

Watershed Planning Program Mission Statement

We are stewards of the water resources of Massachusetts. Together with other state environmental agencies, we share in the duty and responsibility to protect, enhance and restore the quality and value of the waters of the Commonwealth. We are guided by the Federal Clean Water Act and work to secure the environmental, recreational and public health benefits of clean water for the citizens of Massachusetts.

Organizational strategies utilized to achieve our mission:

- Develop and adopt surface water quality standards that optimize these benefits for all the surface waters of the Commonwealth;
- Periodically examine and characterize these waters and effectively communicate the results of these assessments to our stakeholders;
- Develop plans and recommendations to protect and restore water quality; and,
- Coordinate and collaborate with stakeholders to promote stewardship of our valued resources.

Summary

- Monitoring Goals
- DEP monitoring
 - Strengths
 - Weaknesses
- Recommended programs
 - SMART stations
- Partnerships
 - Recommended Volunteer Roles

Monitoring Goals

Why We Monitor

Question

- What is the condition of the resource?
- Is the condition changing over time?
- How do we restore and enhance the resource?
- How do we protect and maintain the resource?
- How do we improve our programs?

Goal

Status

Trends

Restoration

Protection

Program Support

STATUS
ID Problems

Problems?

RESTORATION
Diagnose and Fix

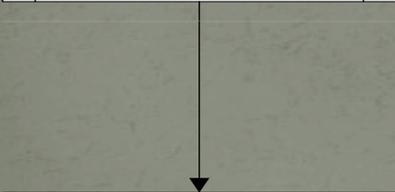
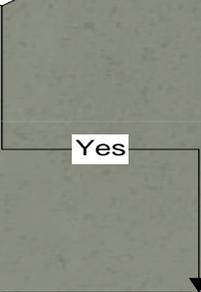
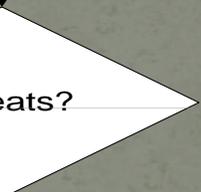
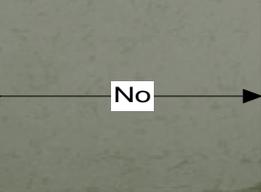
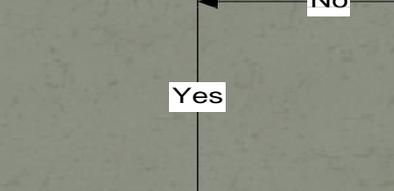
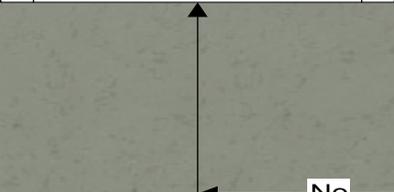
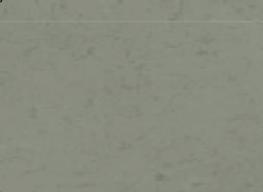
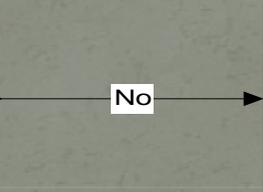
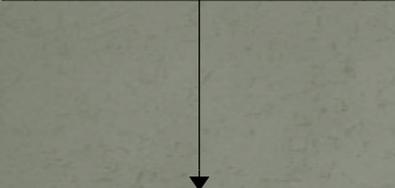
TRENDS
Document
Improvements

PROTECTION
ID Threats

Threats?

Improvements?

PROGRAM
SUPPORT
Improve Programs



Monitoring History

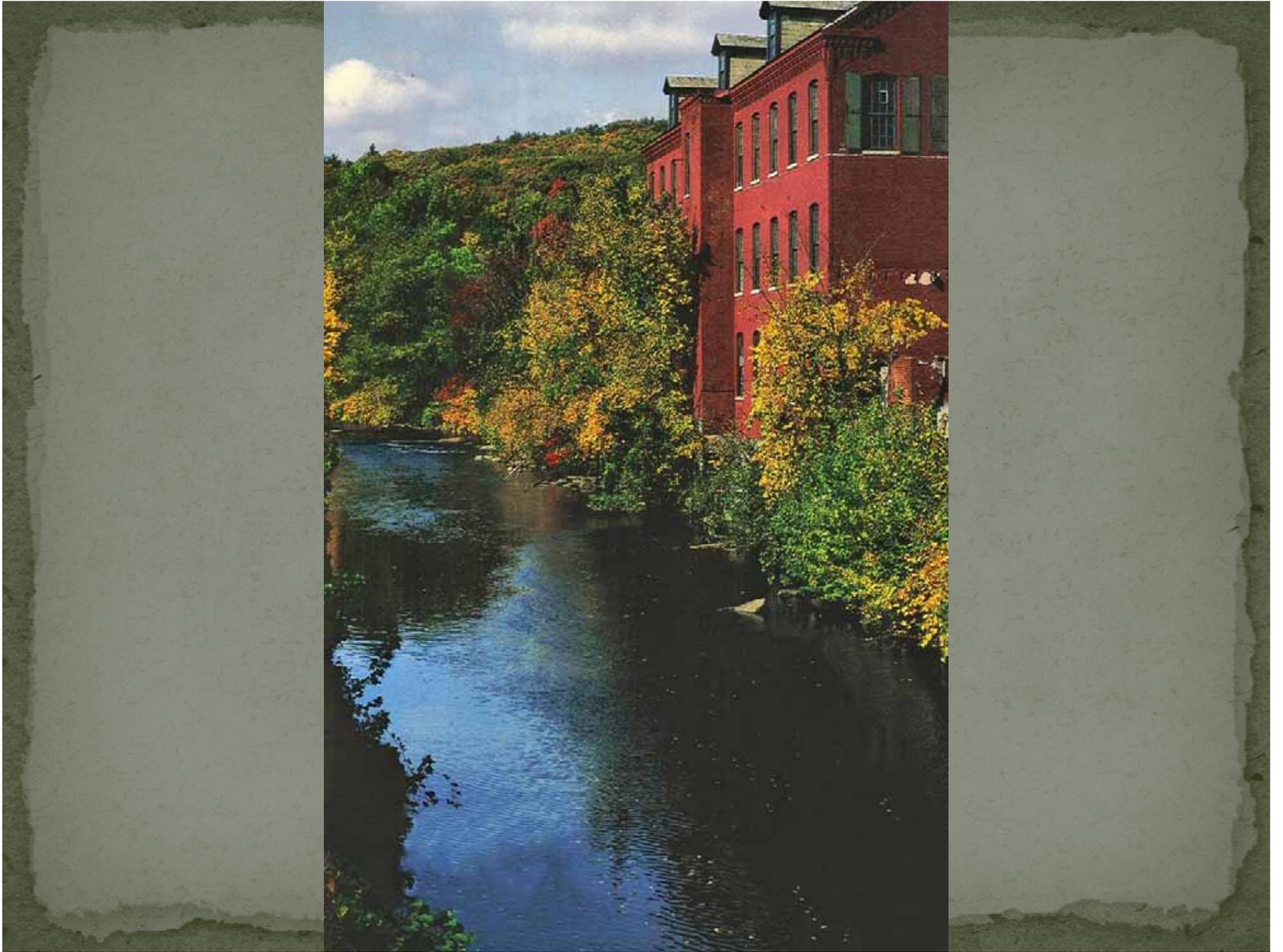
Adding Efficiency

1972-1992- 20 years of monitoring

- Restore Impaired Waters (TMDL)
 - 100 + POTW's
 - 1 Billion Gallons/Day
 - \$4.5 Billion









