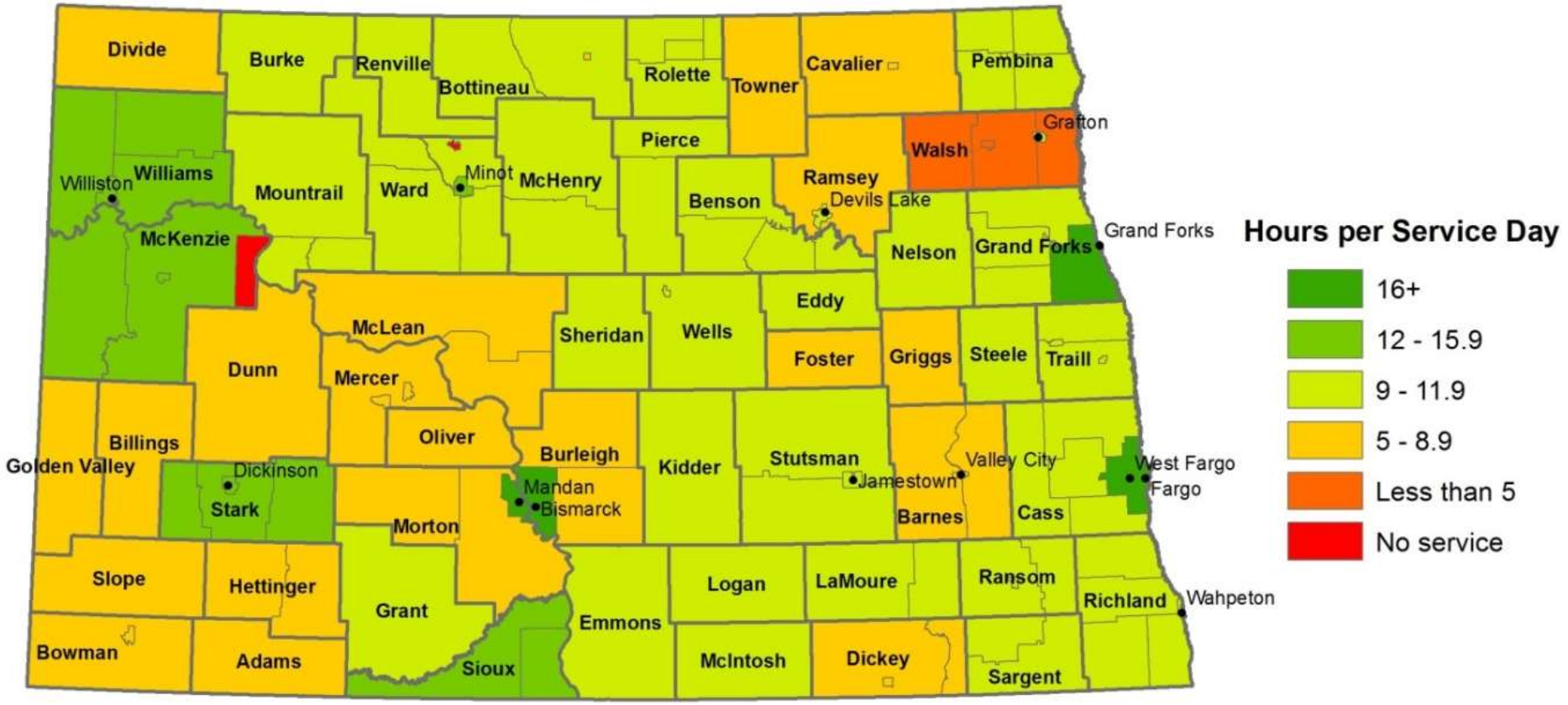
Hours Per Day	Days Per Week						
	6-7	5	3-4	2	1	0.5	<0.5
≥16.0	LOS 1	LOS 2	LOS 4	LOS 5	LOS 6	LOS 7	LOS 8
12.0-15.9	LOS 2	LOS 3	LOS 4	LOS 5	LOS 6	LOS 7	LOS 8
9.0-11.9	LOS 3	LOS 4	LOS 4	LOS 6	LOS 6	LOS 7	LOS 8
5.0-8.9	LOS 5	LOS 5	LOS 5	LOS 6	LOS 7	LOS 7	LOS 8
<5	LOS 6	LOS 6	LOS 6	LOS 7	LOS 7	LOS 8	LOS 8

