

# Welcome to California!

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California Department of Transportation

Western States In-Place Recycling Conference  
September 11, 2012



# What is Sustainability?

**“Meeting the needs of the present without compromising the ability of future generations to meet their own needs”**

World Commission on Environment and Development, 1987

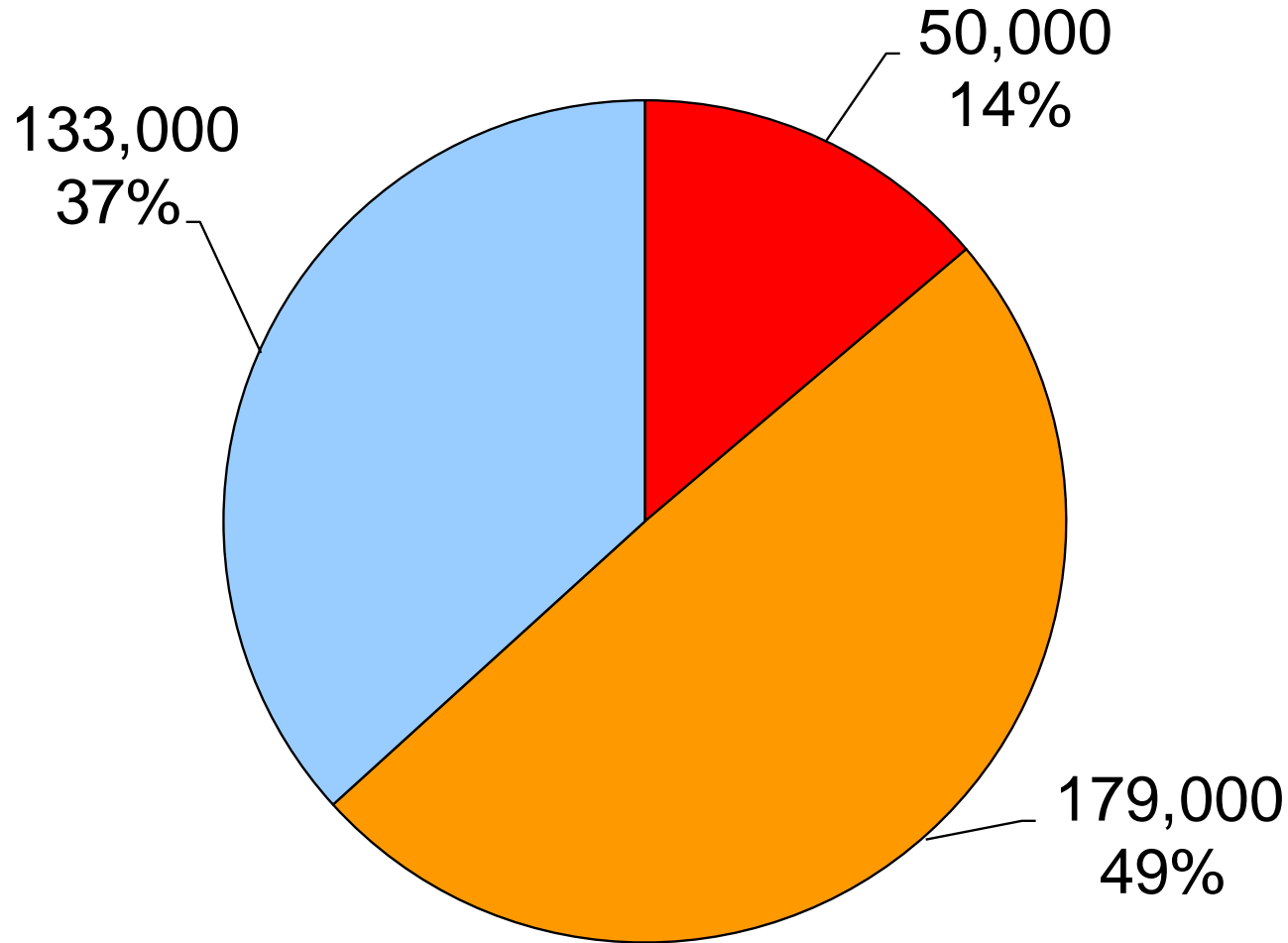


# Assembly Bill (AB) 32

- AB32 established GHG emission reductions similar to the Kyoto Protocol
- Caltrans worked on Climate Action Team Subgroups