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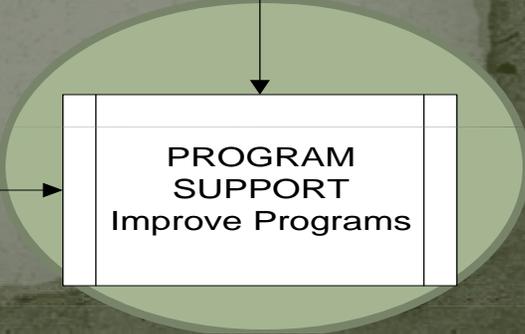
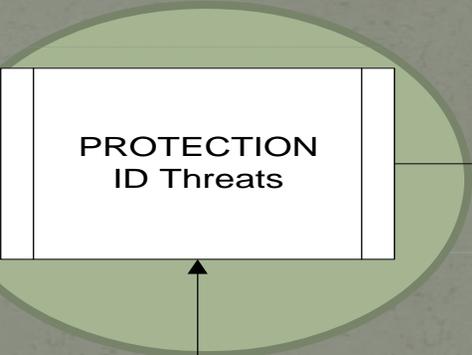
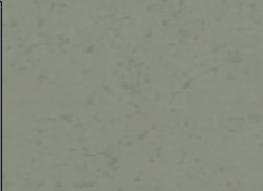
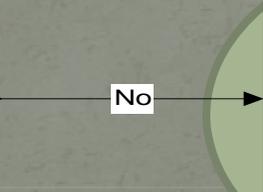
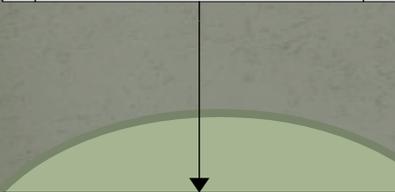
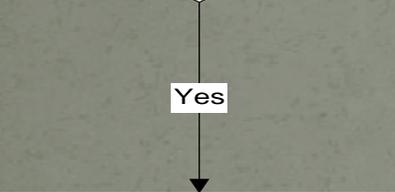
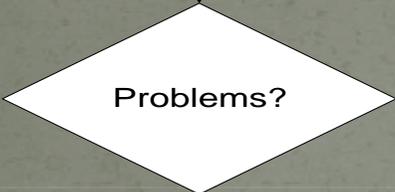
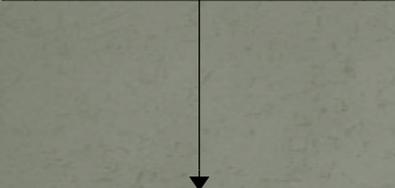
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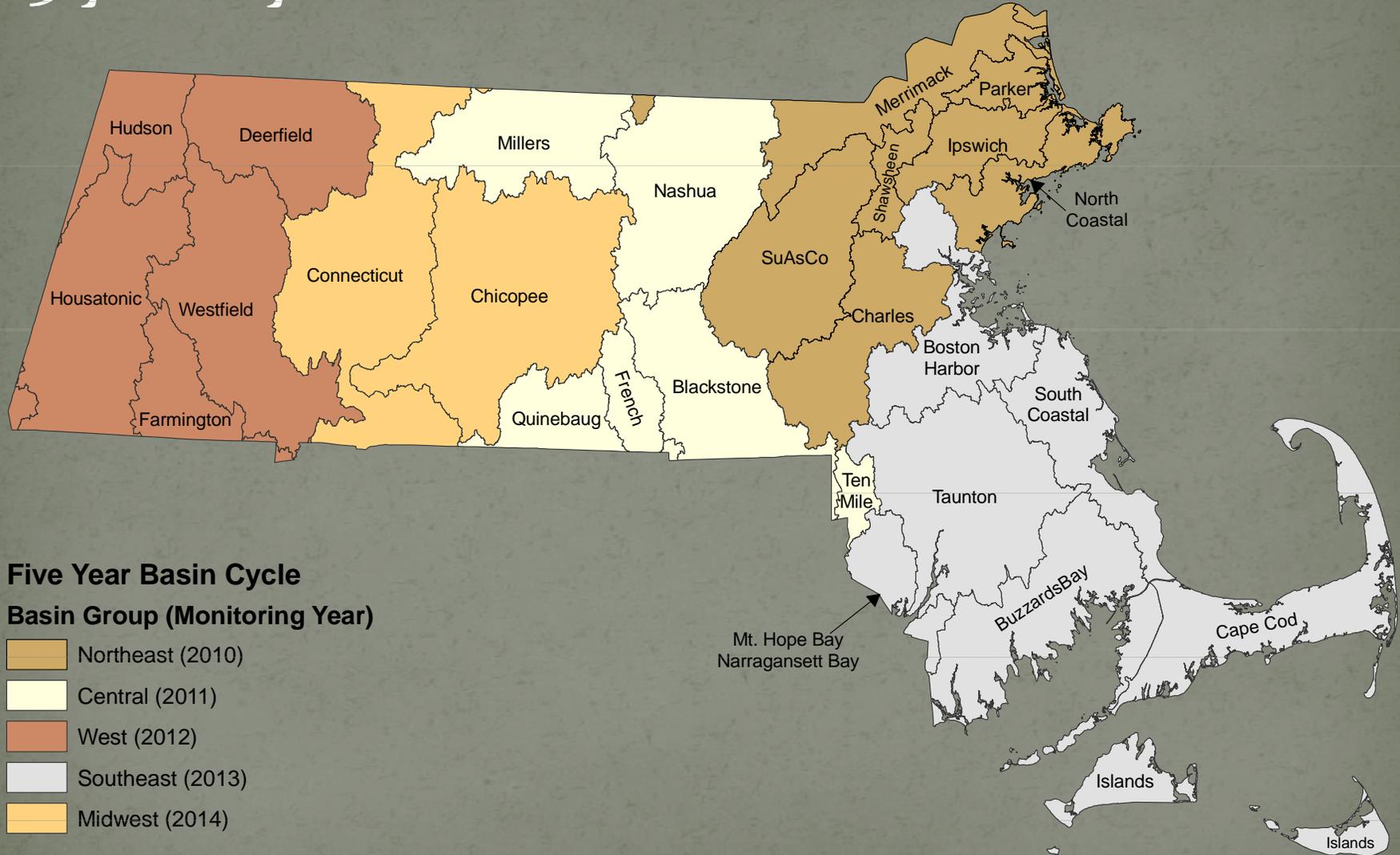
Threats?

PROGRAM
SUPPORT
Improve Programs

Improvements?



5 year cycle- concentrates resources



3 of 5 Monitoring Goals

- Regular Measurements
 - Establish baseline conditions
 - Seasonal variability
- Long term
 - Trends
 - Program success
- **Hydrologic context**
 - Loadings
 - Point Source/ Nonpoint Source

