

Development and Implementation of TMDLs, Watershed Restoration and the Role of Volunteers

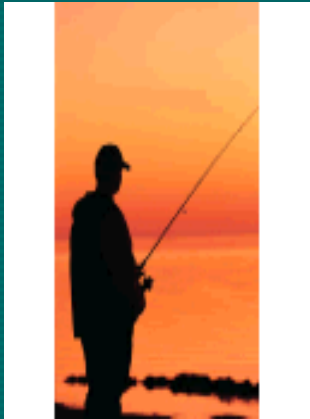
Jay Springer

NJDEP Division of Watershed Management

November 18, 2009

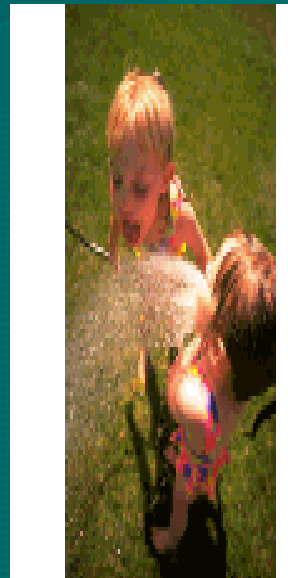
New Jersey's TMDL Program

- Who we are
- Integrated List of Impaired Waterbodies
- What is a TMDL?
 - TMDL Components
 - TMDL Calculations



DWM Goals:

- Comprehensive water resource management on a watershed basis to ensure clean and plentiful water
- Protection and restoration of NJ's water resources by preventing, abating and controlling water pollution to achieve the goal of “fishable and swimmable” state-wide.



Water Resource Management: Impaired Waters



* Sublist 5 of Integrated List of Waterbodies

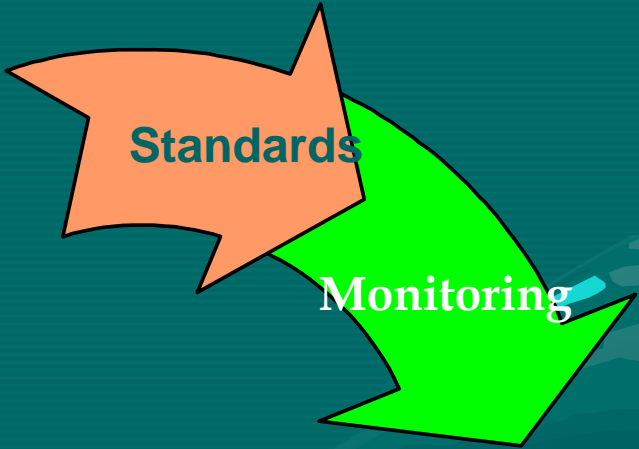


NJ Surface Water Quality Standards (SWQS)



standards

- Surface water quality criteria is established for each of the different stream classifications
- The SWQS are numerical estimates of constituent concentrations, including toxic pollutants, that are protective of the designated uses of the surface waters of the State.
- Narrative criteria describe in-stream conditions to be attained/maintained or avoided. The SWQS also contain technical and general policies, including anti-degradation policies, to ensure that the designated uses are adequately protected.



Standards

Monitoring

State Monitoring Networks

NJDEP-Bureau of Freshwater & Biological Monitoring







- AMNET
 - AMbient Biomonitroing NETwork
- Surfacewater Chemical Monitoring
- Groundwater Chemical Monitoring
- Fish IBI- Index of Biotic Integrity
- Lake Monitoring