Source: Transit Capacity and Quality of Service Manual, 2nd, 3rd editions

Transit Level of Service



Transit Level of Service



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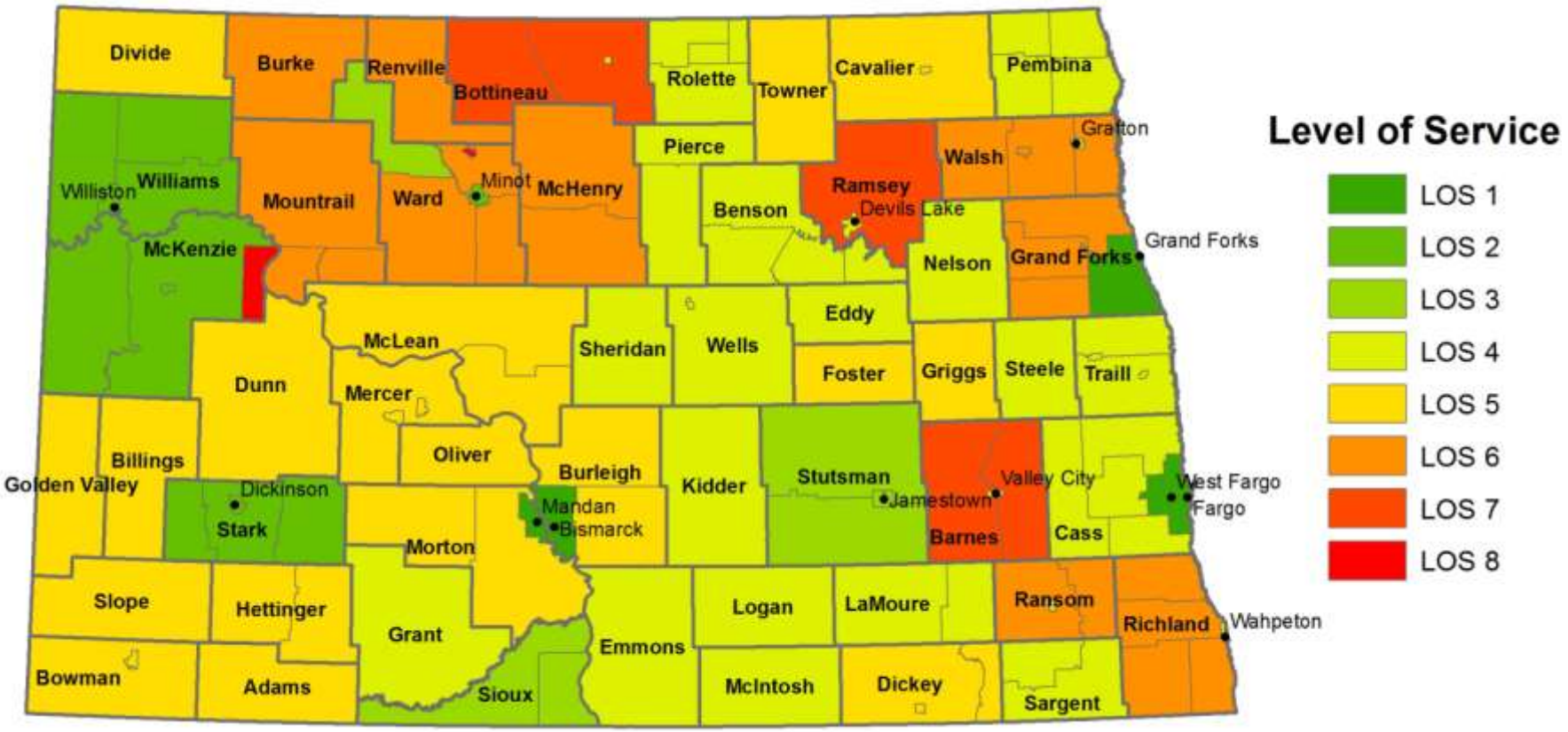
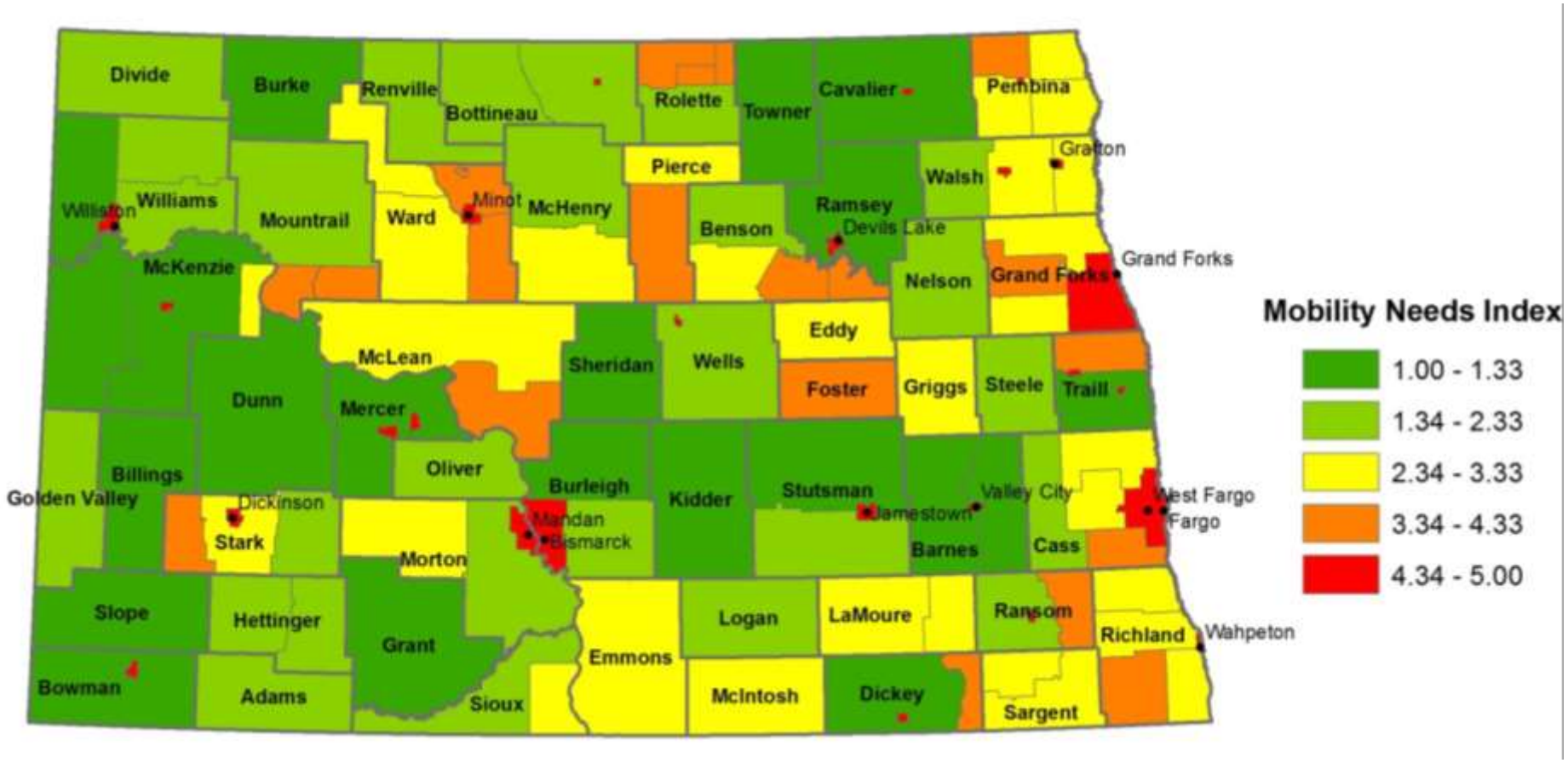