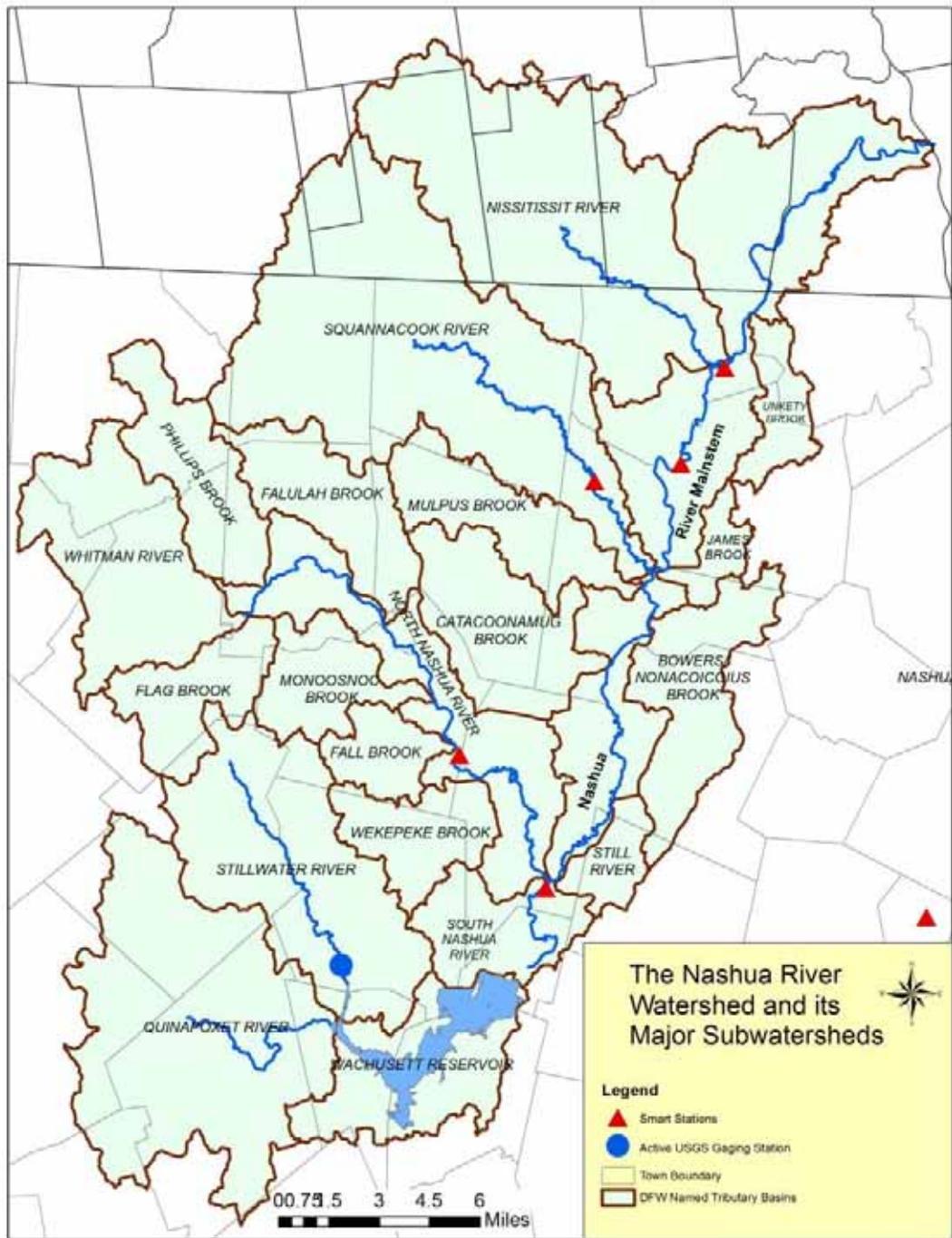


Goals	Attained	Issues
Status	18% river miles	82% unmonitored
Restoration	Conventional Pollutants (point sources)	Nutrients Toxics NPS
Trends	No	\$ 4.5 Billion in POTW's
Protection	No	Acid Rain Urbanization Climate Change
Programs	No	Nutrients Toxics

1996 SMART Program

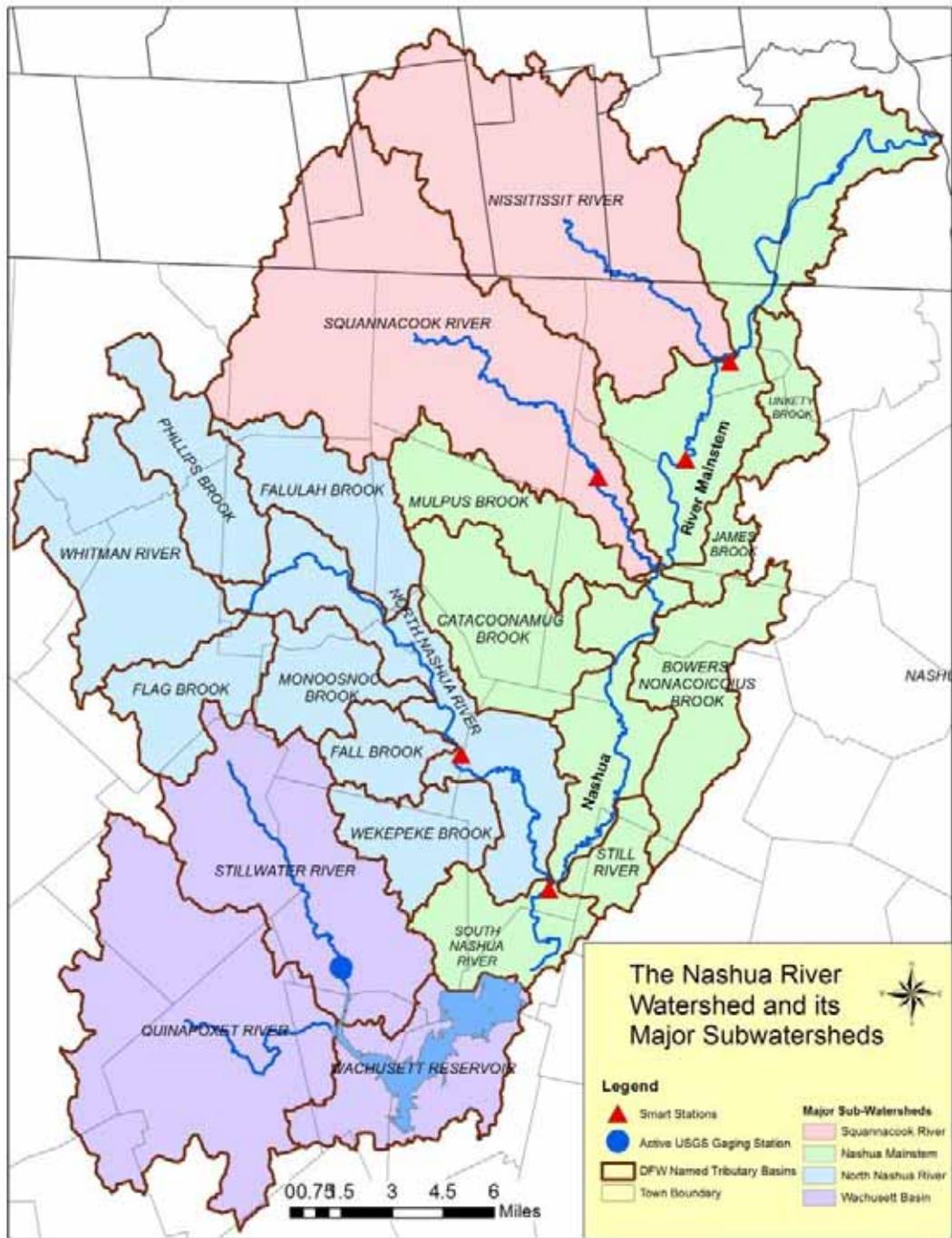
- Test logistics of fixed site monitoring
 - Can it coexist with 5 year program?
- Optimize strategy
 - Number of stations
 - Types of stations
 - Frequency of sampling
- Explore Partnerships





