Lake Tahoe TMDL

California Regional Water Quality Control Board
Lahontan Region

Nevada Division of Environmental Protection

What is the Lake Tahoe TMDL?

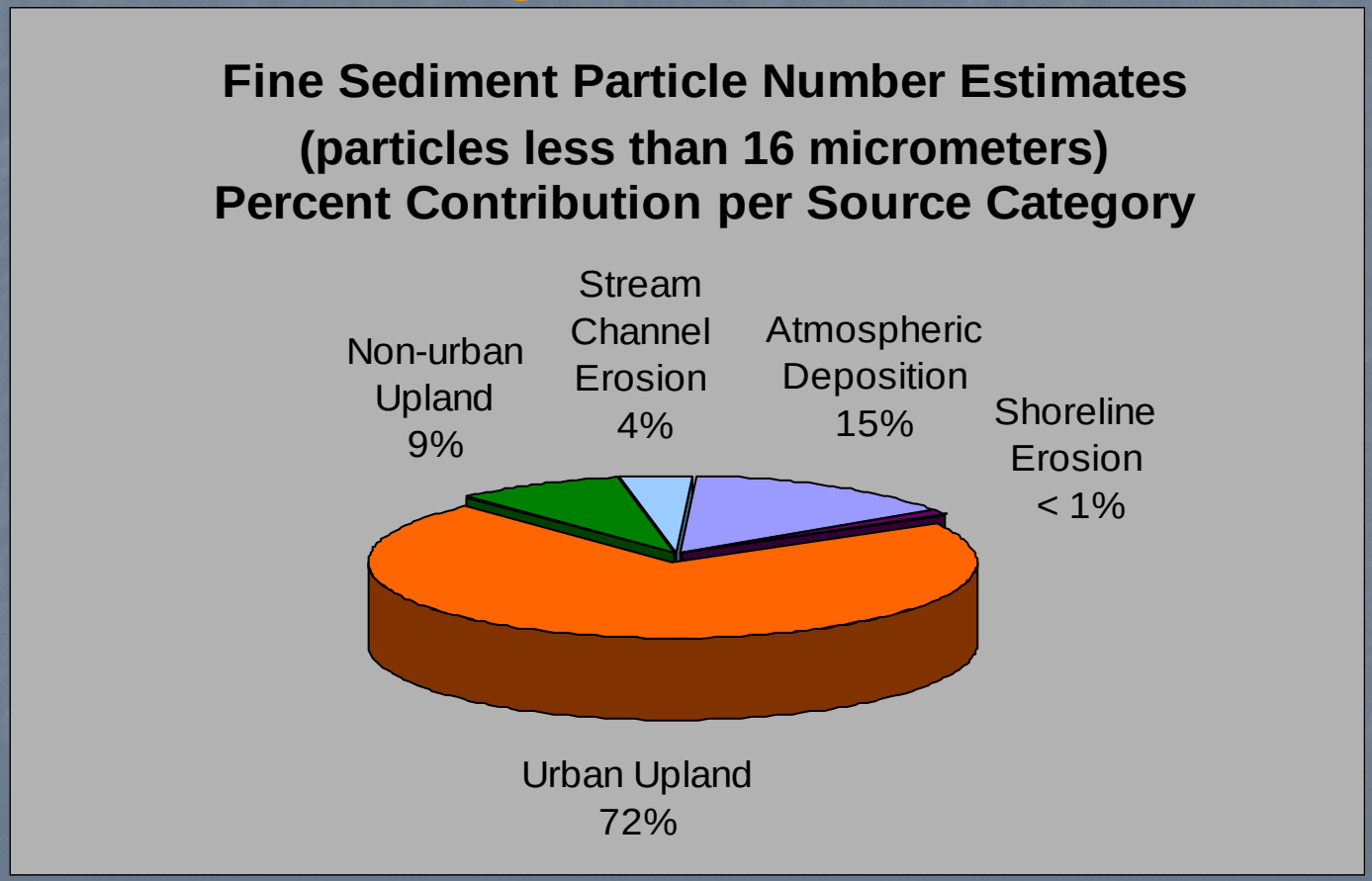
A science-based plan to restore Lake Tahoe's clarity

What pollutants are causing Lake Tahoe's clarity loss?