Mobility Needs Index

- Index based on population densities of
  - Older adults aged 65 or older
  - People with a disability
  - Population below the poverty line
- Scale of 1 to 5, with higher number indicating greater mobility needs

Mobility Needs Index

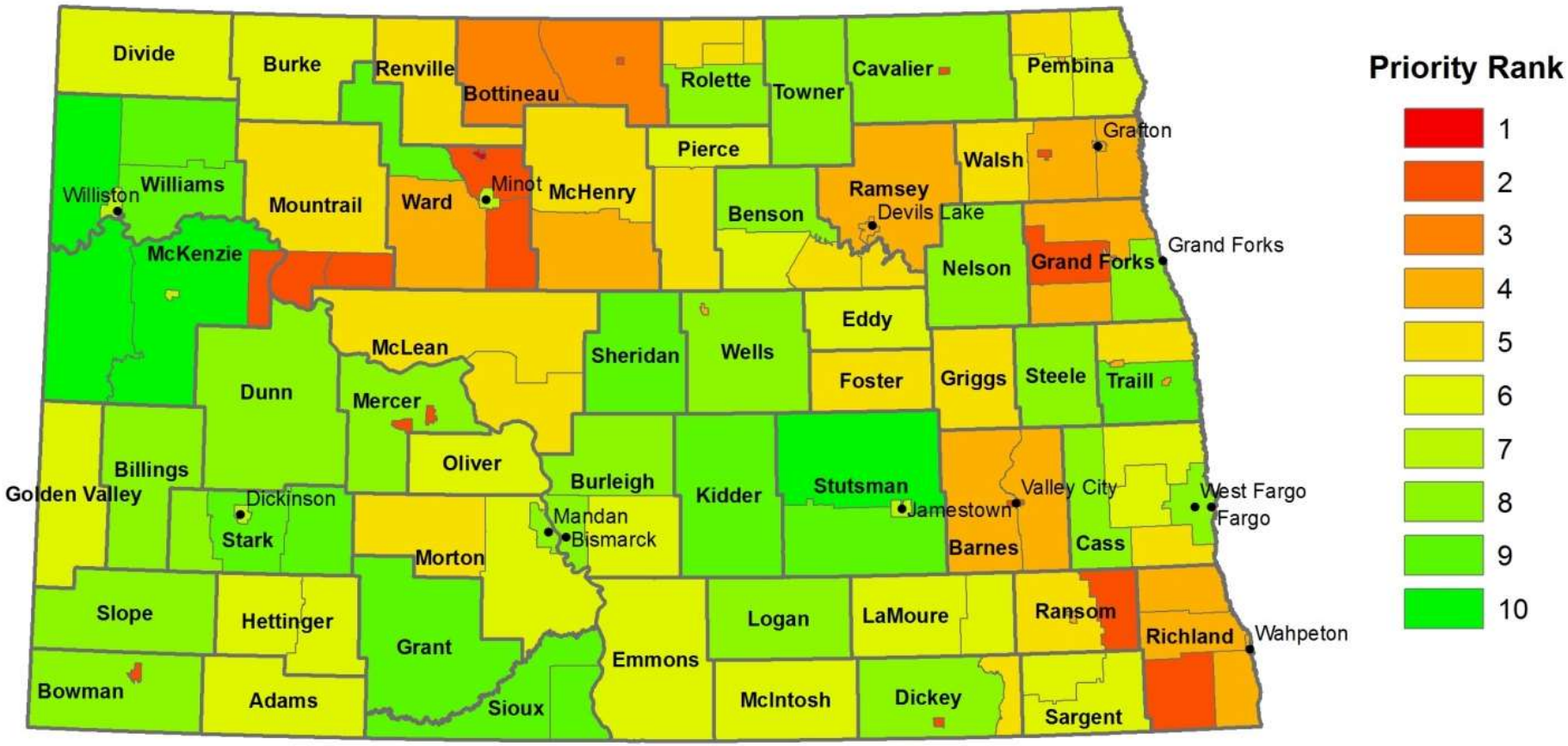


Prioritizing Service Improvements

Priority Ranking Measure for Demand-Response Transit Service Improvements

Mobility Needs Index	Level of Service Measure							
	LOS 8	LOS 7	LOS 6	LOS 5	LOS 4	LOS 3	LOS 2	LOS 1
5 – 4.34	1	1	2	2	4	7	7	8
4.33 – 3.34	1	2	2	5	5	8	8	9
3.33 – 2.34	2	2	4	5	6	9	9	9
2.33 – 1.34	3	3	5	6	8	9	9	10
1.33 – 1.00	4	4	6	8	9	10	10	10