# California Highway System Inventory



■ Caltrans ■ Cities ■ Counties

**Total state network: 362,000 lane miles!**



# Pavement Condition 2011

- 1. Good to excellent: 26,000 miles (53%)**
- 2. Fair: 11,000 miles (22%)**
- 3. Poor: 12,000 miles (25%)**
  - ❖ Major structural: 5,500 miles (11%)
  - ❖ Minor structural: 6,500 miles (14%)

# Caltrans Sustainable Pavement Initiatives

## 1. Asset management:

- ❖ Focus on pavement preservation

## 2. Minimize impact on environment:

- ❖ Long-life pavements: concrete and asphalt

## 3. Explore and employ sustainable technologies:

- ❖ Precast, JPCP, CRCP, SCM and recycling concrete
- ❖ RHMA, WMA, RAP, RAS and in-place recycling

## 4. Resources

# Asset Management

## 1 DATA COLLECTION

EVERY ROUTE



**Comprehensive Pavement Structures**  
GPR: Ground Penetrating Radar



**Distress Identification**  
APCS: Automated Pavement Condition Survey

One Time

Annual

## 2 ROUTE SEGMENTATION

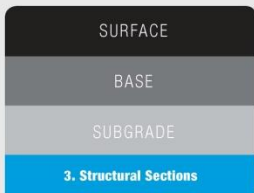
EVERY ROUTE



1. Truck Traffic



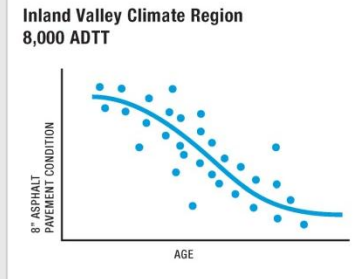
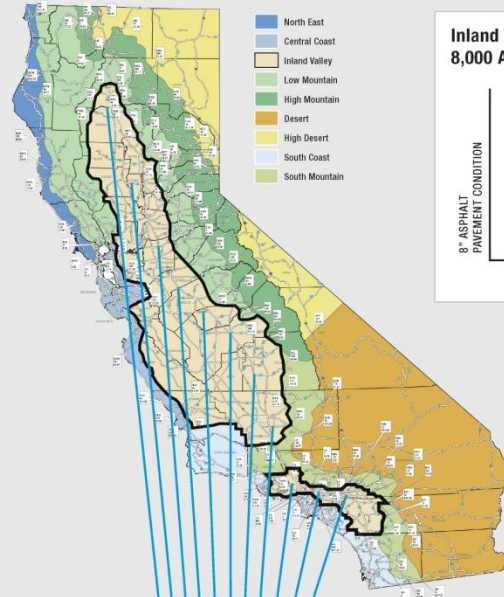
2. Climate Regions



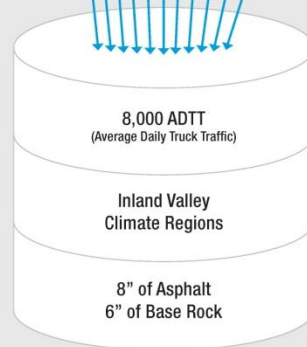
3. Structural Sections

## 3 MODELING

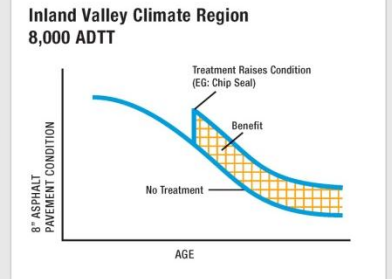
NINE CALTRANS PAVEMENT CLIMATE REGIONS



ASPHALT PERFORMANCE MODELING EXAMPLE



## 4 DATA OUTPUT/WORK PLAN



CONDITION PREDICTION FROM ONE OF 330 PERFORMANCE MODELS

What?	Where?	When?
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Which treatments to apply	To which sections	In which year

