



U.S. Department of Transportation
Federal Highway Administration

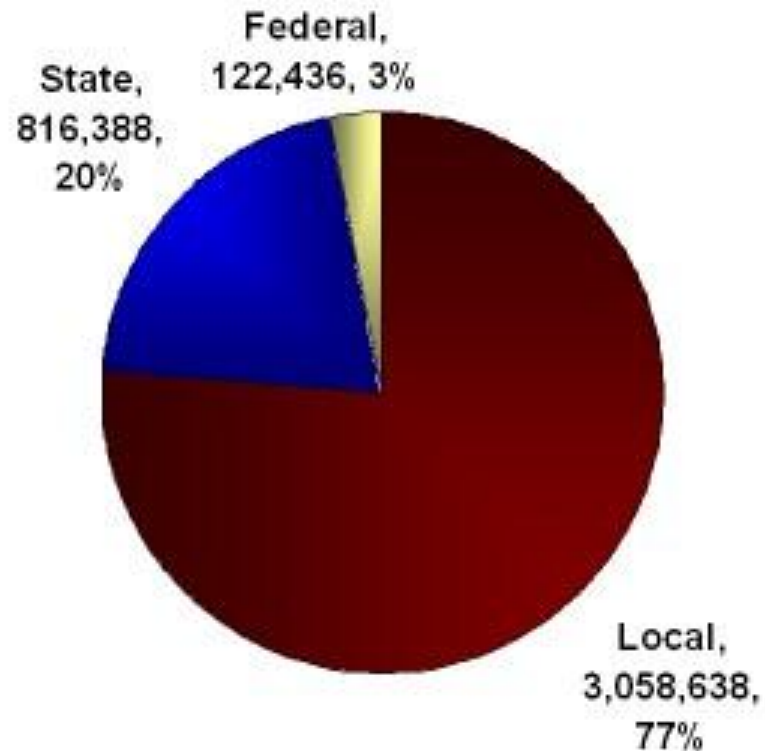
FHWA Pavement & Materials Technology Program

An Overview

Northeast and Mid-Atlantic States
In-Place Recycling Conference
Harrisburg, PA
August 24, 2010

Public Road Network

- System Role
 - Personal Trips
 - Freight Movement
 - Deliveries
 - Intermodal Connection
 - Rapid Deployment
- Facts
 - 4 million miles
 - 76.5% local roads
 - 3 trillion VMT



Keeping America Moving

To improve mobility on our nation's highways through national leadership, innovation and project delivery

- National Highway System

- 1991 ISTEA
- Interstate System
- Key Corridors
- Principal Routes

- Facts

- 160,000 miles
- 4.1% US mileage
- 44.8% total travel
- 61% Flexible



System Performance



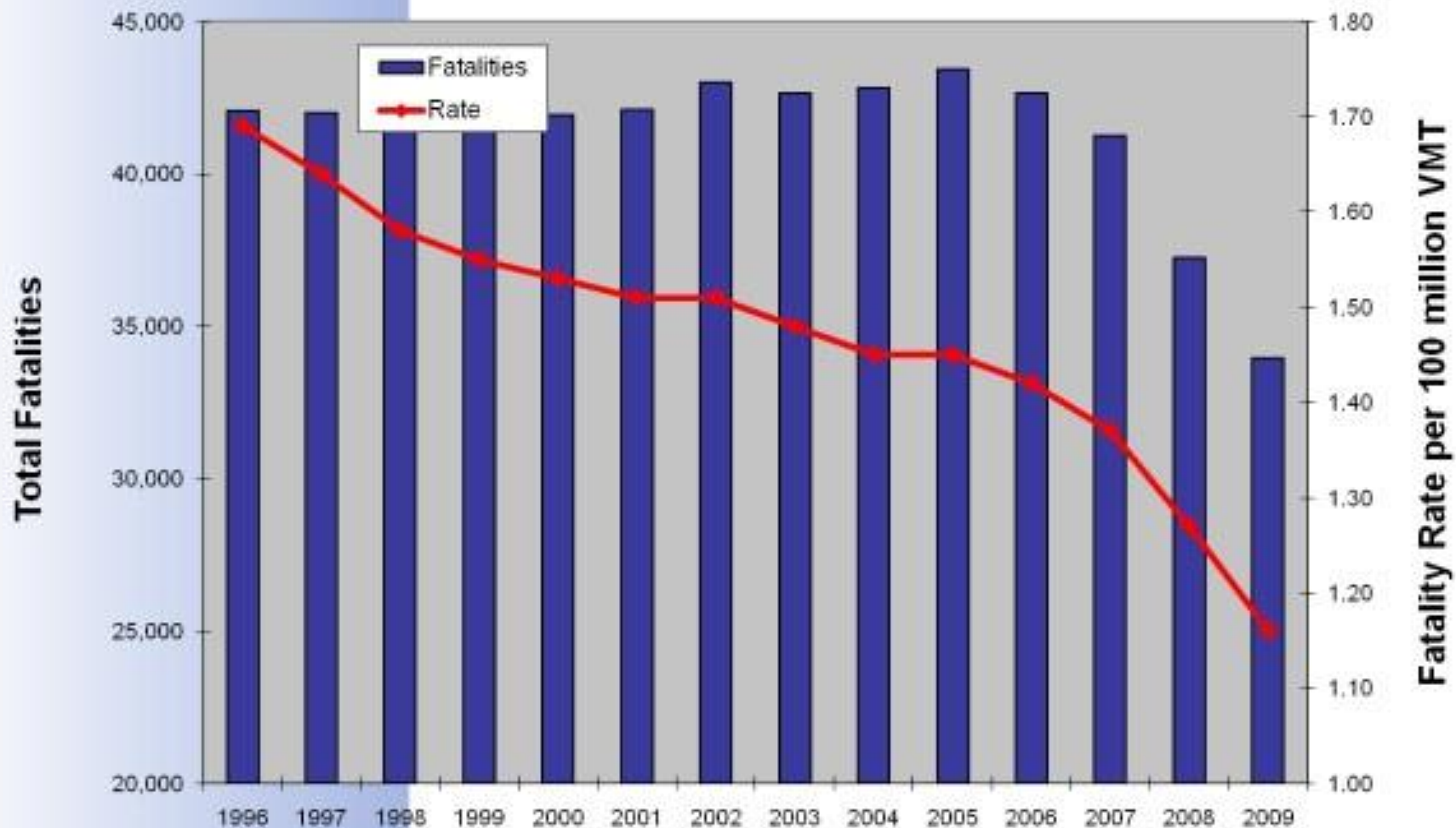
- Safer Travel
- Reduced Travel Time (congestion)
- Improved Freight Mobility
- Healthy Bridges and Pavements
- Sustainable Network

System Performance

- 33,963 fatalities
- 1.16 fatality rate
- 27% congested travel
- 26% deficient bridge area
- 8% structurally deficient bridge area
- 57% of pavements with good ride
- 8% of pavements with poor ride