Three Basic Station Types

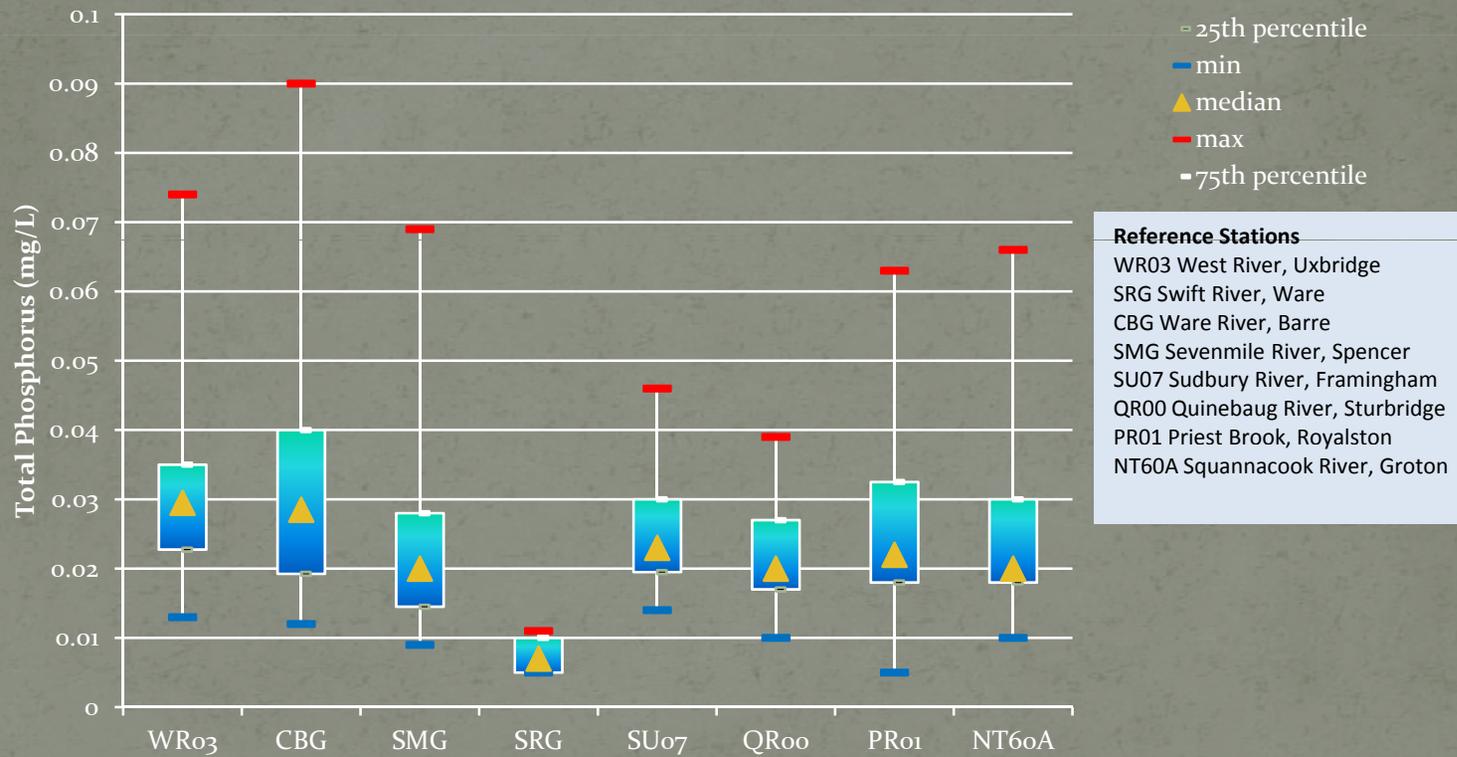
- Boundary
 - Basin trends
- Reference
 - Protection
- Restoration
 - Trends for individual projects (POTW's, CSO's)
 - Document restoration (TMDL)



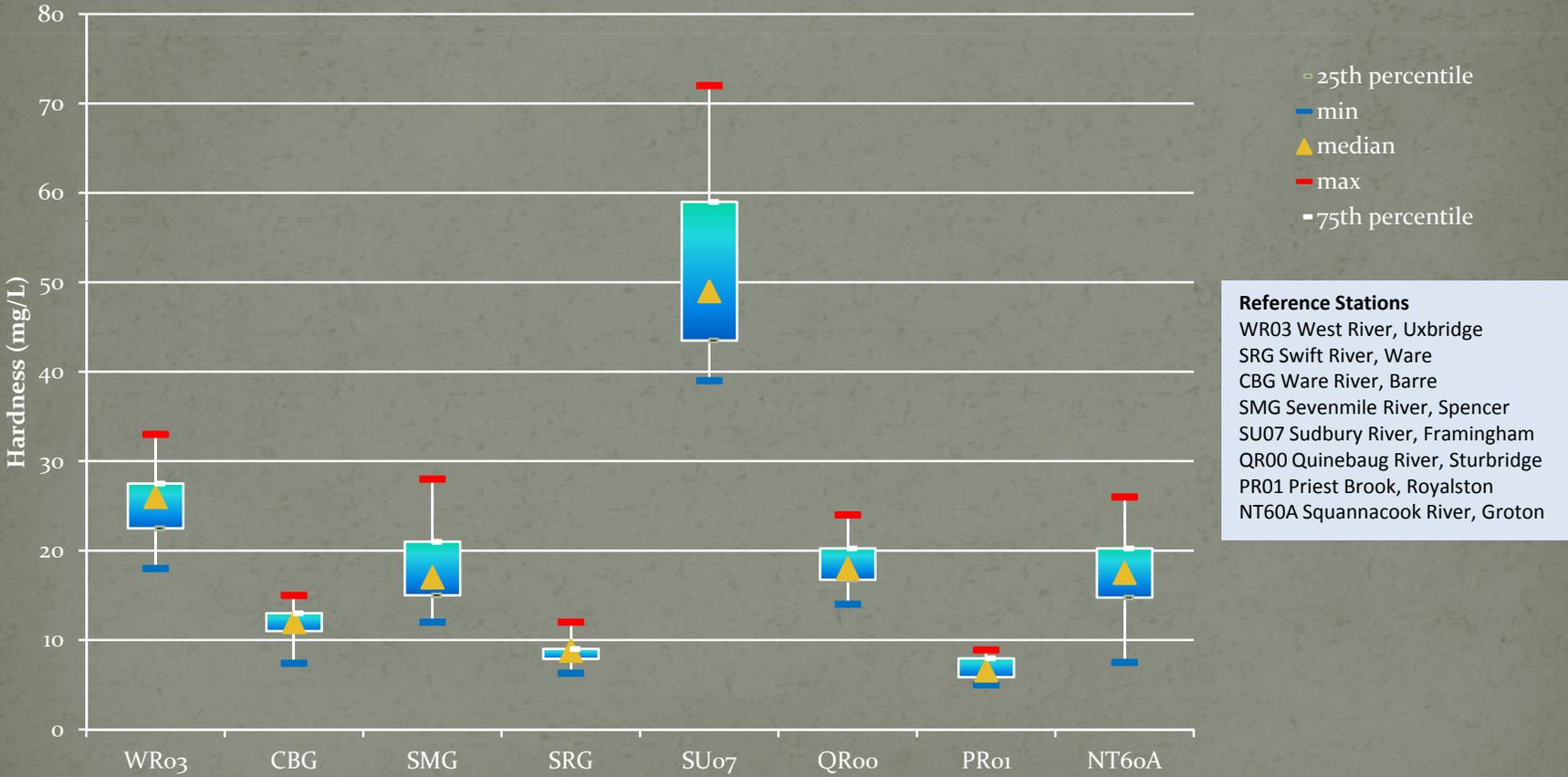
Multipurpose Stations

- All Stations can be used for:
 - Assessments
 - Trends
 - Restoration
 - Program Support
- Additionally
 - 1 station for Protection goal (reference site)

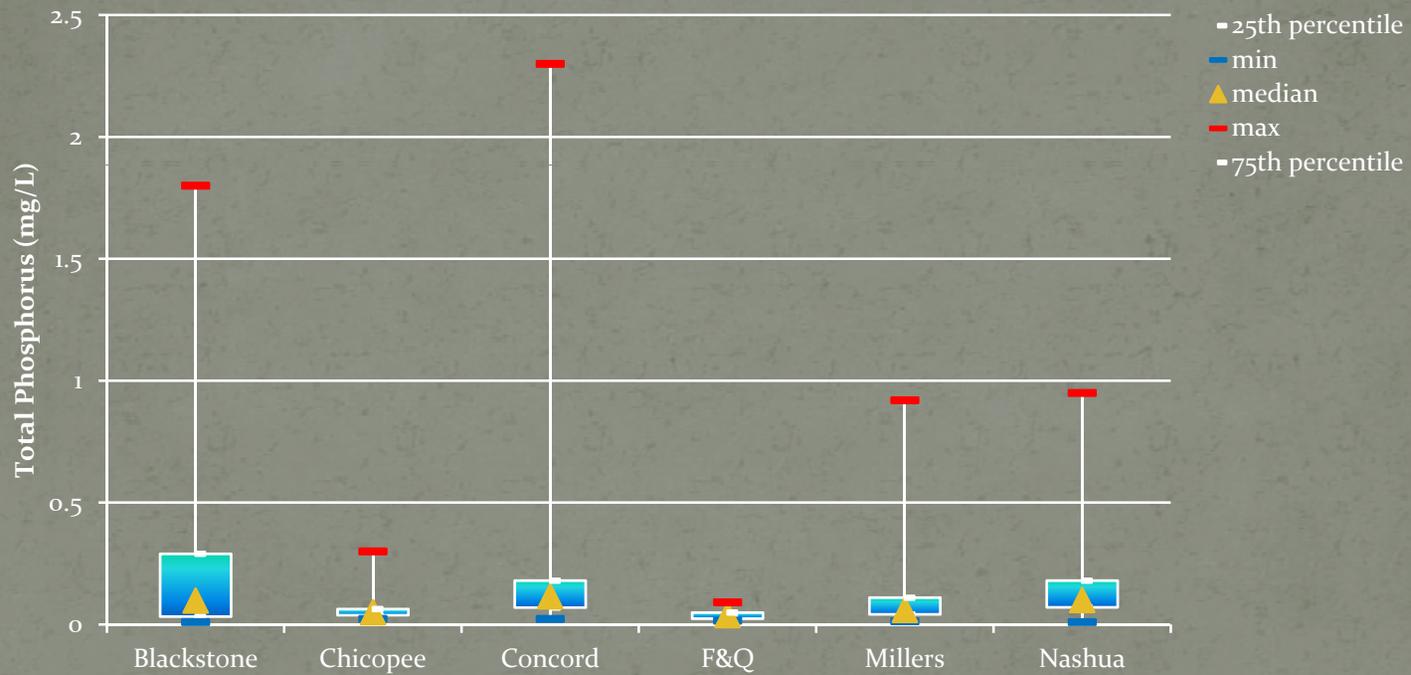
Total Phosphorus in Reference Streams of Central Mass: SMART Monitoring 1998-2004