- Suspended fine sediment particles
- Floating algae – fed by nutrients

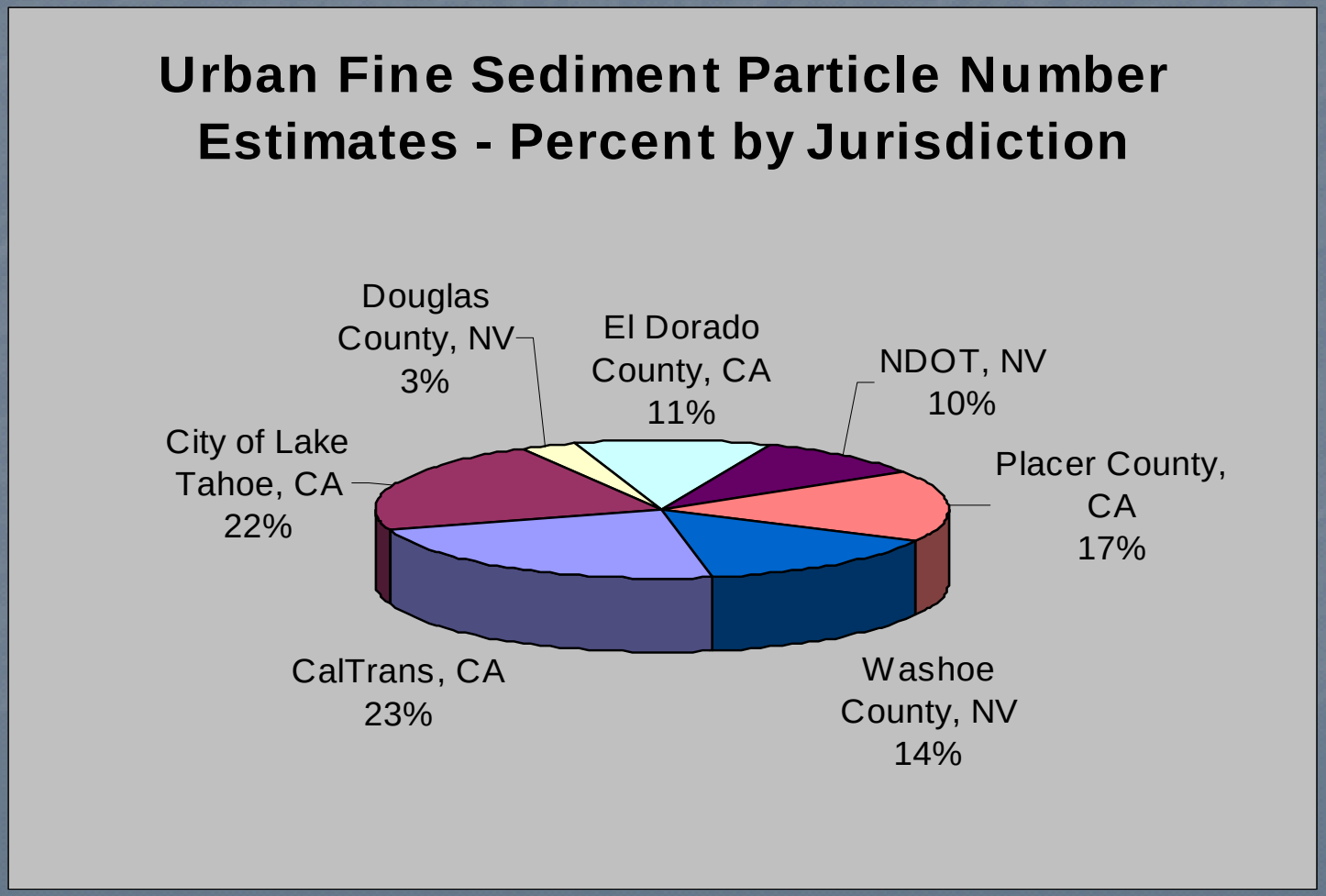
- Fine sediment particle(<16 micrometers) accounts for ~2/3 of the clarity conditions

How much of each pollutant is reaching Lake Tahoe?



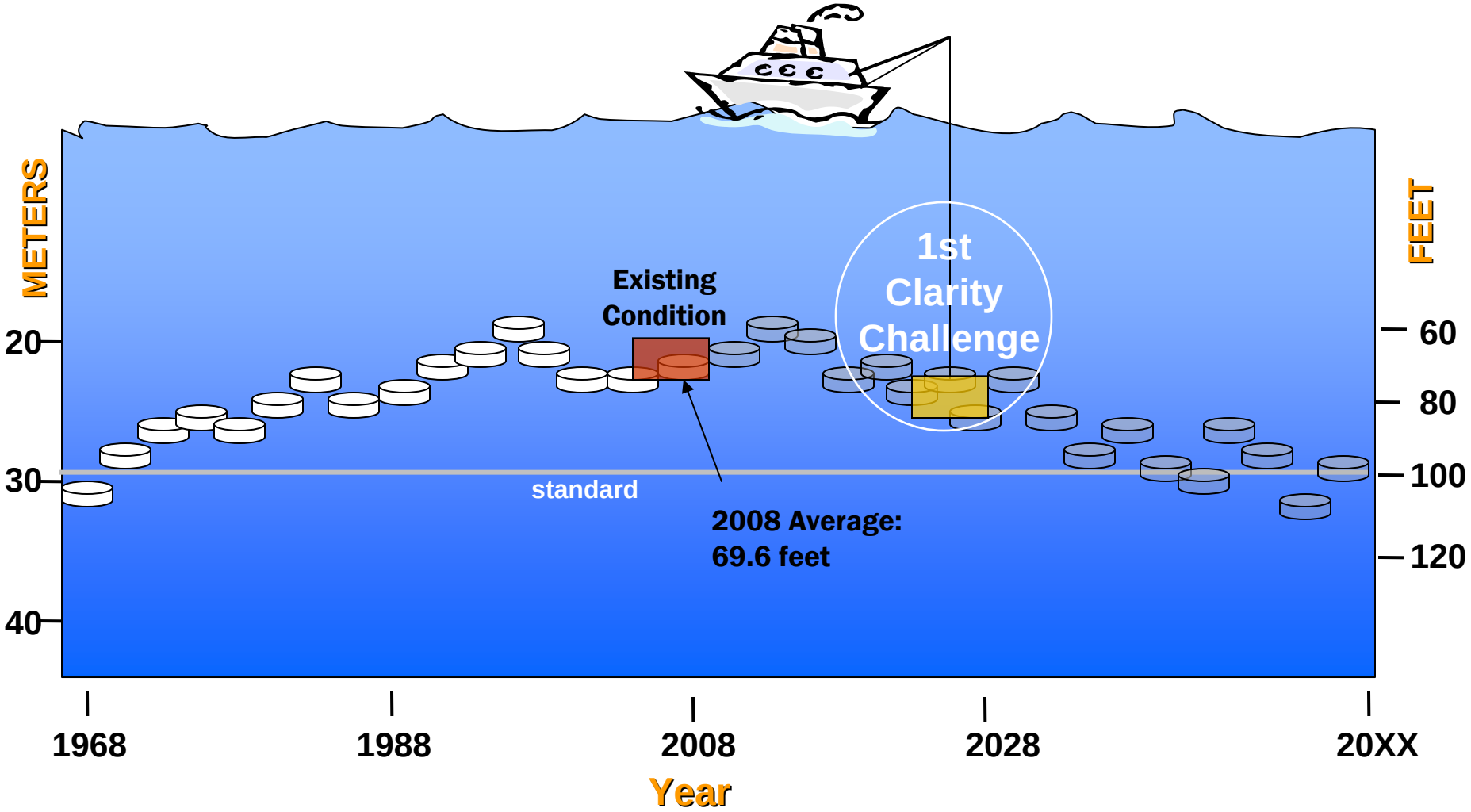
Total Fine Particle Load: 481 x 10^{18} Particles

