Lake Tahoe TMDL

California Regional Water Quality Control Board
Lahontan Region

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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?

Lake Tahoe Clarity Model

- **10+ years of research and development**
- **A <u>Process Based</u> Numerical Model**
- **Several Models Combined Into One:**
  - **Hydrodynamic/Thermodynamic Model**
  - **Biological/Ecological Model**
  - **Particle Fate Model**
  - **Optical Model**

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?

$6M research effort to quantify current loads

- **Lake Tahoe Watershed Model**

- **National Sed. Lab Stream Channel Erosion**

- **USACE Groundwater study**

- **CARB/UC Davis Atmospheric Deposition**
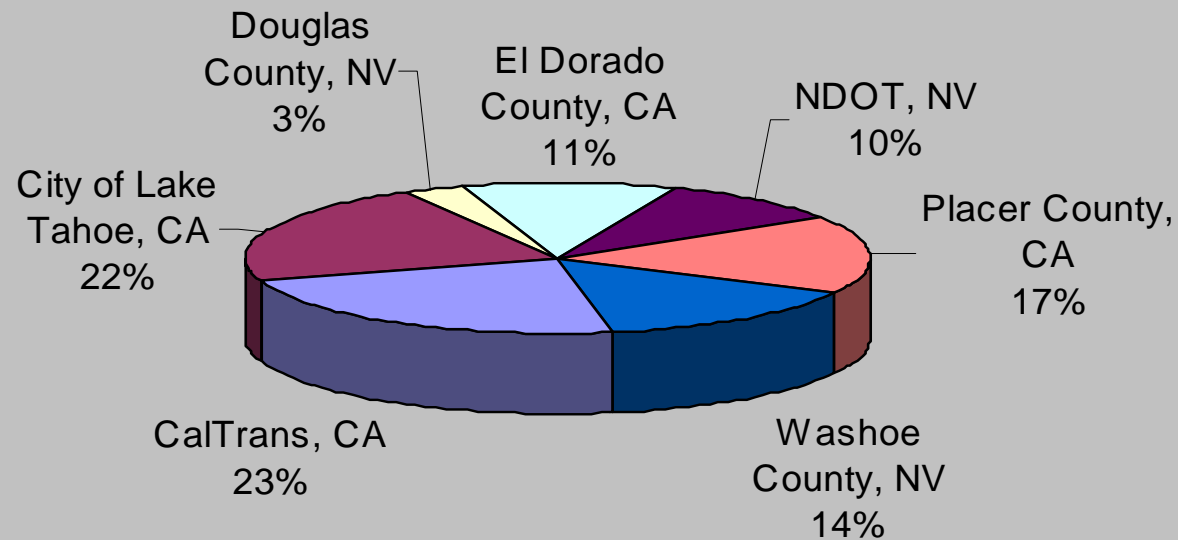
How much of each pollutant is reaching Lake Tahoe?

Fine Sediment Particle Number Estimates
(particles less than 16 micrometers)
Percent Contribution per Source Category

Non-urban
Upland
9%

Stream
Channel
Erosion
4%

Atmospheric
Deposition
15%

Shoreline
Erosion
< 1%

Urban Upland
72%
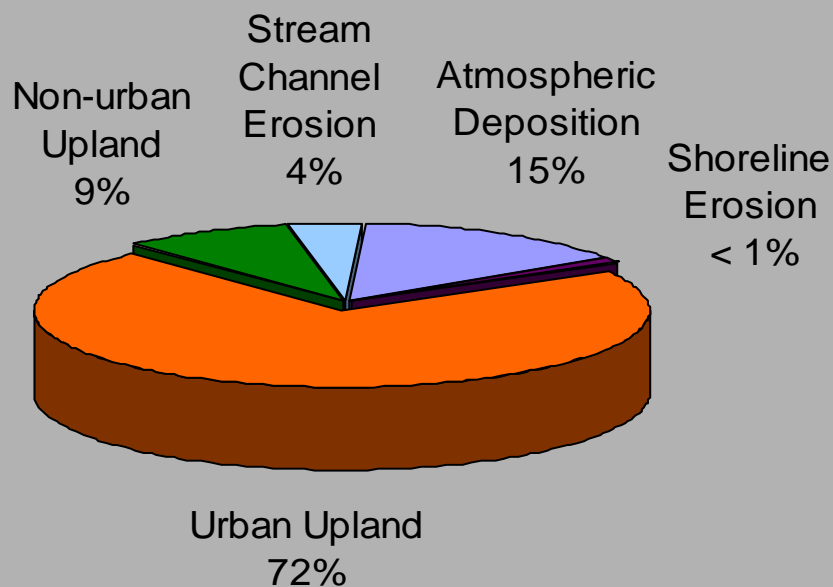
Total Fine Particle Load: 481 x 10^{18} Particles

