North Dakota Roadway Levels of Service

Regional Public Input Meetings

Upper Great Plains Transportation Institute

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Overview

Improvement Costs
- Trends
- Implications
- Timeliness of Improvements

Levels of Service – Scope of the Presentation
- State
  - Surface Condition
  - Lane Width
  - Shoulder Width
- County/Township
  - Gravel/Overlay Interval
  - Gravel/Overlay Thickness
- Bridges
  - Width
  - Load Limit
  - Detour Distance

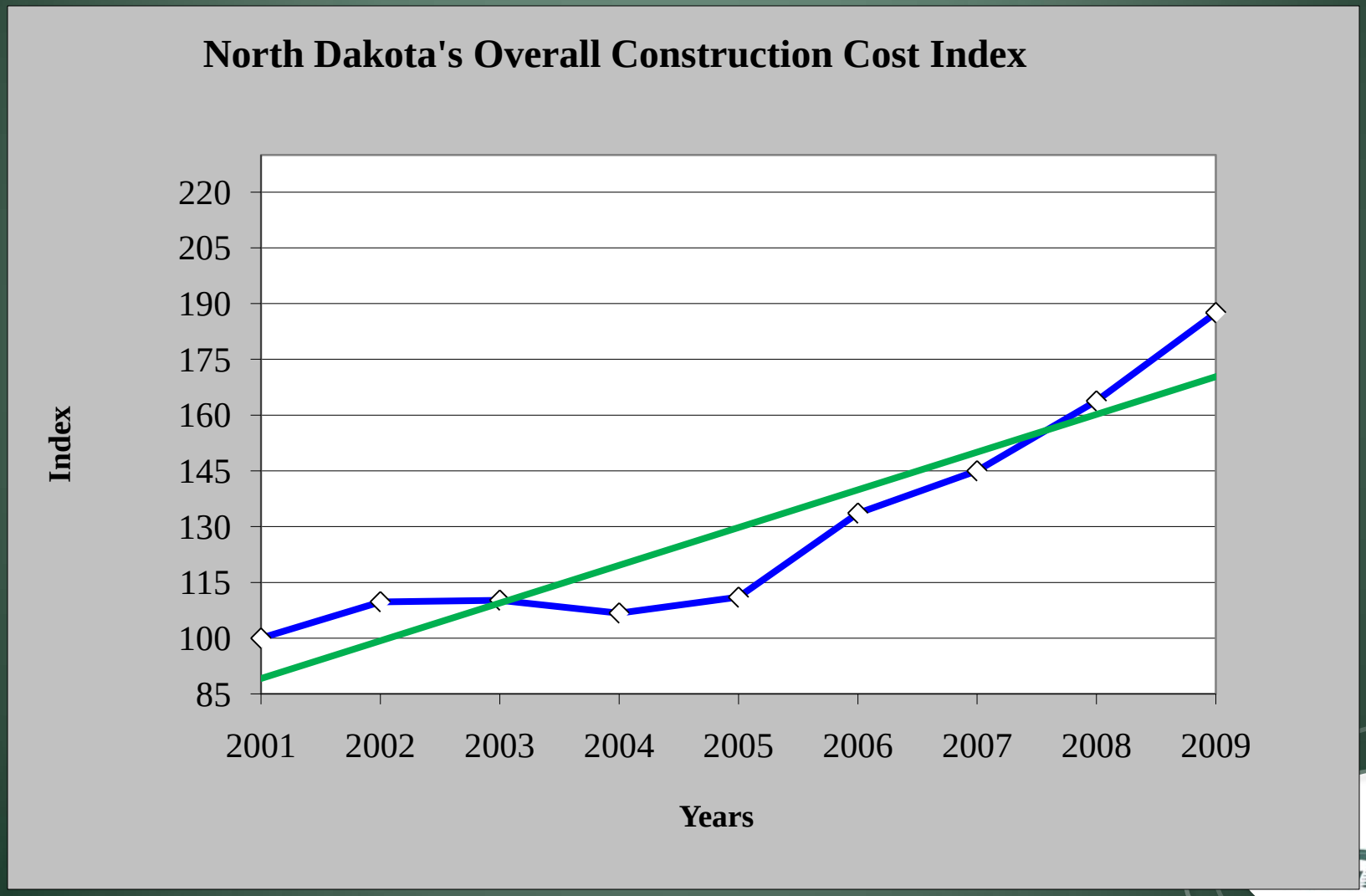
Improvement Costs

Source: NDDOT

Type of Improvement	Average Cost/Mile
Interstate Concrete Paving (two lanes in one direction)	$1,700,000
Resurfacing Interstate (hot bituminous pavement)	$500,000
Reconstruction 2-lane hwy (includes grading & base)	$780,000
3" Overlay (hot bituminous pavement)	$275,000
Thin lift overlay	$125,000
Seal Coat	$28,000
Urban Reconstruction (51' curb & gutter)	$4,600,000