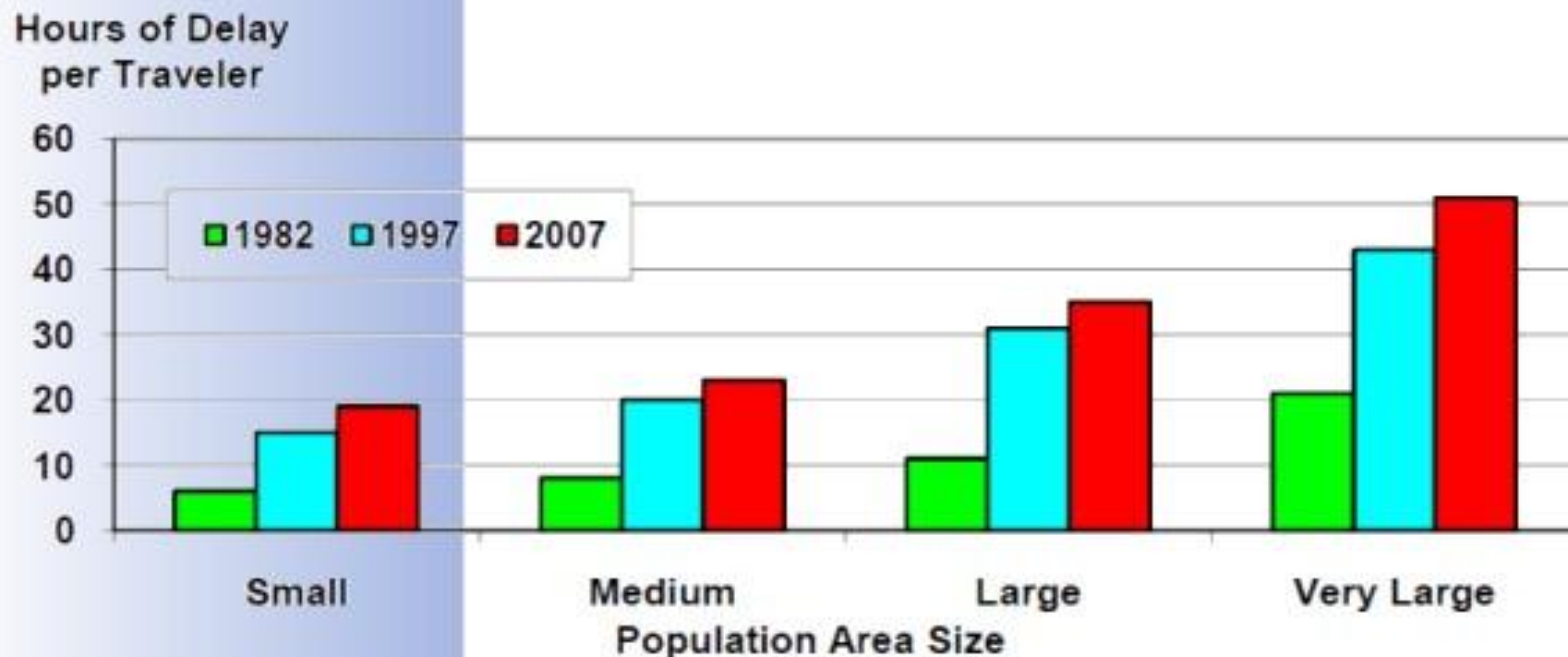


Fatality Trends



Congestion Trends

Trends of Annual Delay During Peak Hours

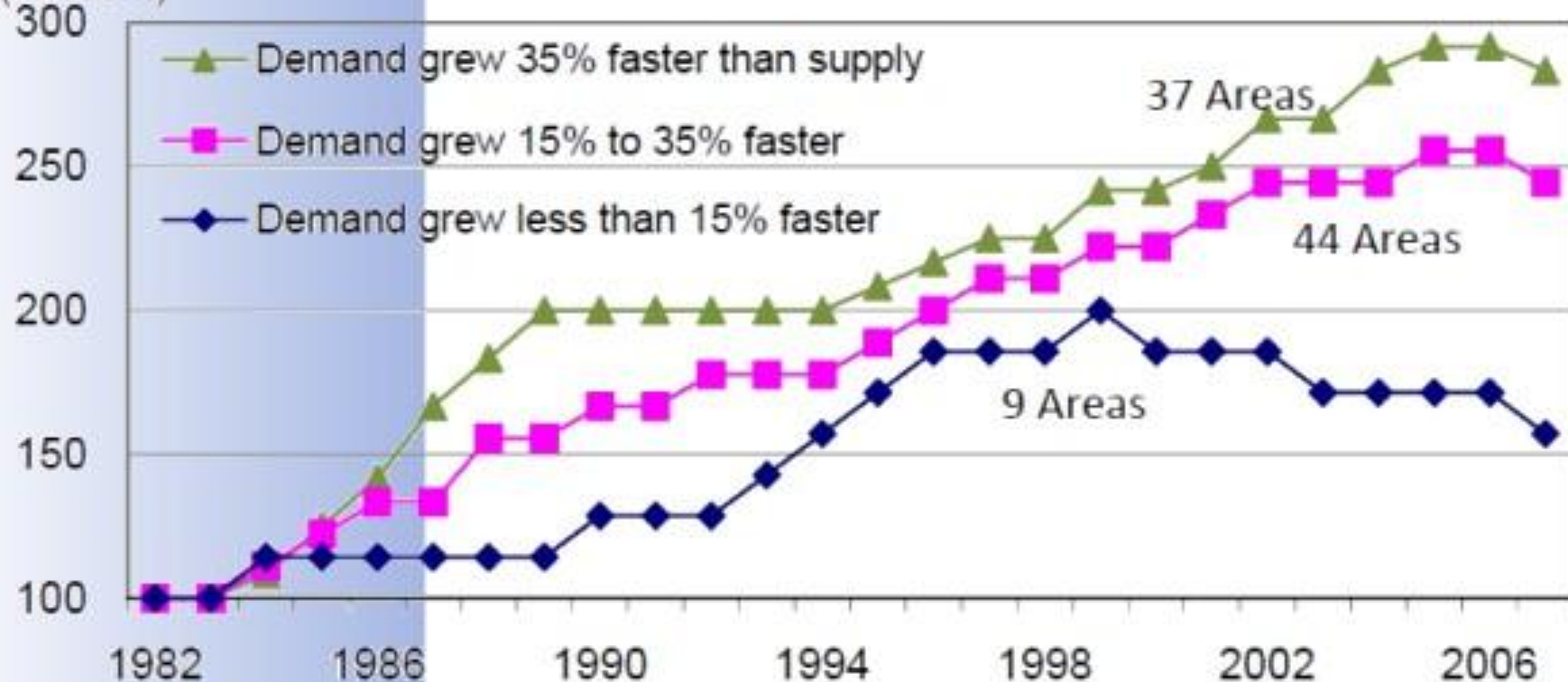


Texas Transportation Institute Report: Urban Mobility Report, 2009

System Expansion vs. Mobility

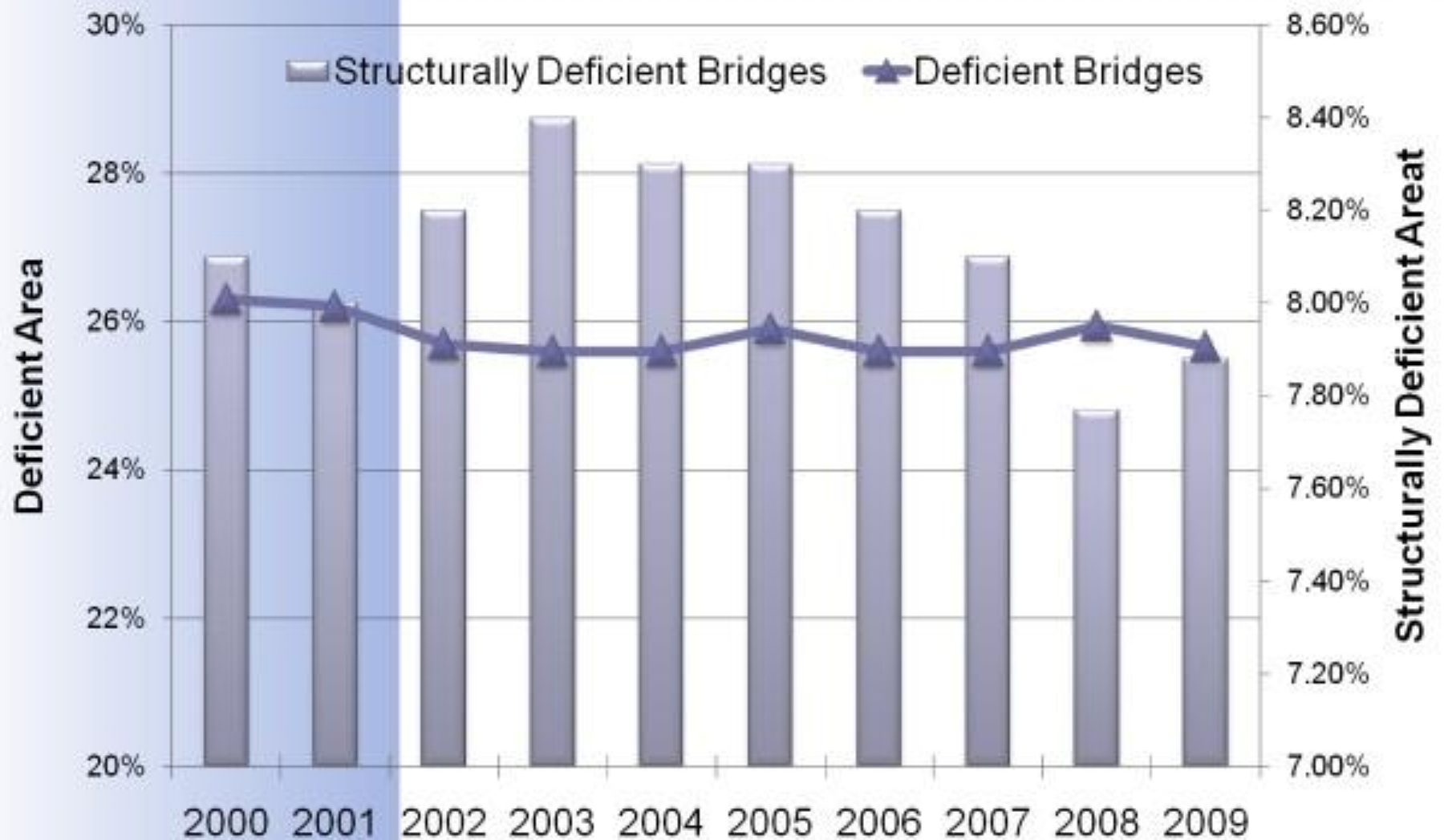
Road Growth and Mobility Level

Increase in Congestion
(Percent)