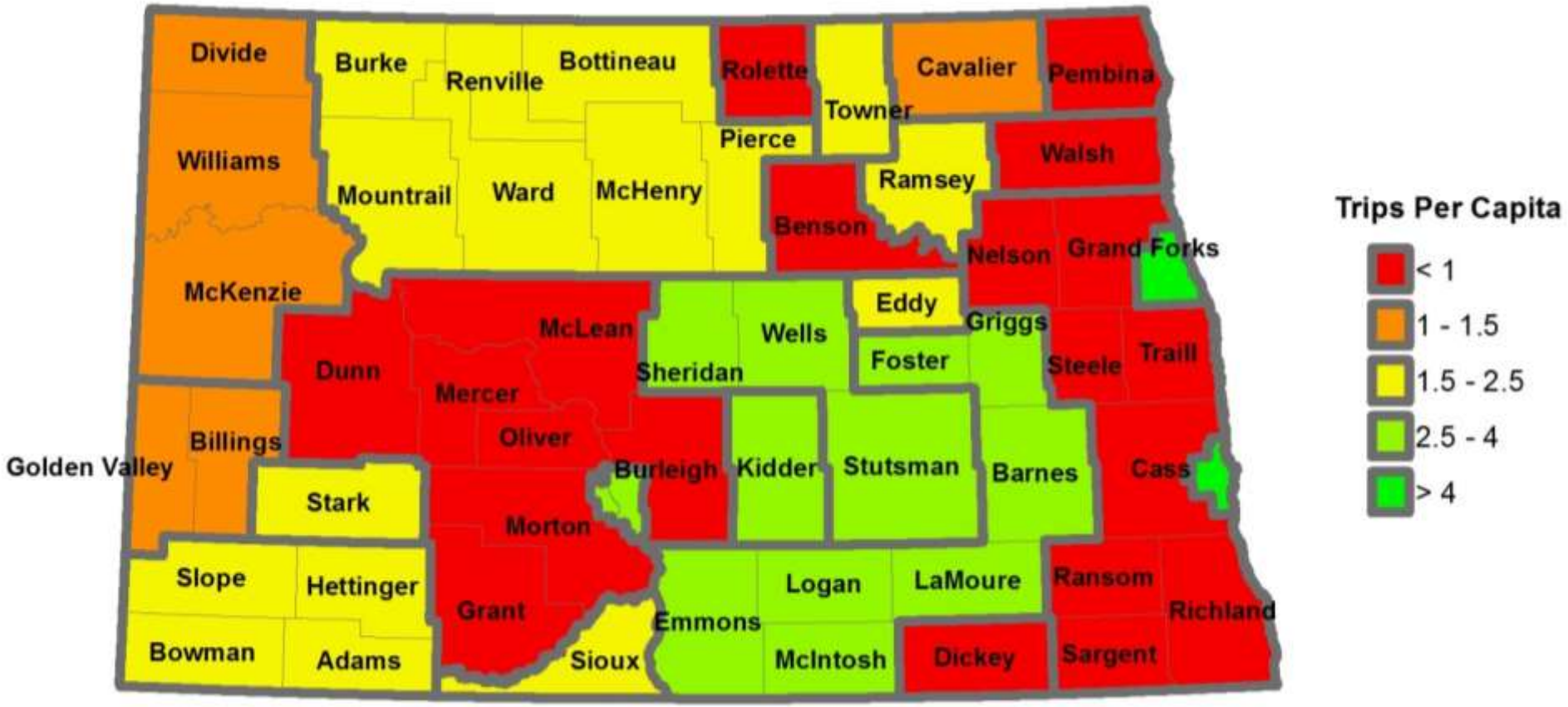
Prioritizing Service Improvements



Performance Measures from the NTD

- Trips per capita
- Vehicle miles per capita
- Vehicle hours per capita

Regional Service Data



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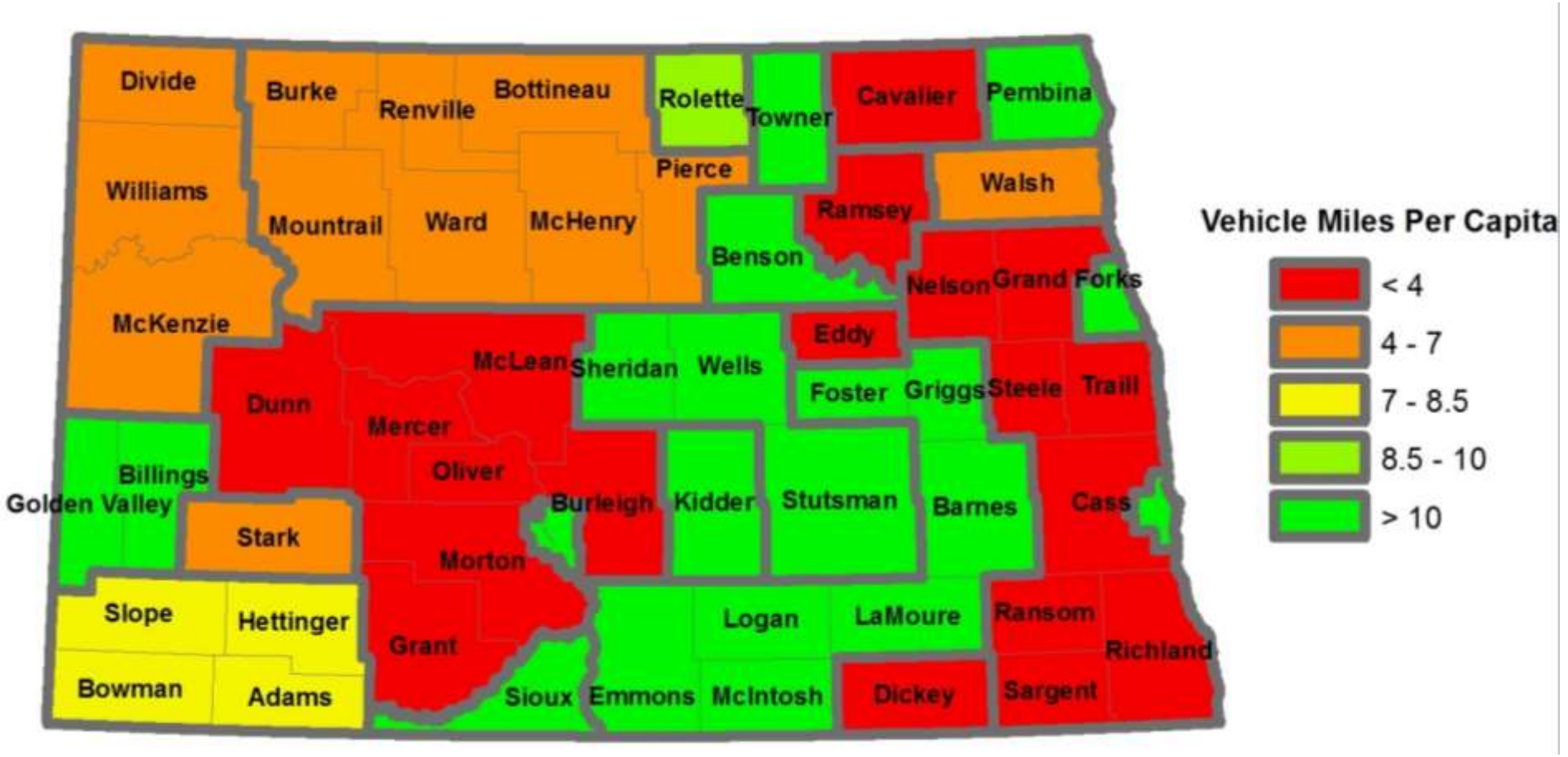