Urban Particle Loads – How the 72% is Distributed



What is a reasonable interim target?

The Clarity Challenge: Reverse clarity decline and measurably improve clarity



What are the options for reducing pollutant inputs to Lake Tahoe?

Pollutant Reduction Opportunity Project

Four Source Category Groups

Assessed different levels of effort

Evaluated site-scale and basin-wide implementation

Provided average load reductions and costs

Estimates offer relative benefit comparisons

Stream Channel Restoration Recommended Strategy

Continue current restoration activities on the UTR, Blackwood and Ward Creeks

Support monitoring and research

Achieve ~2% reduction in total fine particle budget (53% of Stream source)

Estimated Cost: $40M Capital

Forest Uplands Recommended Strategy

Restore/maintain roads as planned

Revegetate/treat disturbed lands

Treat forest fuels

Achieve ~1% reduction in total fine particle budget (12% of Forest load)

Estimated Cost: $120M Capital, $4.5M Annual O&M

Atmospheric Deposition Recommended Strategy

Focus on dust control measures

Continue VMT reduction efforts

Achieve ~5% reduction in total fine particle budget (31% of Atmospheric source)

Estimated Cost: $45M Capital, $0.4M Annual O&M

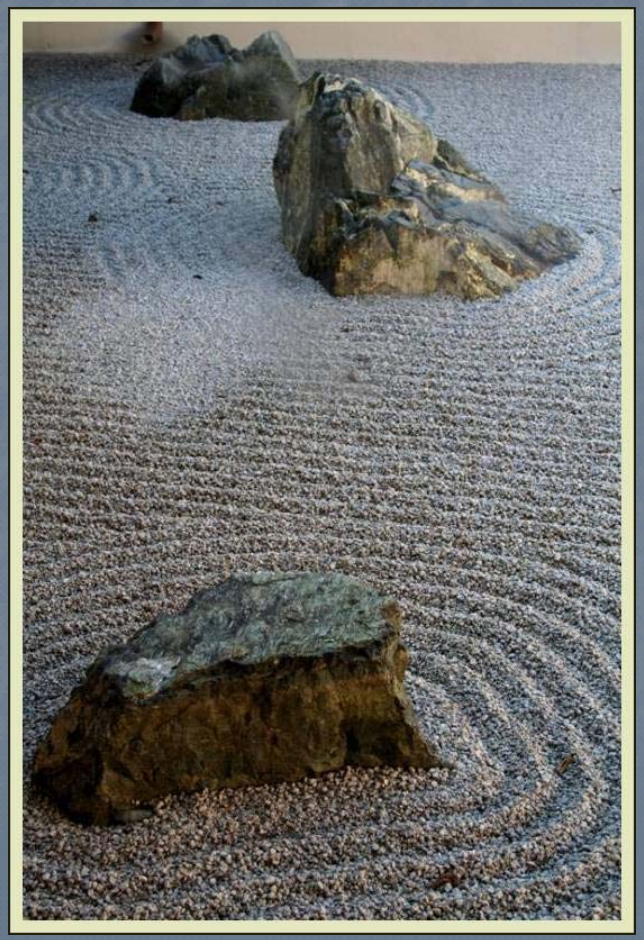
Urban Uplands Recommended Strategy

Continue to implement known technologies

Move toward more innovative practices and intensive operations and maintenance

Achieve ~25% reduction in total fine particle budget (34% of Urban Source)