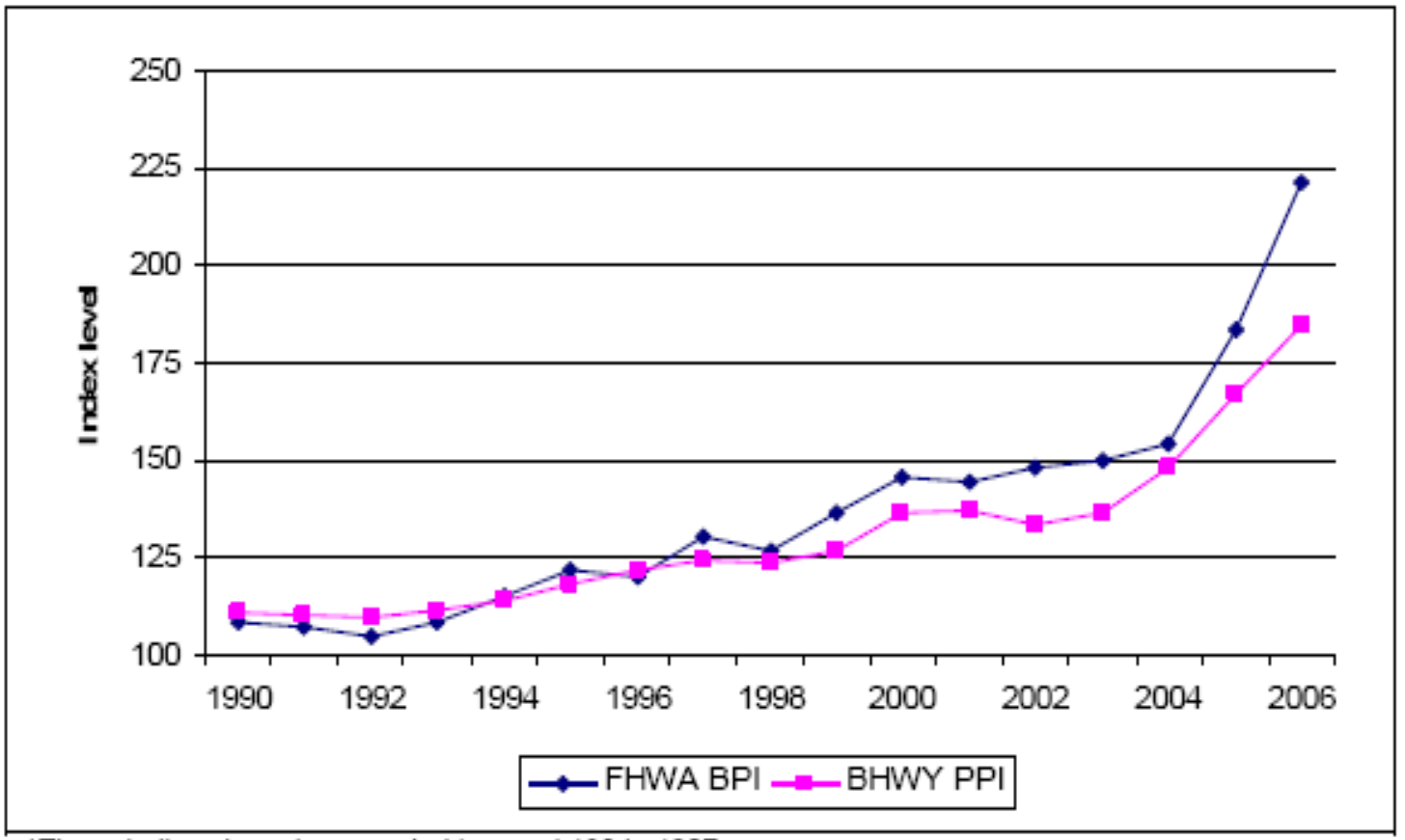
Cost Trends

Source: NDDOT



National Highway Construction and Maintenance Cost Indices*

(Source: FHWA)



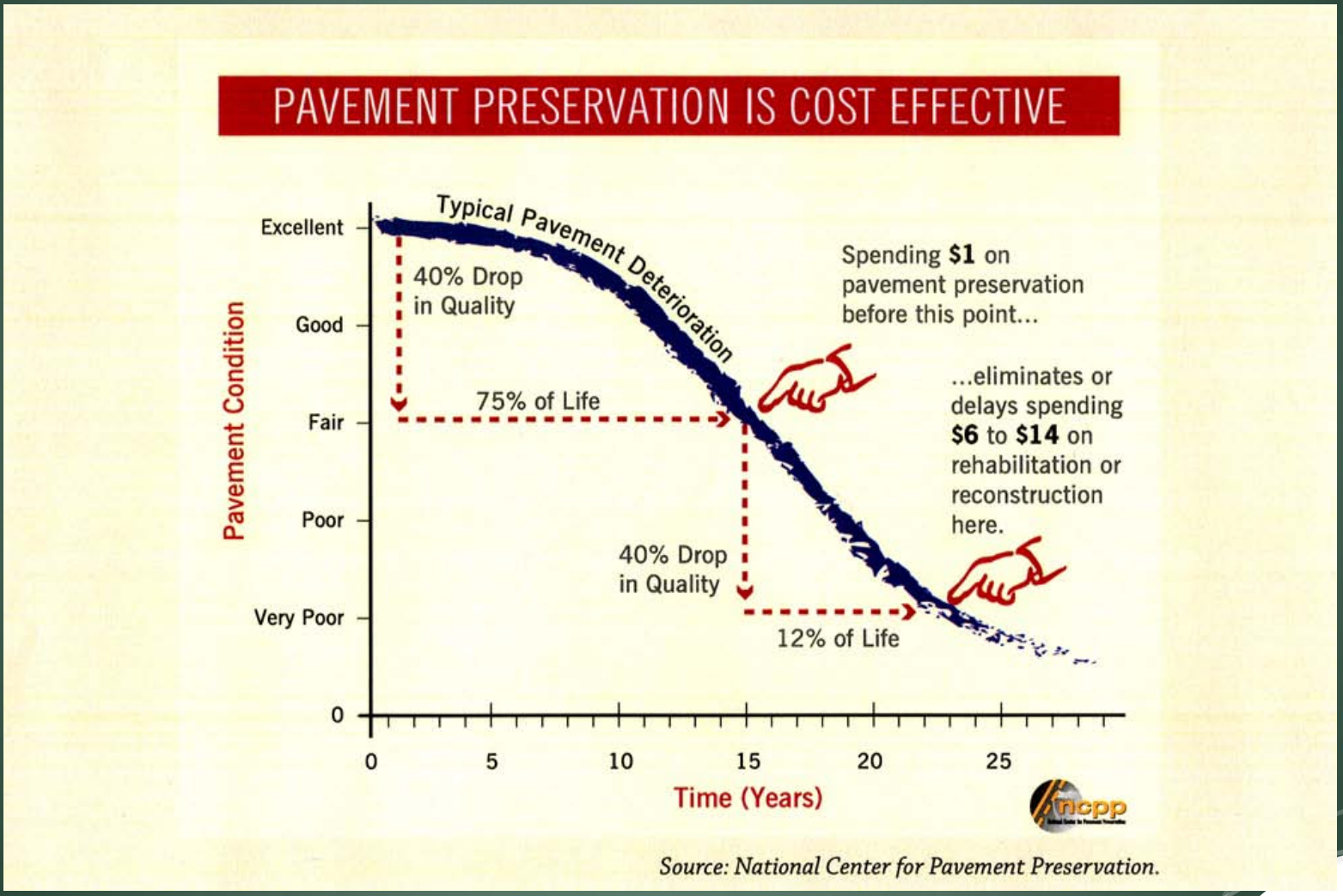
*These indices have been scaled to equal 100 in 1987.