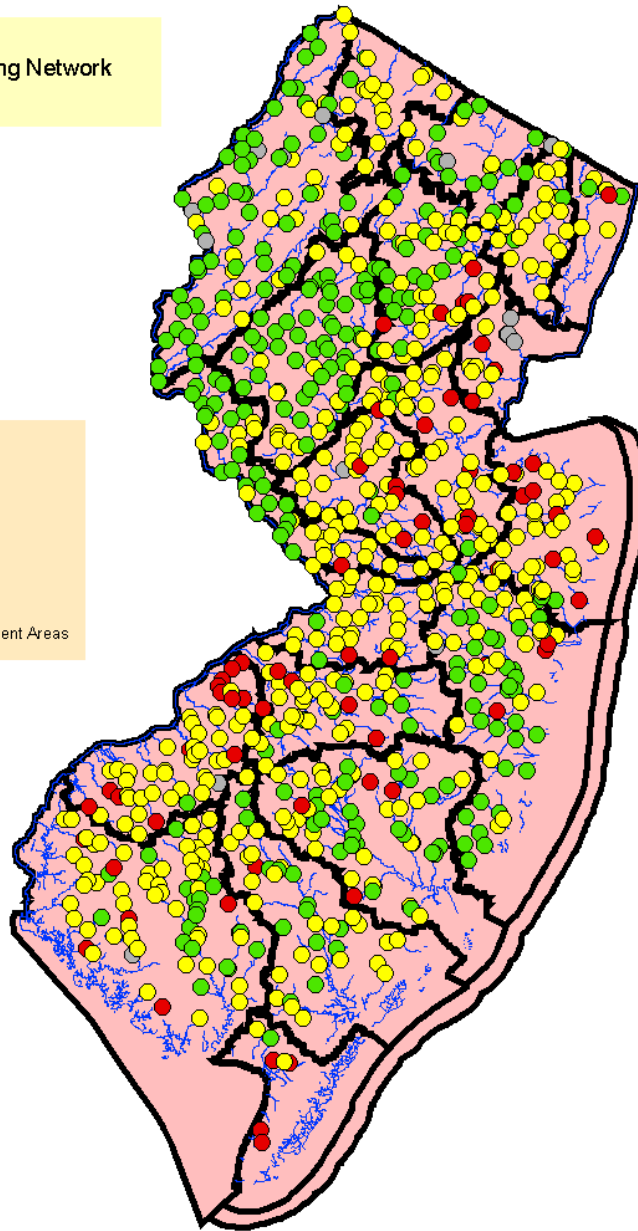


Monitoring

New Jersey's
Ambient Biomonitoring Network
2003

Legend

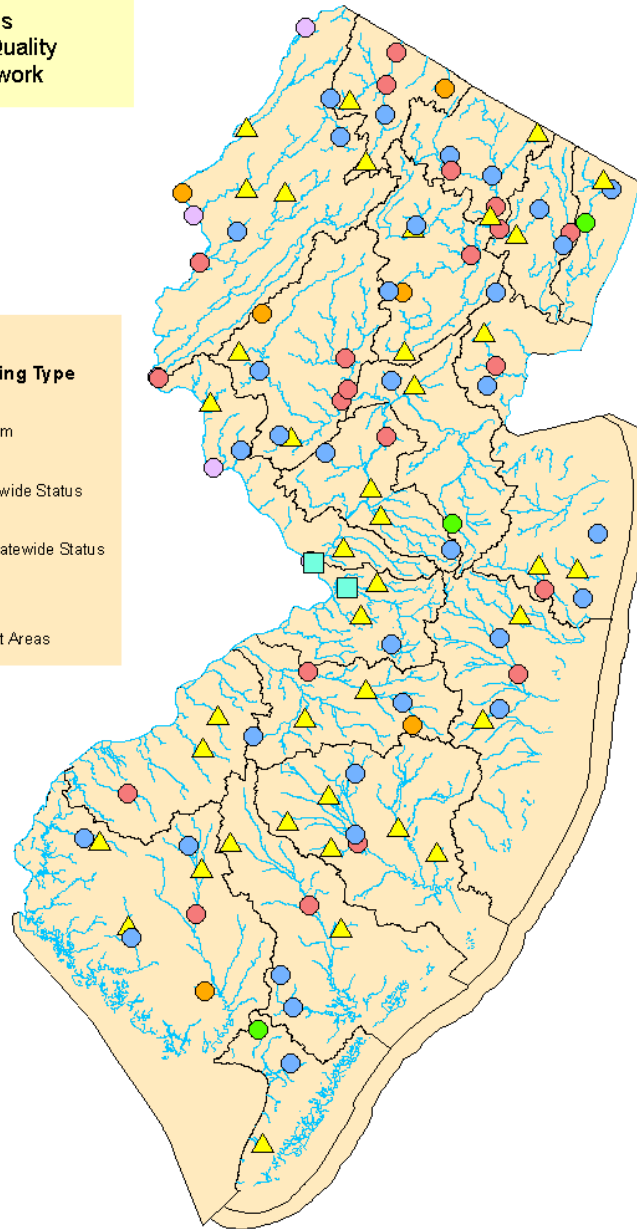
-  Moderately Impaired
-  Non-Impaired
-  Severely Impaired
-  Unsampled
-  Streams
-  Watershed Management Areas



New Jersey's Surface Water Quality Monitoring Network

Ambient Stream Monitoring Type

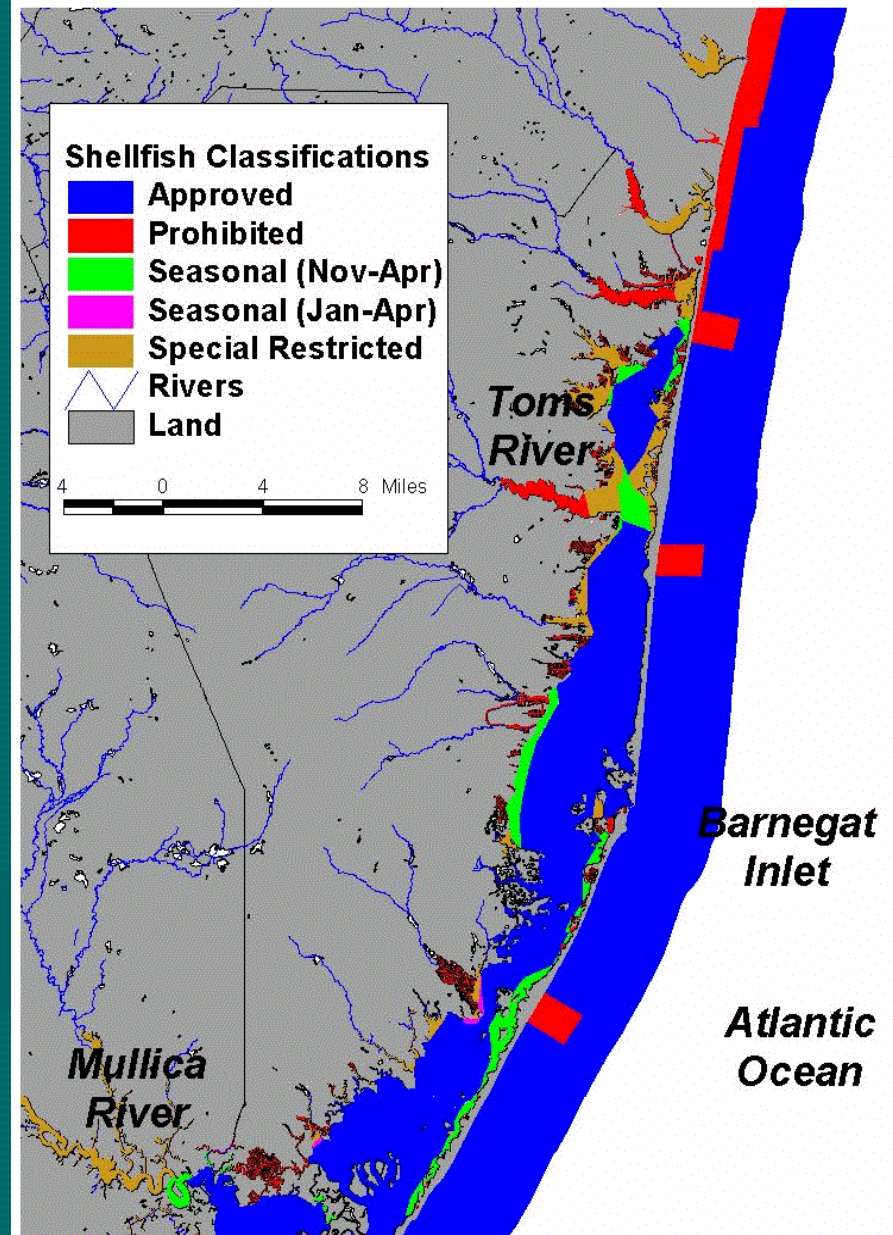
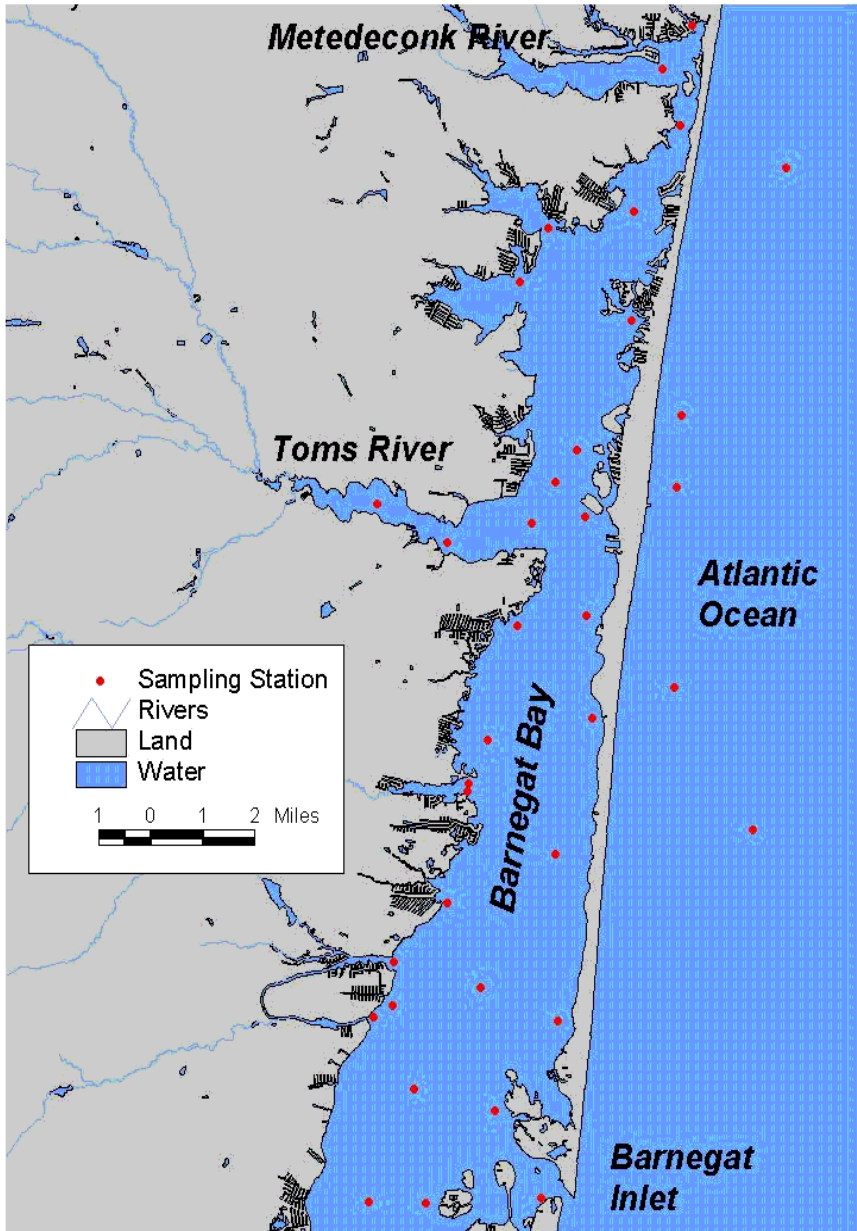
- Background
- Delaware River Mainstem
- ▲ Landuse Indicator
- Landuse Indicator/Statewide Status
- Watershed Integrator
- Watershed Integrator/Statewide Status
- Statewide Status
- Streams
- ▭ Watershed Management Areas