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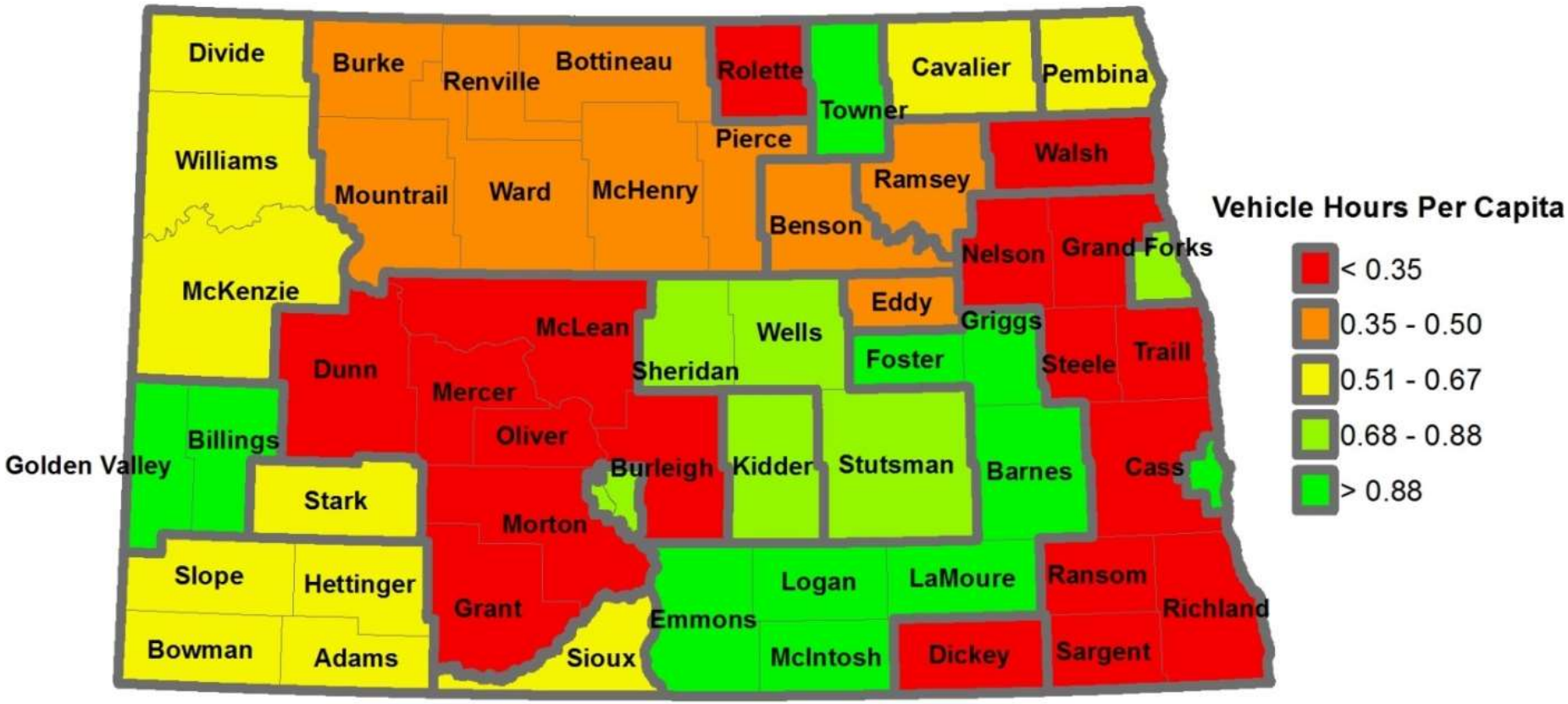

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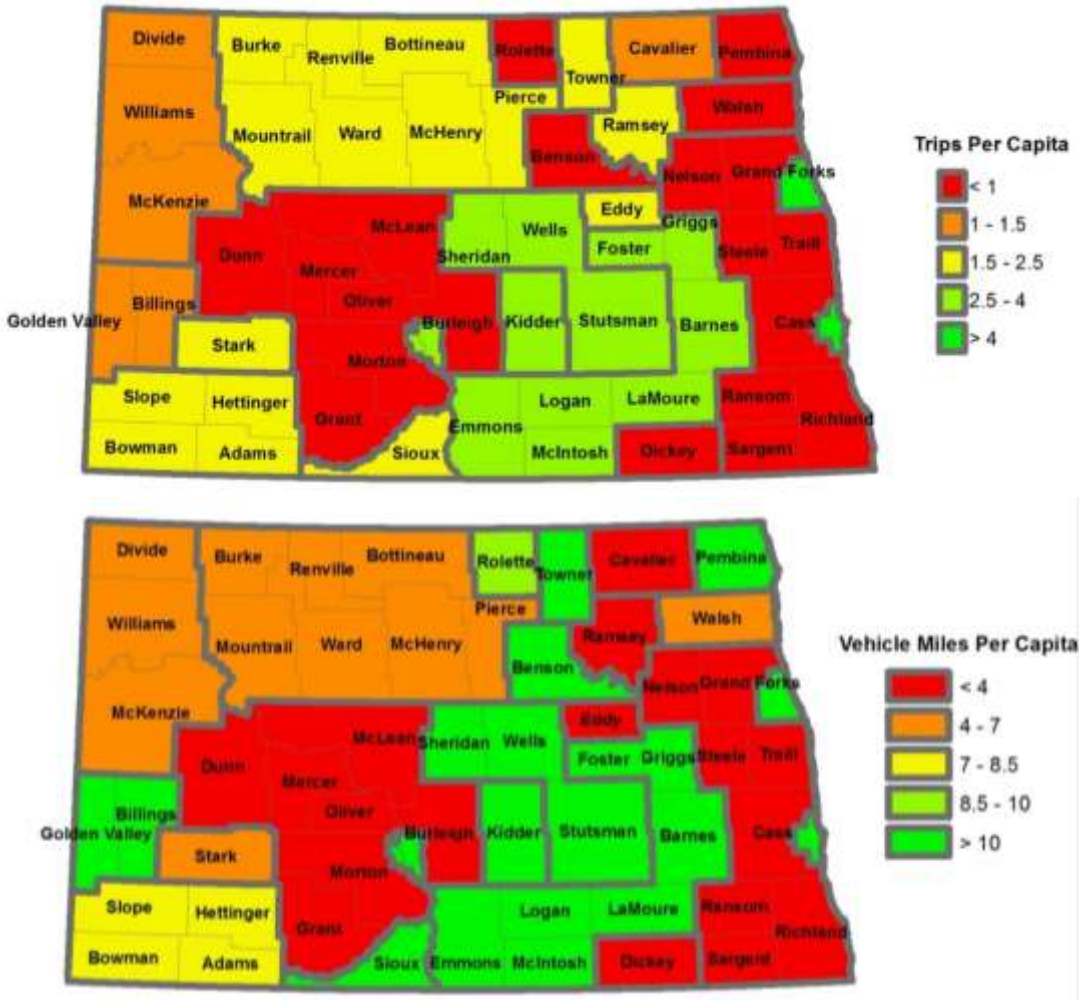