Improvement Costs

Inflation Implications

- The same funding “buys” fewer improvements than it did five years ago
- Timeliness of improvements can not be met in many cases
- Backlog of improvement projects
- Repair vs. resurface vs. reconstruct

Timeliness of Improvements

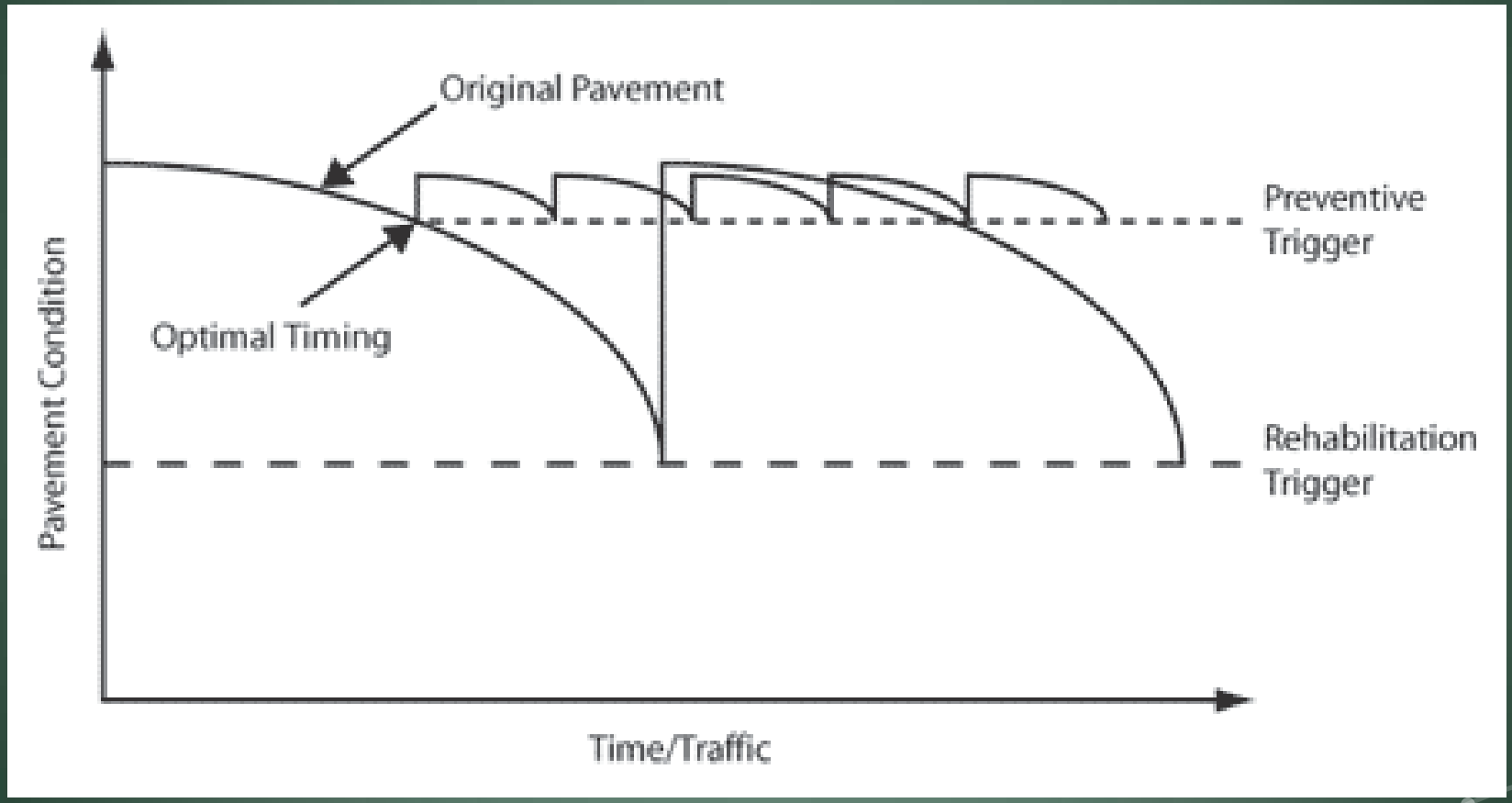


Improvement Costs

Repair vs. Resurface vs. Reconstruct

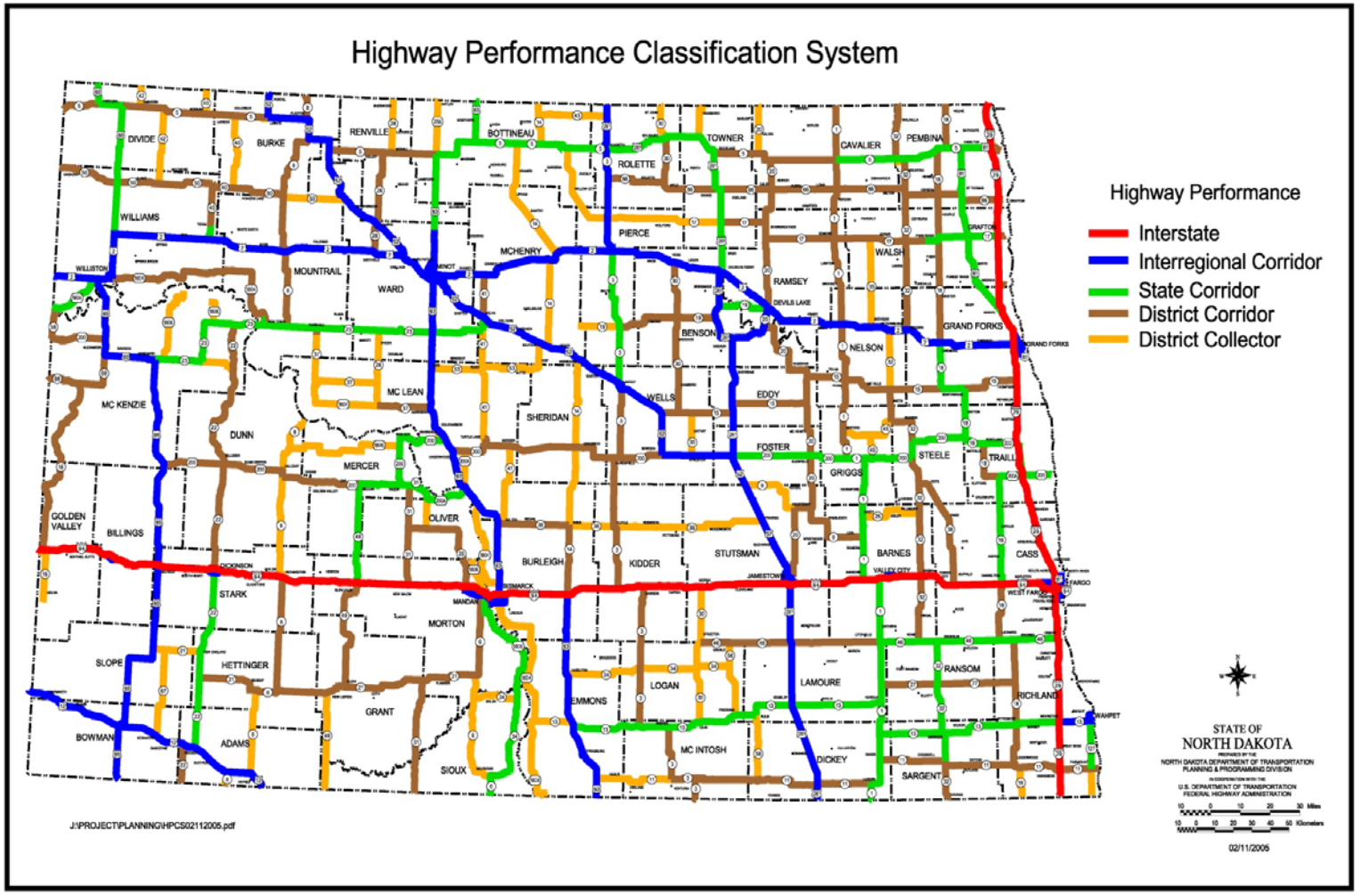
- Seal Coat	$28,000/mile
- Thin Lift Overlay	$125,000/mile
- 3” Overlay	$275,000/mile
- Reconstruction	$780,000/mile

Repair vs. Rehabilitation



Source: FHWA

Highway Performance Classification System



Highway Performance Classification System

Classification	Number of Roadway Miles	Percentage of Miles
Interstate	1,141	13.6
Interregional	1,894	21.7
State Corridor	1,405	16.7
District Corridor	2,568	30.6
District Collector	1,471	17.4
Total	8,479	100%