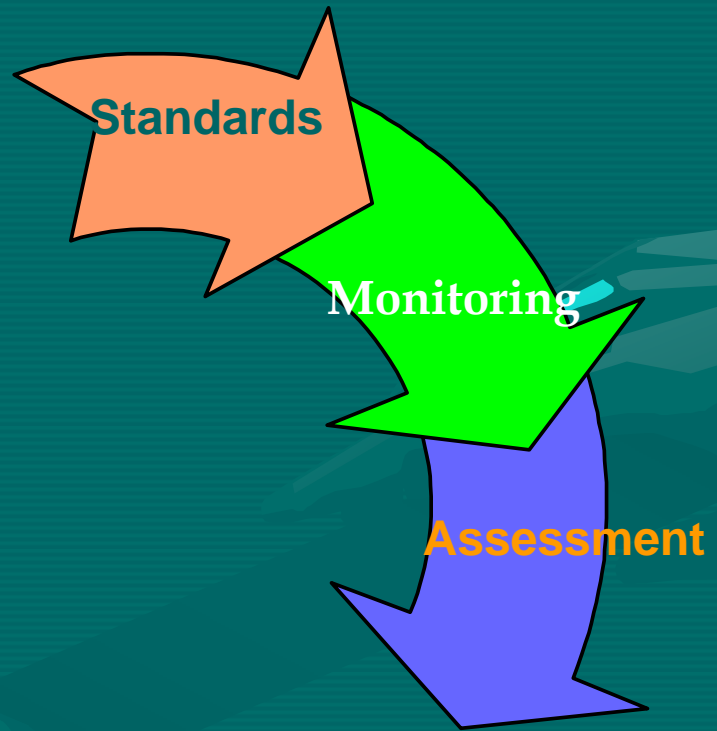


State Monitoring Networks

NJDEP-Bureau of Marine Water Monitoring

- Approximately 15,000 ambient water samples are collected yearly from a 4,000 station sampling network.
- Information is used to classify approximately 700,000 acres of marine and estuarine shellfish waters





Standards

Monitoring

Assessment

Assessment and Listing Process

- State's waters are Monitored
- Results are analyzed by Water Monitoring and Management
- Water Assessment Reports prepared - Pre-2002:
 - 305(b) Water Quality Inventory Report
 - 303(d) List of Impaired Waterbodies
- Water Assessment Reports prepared - 2002 On:
 - Integrated Water Quality Monitoring & Assessment Report

Assessment



Historical River and Stream Assessment

Prior to 2002 the NJDEP issued separately:

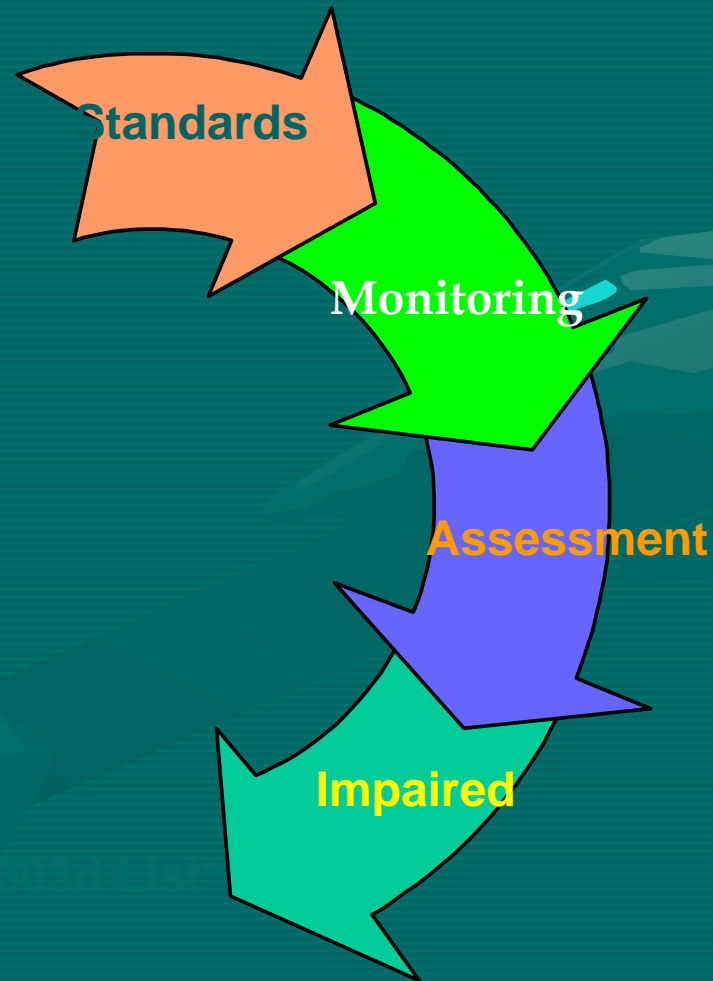
- New Jersey Water Quality Inventory Report 305(b) that described the status and trends in NJ's water quality
- 303-d list of Impaired Waters ONLY
- Water bodies assessed as segments

Both reports were required by the federal Clean Water Act!

Data Sources for Development of the Integrated List

- A. 304(1) List (and toxics Mini-List)
- B. Ambient Biological Monitoring Network (benthic)
- C. Ambient Stream Monitoring Network (conv & toxics)
- D. Shellfish Growing Waters Classification
- E. Fish Tissue Analysis (Hg, PCBs, Chlordane)
- F. NY-NJ Harbor Estuary Program
- G. Delaware Estuary Program
- H. Clean Lakes Program (eutrophication)
- I. Data submission by stakeholders**

Water Resource Management: Impaired Waters



2008 Integrated Water Quality Monitoring and Assessment Report

CATEGORY 1: Attainment

CATEGORY 2: Limited Attainment Data

CATEGORY 3: Insufficient Data

CATEGORY 4: Impaired but No TMDL Required

4A Completed; 4B Other Pollution Control

Requirements in Place; 4C Not Caused by Pollutant

305(b)
Report

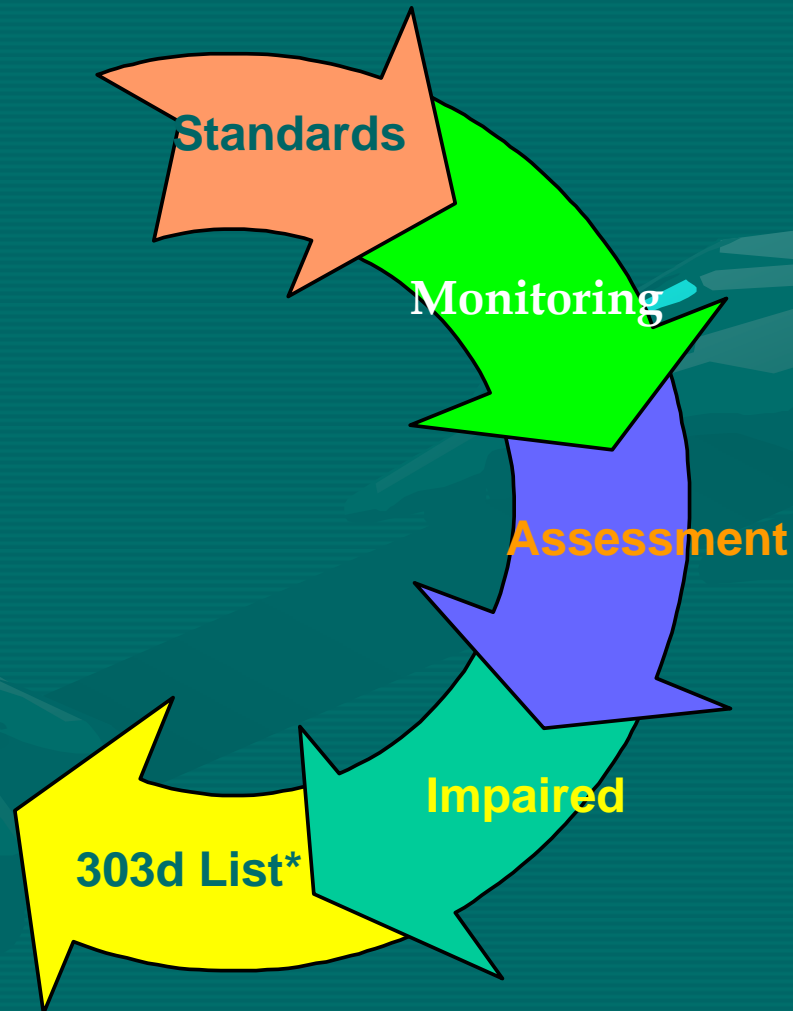
CATEGORY 5: NON-ATTAINMENT } 303(d)
List

Impaired

Integrated List of Water Quality

- **Sublist 1:** All uses assessed and met
- **Sublist 2:** Uses assessed met but not all assessed
- **Sublist 3:** Insufficient or no data to assess the designated use.
- **Sublist 4:** Impaired but TMDL done or other enforceable measure or impaired but not a pollutant
- **Sublist 5 (feeds 303(d) list):** Impaired - pollutant known or unknown

Water Resource Management: Impaired Waters



Management Responses to Sub-List 5 (303(d)) Listings

- Develop a TMDL
- Determine TMDL is not appropriate method for achieving SWQS and that other control actions will result in meeting standards
- Evaluate listing - if site is not impaired or data inadequate to support listing, then pursue delisting in next listing cycle