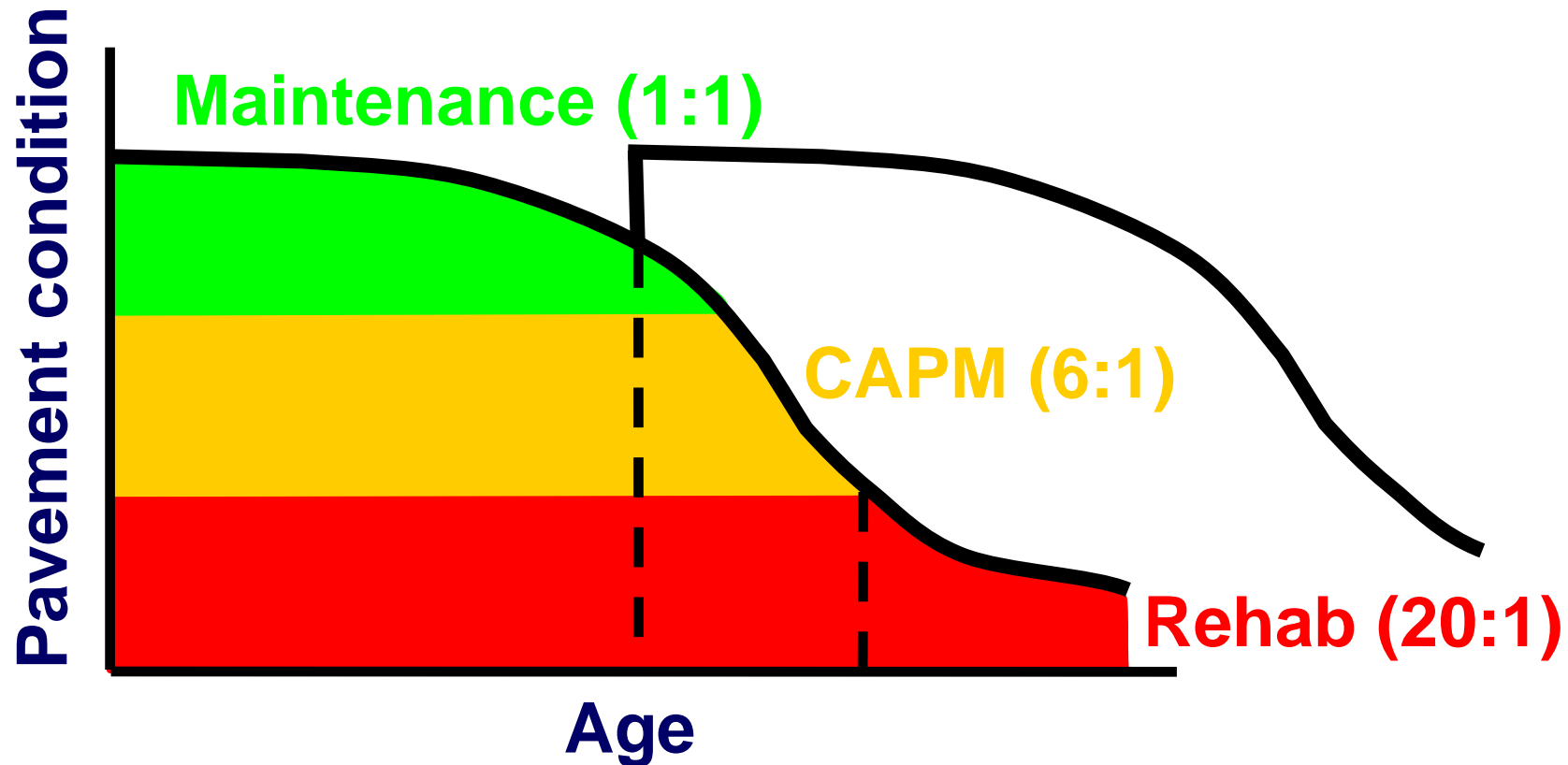
**COST/BENEFIT:**

1. How much will it cost to get the roads to a certain condition?
2. What condition will the pavement be in with the funding available?

ROUTE SEGMENTATION OF THE NETWORK COMBINES SIMILAR TRAFFIC, CLIMATE AND STRUCTURAL SECTIONS.

