



Making a Case for Funding Pavement Preservation in Tennessee

NWPMA Fall Conference

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providing engineering solutions to improve pavement performance

Tennessee



Tennessee fun facts

- Population - 6.549 million (2014)
- 16th State of the Union (1796)
- Grand Ole Opry (1925)
- Jack Daniel Distillery (1866)
- National Storytelling Festival



Transportation System

- Interstate 1,040 miles
I40, I24, I26, I75, I55,
I69, I81
- State Rts 13,000 miles
- 37,492 lane miles
- 95% Asphalt Pavements

2007



2040



Tennessee has one of the better road systems in the United States

- Ohio Interstate Study
- NCHRP Study
- Overdrive Magazine
- 10 Perpetual Pavement Awards
- CNBC Business Report (Infrastructure)



Major Goal:

- Maintain the road system in its present HIGH condition
- How to do it?
 - \$\$\$\$\$
 - Tell the story in a way that people understand



What Can We DO?

- 3 Possible Solutions
 - More Money!!!!!!
 - Use less costly treatments
 - A combination of both



Performance Measurement

- Three methods:
 - (1) Lane miles resurfaced each year
 - (2) Average Pavement Quality Index (PQI)
 - (3) Remaining Service Life

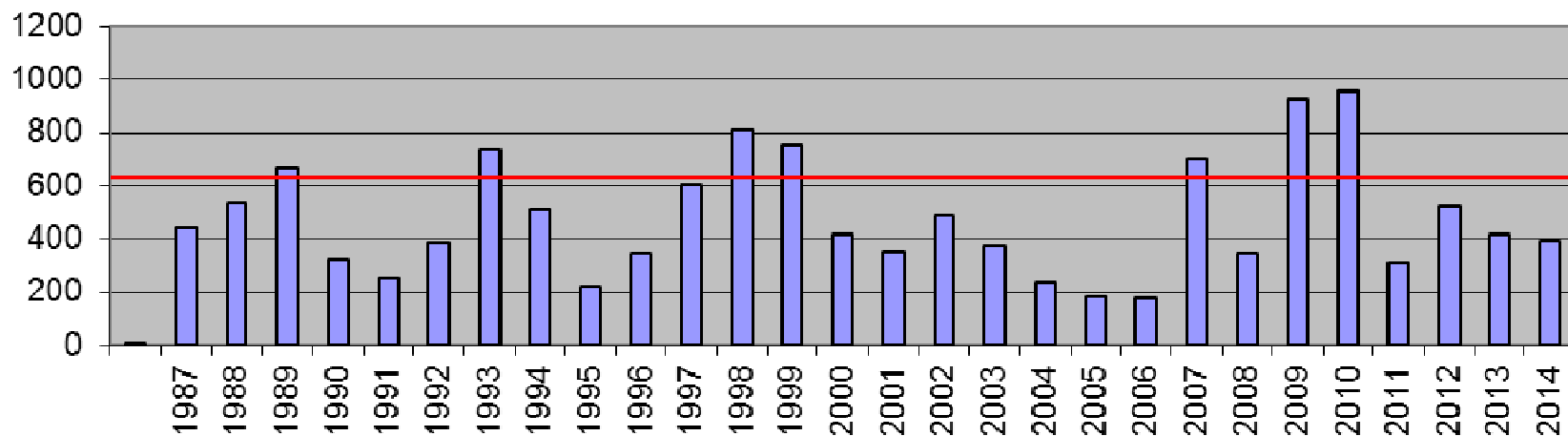


Annual Lane Miles Maintained

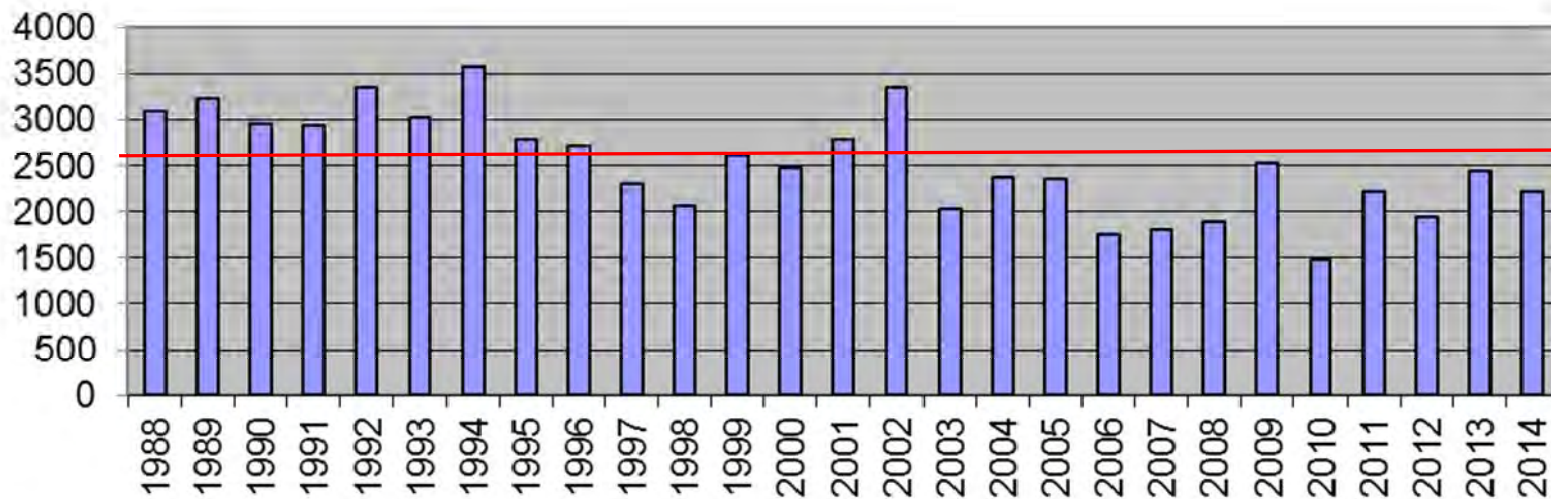
