# Volunteer Water Quality Monitoring

## Annual Volunteer Water Quality Monitoring Summit
## November 22, 2013

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MassDEP

# Overview: Volunteer Monitoring

- Volunteer monitoring in Central Massachusetts
- How volunteer monitoring improves water quality
- How MassDEP supports volunteer programs
- Summary

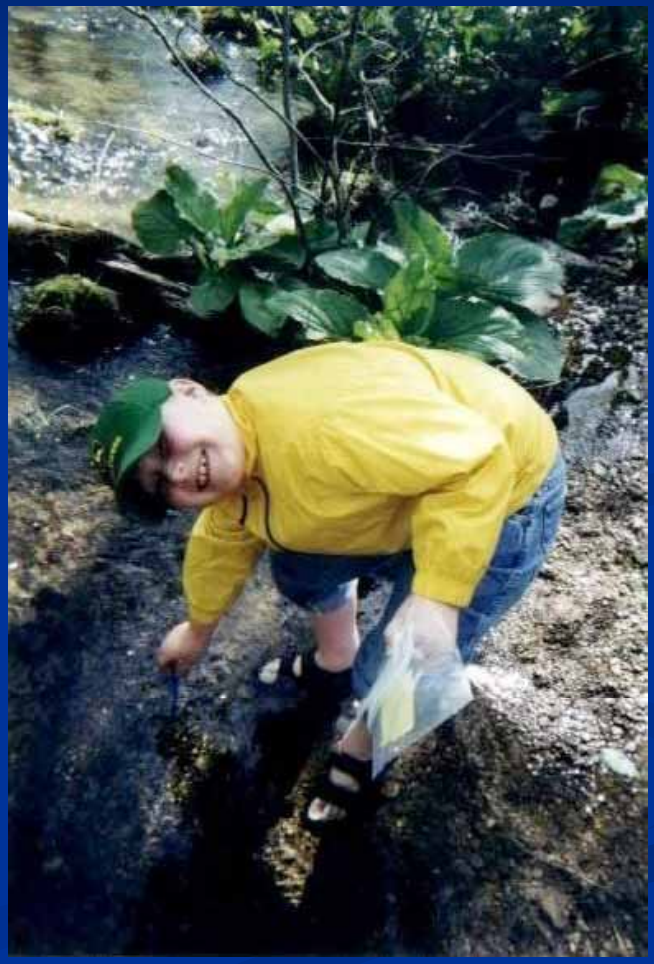
# Volunteers

**Volunteer groups are uniquely positioned to function at the local time and space scales, where most of our streams lie**

# Central Mass Volunteer Monitoring

In 2013, Central Mass Volunteer WQ programs were conducted by:

- 197 volunteer monitors, with
- Additional lab volunteers, at
- 207 regularly-monitored sites



# Central Mass Volunteer Monitoring

**Parameters measured include:**

- Bacteria and other biota
- Conventional pollutants
- Flow
- In situ parameters
- Nutrients

| Watershed | Volunteer Group | Biology | | | Conventional Pollutants | | | | | In Situ Parameters | | | | Nutrients | | | | | | | Miscellaneous | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BST/E. coli | Biomass | Chloro-a | Alkalinity | Chlorides | Hardness | TSS | Turbidity | T | pH | DO | Conductivity | NH3 | NO3 | NO2 | TKN | Dissolved P | orthoP | TP | Aesthetics/ General observations | Flow/ht | Metals | Secchi depth |
| Blackstone | BRC | Yes | No | No | No | No | No | No | Yes | Yes | No | Yes | Yes | No | Yes | No | No | No | Yes | No | Yes | Yes | No | No |
| Concord | OARS | No | Yes | No | No | No | No | Yes | No | Yes | Yes | Yes | No | Yes | Yes | No | No | No | Yes | Yes | No | Yes | No | No |
| F&Q | FRC | No | No | No | No | No | No | No | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | No | Yes | No | Yes | No | No | No |
| F&Q | Upper Quinebaug | No | No | No | No | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No |
| F&Q | Dudley | No | No | No | No | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No |
| F&Q | South Charlton Reservoir | No | No | No | No | No | No | No | Yes | Yes | Yes | Yes | Yes | No | No | No | No | No | No | No | No | No | No | Yes |
| F&Q | Sturbridge Great Ponds | No | No | Yes | Yes | Yes | Yes | Yes | No | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | | No | Yes (Fe, Na) | Yes |
| F&Q | WLA | No | No | Yes | No | No | No | No | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | No | Yes | No | No | No | No | Yes |
| Millers | MRWC | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No |
| Nashua | NRWA | Yes | No | No | No | No | No | No | No | Yes | No | Yes | Yes | No | No | No | No | No | No | No | Yes | Yes | No | No |