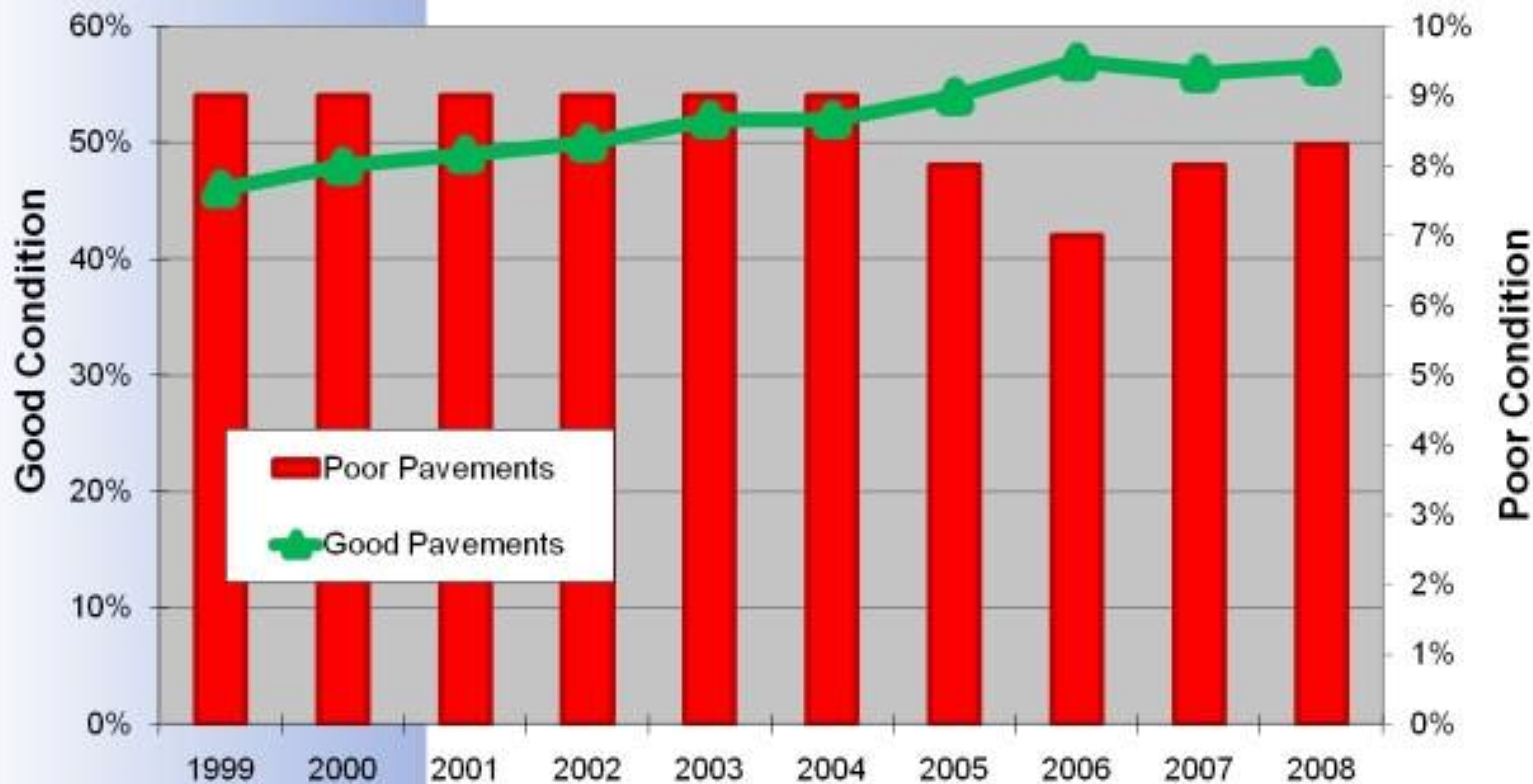
Texas Transportation Institute Report: Urban Mobility Report, 2009