- Previous Goals:
- Interstates – 8 year cycle
 - 648 lane miles/year
- State Routes – 12 year cycle
 - 2583 lane miles/year



Interstate Lane Miles



State Route



Annual Lane Miles Maintained

- Previous Goals:
- Interstates – 8 year cycle
 - 648 lane miles/year **10 year cycle**
 - 5 years average of **517.3** lane miles/year
- State Routes – 12 year cycle
 - 2583 lane miles/year **15 year cycle**
 - 5 years average of **2066** lane miles/year



Performance Trends

- Annual Lane Miles Resurfaced
 - Interstate (8 year cycle)
- Need to average 131.5 additional lane miles/year to maintain existing condition)
 - $131.5 \times \$160,000 = \$21,034,000$
 - $\$21,034,000 + \$60,000,000 = \$81.03$ Million
- Current funding of \$64 Million is not adequate



Performance Trends

- Annual Lane Miles Maintained
 - State Routes (12 year cycle)
- To maintain the 12 year cycle 2667 lane miles must be addressed each year.
 - $2667 \times \$61,170 / \text{lane mile} = \163.1 million
- Current funding of \$141 million is not adequate



Resurfacing Expenditures

- Prior to 2011
 - Interstates - \$50 million
 - State Routes - \$90 million
- 2011 and 2012
 - Interstates - \$60 million
 - State Routes - \$120 million
- 2013 and forward
 - Interstates - \$64 million
 - State Routes - \$141 million