Levels of Service

State System

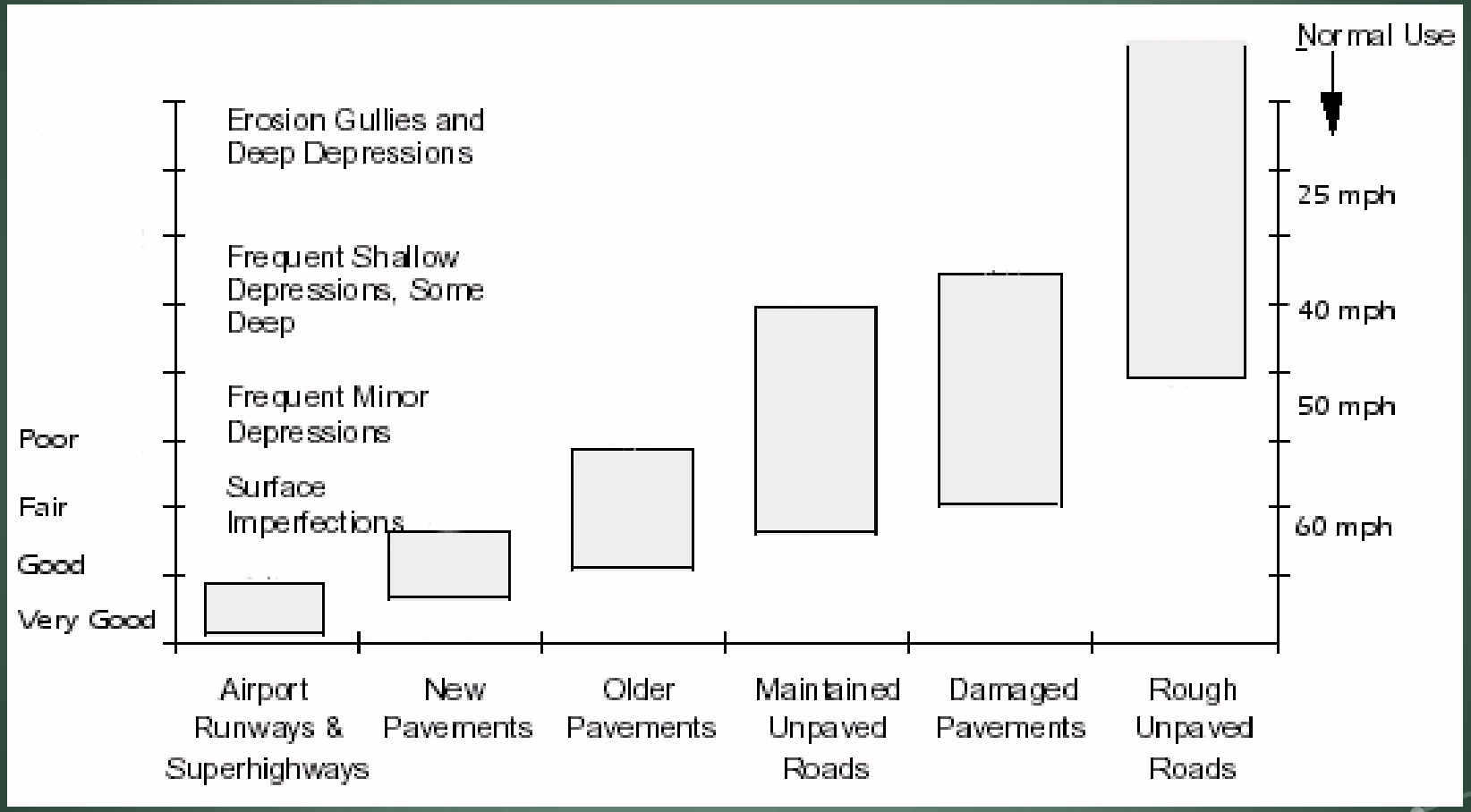
- Surface Condition
- Lane Width
- Shoulder Width

Levels of Service

Surface Condition

- -Very Good
- -Good
- -Fair
- -Poor

Levels of Service



Levels of Service

Current Conditions – State System - Surface Condition

Surface Condition	Percentage of System
Very Good	38
Good	26
Fair	29
Poor	6

Levels of Service

20 Year Projections – State System - Surface Condition

Surface Condition	Percentage of System	Change
Very Good	32	-6
Good	30	+4
Fair	27	-2
Poor	11	+5

Levels of Service

Lane Width

- Standard = 12’
- Represents safety and condition

Levels of Service

Current Conditions

- Lane Width
  - 0.03% of miles deficient
  - Roughly 220 miles

Levels of Service

Shoulder Width

- Standard varies by HPCS
- Represents safety and condition

Classification	Shoulder Width
Interstate	10 feet
Interregional	8 feet/4 feet
State Corridor	4 feet
District Corridor	2 feet
District Collector	2 feet

Levels of Service

Current Conditions – State System - Shoulder Width

Classification	Shoulder Width	% of Miles Below HPCS Guidelines	Number of Miles
Interstate	10 feet	0	0
Interregional	8 feet/4 feet	20	366
State Corridor	4 feet	35	491
District Corridor	2 feet	1	26
District Collector	2 feet	5	73

County Levels of Service

Survey

- Overlay Interval
- Overlay Thickness
- Gravel Interval
- Gravel Thickness
- Blading Interval

County Levels of Service

Overlay Interval – number of years between overlay treatment

- Representative of paved surface quality

Overlay Thickness

- Thicker overlay = longer life, but higher costs

County Levels of Service

County Responses

- Overlay Interval
  - Average - 18.5 years
  - Range - 15-25 years
  - Most Frequent - 20 years
- Overlay Thickness
  - Average - 2.33
  - Range - 1.5-3.5 inches
  - Most Frequent - 2 inches