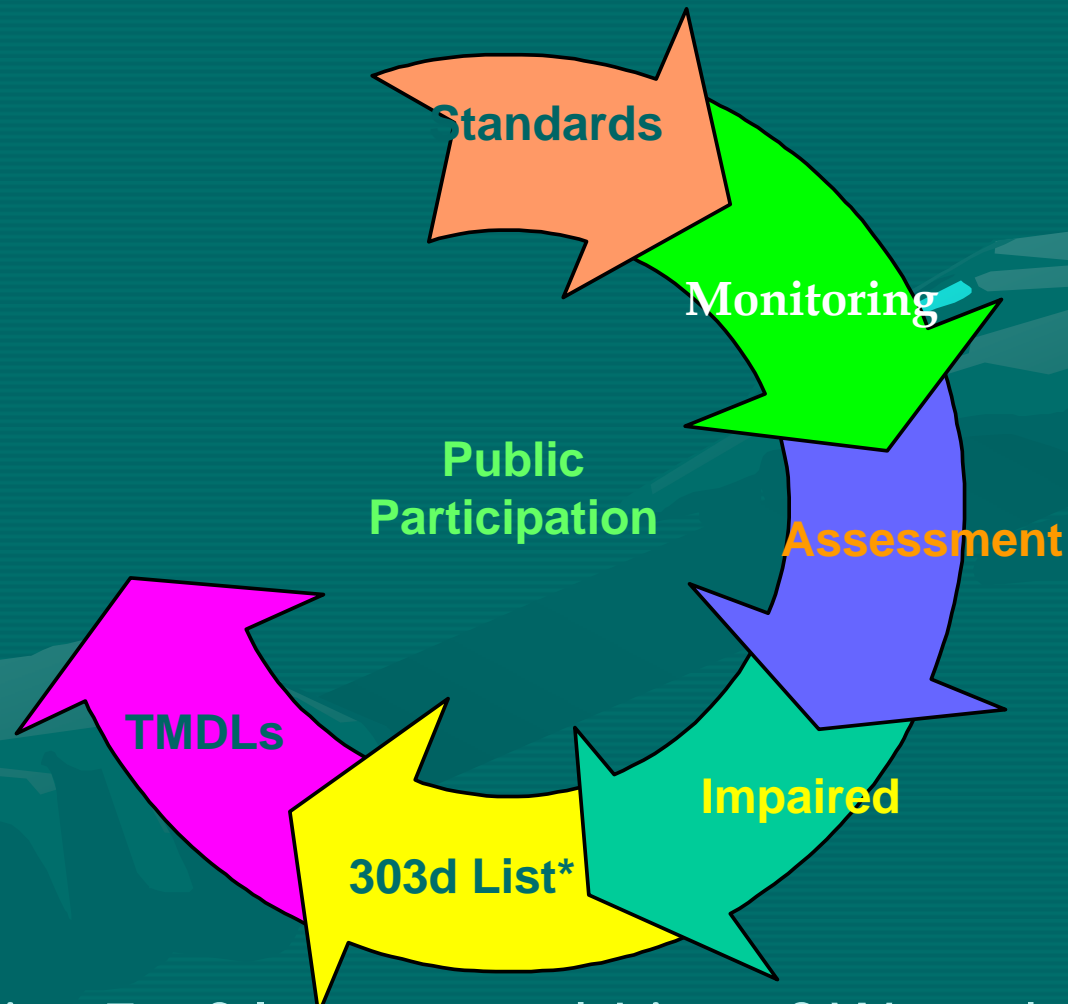
CWA Requirement

- TMDLs are required, under Section 303(d) of the federal Clean Water Act, to be developed for waterbodies that cannot meet surface water quality standards after the implementation of technology-based effluent limitations



303d List*

Water Resource Management: Impaired Waters

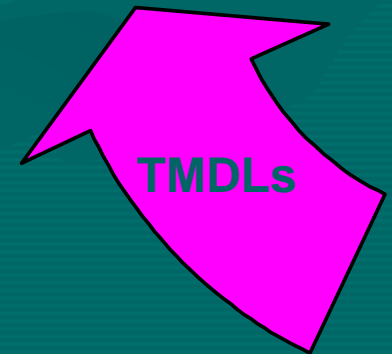


* Sublist 5 of Integrated List of Waterbodies

What are TMDLs?

- Total Maximum Daily Loads (TMDLs) represent the assimilative or load capacity of the receiving water, taking into consideration:
 - point sources of pollutants - NJPDES Permitted (WLA)
 - Treatment facilities
 - Phase II Stormwater
 - CSO's
 - nonpoint sources of pollutants - (LA)
 - NPS other than point source stormwater
 - Background
 - surface water withdrawals
- Express as $TMDL = WLA + LA + MOS^*$

*Margin of Safety accounts for uncertainty in the data, models and solutions



Components of a TMDL

Source assessment

- characterization and quantification as necessary
- identify point, nonpoint and background sources

Water quality analysis

- link pollutant sources & water quality: model
- consider seasonal variation / critical conditions

TMDL calculations



- loading capacity
- margin of safety
- load and wasteload allocations

Follow-up Monitoring

Implementation

Public participation

Source Assessment

- Land Use
 - Aerial Photographs
 - Stakeholder Input
 - Ameri-Corp Visual Assessment Data & Stream Surveys
 - Relationship between Pollutant and FLOW
 - Stream Loading based on actual in-stream concentration.
- 
- Additional Sampling with various source tracking methods as necessary to identify sources and their location
- 
- Implementation ...

Source Assessment

```
graph TD; SA([Source Assessment]) --> I([Implementation]); SA --> FM([Follow-up Monitoring]); FM --> I;
```

The diagram illustrates a process flow with three stages: Source Assessment, Implementation, and Follow-up Monitoring. Source Assessment is the starting point, leading to both Implementation and Follow-up Monitoring. Follow-up Monitoring then leads back to Implementation, suggesting a feedback loop.