Pavement Management System

3 Major Components

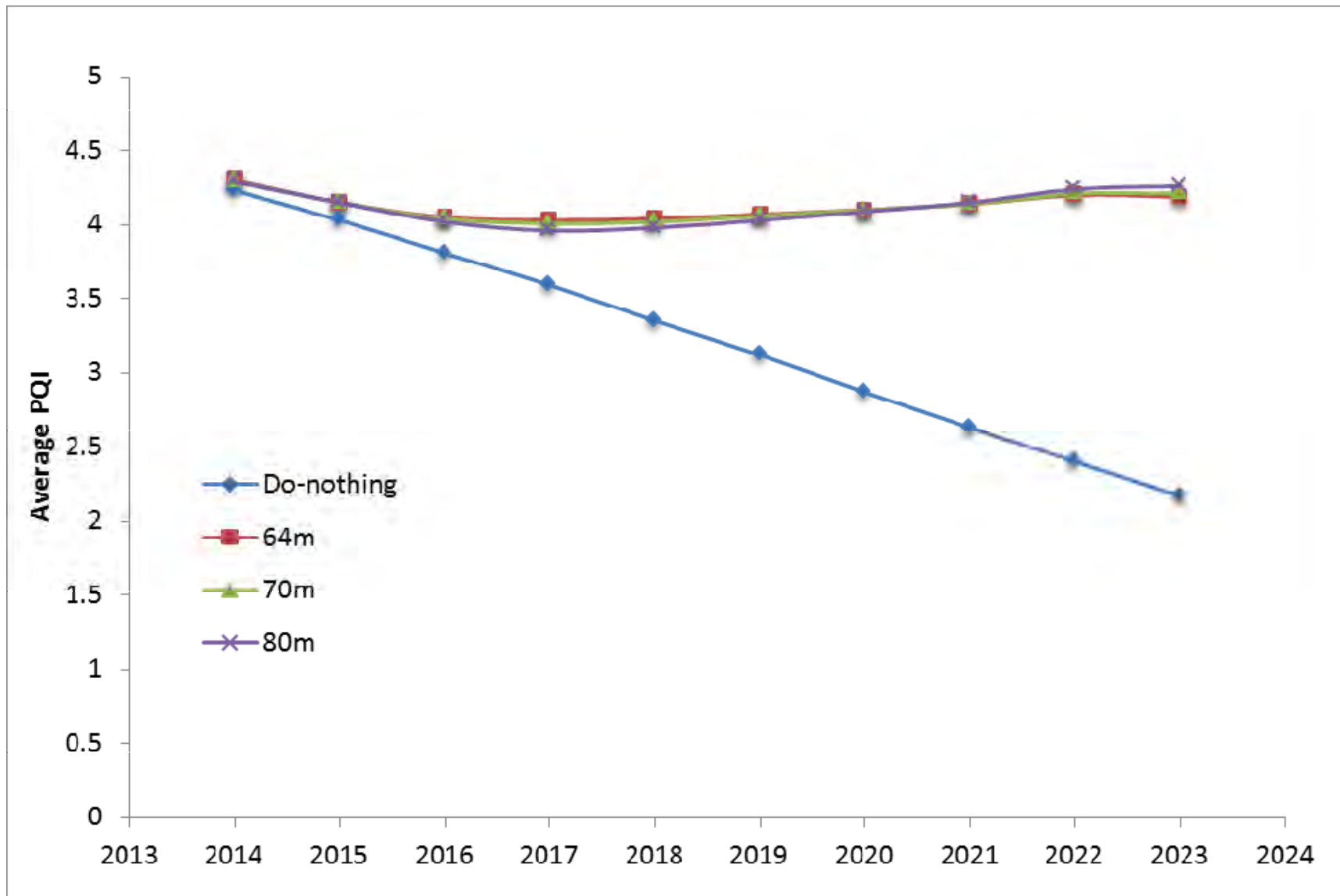
- System for Collecting Data - Mandli Communications collects distress (8 different types), smoothness (IRI), and rutting using state-of-the-art equipment

- Database to sort and store Data
- An analysis program to evaluate repair or preservation strategies, and suggest cost-effective projects for maintaining pavements