NHS Bridge Condition Trends



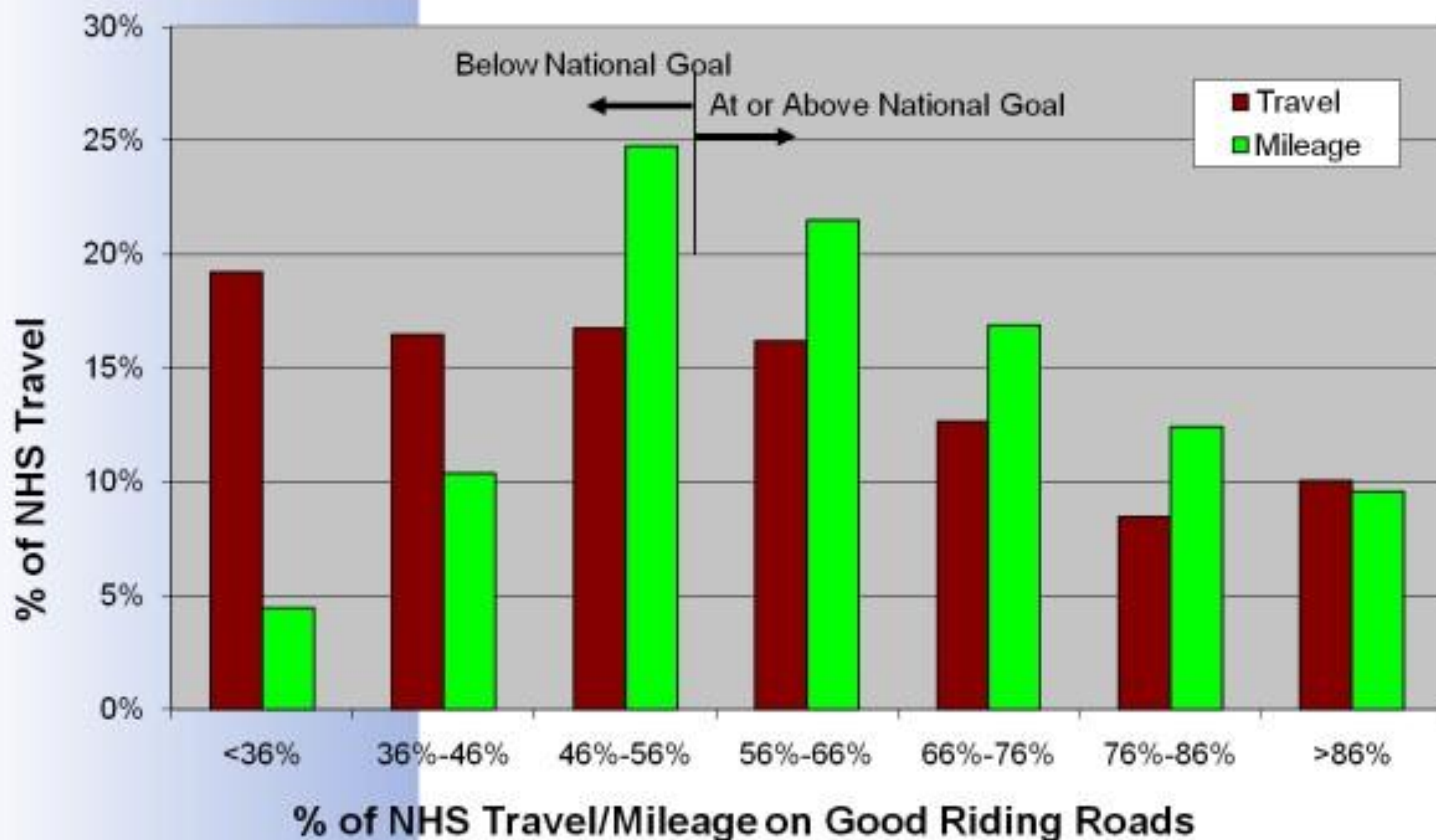
Pavement Condition Trends

Infrastructure Trends



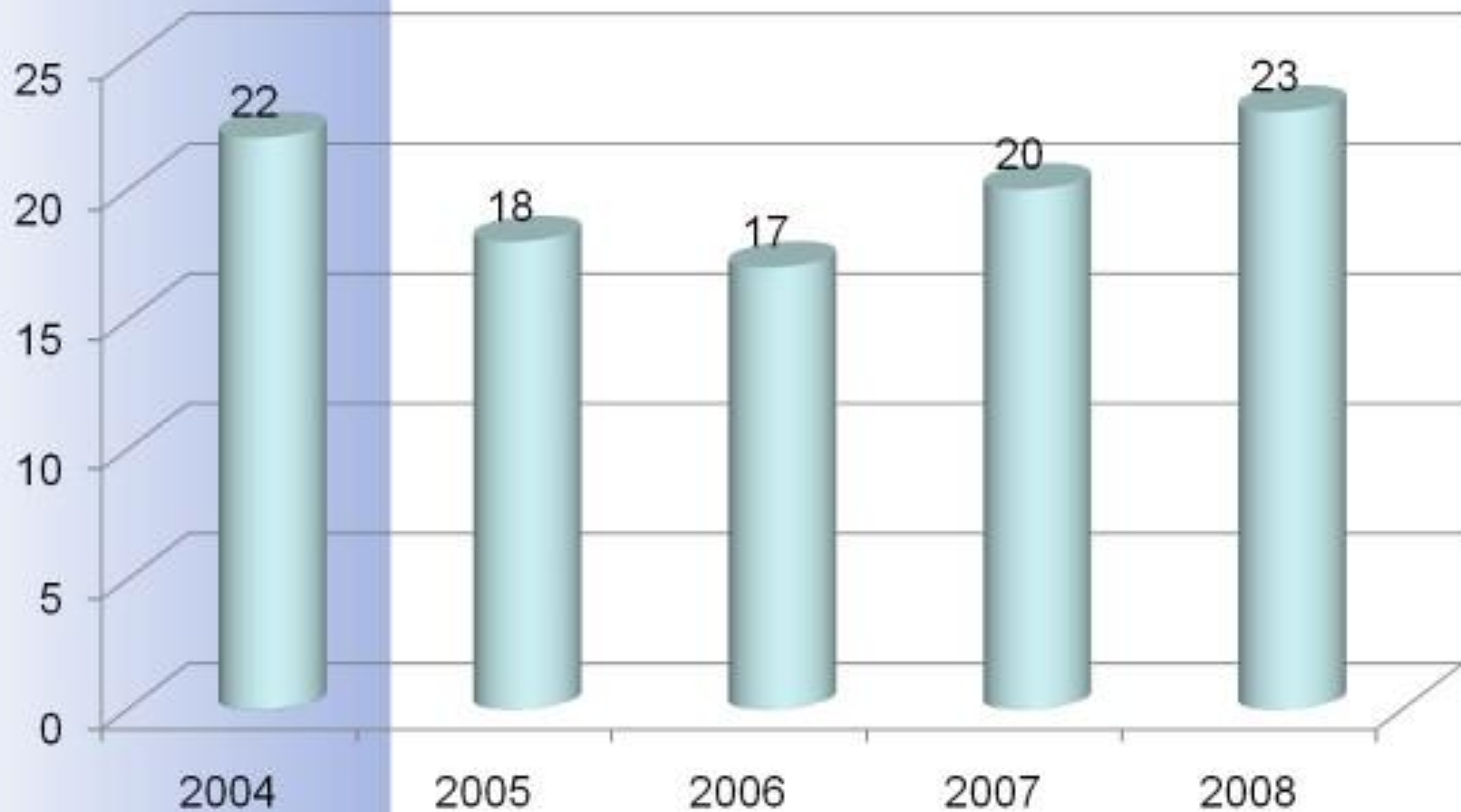
Distribution of Ride Quality

Distribution of NHS Travel on Good Riding Roads



Annual Decline in Ride Quality

States with Annual Decline in Ride Quality



FHWA Pavement & Materials

Protecting the Investment

Preserving our existing pavement network to ensure it delivers mobility today.



Building for the Future

Rapidly renewing pavements to extend service life to deliver mobility for future generations.

Six Focus Areas

- 
1. **Pavement Design and Analysis**
 2. **Materials and Construction Technology**
 3. **Pavement Management and Preservation**
 4. **Surface Characteristics**
 5. **Materials and Construction Quality Assurance**
 6. **Environmental Stewardship**

Sustainable Pavement Practices

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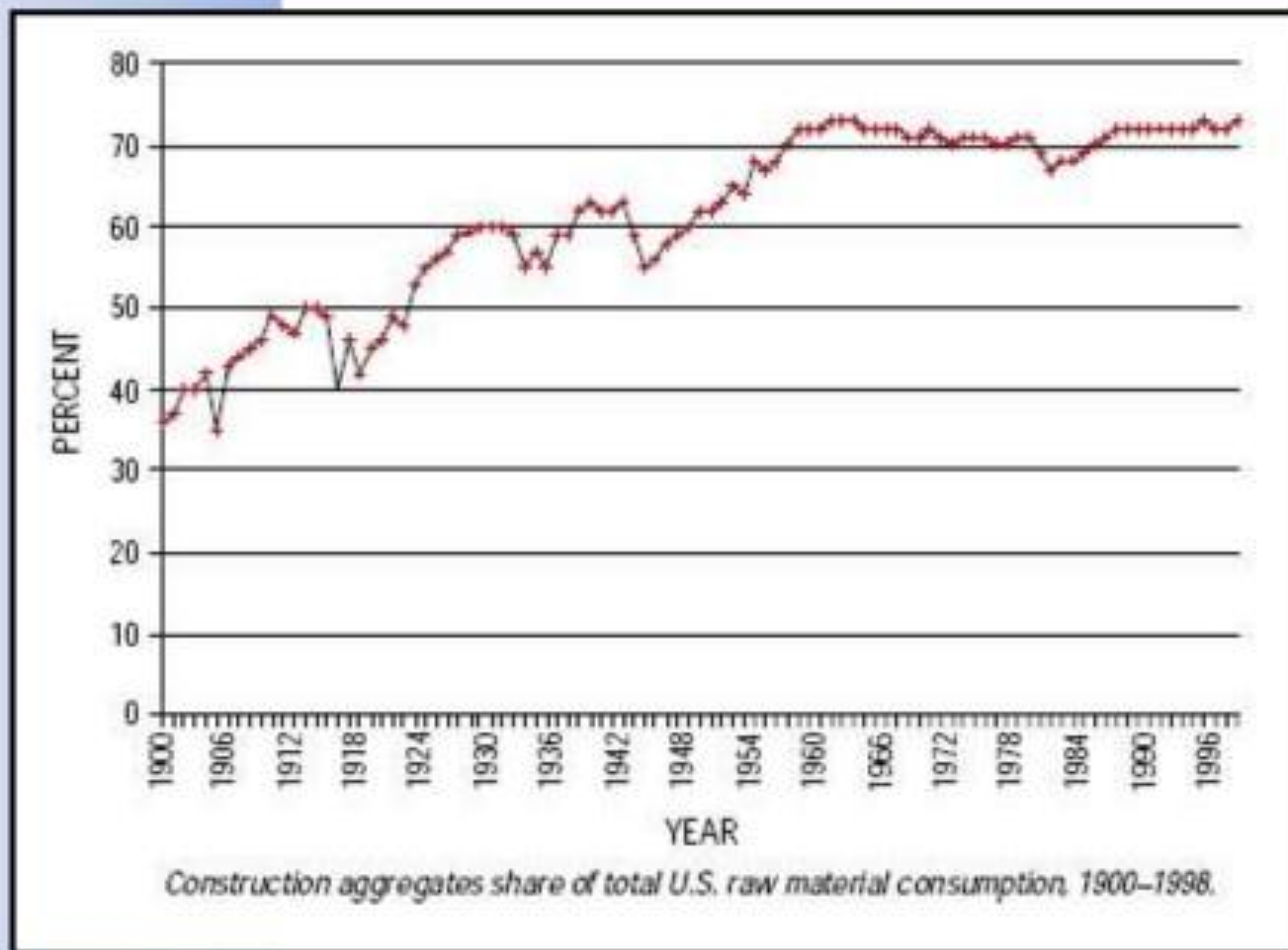
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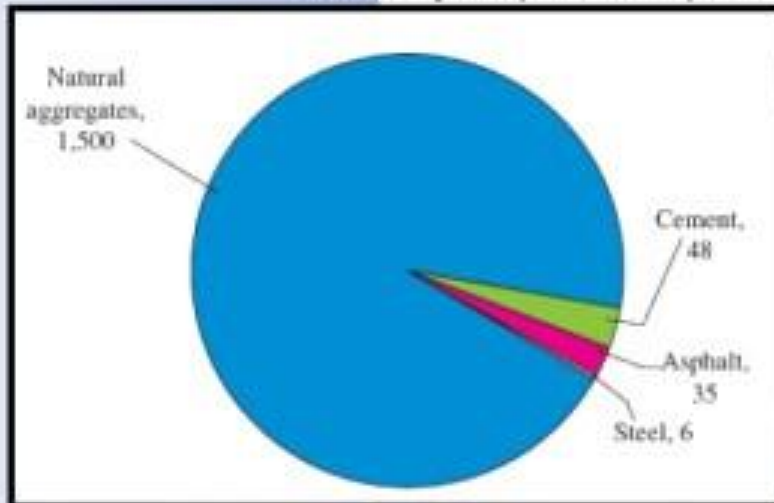
Aggregate Consumption