# Overview of State / Federal programs

## Regional

- Permitting
- Assistance
- Compliance
- Enforcement

## DWM

- 303(d)
- 305(b)
- BST
- CFRs
- Grants
- Hydropower
- NPDES
- NPS
- TMDLs

## Other Agencies

- ACECs
- Fish stocking
- Invasives
- NHESP
- Public Access
- Restoration
- RIFLS+

# Volunteers: Regional Programs

**Regional**

- Permitting
- Assistance
- **Compliance**
- **Enforcement**

# Volunteers: Regional DEP Programs

**BRP: Blackstone River, Worcester**

- Volunteer monitors for the Blackstone Headwaters Coalition observed elevated turbidity
- They traced it to construction activities along the Rte. 146 corridor and notified CERO
- MassDEP responded; MassDOT fixed the problem the next day

# Volunteers: Regional DEP Programs

**BRP, ACEC:** Miscoe Brook, Grafton; unnamed trib, Uxbridge

- Runoff at several large residential construction sites transported silt to trout streams in the Miscoe-Warren-Whitehall ACEC; similar activities impacted a trout stream in Uxbridge
- Volunteer monitors reported these; DEP investigations resulted in site improvements and enforcement (fines, SEPs)

# Volunteers: Regional DEP Programs

**BRP:** Mumford River, Northbridge

- A BRC volunteer noted an ongoing plume of silt during regular monitoring activities
- MassDEP traced it to an improper use of a silt pump at a bridge construction site. The problem was fixed immediately.

# Volunteers: Regional DEP Programs

**BWP:** Mill Brook, Worcester

- A BHC volunteer reported a fish kill in Salisbury Pond in January 2002.
- MassDEP and City of Worcester identified illegal dumping of toxic cleaning solutions into a storm drain
- Enforcement resulted in an SEP for the City of Worcester for improvement of the downstream pond and Institute Park

# Volunteers: Regional DEP Programs

**BWP, BRP:** Bigelow Brook, a tributary to the French River, Webster

- Volunteer monitoring at two sites on Bigelow Brook documented a consistent pH drop of 1+ SU within an approx. 0.7 mi stream segment.
- MassDEP and the Town of Webster identified a stump grinding operation in this stream segment, whose activities extended to the stream edge, on an historic illegal dump site.
- Apple D'Or was issued a cease and desist order; the town of Webster pursued enforcement action.

# Volunteers: Regional DEP Programs

**BRP:** Un-named tributary to Browns Brook, Webster

- Volunteers documented ongoing episodes of high turbidity and traced it to runoff from the adjacent LKQ auto parts/salvage company.
- MassDEP Wetlands followed up and discovered on-site problems with stormwater runoff.
- Enforcement followed; excess turbidity has not been observed since.

# Volunteers: Regional DEP Programs

- **BWSC, BRP:** French River adjacent to the Shields Packaging site, Dudley
- The historic Webster Lens company disposed of lens grinding residue (rouge) on the banks of and into the French River.
- MassDEP required removal of the rouge from the banks and the river bottom.
- Volunteers noted inadequate site controls, and reported runoff of soil.
- MassDEP responded with enforcement action.