Implementation

Follow-up Monitoring

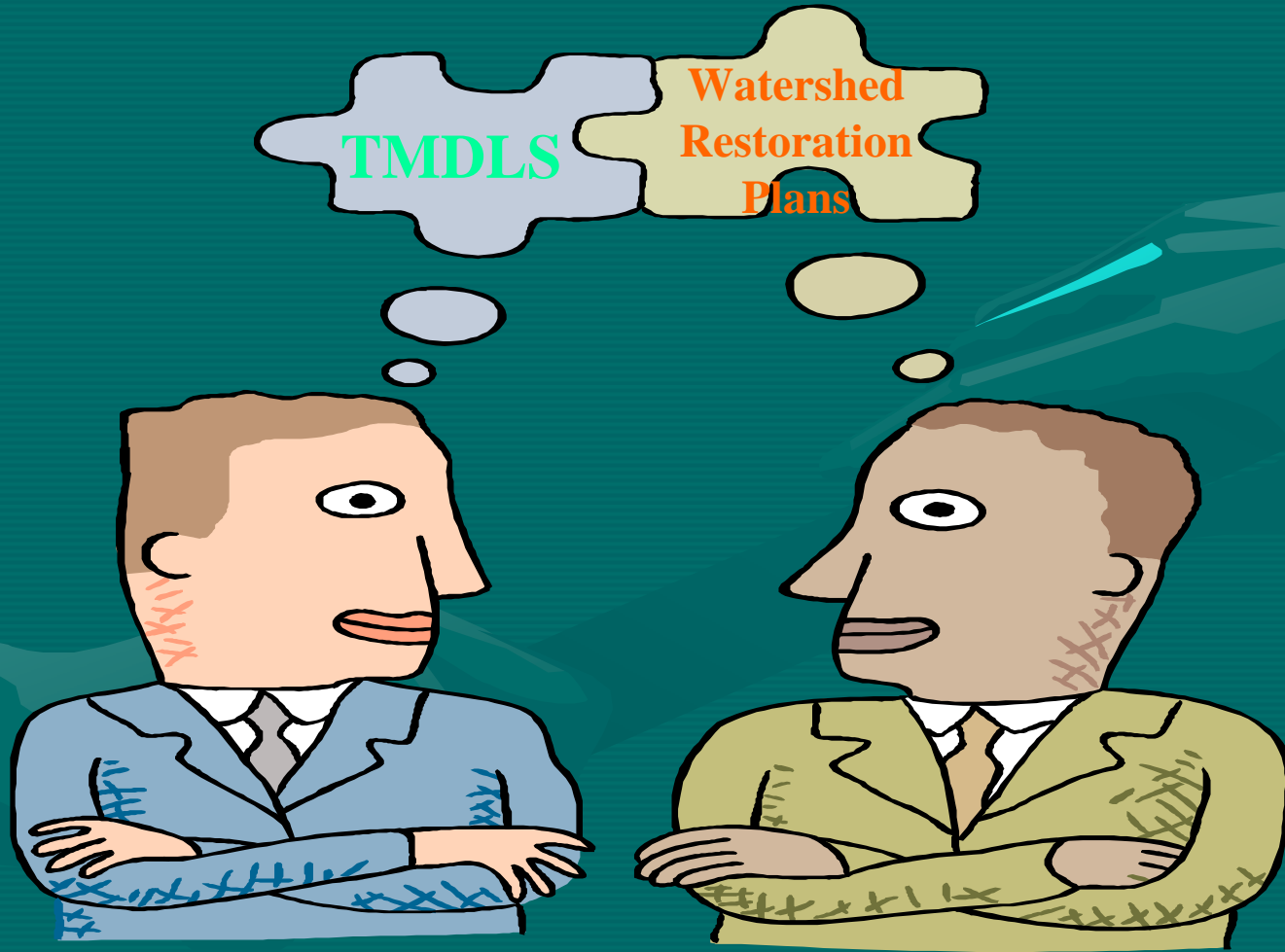
Development of Implementation Plan

- Work in coordination with Stakeholders to evaluate all available data for each impaired segment.
- Make segment specific recommendations including the need for additional monitoring in select locations.

TMDLS

&

Watershed Restoration Plans



Watershed Restoration Plans



- Takes the TMDL and TMDL implementation plan and develops a detailed work plan that will ID sources and strategies to reduce the pollutant of interest
 - analyze results of any additional monitoring
 - review ameri-corps visual assessment data
 - acquire stakeholder input



Achieving the TMDL thru Restoration Plans

The OBJECTIVE is RESTORATION, not to redo the TMDL!

Refine impaired HUC 14 into catchment areas for hot spot identification of sources

- Start w/TMDL Implementation Plan
- Perform Additional Visual Assessments
- Thru Limited but Focused Monitoring

Achieving the TMDL Thru Restoration Plans (cont)

- Identify the appropriate BMP to address the sources from hot spots
- Implement the BMP(s)
- Monitor to determine BMP effectiveness
- Add up incremental reductions of source(s) to achieve your load reduction

Watershed Restoration Plan

- Should result in a set of implementation actions that will achieve load reductions necessary to bring waterbodies into compliance with SWQS...

HOW DO WE GET
TO CLEAN
WATER?