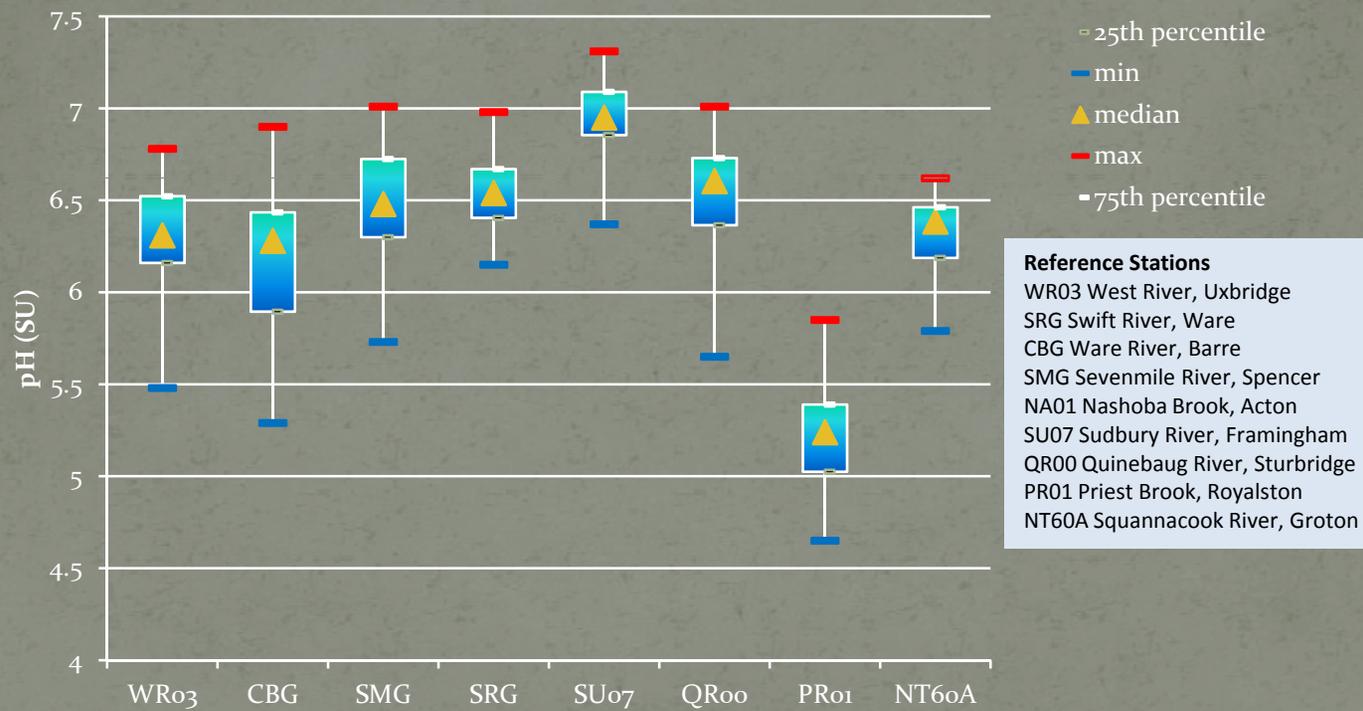
Hardness in Reference Streams of Central Mass: SMART Monitoring 1998-2004



Total Phosphorus in Impacted Streams of Central Mass Watersheds: SMART Monitoring 1998-2004



pH in Reference Streams of Central Mass: SMART Monitoring 1998-2004



Recommended Programs

Strategic
Restoration
Assessment
Headwaters

Monitoring Goal Groupings

	Statewide	Basin	Local
Long term 20+years	Trends Program Support Protection	Trends Program Support Protection	
Intermediate 5-20 years		Restoration Trends (projects) Program Support Protection	NPS Restoration NPS Trends
Short 1-5 years		Assessment	NPS Assessment

Strategic Monitoring Network

	Statewide	Basin	Local
Long term 20+years	Trends Program Support Protection	Trends Program Support Protection	
Intermediate 5-20 years		Restoration Trends (projects) Program Support Protection	NPS Restoration NPS Trends
Short 1-5 years		Assessment	NPS Assessment

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Threats?

PROGRAM
SUPPORT
Improve Programs

Improvements?

Candidate SMART Stations

- Boundary Stations
 - Pour points
- Reference Sites
 - Ecoregions
 - SWMI
- 9 (30) stations

Restoration Monitoring Program

TMDL

Restoration Monitoring Program

	Statewide	Basin	Local
Long term 20+years	Trends Program Support Protection	Trends Program Support Protection	
Intermediate 5-20 years		Restoration Trends (projects) Program Support Protection	NPS Restoration NPS Trends
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STATUS
ID Problems

Problems?

RESTORATION
Diagnose and Fix

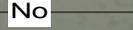
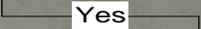
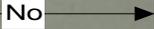
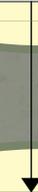
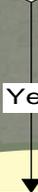
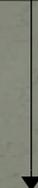
TRENDS
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Threats?

Improvements?

PROGRAM
SUPPORT
Improve Programs



Restoration (TMDL) Program

- Year round fixed sites for life of project (5-20 years)
- Priority basins only (TMDL's)
- Multipurpose stations

Candidate SMART Stations

- 6 Current SMART basins
- Priority TMDL Projects
 - Blackstone
 - Nashua
 - Suasco
- 12 (30) stations