Estimated Cost: $1.3B Capital, $6M Annual O&M



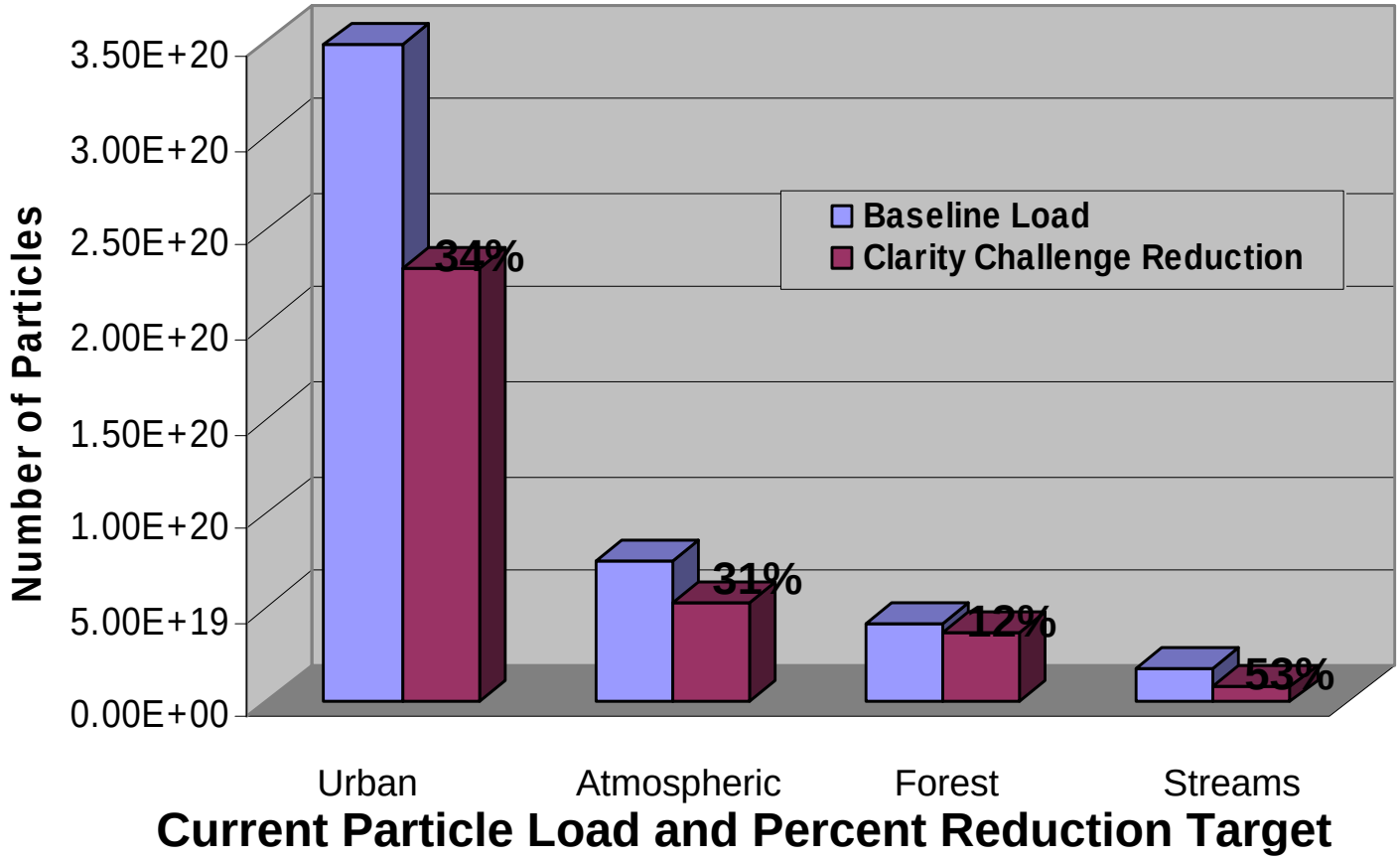
Recommended Strategy

Percent Reduction of <u>Basin-wide</u> Particle Load

Pollutant Source Category	Recommended Strategy Load Reduction
Forest Uplands	**1.0%**
Stream Channel	**1.8%**
Atmospheric Deposition	**4.6%**
Urban Uplands	**24.5%**
Clarity Challenge	**32%**

Recommended Strategy

Particle Load Reductions by Source Category



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Lake Tahoe Total Maximum Daily Load

Technical Report

California and Nevada

September 2007

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Lake Tahoe TMDL Pollutant Reduction Opportunity Report

September 2007
v1.01

Are expected pollutant reductions being achieved?

Lake Clarity Crediting Program

Implementation Tools

- **Pollutant Load Reduction Model**
- **Operations and Maintenance RAM**
- **Roadway Conditions RAM**

TMDL Accounting and Tracking System

Lake Clarity Crediting Program

- **Link actions and activities in the <u>urban</u> landscape to fine sediment particle load reductions**
- **Provide regulatory stability**
- **Define a standard metric to track implementation progress**
- **Motivate action & focus on effectiveness to improve water quality and create incentives for innovation**
- **Increase flexibility for and cooperation between permitted entities**