Urban Particle Loads – How the 72% is Distributed

Urban Fine Sediment Particle Number Estimates - Percent by Jurisdiction

Douglas County, NV 3%

El Dorado County, CA 11%

NDOT, NV 10%

City of Lake Tahoe, CA 22%

Placer County, CA 17%

CalTrans, CA 23%

Washoe County, NV 14%

What is a reasonable interim target?

The Clarity Challenge: Reverse clarity decline and measurably improve clarity

Existing Condition

1st Clarity Challenge

standard

2007 Average: 70.2 feet

METERS

20

30

40

FEET

60

80

100

120

1968   1988   2008   2028   20XX

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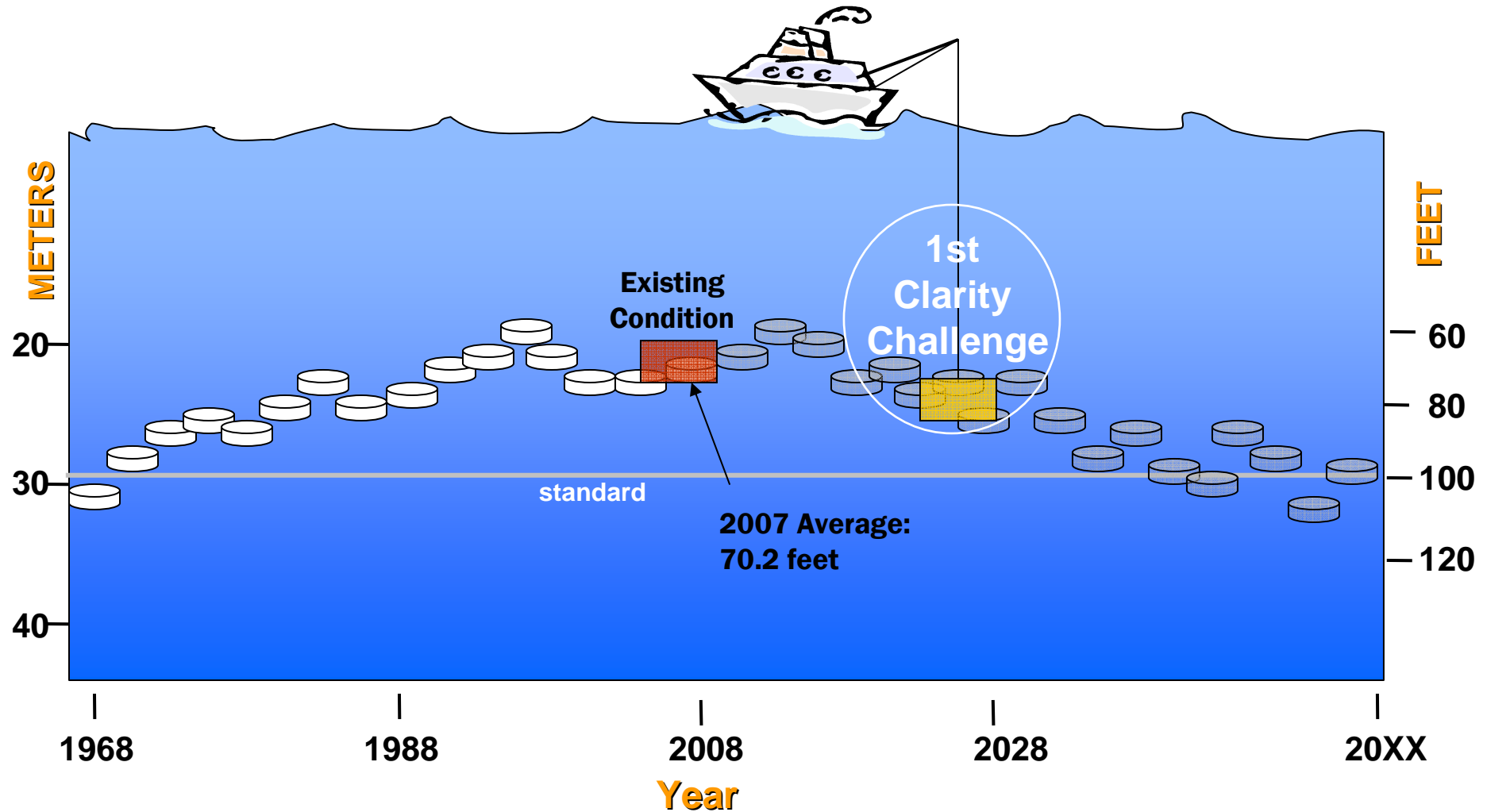
What are the options for reducing pollutant inputs to Lake Tahoe?