# Volunteers: Regional DEP Programs

**BWP:** Assabet River, Concord

- An OARS volunteer canoeing the river reported a milky discharge from MCI Concord
- MassDEP measured high bacteria levels
- MassDEP followed up with enforcement action requiring the DOC to address poor Dumpster practices and to test for cross connections

# Volunteers: DWM Programs

DWM

- 305(b)
- 303(d)
- BST
- CFRs
- Grants
- Hydropower
- NPDES
- NPS
- TMDLs

# Volunteers: DWM Programs

**305(b), 303(d):** Volunteers have submitted QAPP-approved data and observations that have been used in the 303(d) and 305(b) programs:

- In watersheds across the state
- Within many stream reaches, lakes and ponds
- Monitoring a variety of parameters and pollutants
- Spanning a range of sophistication
- Encompassing four designated uses

# Volunteers: DWM Programs

**305(b):** Volunteer data has been used to populate stream segment descriptions and to make assessment decisions. In some cases, volunteer data was the only information available.

# Volunteers: DWM Programs

**305(b):**

**ASSABET RIVER WATERSHED**

**RECOMMENDATIONS**

**The Organization for the Assabet River should continue to collect quality-assured water quality and quantity data and provide it to MA DEP for use in assessing the status of the *Aquatic Life and Aesthetics* uses. If possible, OAR should expand the monitoring program to include bacteria sampling to assess the *Primary and Secondary Contact Recreational uses.***

# Volunteers: DWM Programs

**303(d):** **We have also used volunteer data to document the restoration of impaired waters**

# Volunteers: DWM Programs

| Water body | Segment | Location description | Impairment Causes Removed* (First Year Listed) | Uses attained | "Y" Measurement |
|---|---|---|---|---|---|
| | | ***Blackstone*** | | | |
| Blackstone River<br><br>(Success Story 1) | MA51-05 | Outlet Rice City Pond, Uxbridge to the Old Water Quality Monitor (at Conrail Railroad trestle, Millville | "pH, Low" (2002) | ------ | 1 "Y" |
| Blackstone River<br><br>(Success Story 1) | MA51-06 | From the WQ Monitor, Millville to the Rhode Island border west of Route 122 (Main St.), Blackstone | "Fecal Coliform", "Taste and Odor" and "Turbidity" (2002) | Prim., & Second. Contact,<br><br>Aesthetic** | 3 "Y"; 3 Uses Attained |
| Mumford River<br><br>(Success Story 2) | MA51-14 | Douglas WWTP discharge, Douglas to confluence with Blackstone River, Uxbridge (thru 6 ponds) | "pH, Low", "Oxygen, Dissolved" and "Fecal Coliform" (2002) | ------ | 3 "Y" |
| West River<br><br>(Success Story 3) | MA51-11 | Outlet Silver Lake, Grafton to Upton WWTP discharge, Upton | "Fecal Coliform" and "Oxygen, Dissolved" (2002) | ------- | 2 "Y" |

# Volunteers: DWM Programs

**BST**: West River, Northbridge/ Upton

- The ACOE beach suffered numerous dry weather closures from elevated bacteria counts
- The BRC partnered with the ACOE , MassDEP CERO and DWM to conduct bacteria source tracking
- Several houses with failed septic systems were found within 20 feet of the river; Upton BOH required the homeowners to repair the systems

# Volunteers: DWM Programs

**BST, Outreach:** In the same location, another homeowner had stockpiled horse manure in the riverfront area

- Additional homes with small livestock operations had similar manure issues
- The BRC conducted animal husbandry outreach

- **A Small Farm Owner's Guide to Protecting Water Quality in the Blackstone Valley**
- **A Horse Owner's Guide to Protecting Water Quality in the Blackstone Valley**