Lake Clarity Crediting Program

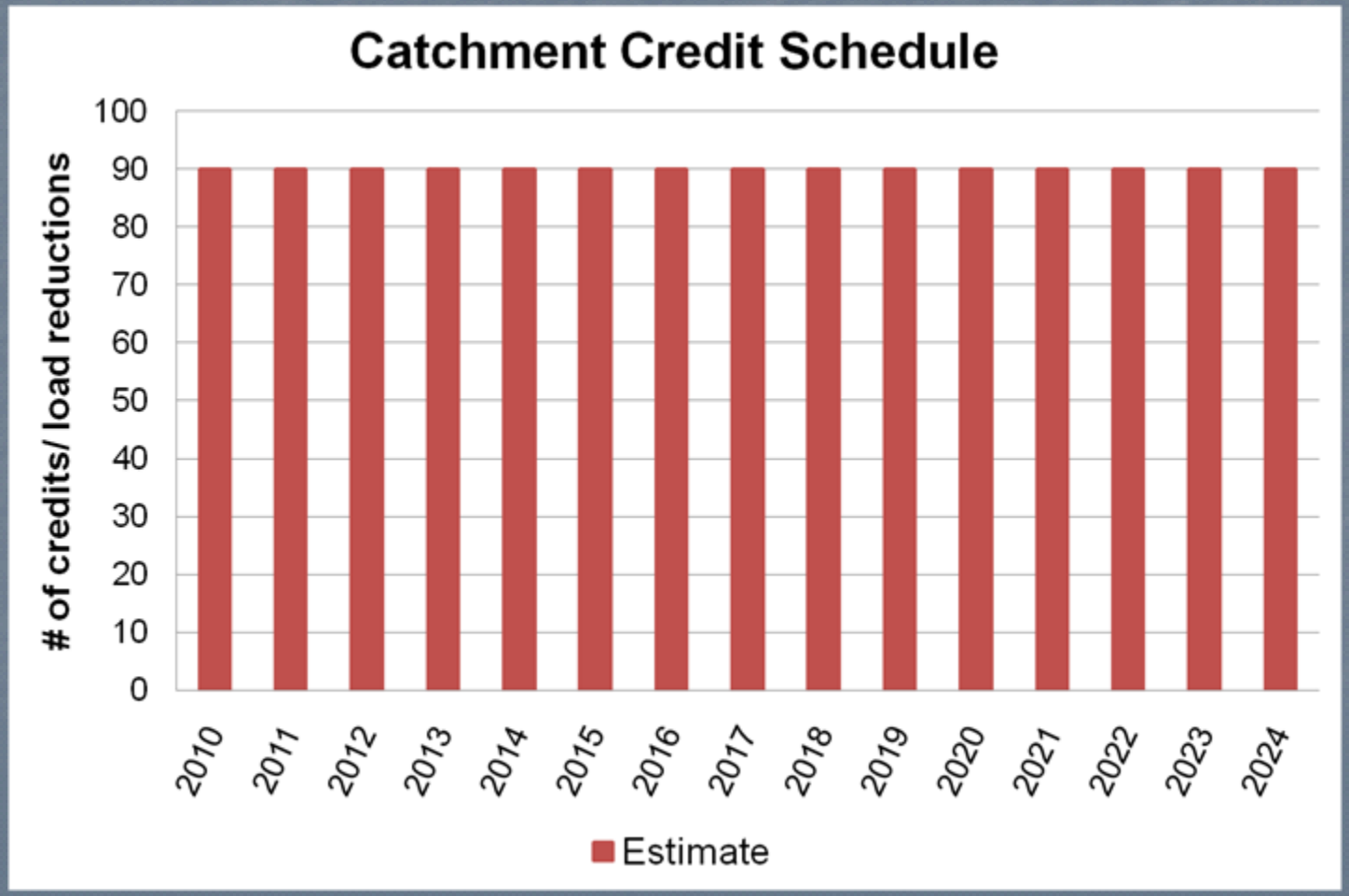
- Currently
  - measure number of projects and $ spent
  - build projects and move on
- Crediting Program
  - Estimate **credit potential** based on potential project effectiveness
  - Annually determine that pollution controls are **realizing load reduction potential**