Success Stories

- Lake Hopatcong
- Stony Brook Millstone
Watershed

Land Use in Lakeshed

Legend

 Watershed Boundary

NJDEP 95/97 Land Use Coverage

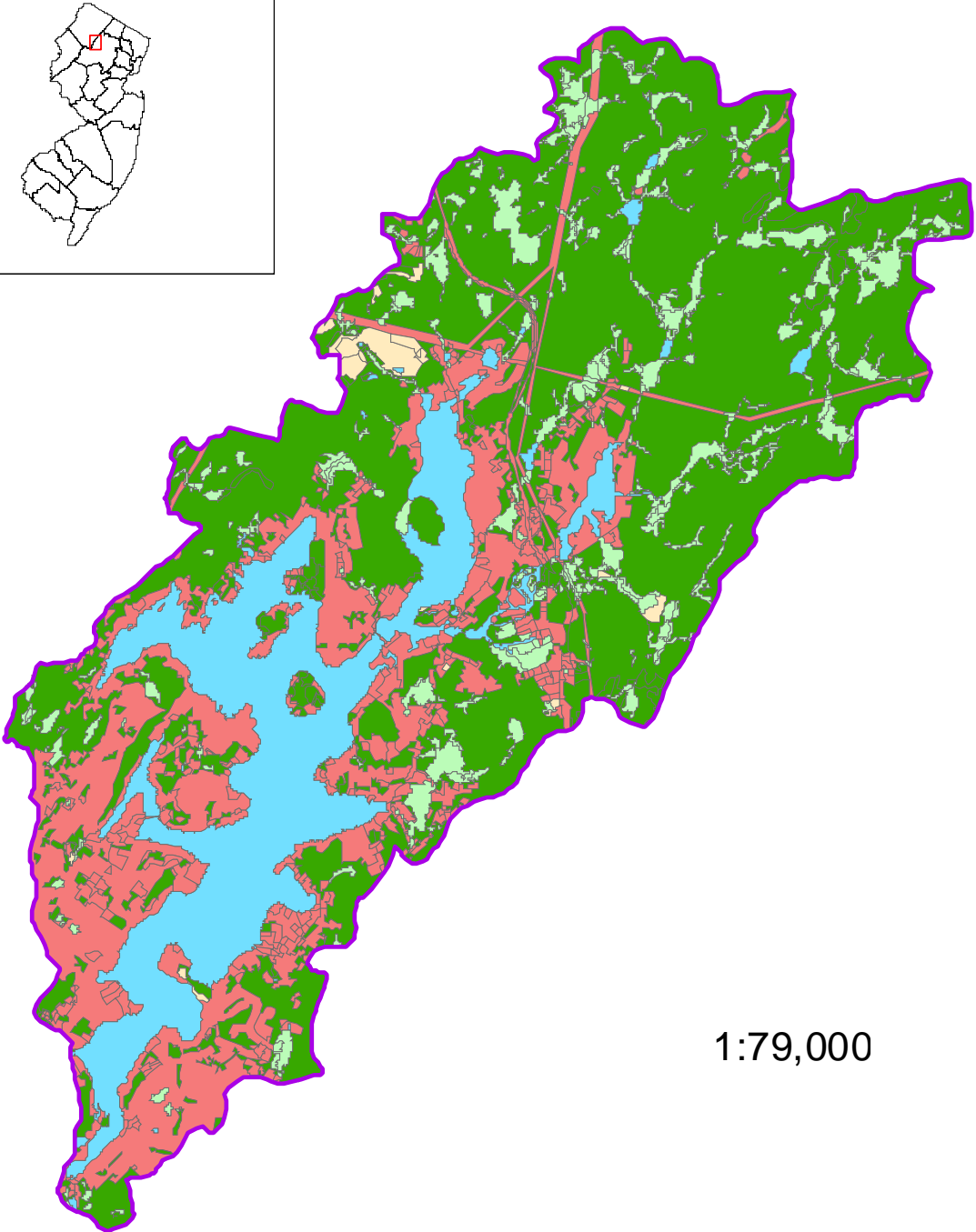
 BARREN LAND

 FOREST

 URBAN

 WATER

 WETLANDS



1:79,000



Lake Hopatcong Commission

- Created by Legislature 2000
- First Lake Hopatcong Meeting - May 2001
- Mandate: “To oversee and safeguard Lake Hopatcong as a natural, scenic and recreational resource.”
- 11 Members – 5 State/6 Local
 - State - Chair, DEP & DCA Commissioners and 2 Public Members
 - Local - Morris & Sussex County, Borough of Hopatcong, Jefferson Township, Roxbury Township; Borough of Mt. Arlington

Major Uses

- Boating
- Fishing
- Swimming
- Sight seeing
- Water Supply



Use Impairments Invasive Weed Growth



Use Impairments Woodport area



Use Impairments Summer Algal Blooms



Use Impairments Summer Algal Blooms



Major Sources

- Stormwater runoff
 - High density land uses
- Wastewater Management
 - Failing Septic Systems

Implementation – What?

- Wastewater
 - Sewers
 - Septic Management
- Stormwater
 - Inventory and address intakes and outfalls
 - Required 7:14 Ordinances (Pet Waste, Wildlife Feeding, etc.)
 - Phosphorus-free Fertilizer Program
- Weed Controls
 - Weed Harvesting
 - Herbicide Application
 - Water Level Management
- Education and Outreach of All Lake Management Measures

Goals of Lake Characterization and Restoration Plans

- Verify/refine source contributions
- Specific tasks to restore lake
 - Specific load reduction BMPs by location and type, including cost, feasibility, responsible party
 - In-lake measures necessary to supplement nutrient reductions required by TMDL