County Levels of Service

Gravel interval – number of years between regraveling

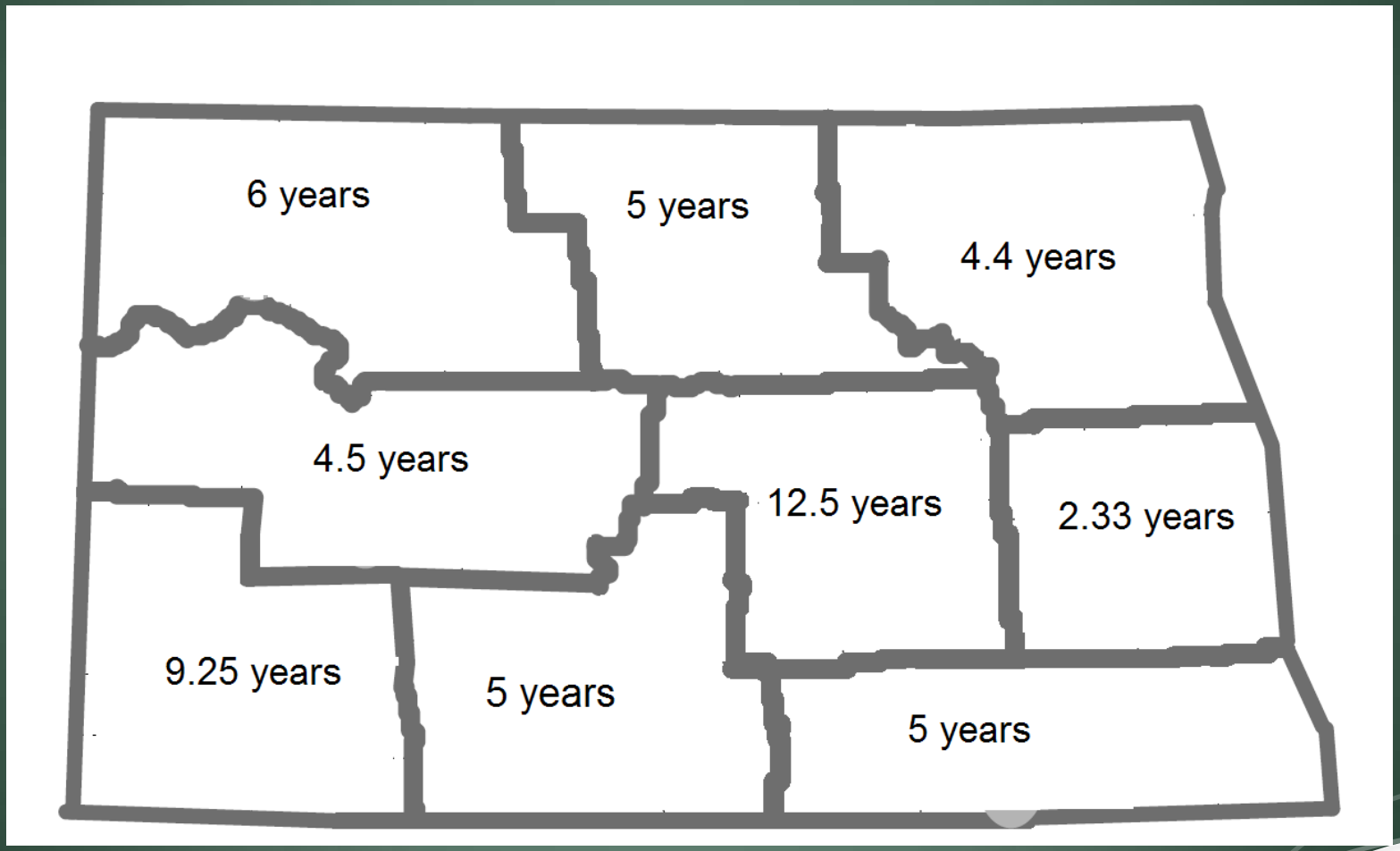
Gravel Thickness – yards/mile of gravel applied during regraveling (excludes spot graveling)

County Levels of Service

County Responses

- Gravel interval
  - Average – 6 years
  - Range – 3-15 years
  - Most Frequent – 5 years
- Regional Variations