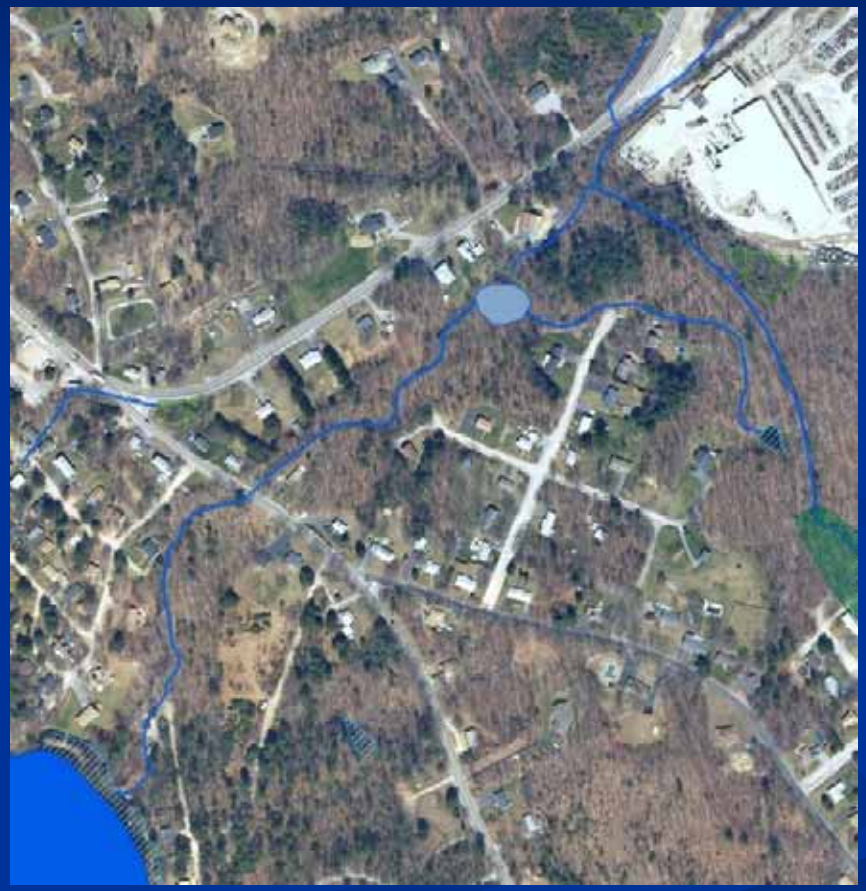
# Volunteers: DWM Programs

**CFRs:** **Volunteers have an interest in protecting coldwater fisheries, and have worked with MassDEP and DFW to collect temperature data in local streams**

# Volunteers: DWM programs

**CFR:** WLA placed temperature loggers in select tributaries to identify potential cold-water fisheries streams.

- Data indicated an abrupt rise in temperature during the data collection period.
- Their investigation found a property logged under an approved Forest Cutting Plan, that resulted in a complete loss of stream canopy cover.
- DEP is working with DCR to improve forestry practices required in cutting plans



# Volunteers: DWM Programs

**Grants:** There are numerous ways in which volunteers have utilized grant programs we oversee. For example:

- Volunteer groups have pursued 104(b)(3), 604(b), and 319 grants to assess and address sources of pollution
- Volunteers often monitor 1st and 2nd order streams, where most of the BMPs are directed; we are exploring the use of this data to document the effectiveness of grant-funded projects.
- Grant monies have been used to fund volunteer monitoring coordinators e.g., the NRWA, as well as equipment.