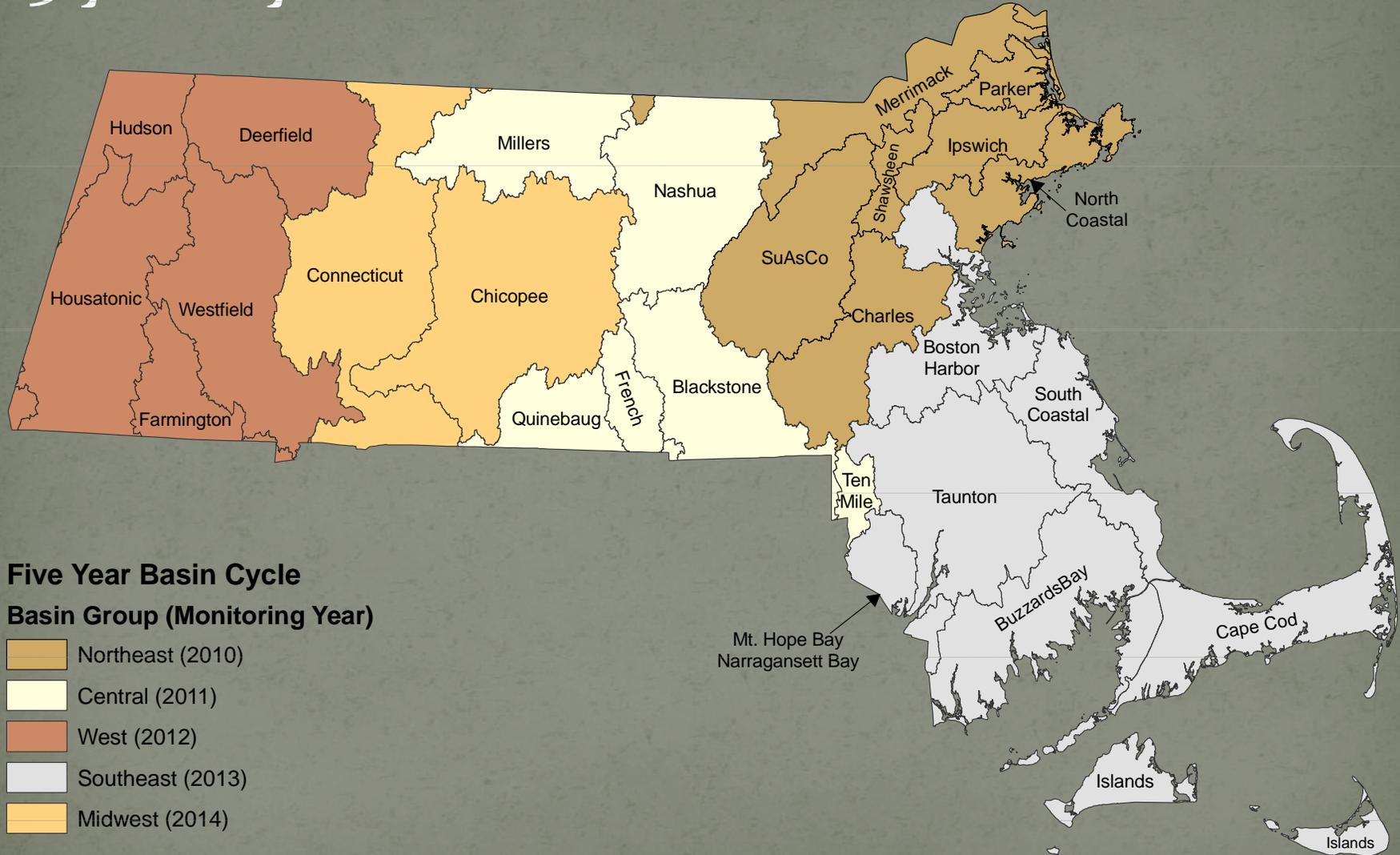
Assessment Monitoring Program

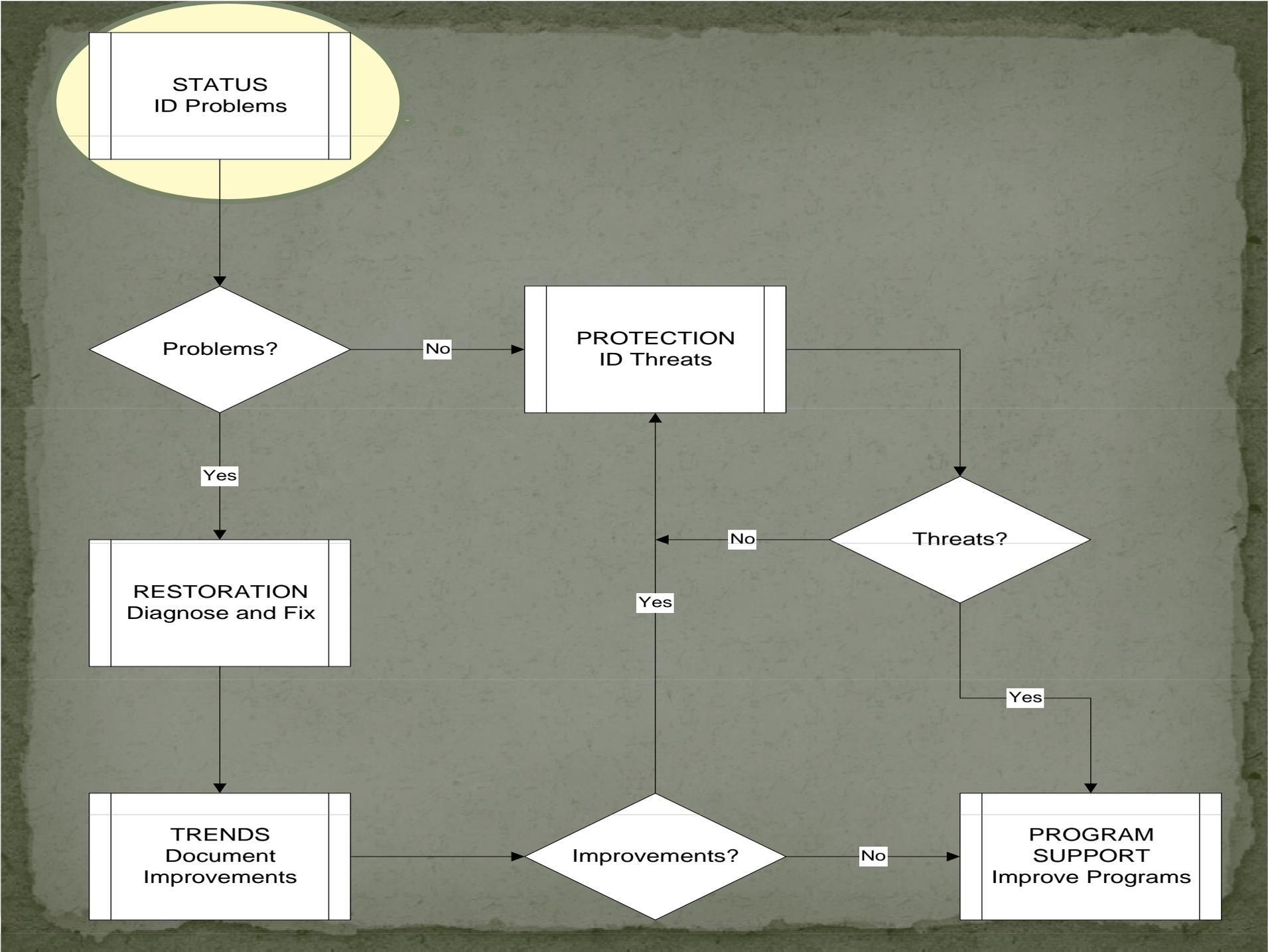
Status

Assessment Monitoring

	Statewide	Basin	Local
Long term 20+years	Trends Program Support Protection	Trends Program Support Protection	
Intermediate 5-20 years		Restoration Trends (projects) Program Support Protection	NPS Restoration NPS Trends
Short 1-5 years		Assessment	NPS Assessment

5 year cycle- concentrates resources





Candidate SMART Stations

- Remaining 9 stations
 - 9 → strategic program
 - 12 → restoration program

Headwaters Program

	Statewide	Basin	Local
Long term 20+years	Trends Program Support Protection	Trends Program Support Protection	
Intermediate 5-20 years		Restoration Trends (projects) Program Support Protection	NPS Restoration NPS Trends
Short 1-5 years		Assessment	NPS Assessment