Gravel Interval



Levels of Service

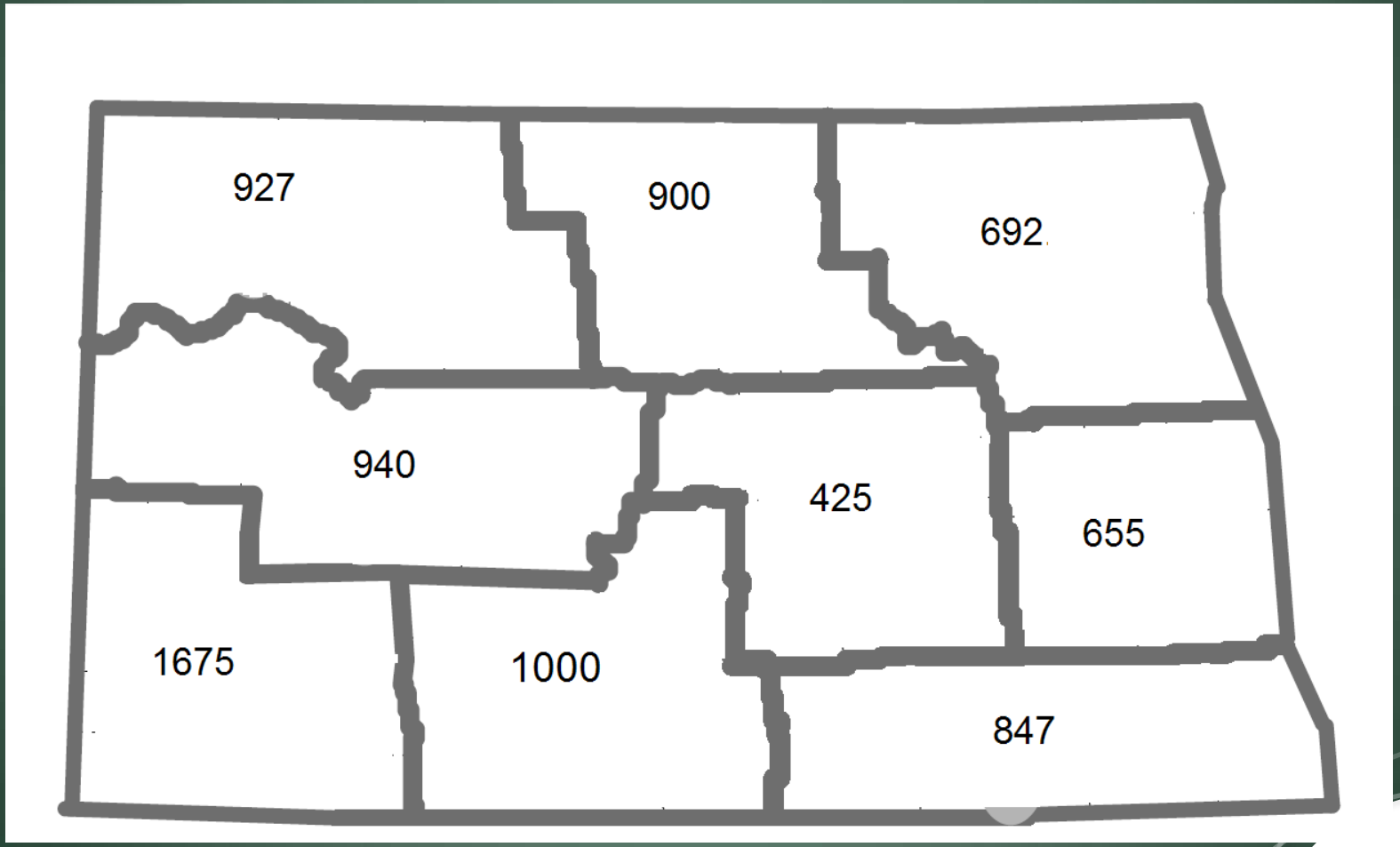
County Responses

-Gravel thickness

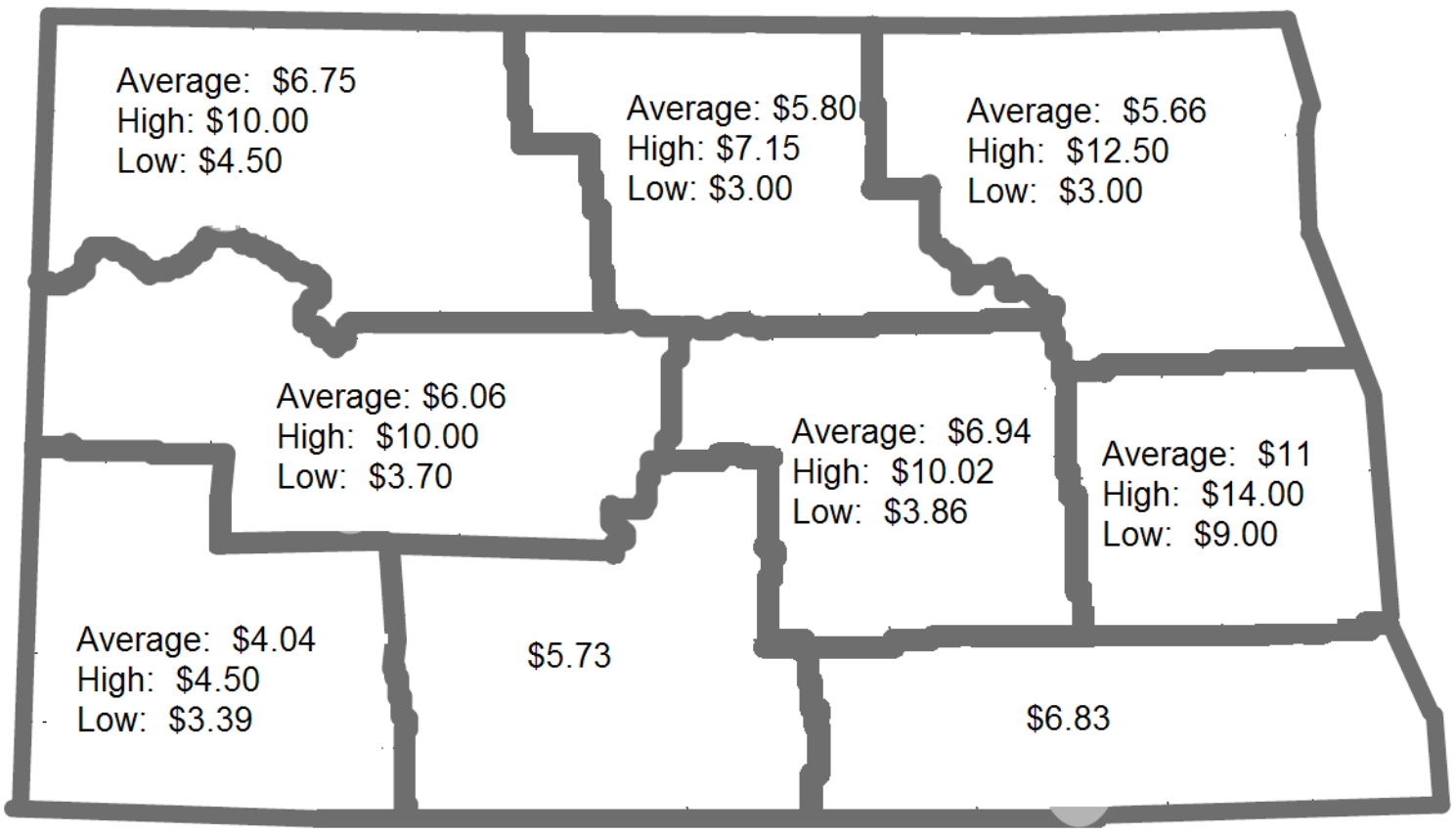
- Average – 932 cu. yd./mile
- Range – 300-2100 cu. yd./mile
- 1,000 cu.yd./mile = 2” of gravel on a 24’ driving surface