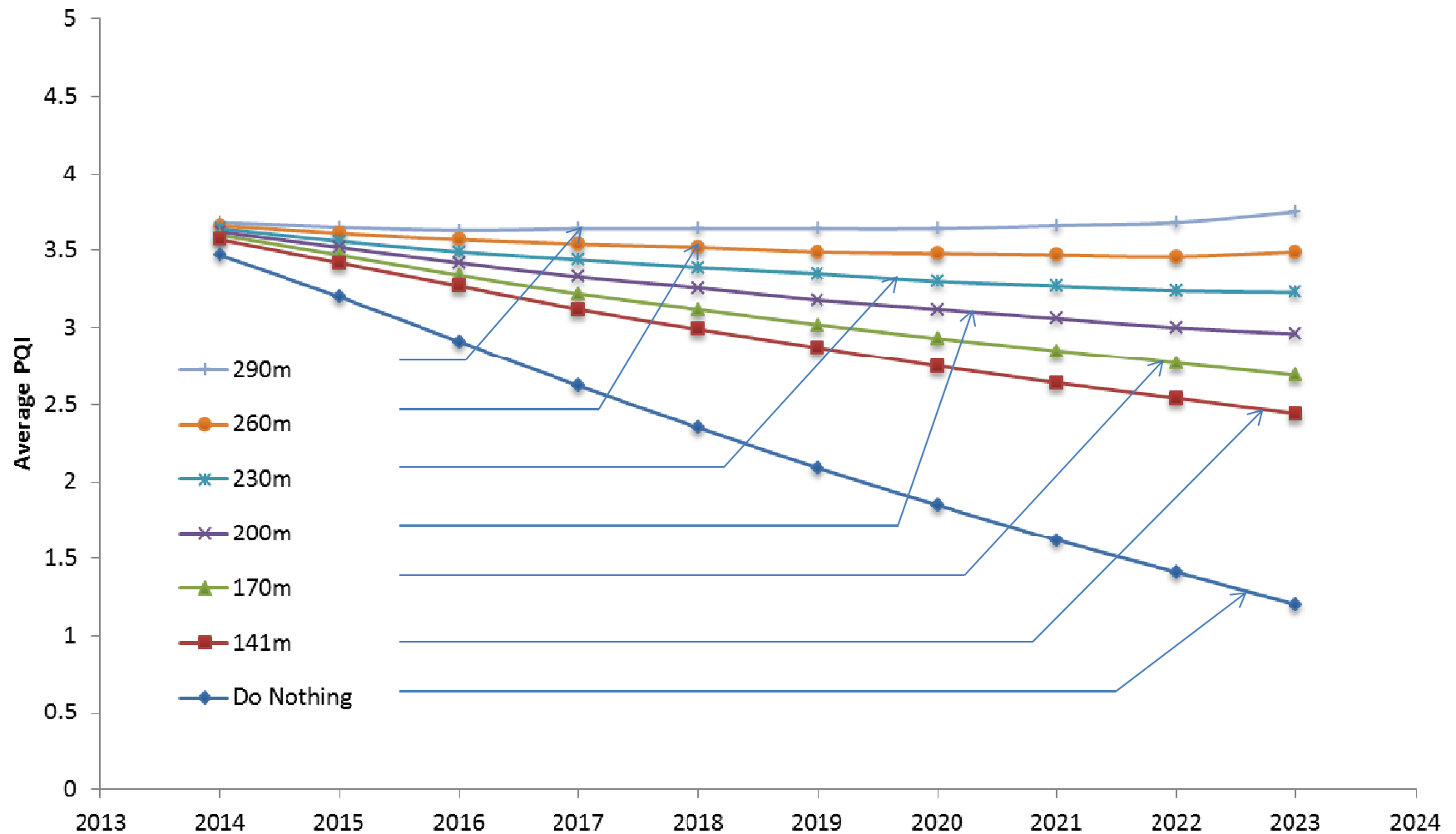
Stantec's
Highway Pavement
Management
Application
(HPMA)



Pavement Management System



Pavement Management System



Performance Trends

- Pavement Management System PQI
 - Interstate performance is adequate at present \$64M
 - State Routes indicates that approx. \$260M will be required annually to maintain condition



Remaining Service Life (RSL)

- TDOT – 37,492 Lane Miles
- Every year each lane mile on the network ages 1 YEAR
- To keep the network at the same overall condition level, we must add:

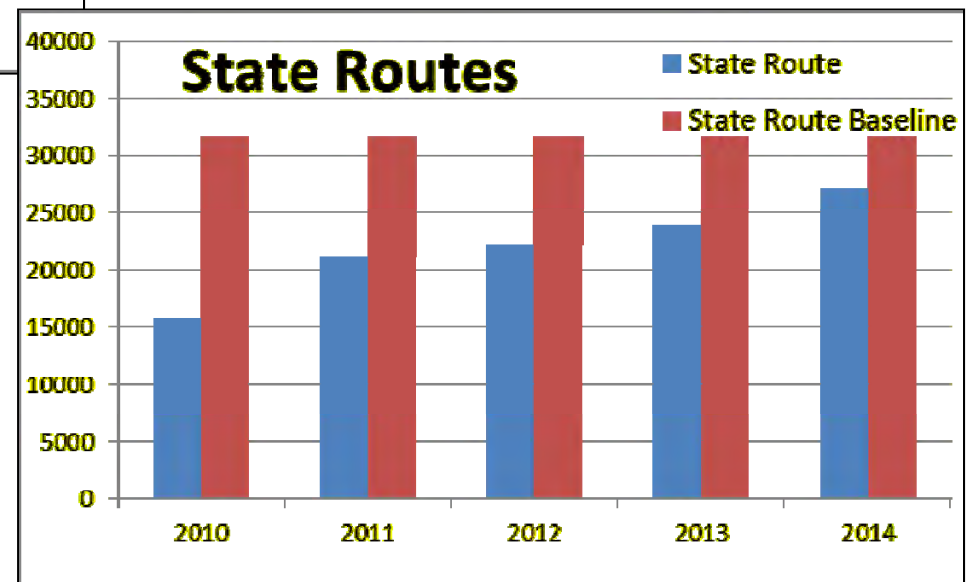
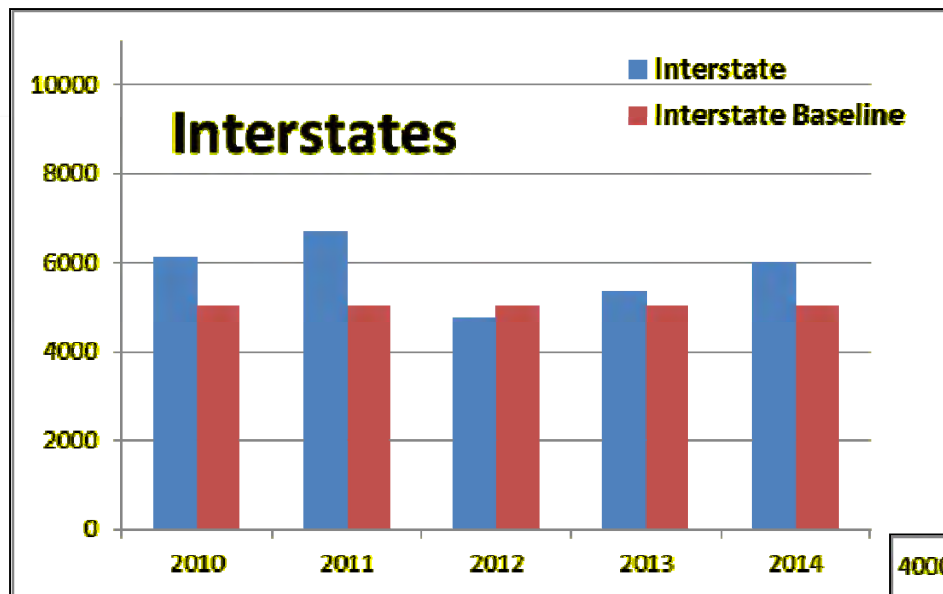
37,492 lane-mile-years of life
to the network annually



Remaining Service Life (RSL)

Treatments	PQI / Distress Selection Guidelines	Typical ADT Range	Expected Service Life Extension
Thin Mix Overlays 1" – 1.5" Thick	≥ 3.5 / Low to moderate fatigue cracking, oxidized pavement, raveling, and rutting in wheel paths < 0.25"	No Limit	12 Years
Ultra Thin Mix Overlays <1"	≥ 3.8 / Low fatigue cracking oxidized pavement, loss of fines on pavement surface.	0 – 5000	6 – 8 Years
Micro-Surfacing	≥ 3.8 / Low fatigue cracking oxidized pavement, loss of fines on pavement surface.	0 – 5000	6 – 8 Years
Chip Seal	N/A / moderate fatigue cracking, oxidized pavement, raveling, and rutting in wheel paths < 0.25"	< 2000	6 – 8 Years
Crack Seal	N/A / Longitudinal and Transverse Cracks (1/8" -1/2")	No Limit	3 – 5 Years
Fog Seal	N/A / Slight loss of fines	≤ 5000	2 – 3 Years

Remaining Service Life Statewide



Performance Trends

- Remaining Service Life
 - Interstate
 - Must add 5164 lane mile years to Interstate system in each year
 - 5 year average 5200 lane mile years
- Cost \$10,000 / lane mile year
- \$64M adequate



Performance Trends

- Remaining Service Life
 - State Routes
 - Must add 31,863 lane-mile-years each year
 - 5 year average 22,038 lane-mile-years
 - add 11,086 additional lane-mile-years
- $11,086 \times \$5026 = \55.8 million additional expenditure required
- Total Funding Required = $\$141,000,000 + 55,800,000 = \196.8 million



What's the Story

Funding Suggested	Annual Miles Maintained	Pavement Management System	Remaining Service Life	Average
Interstate	81.0	64.0	64.0	69.7
State Routes	163.1	260.0	196.8	206.6
Total	244.1	324.0	260.8	276.3

Current Funding

- Interstates - \$64 million
- State Routes - \$141 million





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