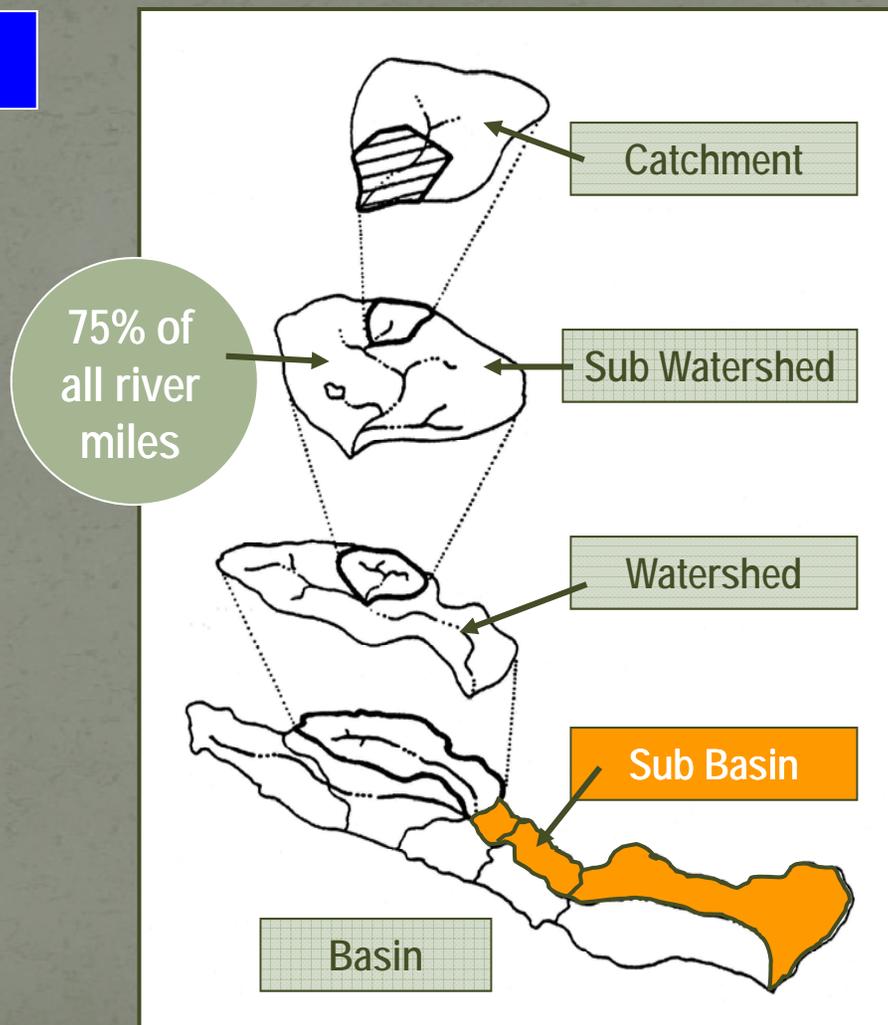
Historic Monitoring Program

EFFECTS

NONPOINT
SOURCE
POLLUTION

POINT
SOURCE
POLLUTION

TRENDS



USE

BMP's,
Site Design

NPS
Assessment

Land Use
Zoning

Basin
Planning

Basin
Planning

Goals	Attained	Issues
Status	18% river miles	82% unmonitored
Restoration	Conventional Pollutants (point sources)	Nutrients Toxics NPS
Trends	No	\$ 4.5 Billion in POTW's
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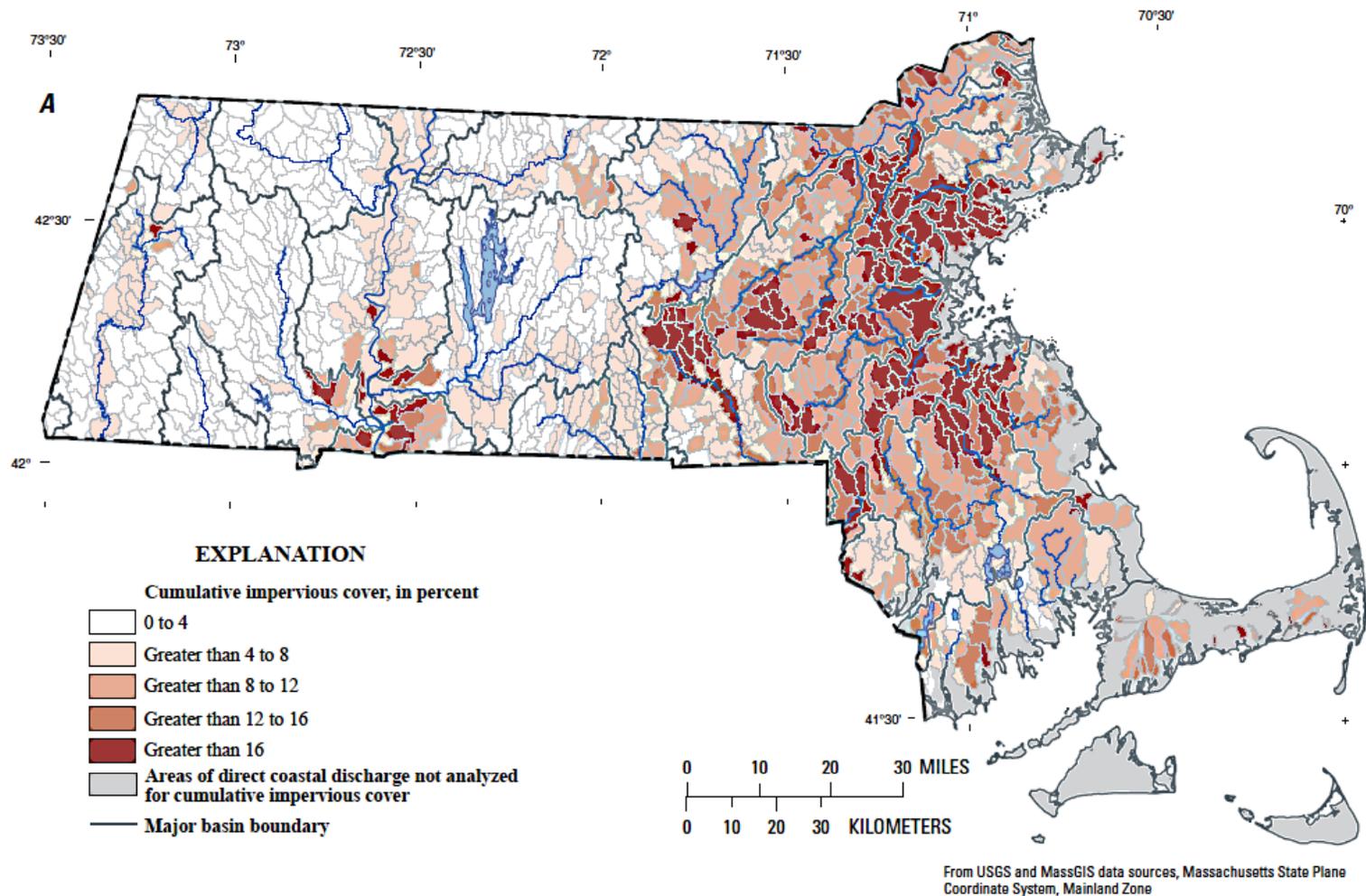


Figure 24. (A) Cumulative percent impervious cover in Massachusetts subbasins. (B) Cumulative percent impervious cover in Massachusetts 12-digit Hydrologic Unit Code (HUC-12) basins.

Headwaters Strategy

Status Protection (threats)	Impervious Cover Model
Restoration Program Support	National Studies
Trends (Program working?)	Geo-targeted monitoring Volunteers

Headwaters Program

- Volunteers
 - Local issues
 - Local solutions
- Hot spots
- Bacterial Source Tracking
- Department of Transportation (culverts & road salt)
- Invasive species (lakes)
- Riparian areas – stream walks
- RPA- intermittent streams
- Spills
- NRCS ?