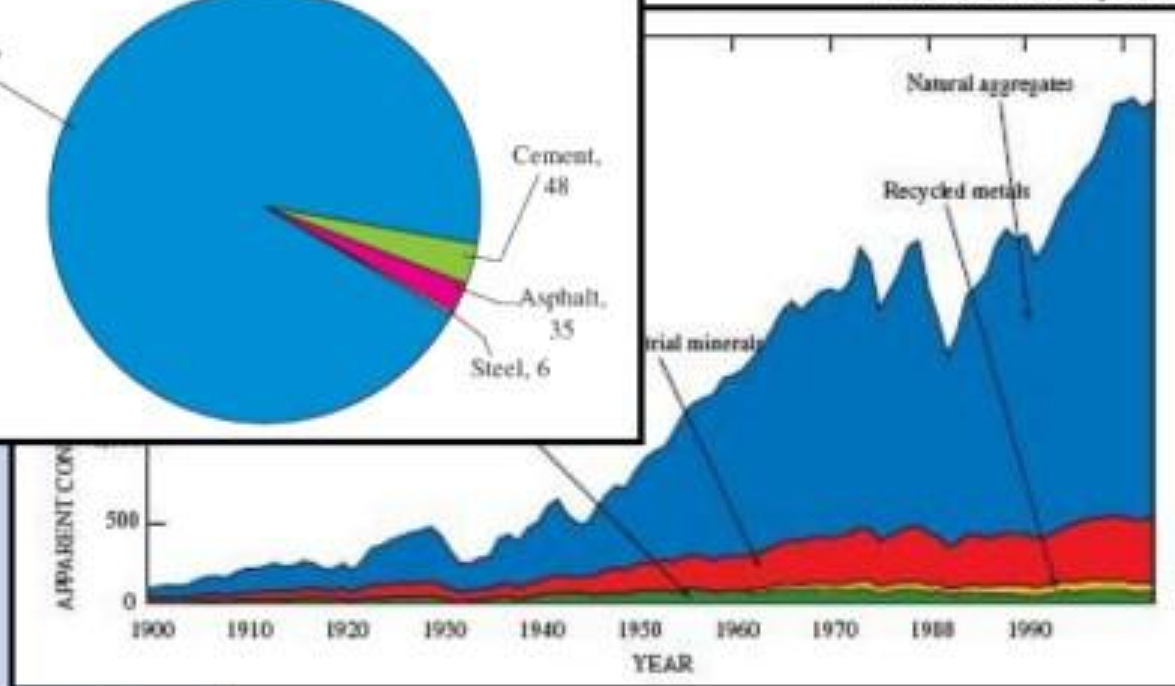
USGS Recycled Aggregates – Profitable Resource Conservation

Aggregates in Pavements

NHS Highway Consumption



Total Consumption

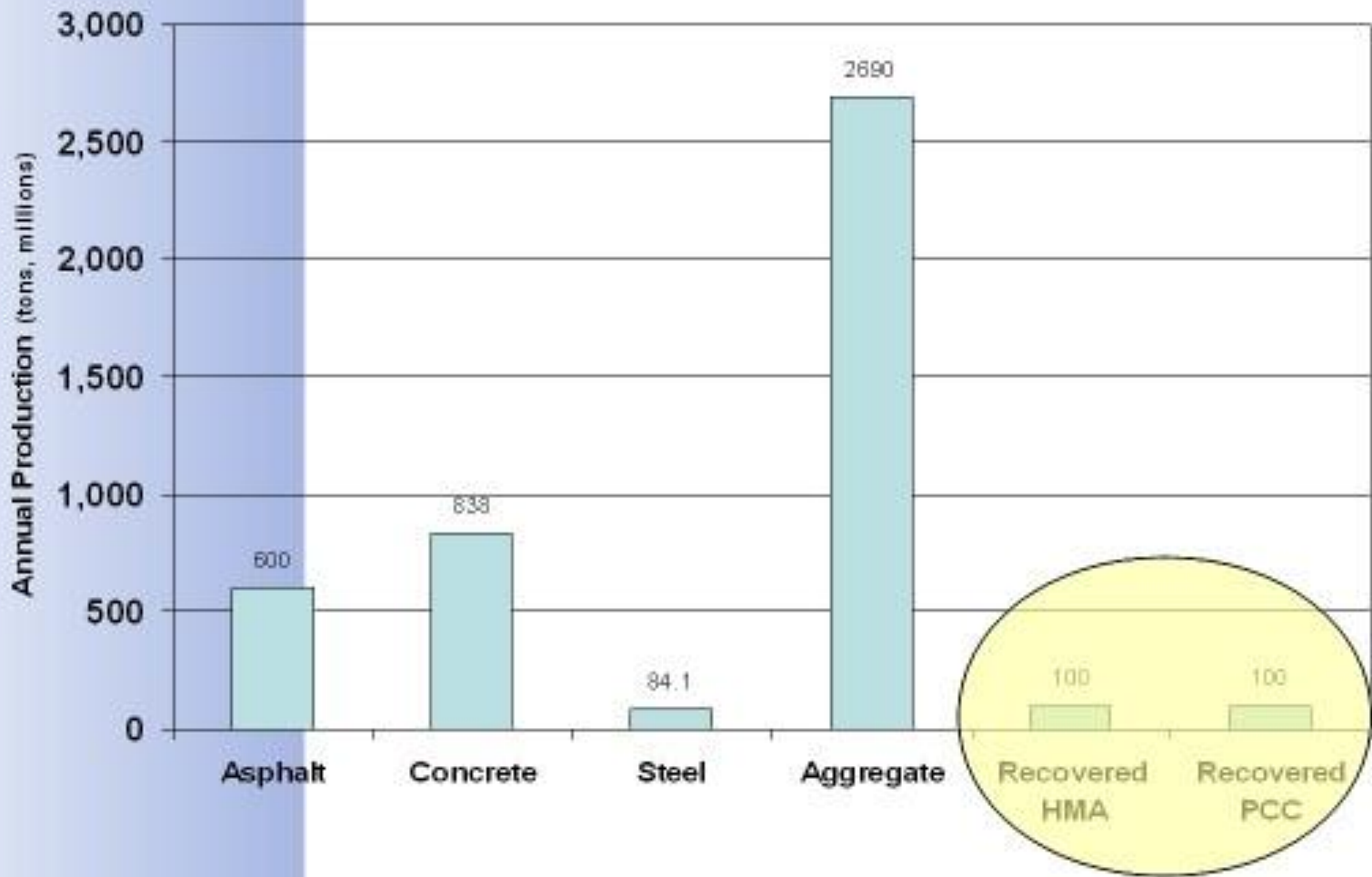


Demand for Materials

- 160,000 mile National Highway System
- 4 million miles of public roads
- Produce over 600 million tons of HMA annually & 85+ million SY of concrete for paving annually
- \$70 billion capital outlay to maintain pavements
- Demand for aggregates considerable requiring an estimated 700+ million tons to meet annual demand (15%-25% of annual production)



Material Production Quantities - US



FHWA Policy - 2002

- Recycled/Re-Use materials are viable resources
- Recycled materials should get 1st consideration
- Consider use of recycled materials early in the planning/design process
- Economic benefits should be considered in the material selection process
- Restricting the use of materials should be technically based
- Material should not adversely impact the environment and should perform as intended