Lake Clarity Crediting Program

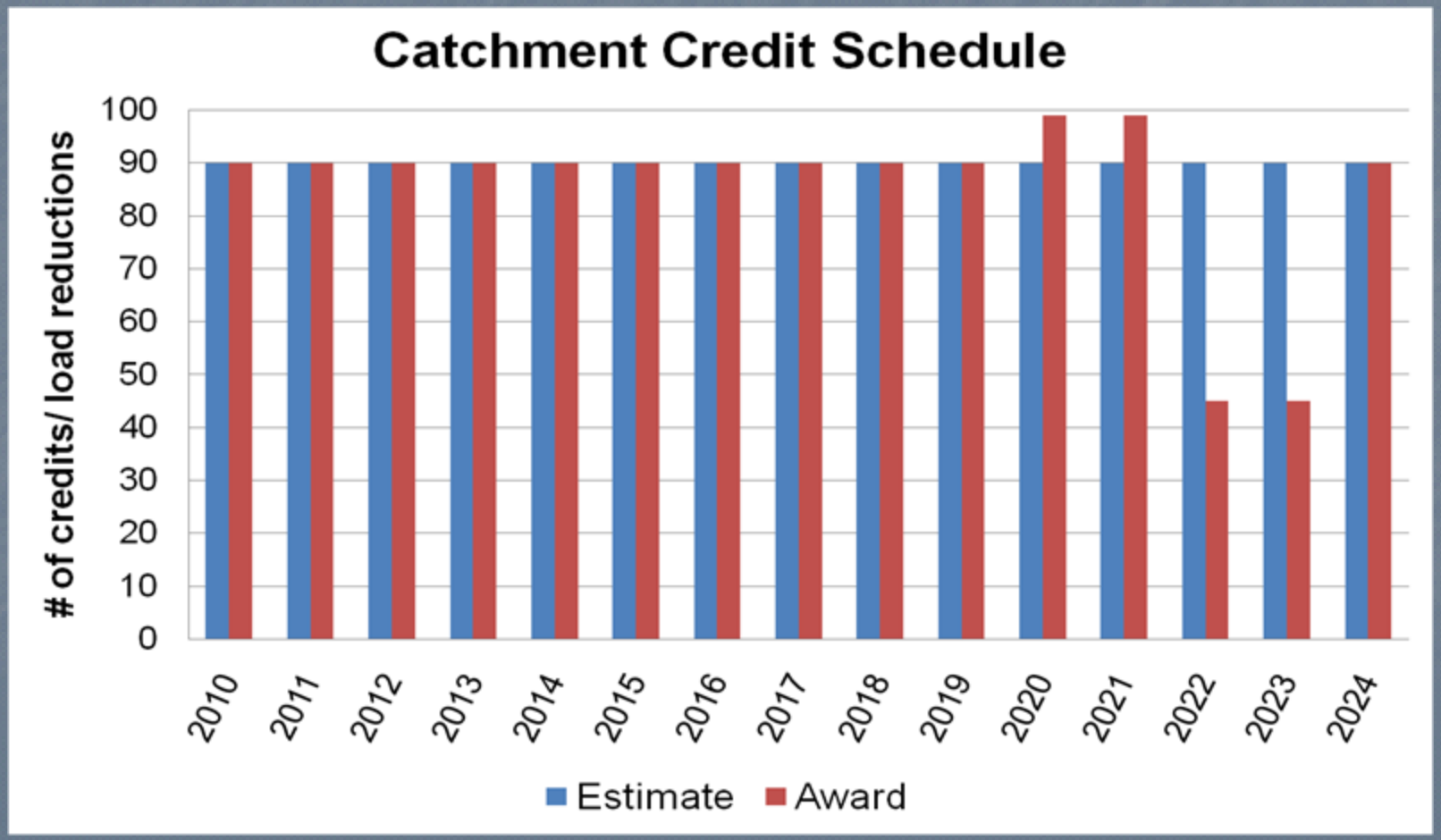
Acknowledges Various Actions

- Water Quality Improvement Projects
- Operational Activities
- Ordinances and Programs
- Innovative Practices