# Focus on Best (Good) First

- Extend the service life by preserving pavements when they are still in good condition





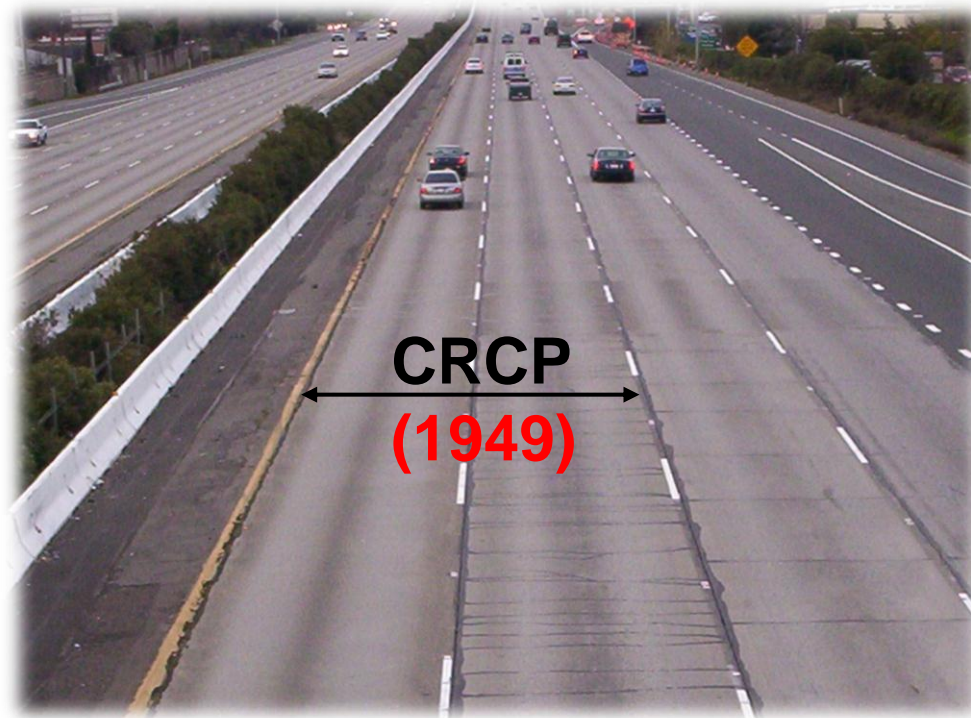
# Long-Life Pavement Projects

- Design approach:
  - ❖ **Concrete:** DARWin-ME
  - ❖ **Asphalt:** CalME
- Increased design life to 40 years