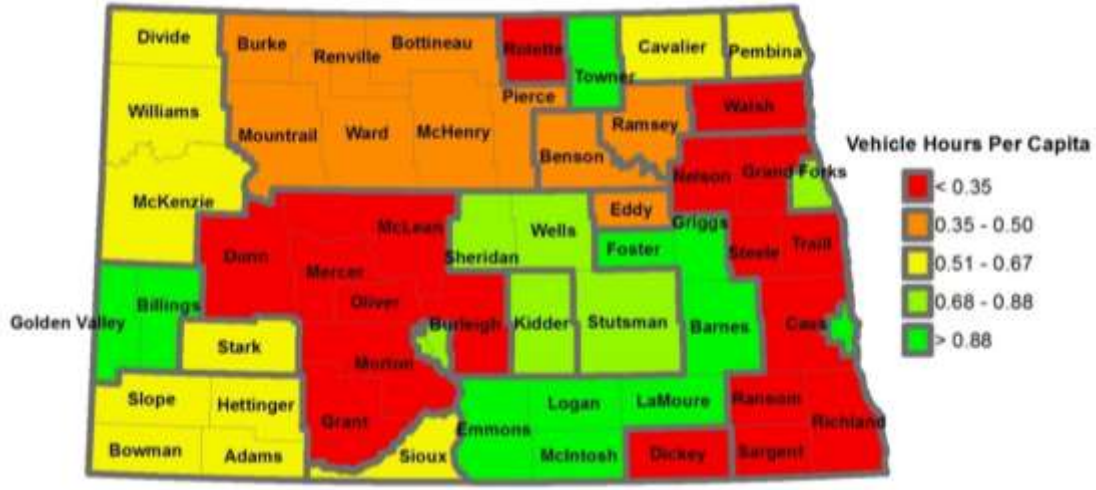

Targeted Levels of Service

Rural and Small Urban Transit Service Benchmarks: National Averages

	Trips Per Capita	Miles Per Capita	Hours Per Capita
Rural	2.0	8.5	0.5
Small Urban Fixed-Route	10.9	6.9	0.5
Small Urban Demand-Response	0.5	2.7	0.2

Rural Transit

Region	Counties	Population 2013	Projected Population 2020	Trips Provided Per Capita	Vehicle Miles Per Capita	Vehicle Hours Per Capita
Northwest	Divide, Williams, McKenzie	41,223	66,938	1.07	4.9	0.67
Golden Valley/Billings	Golden Valley, Billings	2,697	3,388	1.08	33.7	1.38
Southwest	Slope, Hettinger, Bowman, Adams	8,995	10,298	1.89	7.7	0.67
Stark County	Stark	28,212	39,195	1.57	6.7	0.65
Souris Basin/Minot	Burke, Mountrail, Renville, Ward, Bottineau, McHenry, Pierce	99,389	121,425	2.19	5.9	0.46
West River	Dunn, Mercer, McLean, Oliver, rural Burleigh, rural Morton, Grant	57,048	62,961	0.91	3.4	0.22
Sioux County	Sioux	4,430	4,693	1.58	20.0	0.55
Rolette County	Rolette	14,582	15,172	0.53	8.6	0.33
Towner County	Towner	2,317	2,301	2.44	19.6	1.41
Cavalier County	Cavalier	3,896	3,805	1.31	3.9	0.58
Pembina County	Pembina	7,181	7,174	0.93	14.1	0.68
Walsh County	Walsh	11,104	10,636	0.77	5.6	0.32
Benson County	Benson	6,877	7,322	0.87	12.6	0.46
Ramsey/Eddy	Ramsey, Eddy	13,958	13,654	2.11	4.0	0.49
James River	Sheridan, Wells, Stutsman	26,630	27,877	2.91	10.9	0.79
Kidder County	Kidder	2,428	2,319	3.60	20.1	0.74
South Central	Foster, Griggs, Barnes, LaMoure, Logan, McIntosh, Emmons	29,204	28,917	3.86	22.4	1.69
Dickey County	Dickey	5,248	5,313	0.98	2.0	0.34
Red River Valley	Nelson, rural Grand Forks, Steele, Traill, rural Cass, Ransom, Richland, Sargent	72,585	72,585	0.39	3.1	0.17

Urban Transit Fixed-Route

Region	Counties	Population 2013	Projected Population 2020	Trips Provided Per Capita	Vehicle Miles Per Capita	Vehicle Hours Per Capita
Bismarck-Mandan	Urban Burleigh/Morton	86,921	102,046	1.56	3.5	0.23
Grand Forks	Urban Grand Forks	54,932	59,179	6.63	7.0	0.46
Fargo-West Fargo	Urban Cass	143,536	157,070	11.72	6.5	0.51