Shared Services Agreements



Catch basin rebuild



Outfall survey



Catch basin survey



Catch basin rebuild - Jefferson



Outfall survey



Outfall mapping



5 Year Drawdown



LAKE HOPATCONG SHORE-LINE CLEAN-UP

Harvesting



Harvesting



BEFORE



AFTER



P-free fertilizer



PLEASE USE

**LAKE-FRIENDLY
FERTILIZER**

As Recommended By The



LAKE HOPATCONG COMMISSION

Visit our Website www.lakehopatcong.org

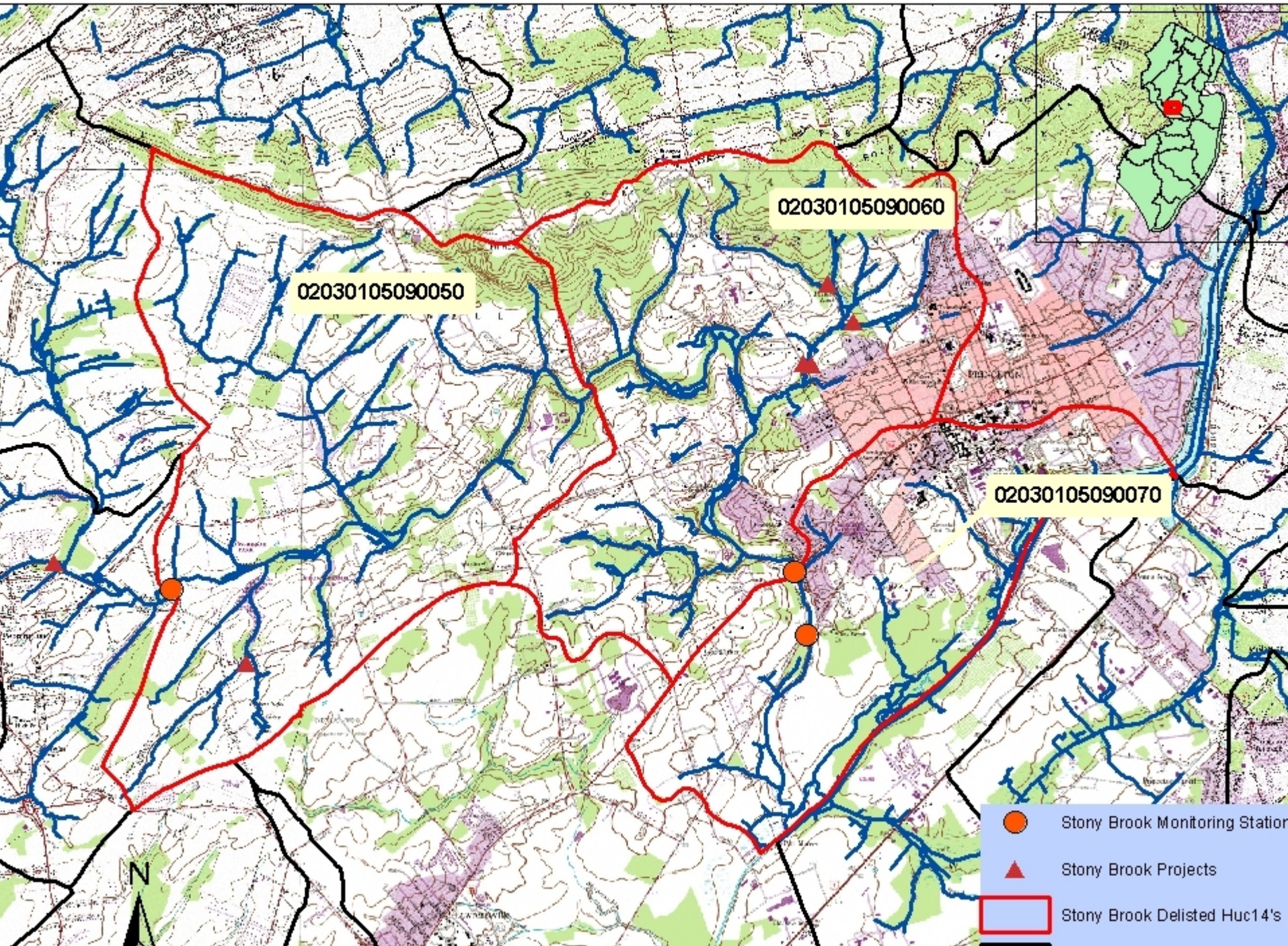
Or Call 973-601-1070

Success Story

Stony Brook Millstone Watershed

- In 1997 SBMWA performed extensive C&A throughout watershed. Identified and prioritized restoration areas.
- NJDEP confirmed TSS impairment for “Stony Brook at Princeton” stream segment and placed on 2002 303(d) list.
- This translated into 3 impaired HUC 14’s on the 2006 303(d) list for TSS.

Stony Brook (HUC) Success Story



Success Story cont'd

- In 1999, SBMWA initiated 6 bank restoration/floodplain reforestation projects utilizing 319(h) grant funding.
- Partners included:
 - NJDEP
 - SBMWA
 - NRCS
 - Princeton and Hopewell Townships

Success Story cont'd.

- Mountain Brook, pre-implementation



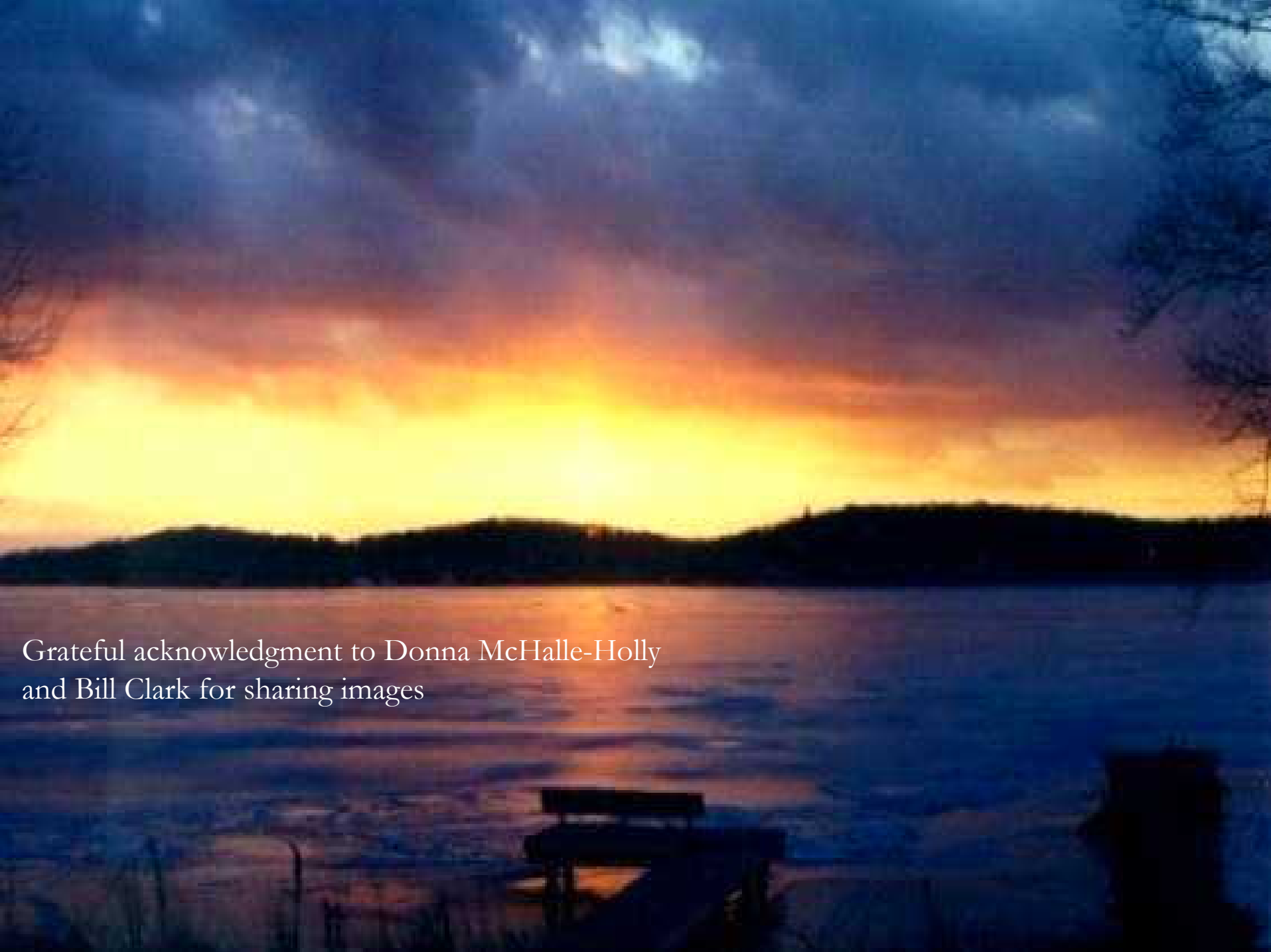
Success Story cont'd.

- Mountain Brook, July 2003, post implementation.



Success Story cont'd.

- Six stream bank restoration projects provided native vegetation and erosion control.
- Once established, these restoration projects resulted in measurable water quality improvements within the 3 HUC 14's for TSS.
- Consequently, NJDEP proposed removal of the HUC 14's listed as impaired for TSS from the 2008 303(d) list.



Grateful acknowledgment to Donna McHalle-Holly
and Bill Clark for sharing images