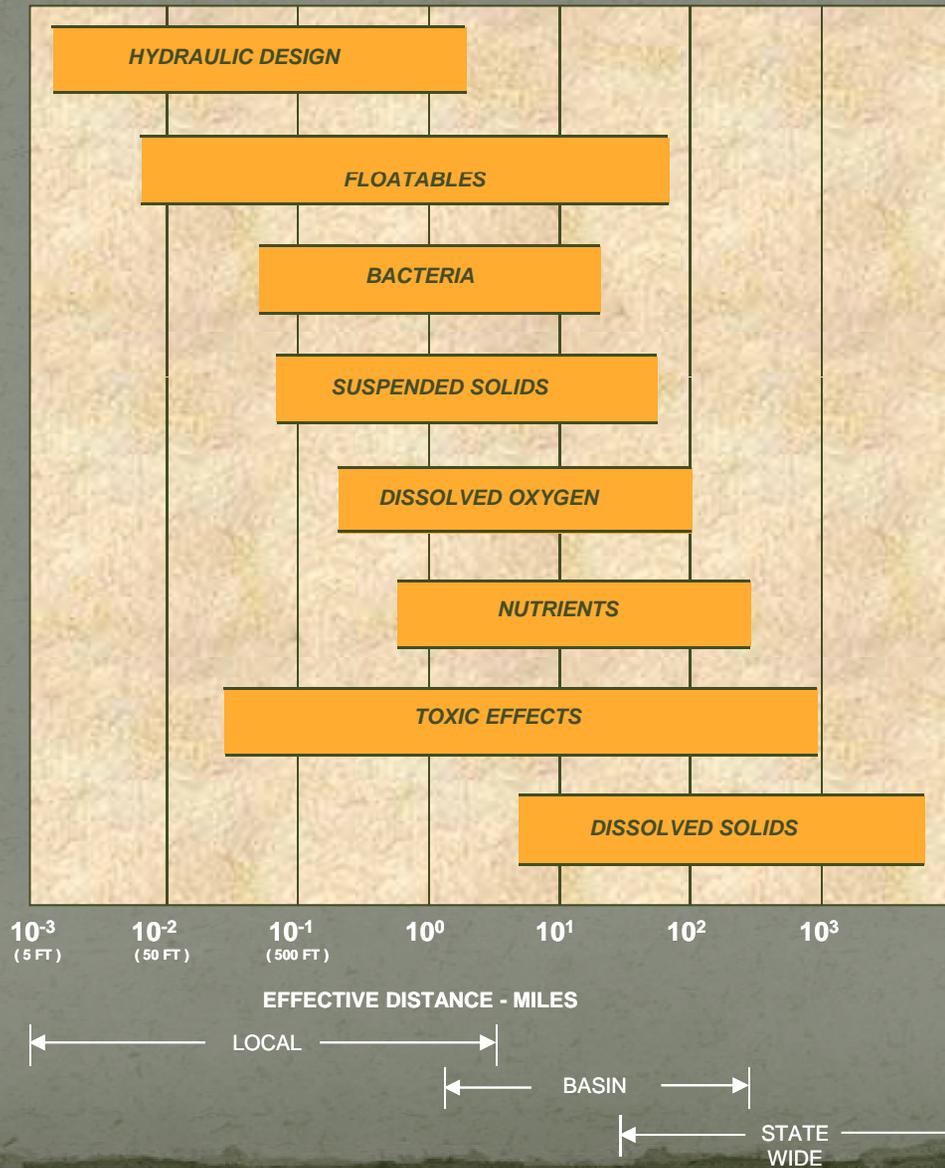
Partnerships

Local
Municipal
Federal

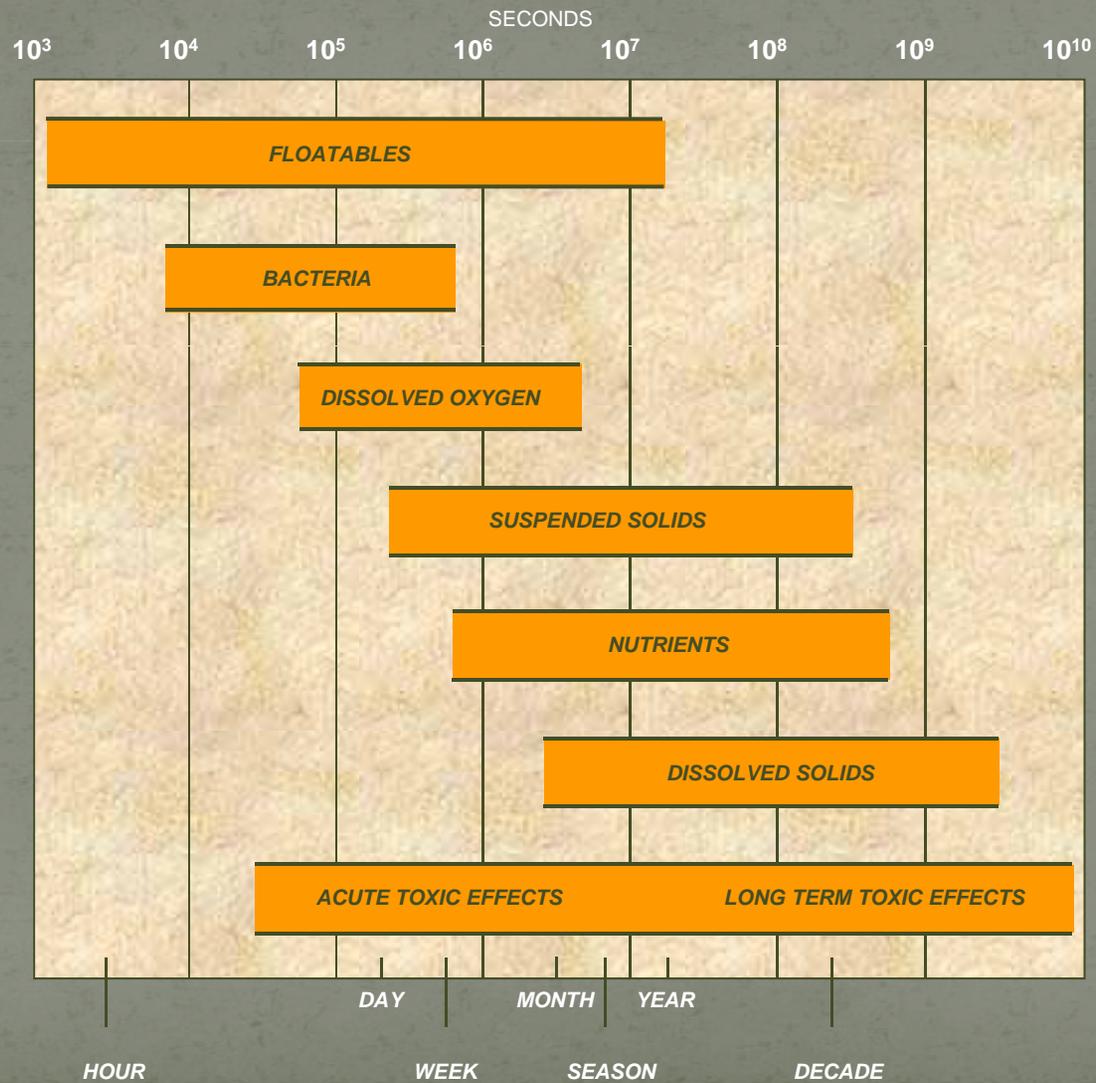
Volunteer Monitoring

- Best Use of Volunteers
 - sites?
 - Indicators ?
 - Sampling frequency?
- Analyze Time and Space Scales

Space Scales



Time Scales



Volunteer Indicators

- Habitat- ideal
 - Local space scale
 - Long time scale
 - Stream walks –miles of stream
 - Low tech methods-observations
- Bacteria
 - Local space scale
 - Local time scale- problem
 - Capture with monthly sampling
 - Low tech-Colilert
- Aesthetics

Volunteer Monitoring

- Local time and space scales
- Visual and low tech methods
 - Habitat - "Unified Stream Assessment" (USA)
 - Bacteria - Coliert™
 - Aesthetics- "Stream Walks"
- Chemistry or biology
 - Interest and Abilities

Future Volunteer Network

- Broaden Scope (beyond 305b)
 - Screening for state sampling
 - Source tracking (Fitchburg)
 - Spills (Blackstone)
 - Intermittent streams (RPA)
 - Trash TMDL (California)
 - Fish Kills (real time app)
- Provide data base
 - Connect independent groups
 - Data users (high school groups)
- Provide Interpretation
 - Sort by data confidence level
 - Some to 305 b

Natural Partnerships

Program	Partners	Indicators
Statewide	Federal/State	Flow Sediment Nutrient loading
Basins	State/Municipal	Biology Chemistry
Local	State/Local	Habitat Bacteria Aesthetics

Summary

- Future Monitoring Programs
 - Strategic
 - Restoration
 - Assessment
 - Headwaters
- All SMART Stations candidates for these programs
- Expanded role for Volunteers
 - Local scale