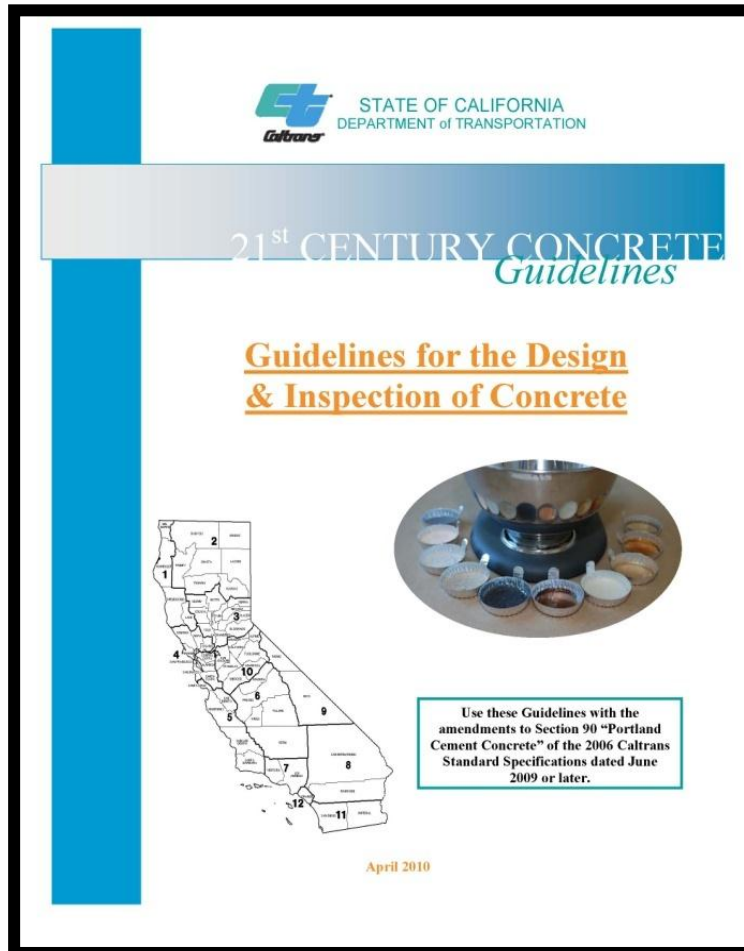


# Long-Life Pavement Projects (Cont.)

- Minimize impact on the environment by building long-life concrete and asphalt pavements:
  - ❖ **Concrete:** I-680, I-710, I-15 etc
  - ❖ **Asphalt:** I-710, I-5 and I-80



# Explore and Employ Sustainable Technologies for Concrete



# Explore and Employ Sustainable Technologies for Recycled Concrete Aggregate (RCA)

- Explore potential re-use of green or fresh concrete
- Development of new and revised standards
- Use of available materials