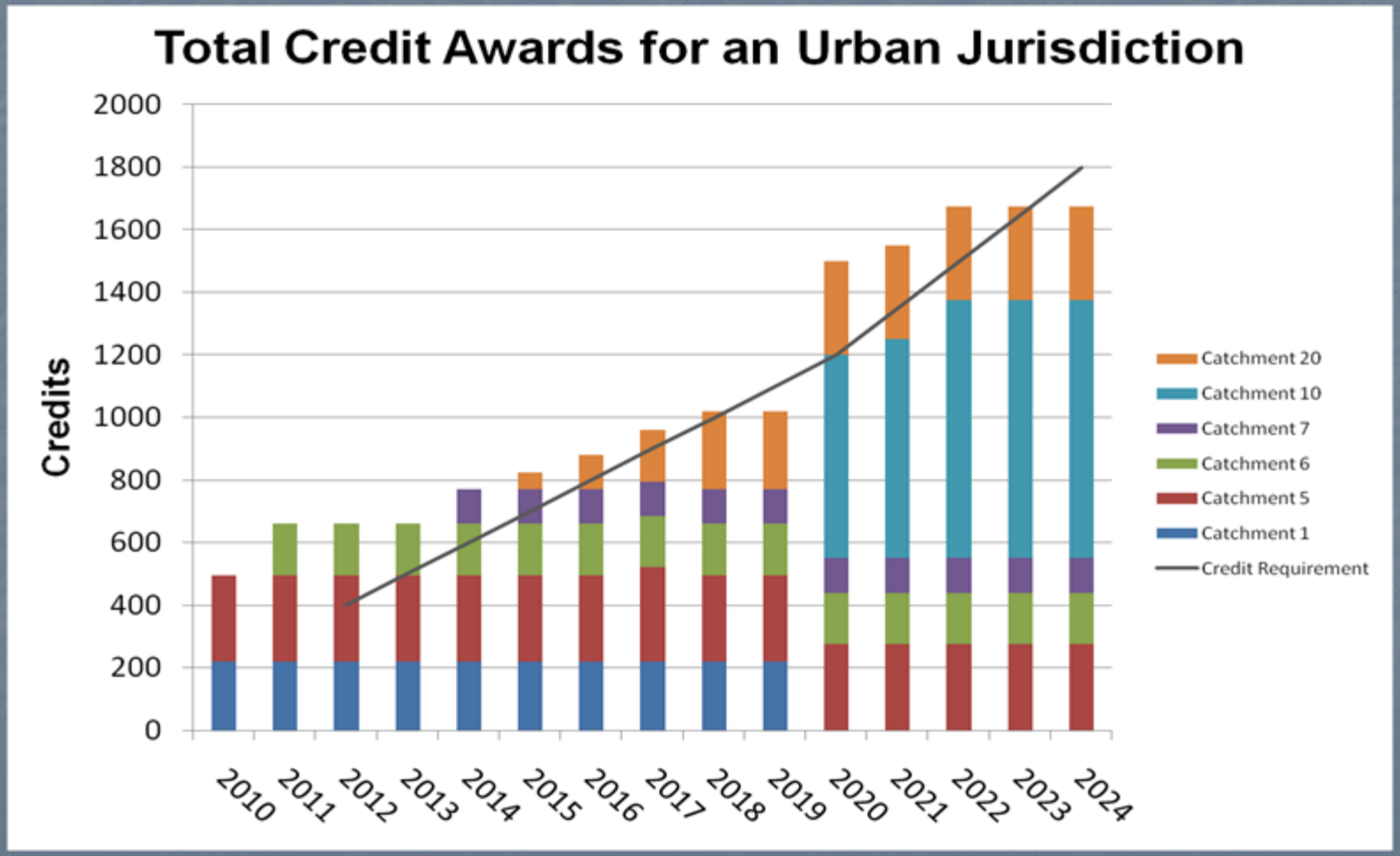
Lake Clarity Crediting Program



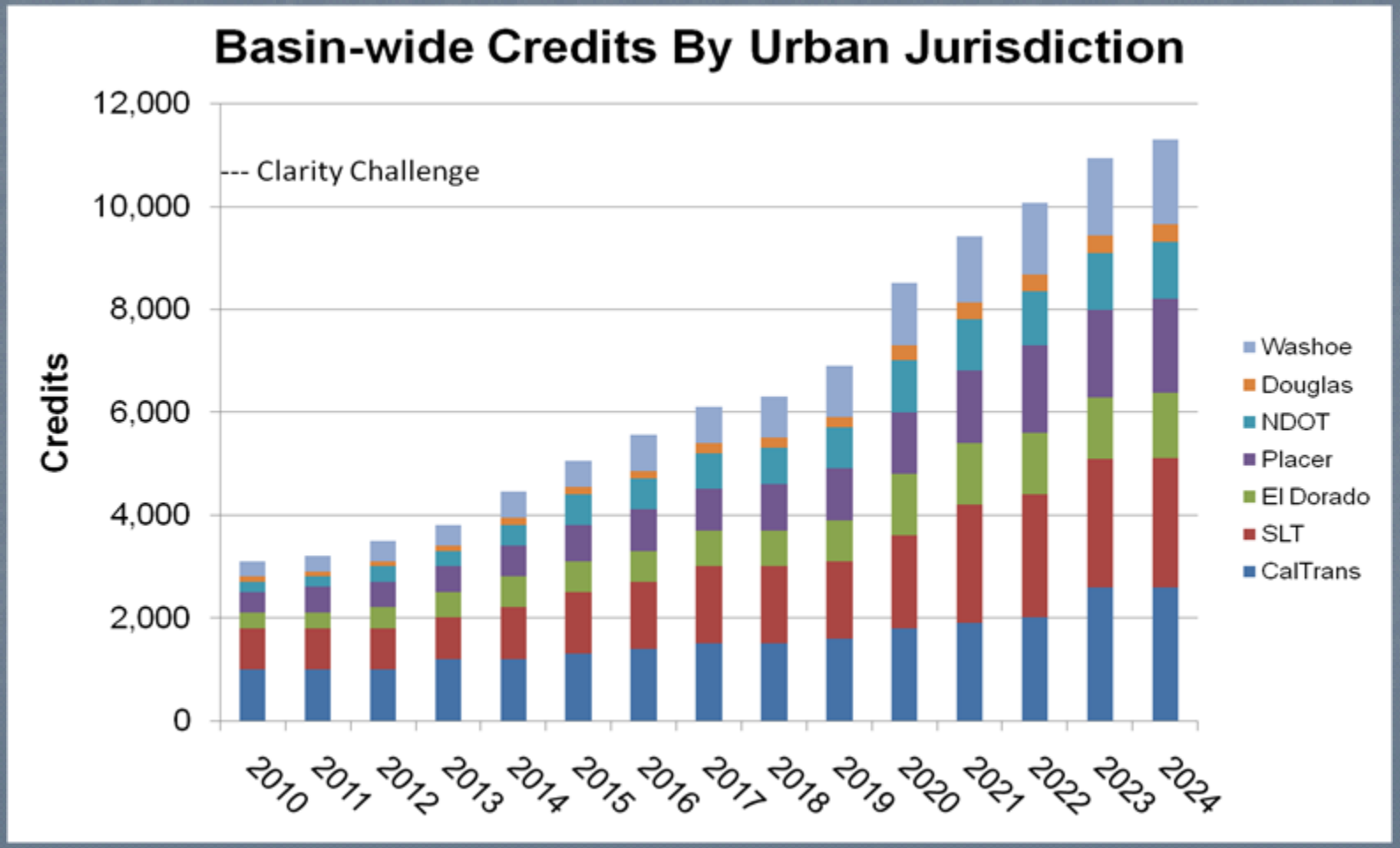
Lake Clarity Crediting Program



Lake Clarity Crediting Program



Lake Clarity Crediting Program



Pollutant Load Reduction Model and Rapid Assessment Methods

Provide a consistent method to estimate pollutant load reductions

Provide a consistent method to assess stormwater facility maintenance needs

Provide a consistent method to assess roadway conditions/pollutant potential

TMDL Accounting and Tracking System

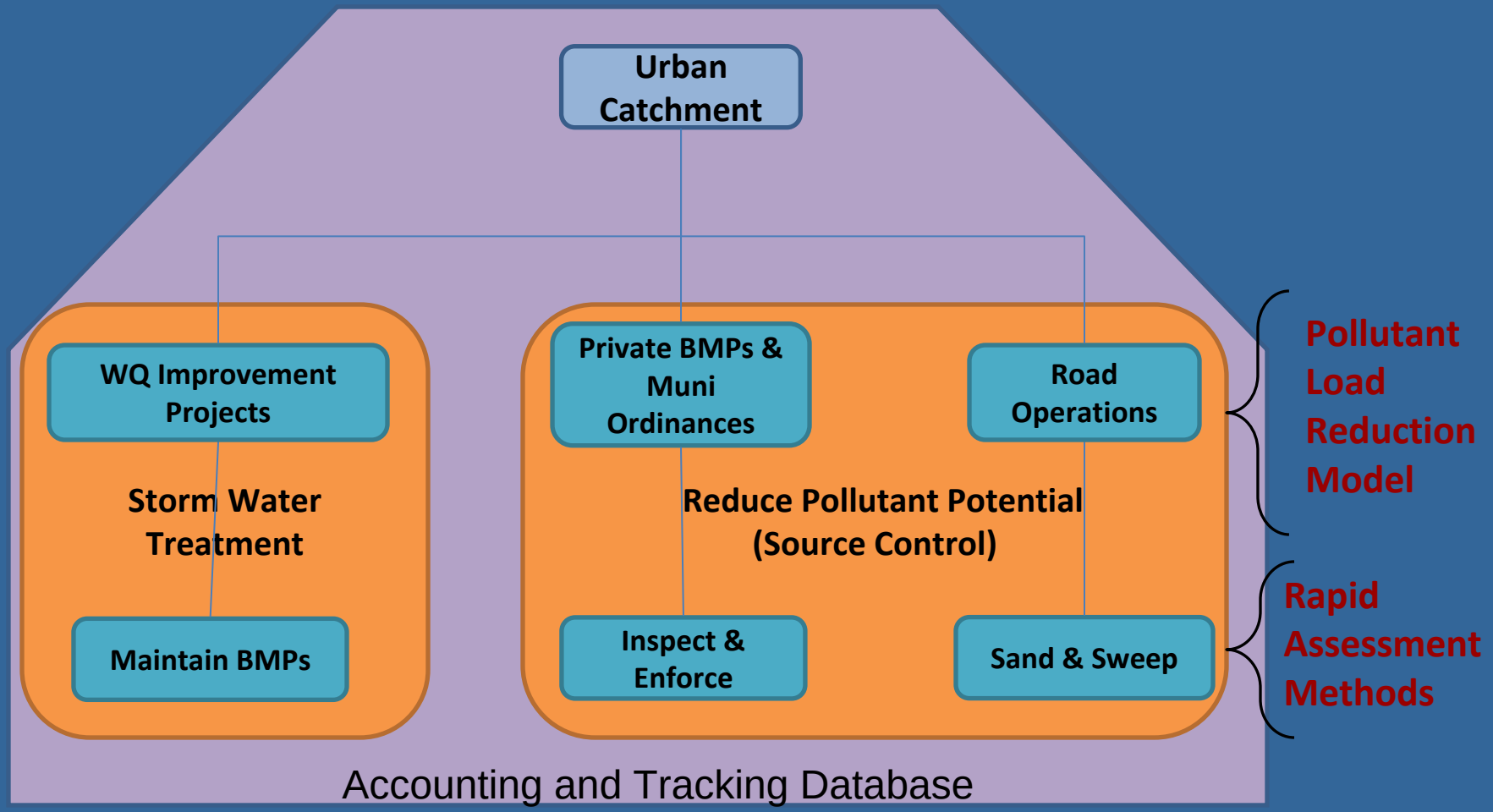
Comprehensive load reduction database

Supports the Lake Clarity Crediting Program

Able to track reductions from all pollutant sources

Offers transparent, simple reporting capabilities

Lake Clarity Crediting Program & Implementation Tools



Transition Process

One year "Beta" testing period:

Summer 2009-Summer 2010

- **Lake Clarity Crediting Program**
- **Pollutant Load Reduction Model**
- **Rapid Assessment Methodologies**
- **Accounting and Tracking System**

Schedule

TMDL Peer Review – Complete

- Professor Patrick Brezonik, Department of Civil Engineering, University of Minnesota
- Professor Thomas Holsen, Department of Civil and Environmental Engineering, Clarkson University
- Professor William Lewis, Jr., Associate Director, University of Colorado Cooperative Institute for Research in Environmental Sciences
- Professor Menachem Elimelech, Department of Chemical Engineering, Yale University
- Professor John M. Melack, Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

Agency and Public Review – Winter 2009

TMDL adoption – Spring 2010

Municipal NPDES Permit & MOA – Fall 2010

Questions?

http://www.waterboards.ca.gov