- Regional Variations

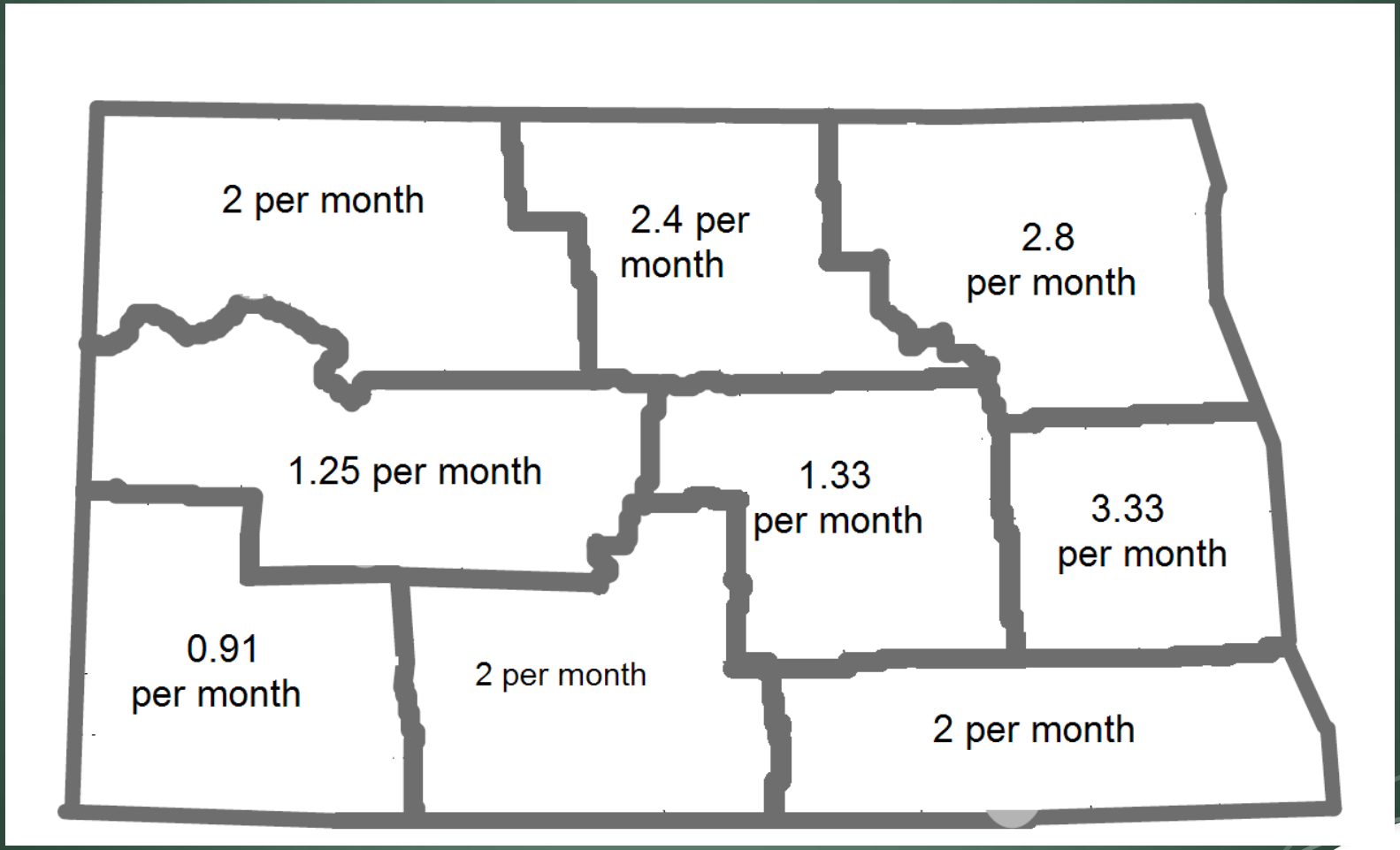
Regional Variations in Gravel Thickness – Cubic yd/mile



Gravel Cost


Average: $6.75
High: $10.00
Low: $4.50
Average: $5.80
High: $7.15
Low: $3.00
Average: $5.66
High: $12.50
Low: $3.00
Average: $6.06
High: $10.00
Low: $3.70
Average: $6.94
High: $10.02
Low: $3.86
Average: $11
High: $14.00
Low: $9.00
Average: $4.04
High: $4.50
Low: $3.39
$5.73
$6.83

Blading Interval



Levels of Service

Bridges

Ownership	Number	Percentage
State	1123	25
County	3187	71
City or Township	64	2
Other	74	2
Total	3,925	100%

NHS

– 12% (526) of the state's bridges are on the National Highway System

- Expected to receive priority funding from Federal government and provide good service into the future

Levels of Service

Bridge Cost

- 100’ L x 30’ W bridge replacement cost is roughly $330,000

Bridge LOS

- Roadway Width
- Load Limit
- Detour Distance

Levels of Service

Roadway Width

- Represents accessibility and safety
- Ninety-six percent of non-NHS bridges are two lanes
- Two-lane bridges – recommended width is 28’; curb to curb (12’ lanes with 2’ lateral clearance)
- Less than 25% of non-NHS two lane bridges meet this standard

Levels of Service

Roadway Width

- 75% of non-NHS two lane bridges have roadway widths of at least 23 feet (10’ lanes with 1.5’ lateral clearance)

Levels of Service

Load Limit

- Represents accessibility
- Legal limit of a loaded 5 axle semi – 80,000 lbs.
- Twenty-six percent of non-NHS bridges can safely accommodate trucks weighing 80,000 lbs
- Approximately 68% of non-NHS bridges can safely accommodate trucks weighing 46,000 lbs

Levels of Service

Detour Distance

- Represents connectivity
- If the bridge was no longer in service, how far is the detour to the closest bridge?
- 25% less than 2 miles
- 50% less than 3 miles
- 75% less than 6 miles
- 90% less than 18 miles

Summary

Cost Trends

- The same dollar buys fewer improvements than in the past
- Backlogs occur and improvements cannot be implemented on a timely (optimal) basis

Summary

Levels of Service

- Where are we now?
  - State – 64% Good or better
  - County – Average gravel every 6 years, average overlay every 18 years
- Where will we be 20 years from now?
  - With existing revenue, overall system condition will decrease and inflation may continue to devalue the buying power of the revenue
- Choices/Prioritization

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