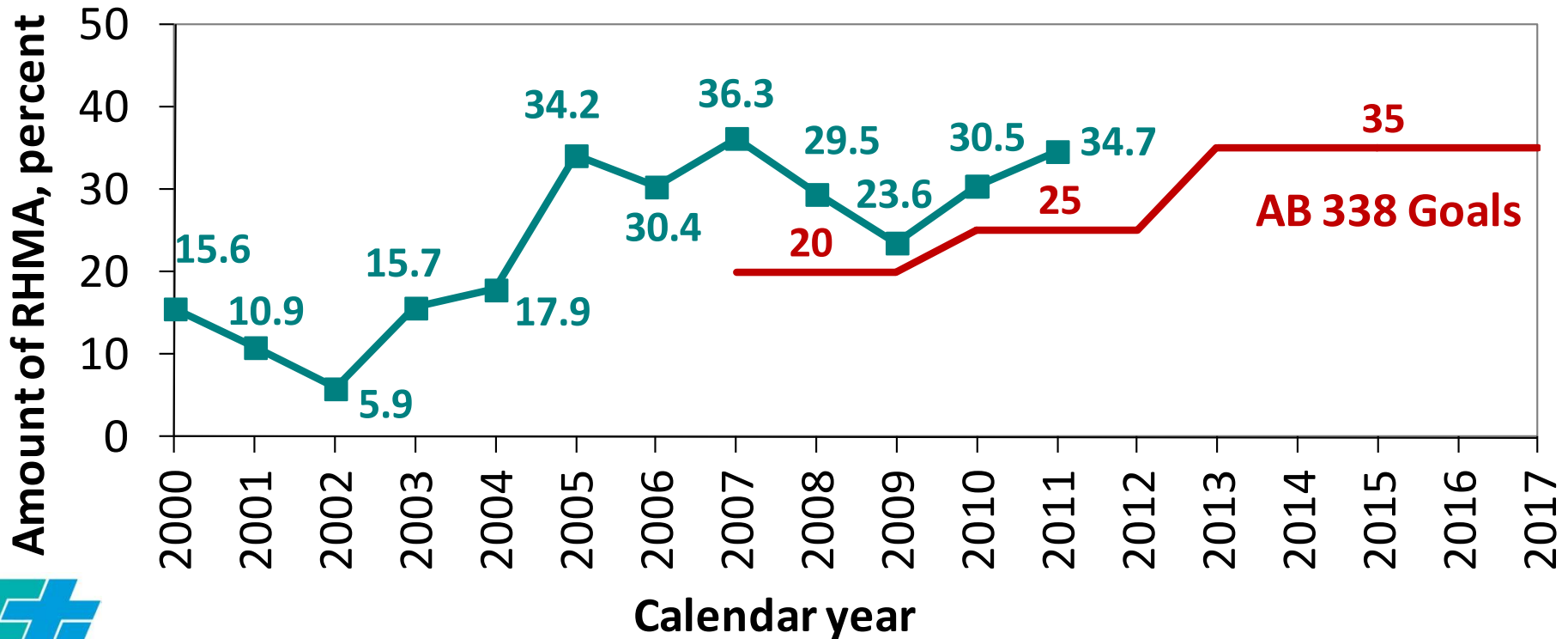


# Explore and Employ Sustainable Technologies for Asphalt



# Rubber Hot Mix Asphalt (RHMA)

- RHMA been successfully used in CA for over 30 years.
- CA generates more than 44 million scrap tires every year.
- A two-inch RHMA overlay uses about 2,000 scrap tires per lane mile.



# Warm Mix Asphalt (WMA)

## One Million Tons Paved in California



# Recycled Asphalt Pavement (RAP) & Recycled Asphalt Shingles (RAS)

- Adds recycled asphalt pavement to HMA mix
- Pilot projects in 2012/2013: High RAP and RAS
- Caltrans supports RAP because it is:
  - ❖ Cost effective
  - ❖ Reduces the aggregate use preserving landfill space
  - ❖ Reduces greenhouse gases emissions





# In-Place Recycling



# Pavement Memo on Recycling

State of California  
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

## Memorandum

*Flex your power!  
Be energy efficient!*

To: DISTRICT DIRECTORS

Date: June 18, 2012

From: AMARJEET S. BENIPAL  
State Pavement Engineer  
Pavement Program  
Division of Maintenance



File: Pavement Recycling

Subject: **Using In-Place Recycling for Sustainable Pavement Preservation on Class 3 Roads**

For sustainable pavement preservation, the Department of Transportation (Caltrans) encourages the use of environmentally friendly pavement strategies such as in-place recycling. In-place recycling is an innovative and sustainable pavement strategy that:

- Reduces green house gases due to less mining of new materials and transporting materials from the site.
- Constructs faster because material removal and replacement occurs simultaneously.
- Provides a cost effective option where surface repairs are needed.

# Hot-In-Place Recycling

## Trinity County: SR 299 (~2 miles in D2)



# Cold-In-Place Recycling

- **Completed:** 30 projects (~70 million dollars)
- **On-going:** 8 projects (~10 million dollars)