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
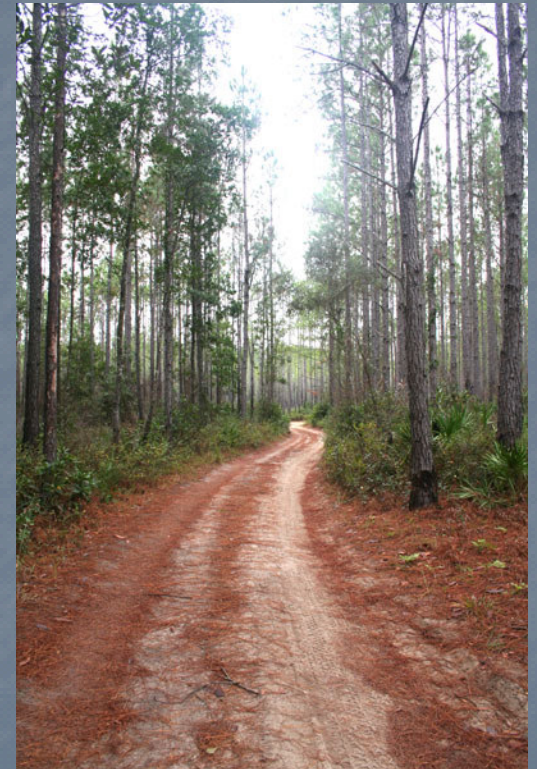
Forest Uplands Recommended Strategy

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

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

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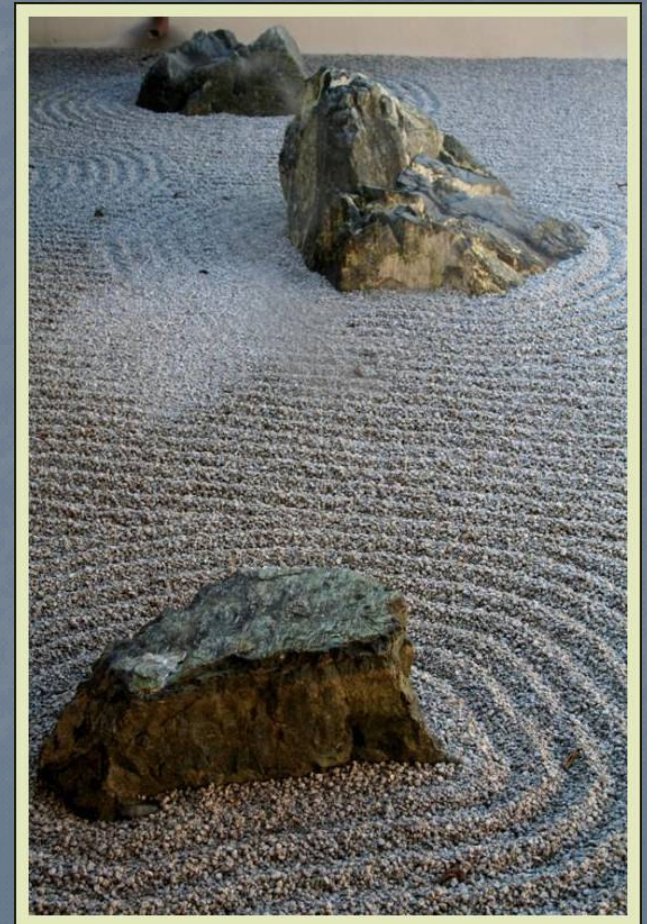
Estimated Cost: $45M Capital, $0.4M Annual O&M

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)