Urban Transit Demand-Response

Region	Counties	Population 2013	Projected Population 2020	Trips Provided Per Capita	Vehicle Miles Per Capita	Vehicle Hours Per Capita
Bismarck-Mandan	Urban Burleigh/Morton	86,921	102,046	1.85	7.23	0.51
Grand Forks	Urban Grand Forks	54,932	59,179	0.96	3.47	0.37
Fargo-West Fargo	Urban Cass	143,536	157,070	0.74	4.51	0.37

Scenarios

Scenario 1

- Each region must meet one of the three benchmarks

Scenario 2

- Each region must meet one of the three benchmarks
- Regions with LOS 5 or lower must have a minimum 20% increase
- Service must increase at a rate equal to or greater than the projected population growth

Scenario 3

- Each region must meet at least two of the three benchmarks
- Other requirements from Scenario 2 must be met

Scenario 4

- The requirements of Scenario 3 must be met
- Service must increase a minimum 10% in each region

Rural Transit: Increase in Vehicle Miles to Satisfy Each Scenario

Region	Current Vehicle Miles	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Northwest	203,517	41,890	126,954	365,456	365,456
Golden Valley/Billings	90,844	0	23,275	23,275	23,275
Southwest	68,834	0	13,767	14,443	14,443
Stark County	189,235	11,671	73,670	143,923	143,923
Souris Basin/Minot	584,200	67,838	129,526	183,361	183,361
West River	187,381	272,811	272,811	281,269	281,269
Sioux County	283,131	0	18,233	18,233	28,313
Rolette County	125,196	3,766	29,713	70,183	70,183
Towner County	45,377	0	9,075	9,075	9,075
Cavalier County	15,157	0	3,031	7,513	7,513
Pembina County	101,350	0	4,834	4,834	10,135
Walsh County	62,308	28,098	28,098	30,586	30,586
Benson County	86,553	0	5,601	13,029	13,029
Ramsey/Eddy	55,723	0	4,361	4,361	5,572
James River	289,644	0	13,563	13,563	28,964
Kidder County	48,702	0	1,743	1,743	4,870
South Central	652,751	0	13,379	13,379	65,275
Dickey County	10,507	4,922	4,922	11,101	11,101
Red River Valley	224,384	392,589	392,589	433,460	433,460
Total Rural	*3,329,855*	*823,584*	*1,169,145*	*1,642,788*	*1,729,805*
% increase		*25%*	*35%*	*49%*	*52%*

Small Urban Fixed-Route Transit: Increase in Vehicle Miles to Satisfy Each Scenario

Region	Current Vehicle Miles	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Bismarck-Mandan	300,704	403,413	403,413	468,591	468,591
Grand Forks	382,632	25,703	29,583	68,008	68,008
Fargo-West Fargo	927,601	16,429	87,463	87,463	92,760
Total Urban Fixed-Route	*1,610,937*	*445,546*	*520,460*	*624,063*	*629,360*
% increase		*28%*	*32%*	*39%*	*39%*

Small Urban Demand-Response Transit: Increase in Vehicle Miles to Satisfy Each Scenario

Region	Current Vehicle Miles	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Bismarck-Mandan	628,858	0	0	0	0
Grand Forks	190,734	0	14,746	14,746	19,073
Fargo-West Fargo	647,510	0	61,054	61,054	64,751
Total Urban Demand-Response	*1,467,102*	*0*	*75,800*	*75,800*	*83,824*
% increase		*0%*	*5%*	*5%*	*6%*

Cost Estimates

- Calculate increased costs based on:
  - Current operating cost per vehicle mile
  - Expected increase in costs
  - Number of new vehicles needed to provide expanded service
  - Cost per vehicle

Summary of Estimated Increase in Operating and Vehicle Expenses for Expanded Mobility Options, Assuming Projected 2020 Population

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Rural Transit				
Annual operating expense	$2,836,425	$4,026,537	$5,657,762	$5,957,448
% increase over 2012	30%	42%	60%	63%
Vehicle expense (one-time cost)	$1,800,000	$2,550,000	$3,600,000	$3,800,000
Urban Fixed-Route Transit				
Annual operating expense	$2,173,276	$2,622,757	$3,244,377	$3,276,157
% increase over 2012	7%	9%	11%	11%
Vehicle expense (one-time cost)	$6,750,000	$8,100,000	$9,450,000	$9,450,000
Urban Demand-Response Transit				
Annual operating expense	$0	$345,648	$345,648	$382,239
% increase over 2012	0%	2%	2%	3%
Vehicle expense (one-time cost)	$0	$260,000	$260,000	$260,000
Total				
Annual operating expense	$5,009,701	$6,994,942	$9,247,787	$9,615,844
% increase over 2012	9%	13%	17%	18%
Vehicle expense (one-time cost)	$8,550,000	$10,910,000	$13,310,000	$13,510,000

Conclusions

The study demonstrates a method for

- Identifying transit needs and gaps
- Prioritizing investment needs for statewide transit planning
- Collecting better data for demand-response transit level of service
- Estimating costs of needed improvements
- Projecting future needs based on projected population growth

Thank you!

Questions?

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