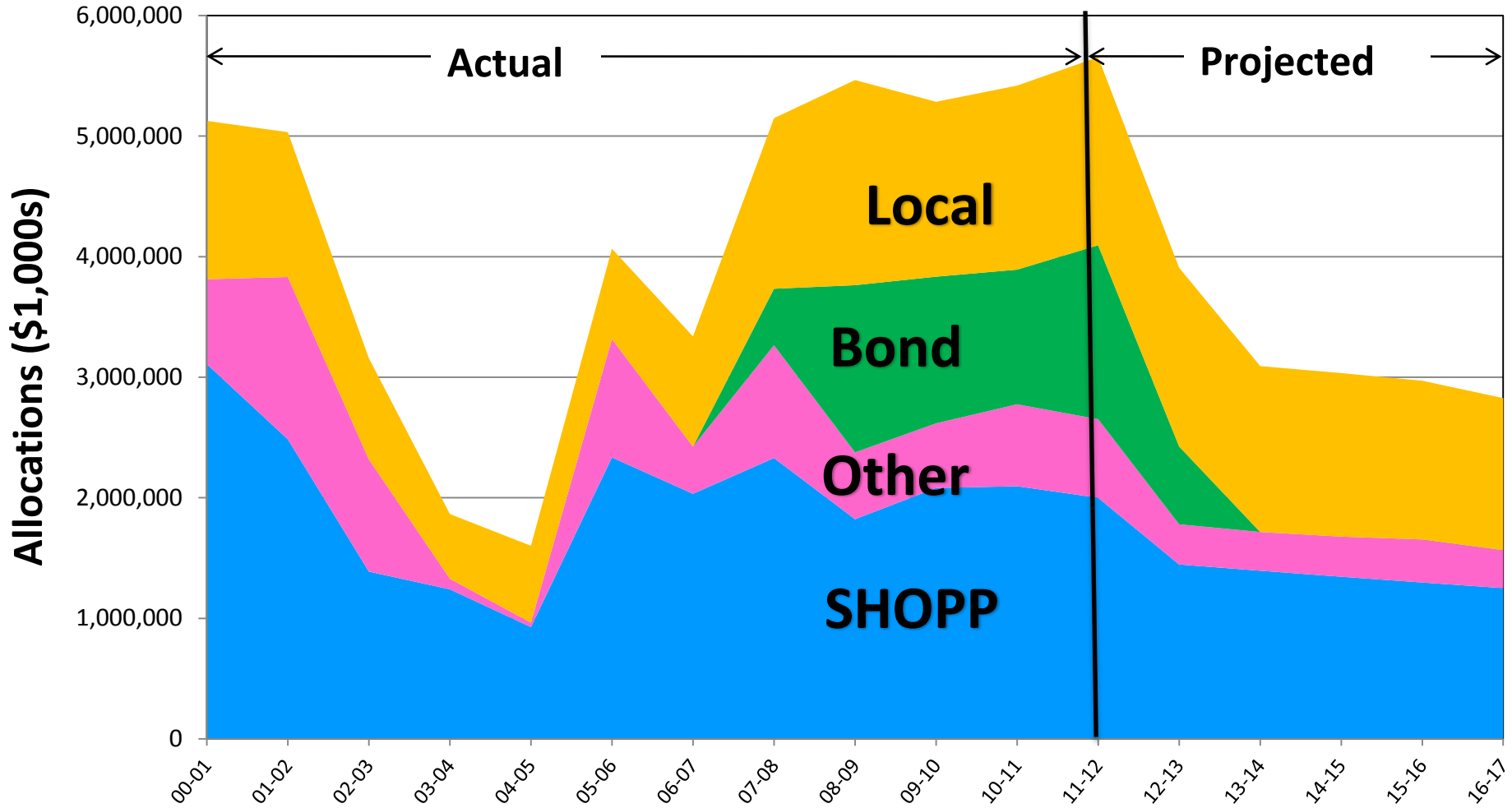


# Completed and On-Going FDR Efforts

- Cold foam, pulverization and FDR with several additives (cement, emulsion etc)