FHWA Priority Areas

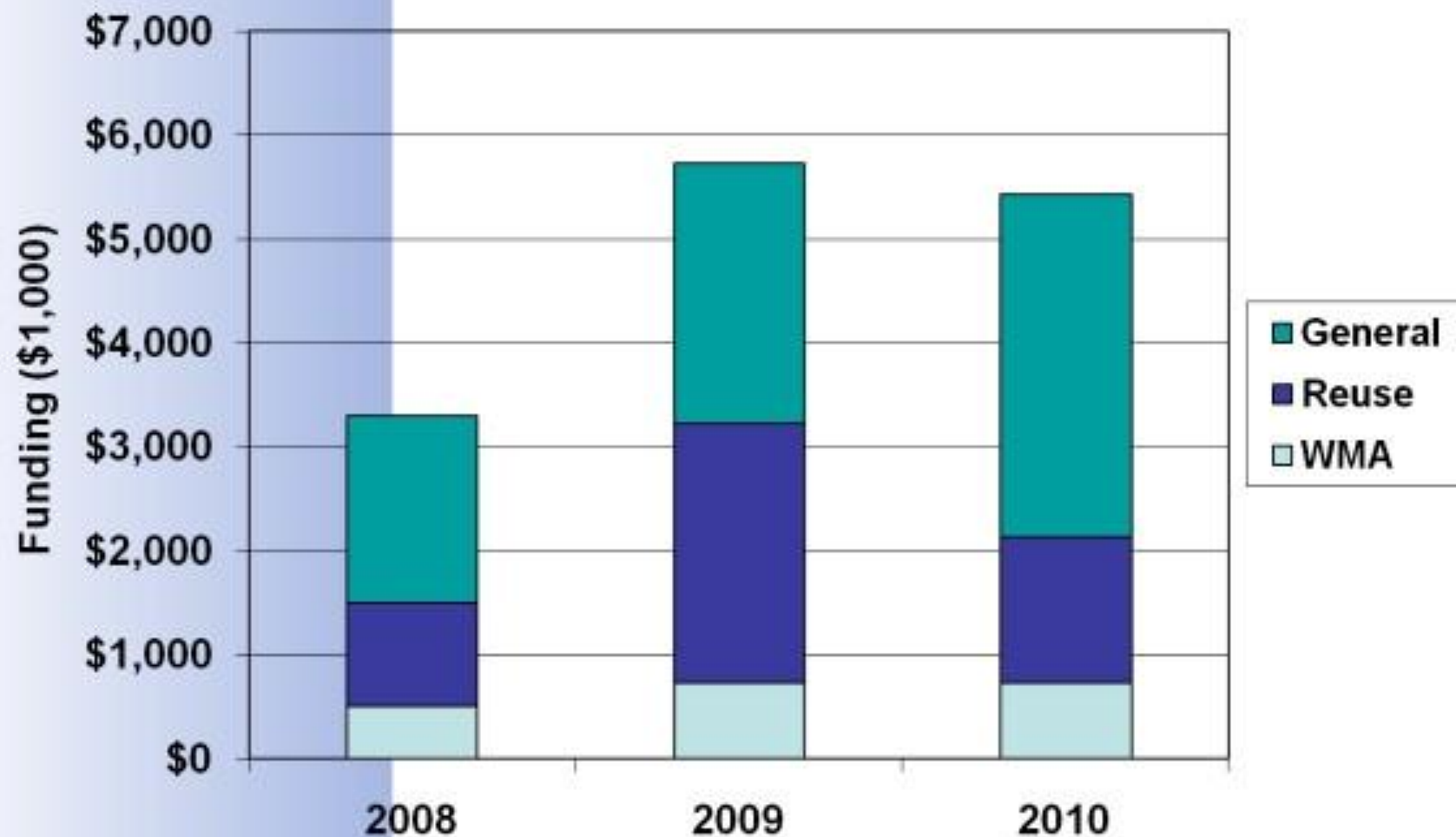
- Recycled Material Use
 - Reclaimed Asphalt Pavement (RAP)
 - Reclaimed Asphalt Shingles (RAS)
 - Recycled Concrete Aggregate (RCA)
 - *In-Place Recycling*
- Warm Mix Asphalt
- Quantifying Sustainable Benefits



Desired Outcomes

- Develop a methodology to incorporate the benefits of sustainable practices into the Pavement Type Selection
- Issue technical report on methods to more effectively utilize marginal materials
- Increase the percentage of states using 25% or more RAP in HMA
- Implement method to capture recycled materials quantities
- Develop national targets for RCA and RAS
- Increase the adoption of WMA as a standard
- Deliver top priorities of pavement preservation roadmap

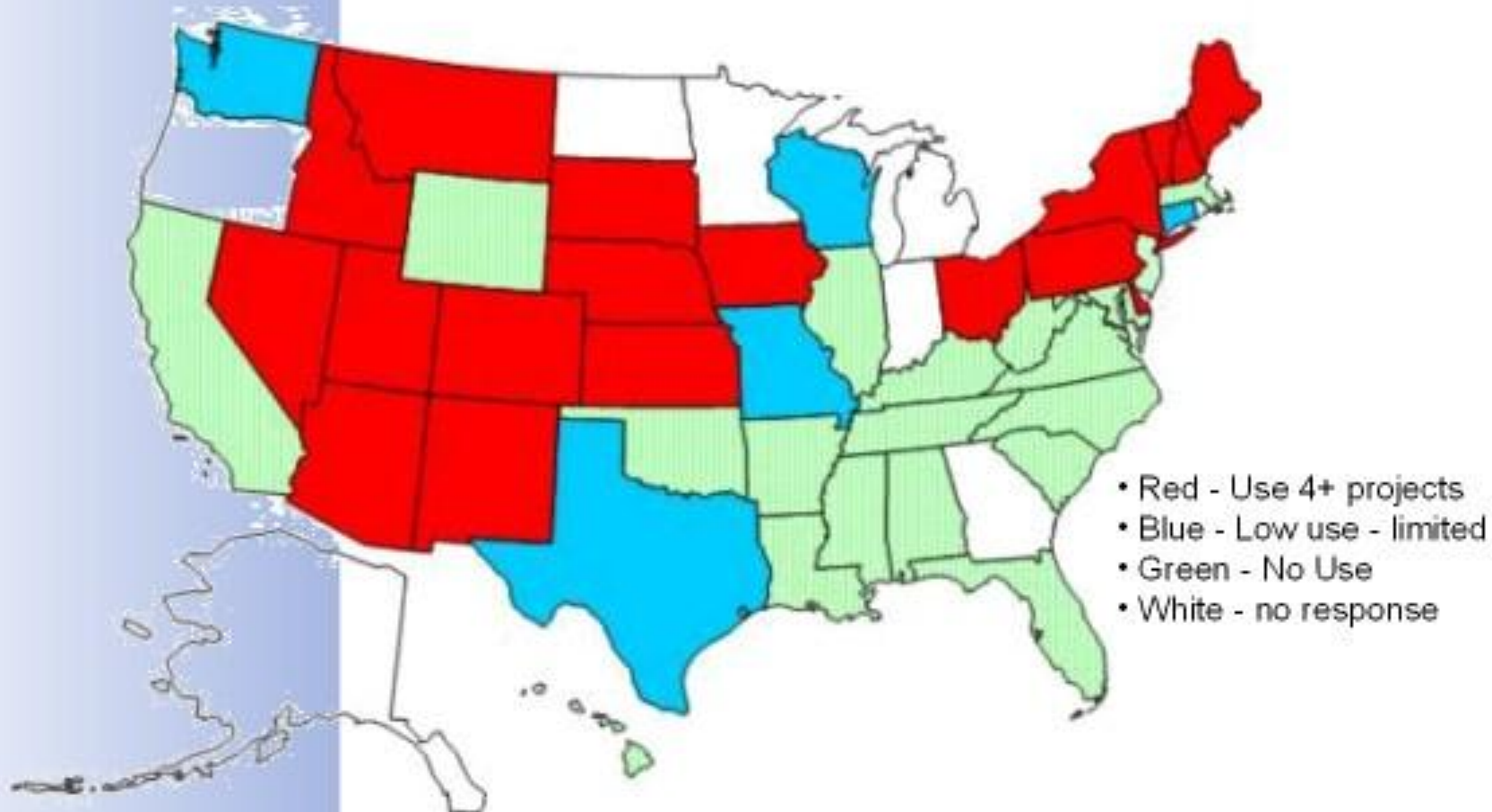
Program Environmental Efforts



Efforts

- Expert Task Groups
- Technical Support
- Documentation of Best Practices
- Specification Development
- Performance Evaluation
- Sustainability Measures
 - Carbon Footprint (outcome)
 - Technology/Material Use (outcome)
 - Deployment Progress (output)

Cold-In Place Recycling Use



In-Place Recycling Initiatives

- Update NHI “Asphalt Pavement In-Place Recycling Technologies” Course
- Update Basic Asphalt Recycling Manual (BARM)
- Recycled Materials Resource Center
- Support of Regional In-Place Technology Workshops
- Methodology to Consider Sustainability in RealCost
- Sustainability in Asphalt and Concrete Pavements
- Providing more information over the internet

State of Deployment 2009

Reclaimed Asphalt Pavement

States that *Permit*
more than 25% RAP



States that *Use*
more than 20% RAP



Over 80% State DOTs *permitted* high RAP (> 25%) in the intermediate and surface layers.