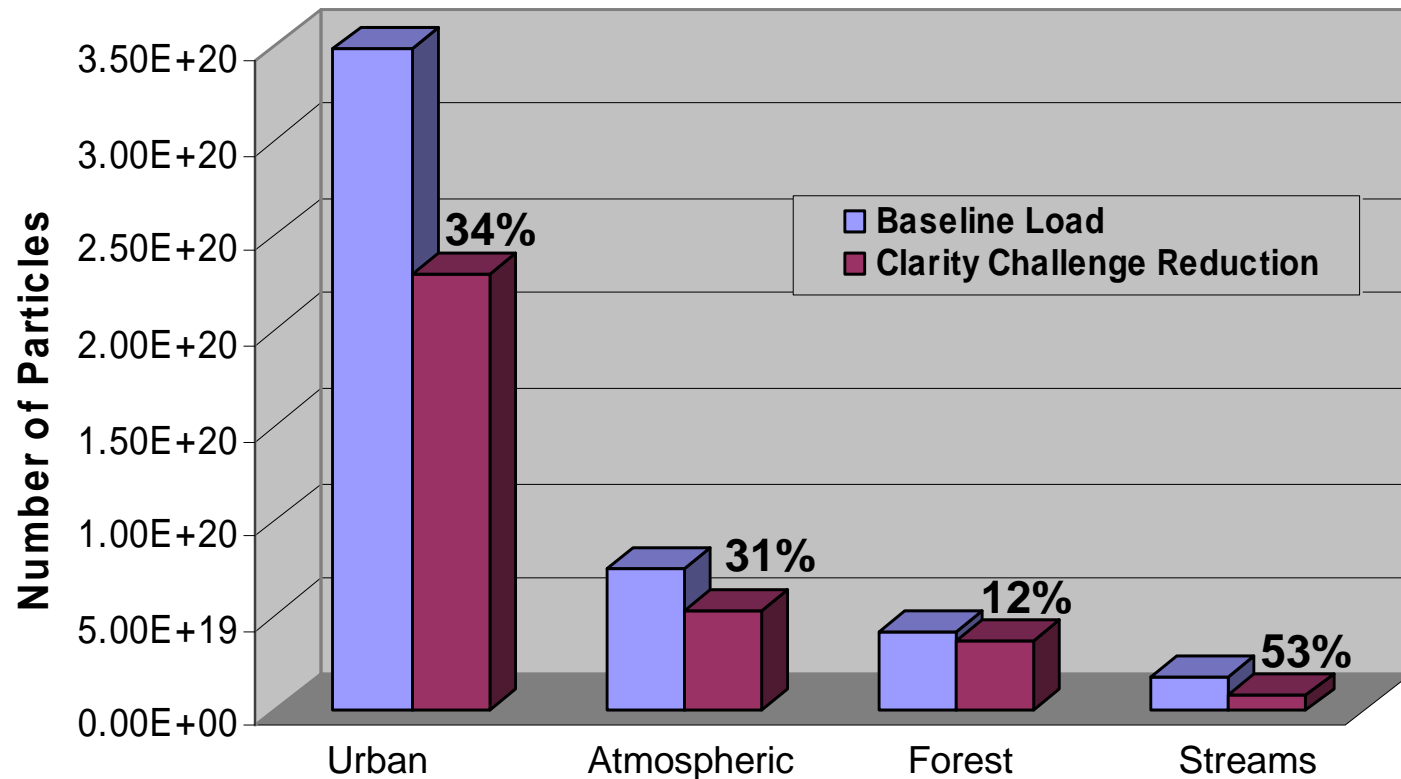**Estimated Cost: $1.3B Capital, $6M Annual O&M**

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

http://www.waterboards.ca.gov/lahontan/water_issues/programs/tmdl/lake_tahoe/index.shtml