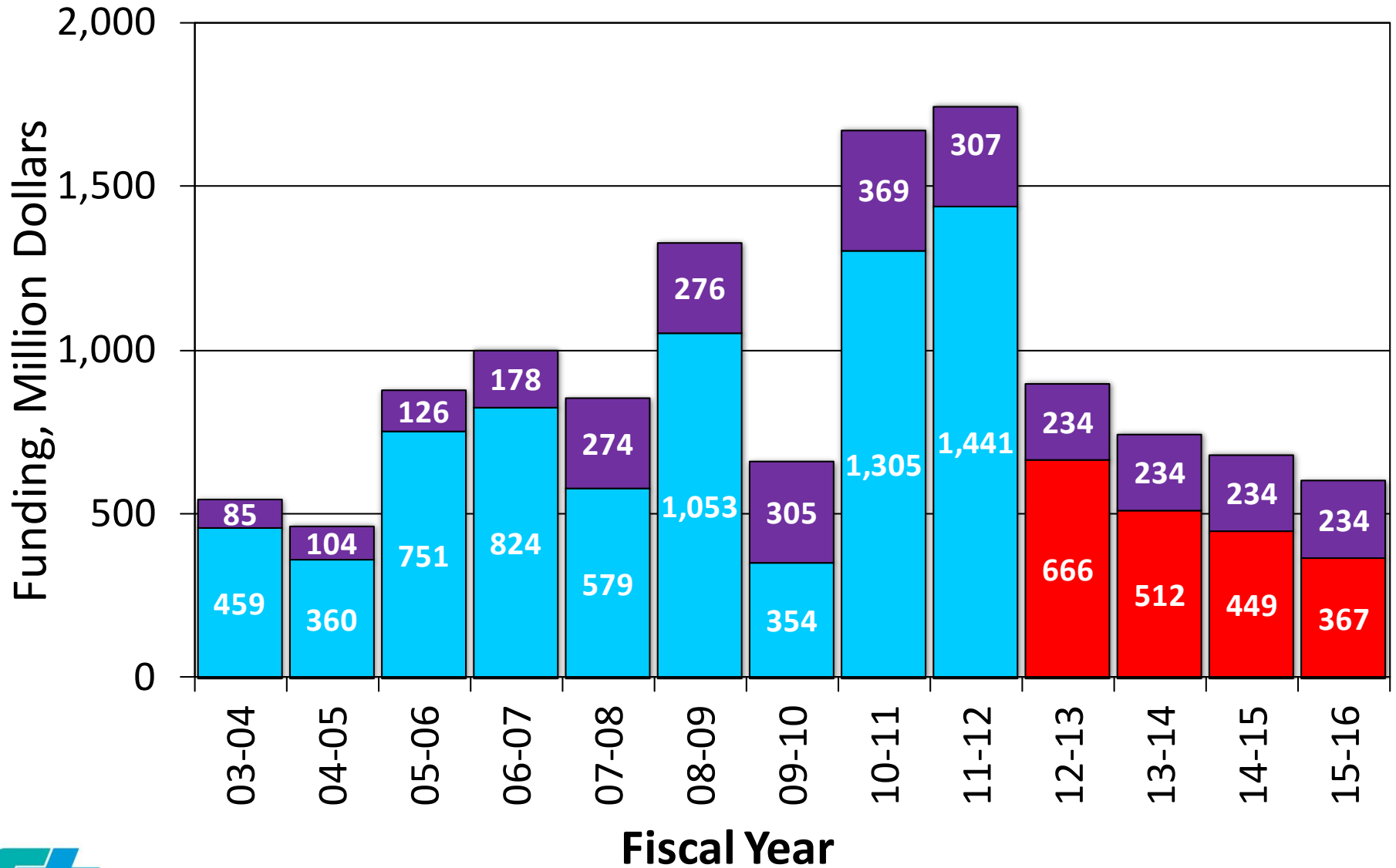


# Resources



■ Local     
 ■ Bond     
 ■ Other Capacity Increasing     
 ■ SHOPP

# Pavement Program Projects



■ Awarded 
 ■ 2012 SHOPP 
 ■ Preservation funding

# Efficiently Managing California Roads!

## Thank You