About 42% actually *used* more than 20% RAP in the intermediate and surface layers.

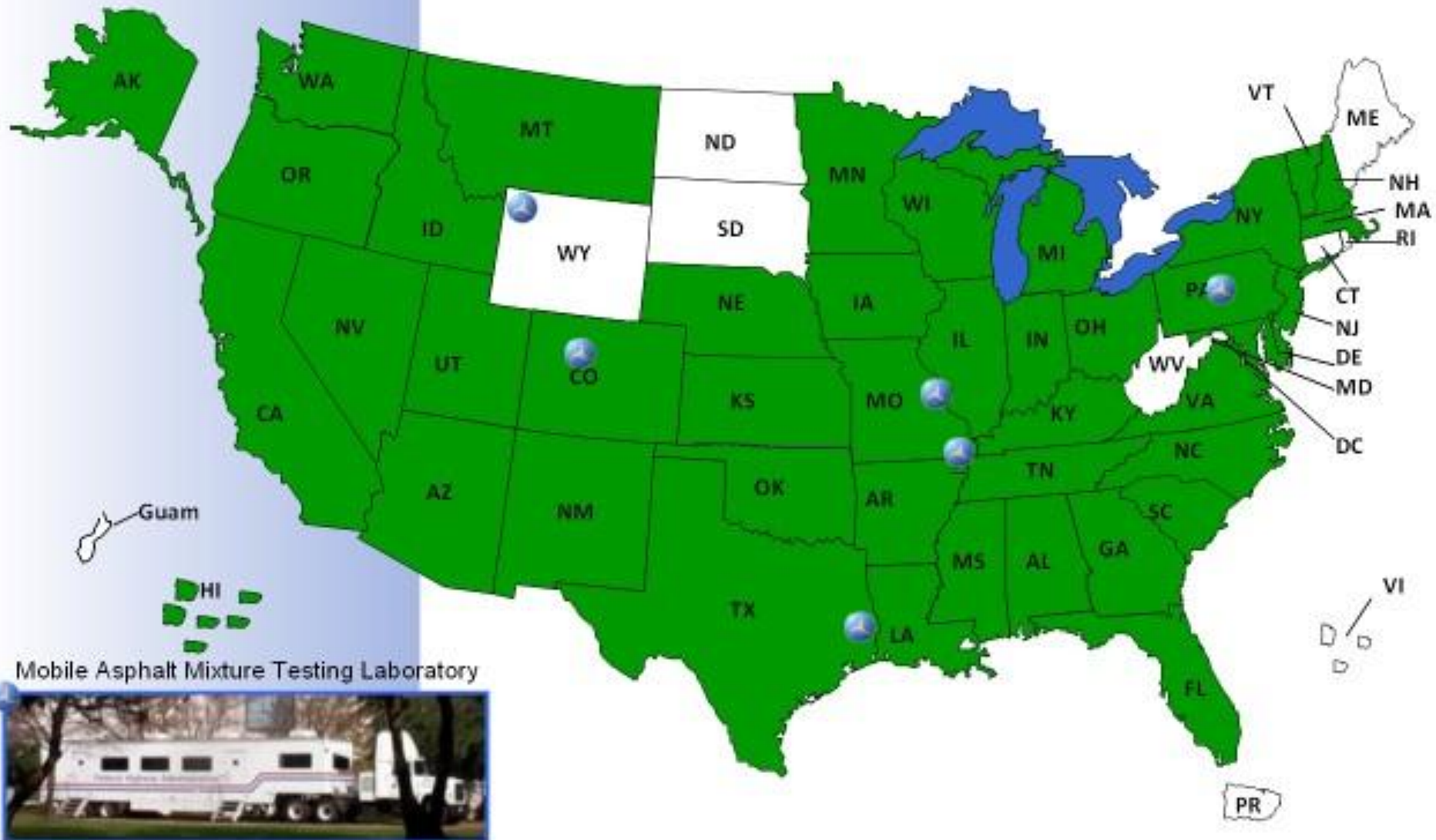
Things are improving...

[illegible]

- 23 States now have experience with high RAP mixes
- 11 States have experience with high RAP and Warm Mix Asphalt mixes

WMA Trials & Demonstration Projects

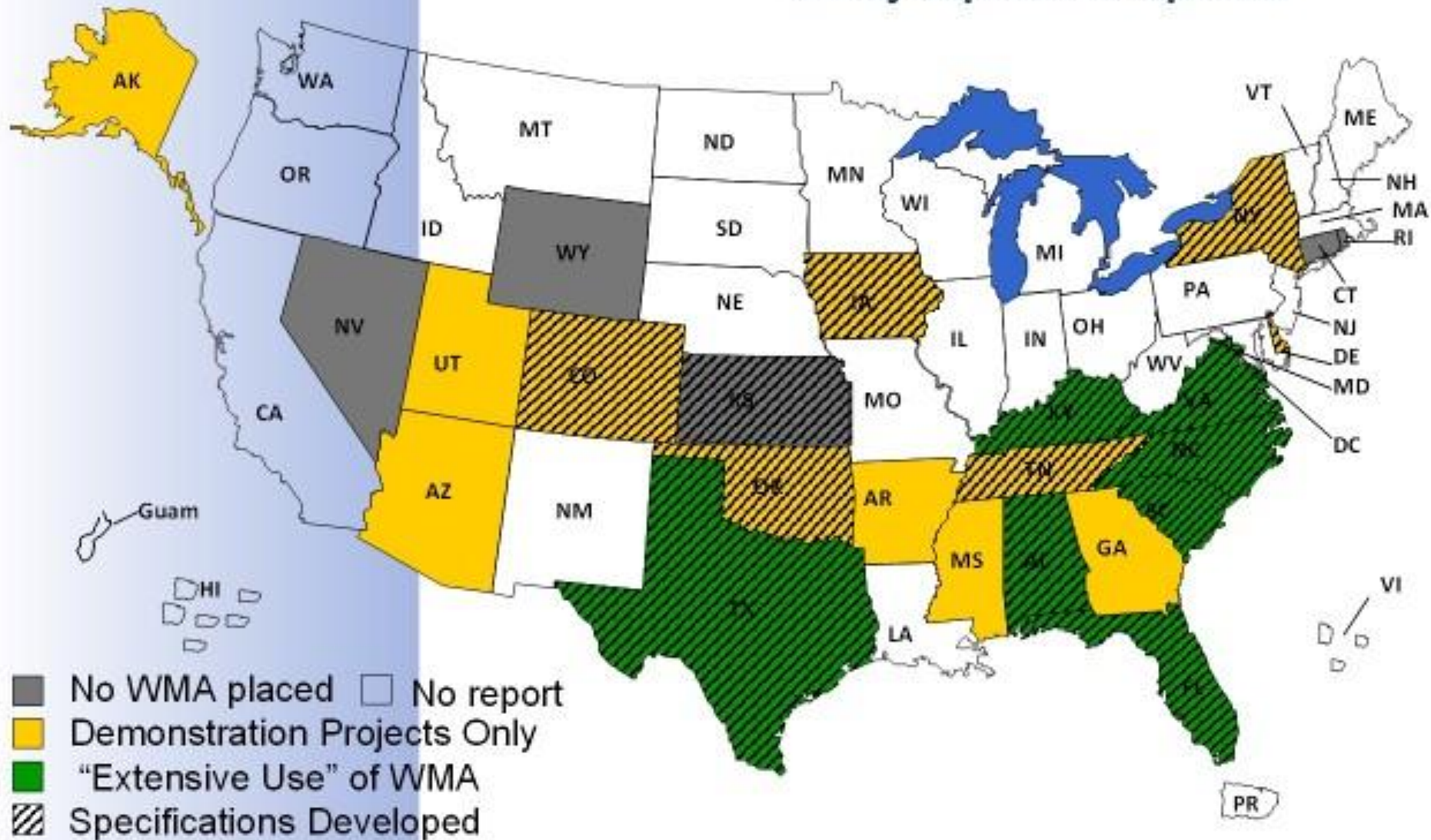
Jan 2010 - All Sources (not limited to DOT projects)