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

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

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
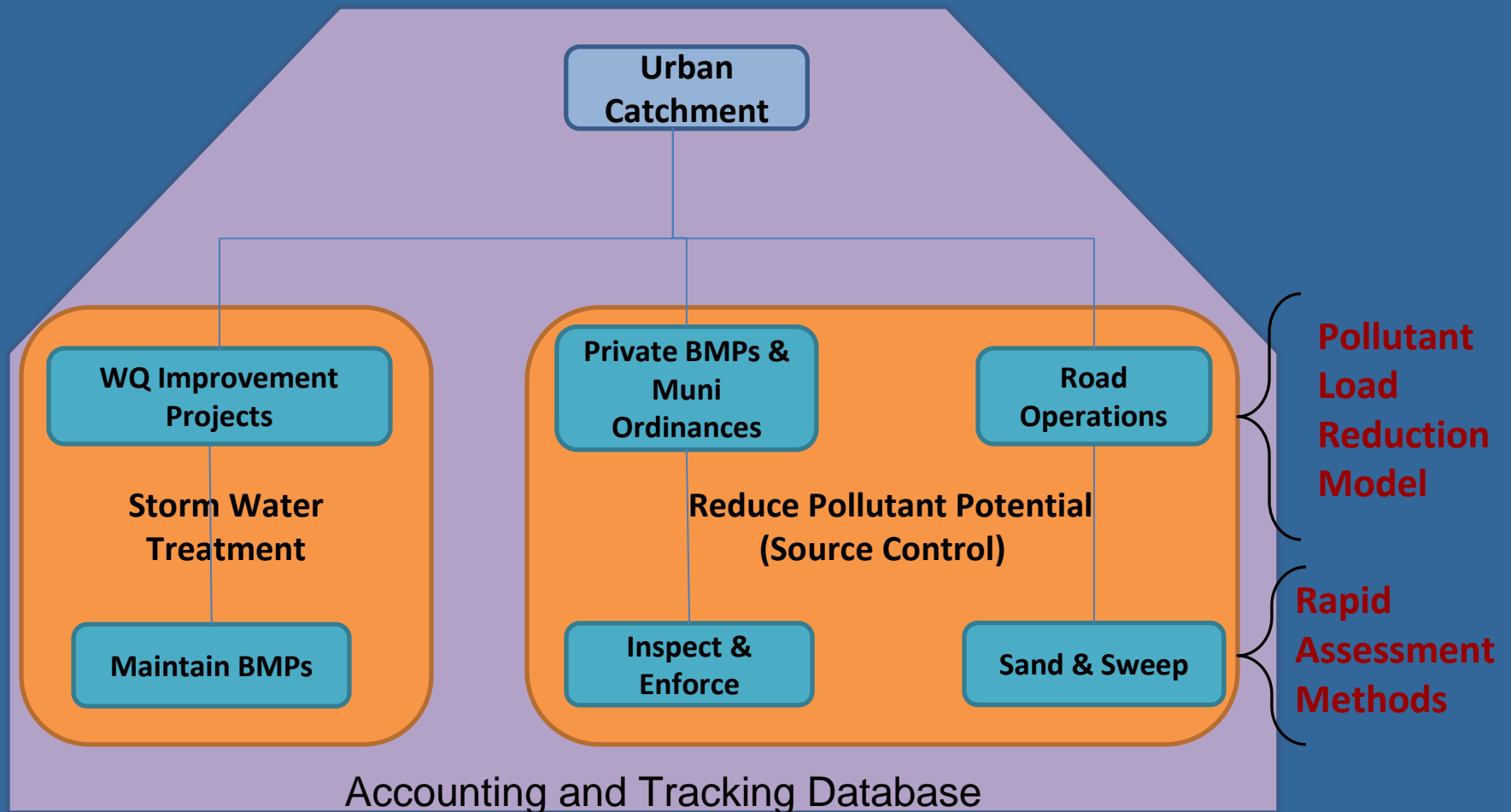
TMDL Accounting and Tracking System

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

Urban Catchment

WQ Improvement Projects

Storm Water Treatment

Maintain BMPs

Private BMPs & Muni Ordinances

Road Operations

Reduce Pollutant Potential (Source Control)

Inspect & Enforce

Sand & Sweep

Pollutant Load Reduction Model

Rapid Assessment Methods

Accounting and Tracking Database

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**

Stormwater Regulation Approach

	Existing Policy	TMDL Implementation Plan
Regulatory Focus	Concentration limits – everywhere, all the time	Load limits – average annual
Compliance Prospects	Not reasonable – even advanced measures may not meet effluent limits	Reasonable – possible demonstrate progress toward achieving stated goals
Linkage between actions/benefits	Poor - hard to link projects/actions to lake clarity response	Strong – TMDL load reductions directly related to clarity response
Comparability	Little ability to compare results across different implementers	Direct performance comparisons, transparent through reporting
Responsibility	Funders & regulators	Municipal stormwater managers & programs

Schedule

TMDL Peer Review – Summer 2009

Agency and Public Review – Winter 2009

CEQA – Fall 2009

TMDL adoption – Spring 2010

Municipal NPDES Permit & MOA – Fall 2010

Questions?