DOT WMA Projects & Specifications

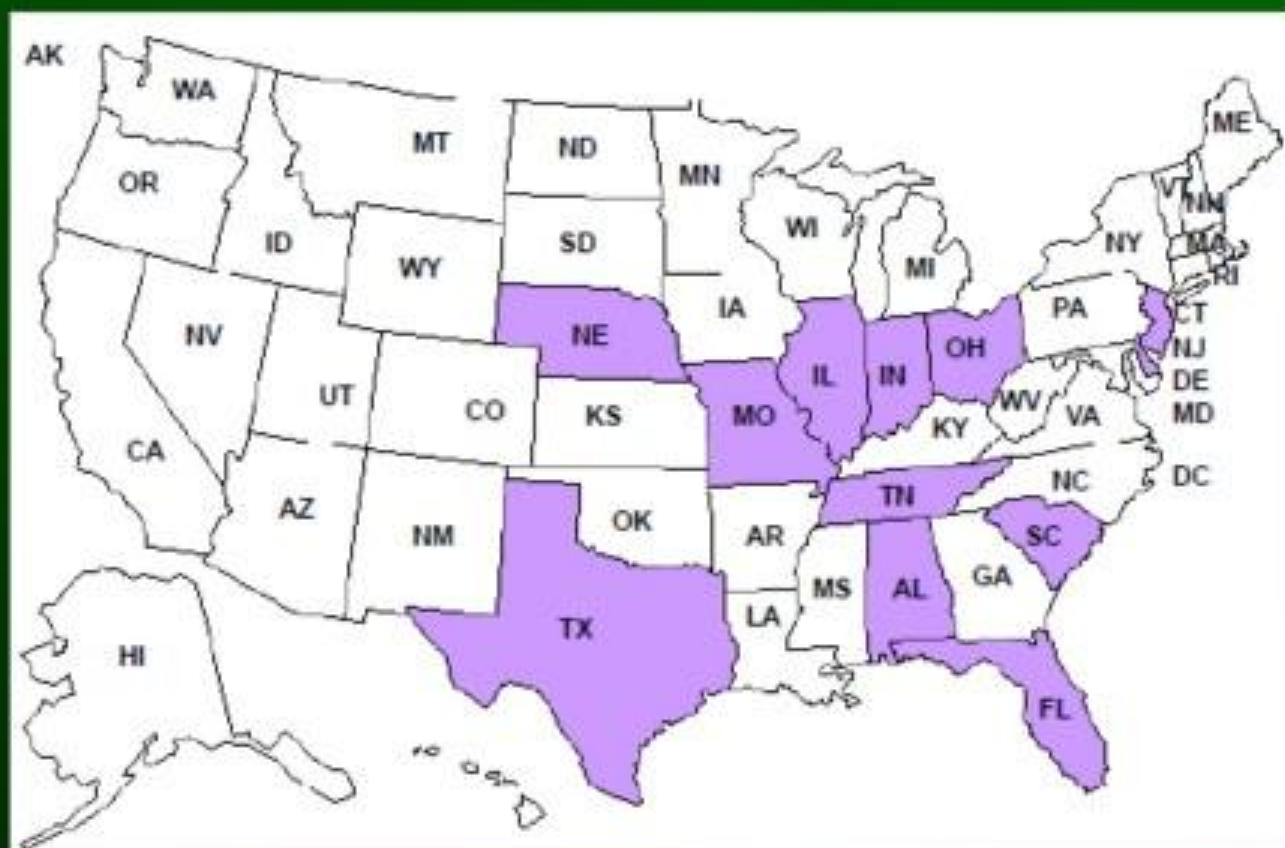
as of March 2010 - (limited to State DOT projects only)

50% of respondents reported

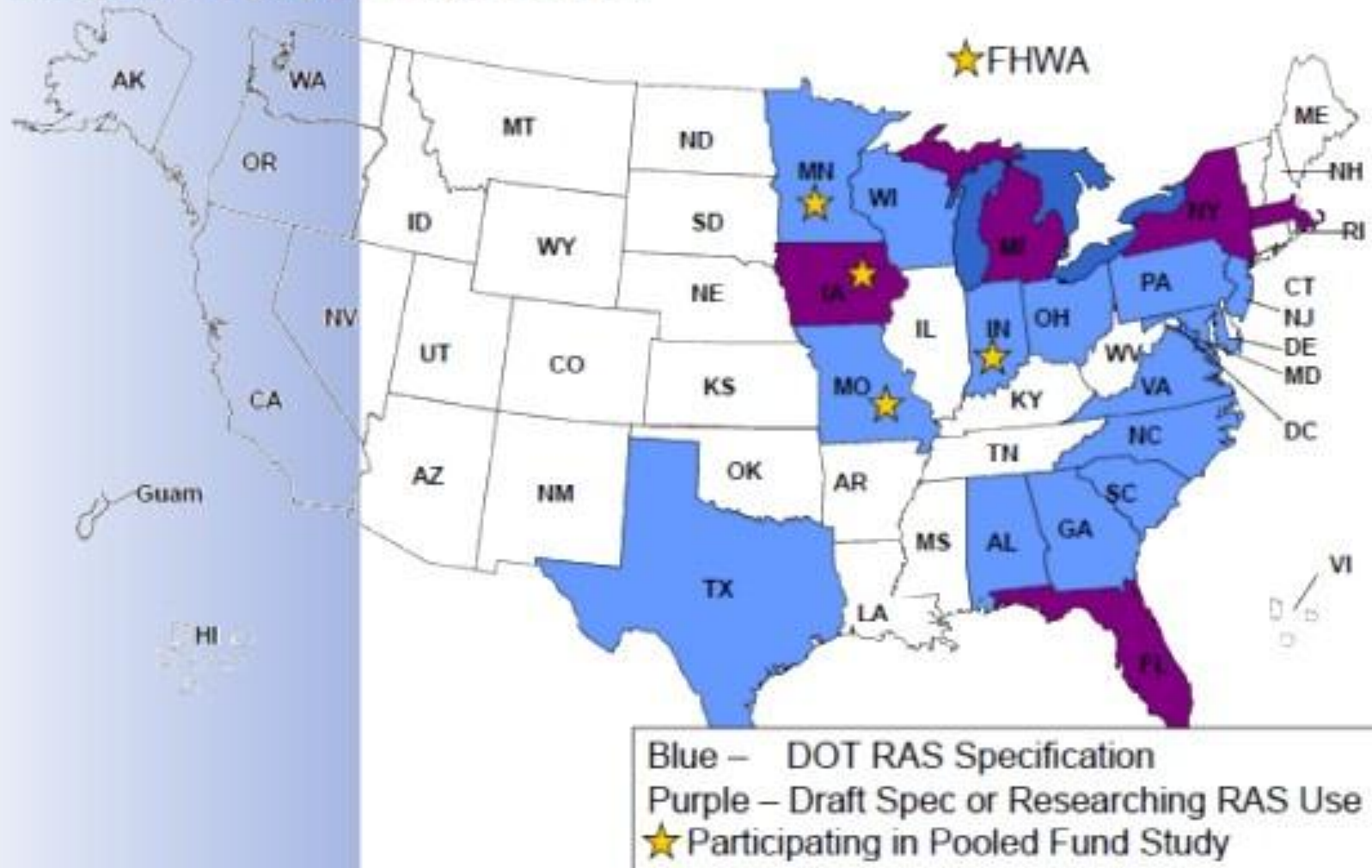


RAP and WMA Use

States That Have Tried WMA & Higher RAP



Recycled Asphalt Shingles (RAS)



RCA Use - 2002



Figure 1 Recycling concrete as aggregate



Figure 2 Base Aggregate



Figure 3 PCC aggregate



Figure 4 HMA aggregate

Criteria & Tools for Sustainable Highways

- Evaluate and Establish Criteria
- Develop a Tool to Apply Criteria
- Establish an Evaluation Method
- Completion – September, 2010
- Peer Exchanges – May, June
- Credit Approach
- Contact – Connie Hill
 - 804-775-3378, Connie.Hill@dot.gov



Looking to the Future

- Pavement and Materials Technology
 - FY2010 Planning underway
 - Stakeholder input (increased visibility)
- “Green” Design and Construction
- Performance Based Program
 - Use of Federal Funds
 - Process
 - Reporting
 - Accountability

Thank You



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