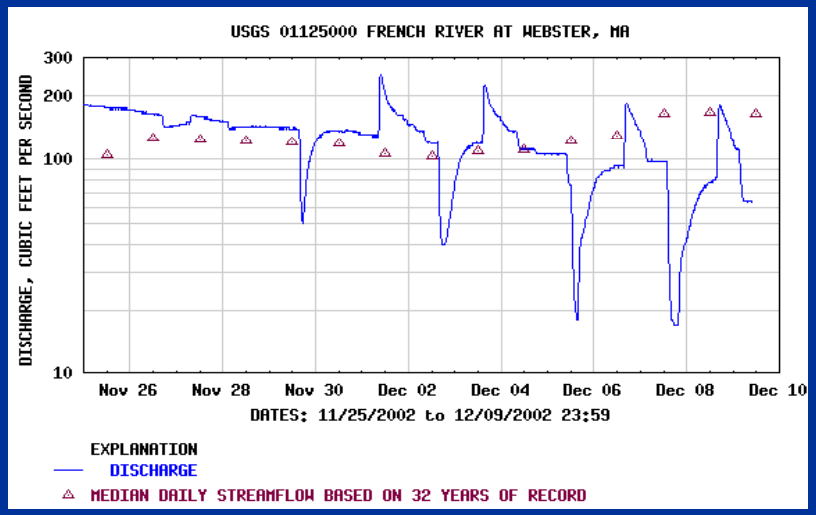
# Volunteers: DWM programs

**319:** The Mill Brook Task Force brought together state and local agencies, NGOs, universities and residents

- Partnered with the City of Worcester to obtain a §319 grant to reduce NPS
- Vortex separator units were installed to capture sediment input from the SW drainage area – shown at two flows
- More BMPs are planned

Movie credit: City of Worcester

# Volunteers: DWM Programs




**FERC:** Hydropower projects sometimes operate outside of the required run-of-river mode

- Local advocates document flow fluctuations and notify US F&W
- F&W works with facility owner(s) and FERC to address the problems

# Volunteers: DWM Programs

**NPDES:**

- Groups often select sampling sites that bracket effluent discharges to document changes in water quality.
- They put considerable effort into participating in the public hearing process for permit updates.
- They partner with permittees e.g., to utilize lab resources for bacteria samples.
- Permittees have funded volunteer monitoring e.g., Upper Blackstone has donated funds to the BRC for their coordinator's position.

# Volunteers: DWM programs

**NPDES: Volunteer data, collected under a QAPP approved by MassDEP, have been used to determine permit limits.**

- The MassDEP's Blackstone River Watershed 1998 and 2003 Water Quality Assessment Reports indicated a need for additional studies in order to understand the eutrophication impacts within the Mill River segment MA51-10, since the impacts were observed without the support of sampling data. **The Blackstone River Basin Volunteer Monitoring Program,** which MassDEP convened and oversees as part of the Blackstone River Initiative, has been conducting water quality sampling for the Mill River for several years at sampling stations that are located upstream and downstream of the **Hopedale WWTF** discharge location. Monitoring is conducted monthly from April through November, on the second Saturday of the month. **The samples are analyzed by trained volunteers using HACH colorimeters, and participants follow an approved Quality Assurance Project Plan (QAPP) signed by EPA, MassDEP, and RIDEM.** Phosphorus sampling results and sampling station locations are attached to this Fact Sheet. (see **Attachments B and C, respectively.)**

# Volunteers: DWM programs

## NPDES: (Hopedale WWTP permit continued):

- **The [data from the BRC program]… show that the existing limits are not sufficiently stringent to ensure that the discharge does not cause or contribute to an exceedance of water quality standards. Accordingly, a more stringent limit has been calculated that will ensure attainment of the Gold Book criteria.**

# Volunteers: DWM programs

- **NPS, Outreach:**

Volunteer groups have partnered with various agencies and private entities to emplace rain gardens in their watersheds.

# Volunteers: Other Programs

**NPS, Outreach:**
Volunteers have stenciled storm drains in vulnerable drainage areas

# Volunteers: DWM programs

- **NPS, Outreach:** The Blackstone Watershed Coalition has supported the Blackstone Canal bioremediation project to address petroleum pollution retained in sediments at the former Fisherville Mill site, Grafton.

# Volunteers: DWM programs

**TMDL, NPDES:** Excess phosphorus = accelerated eutrophication

- OARS' volunteer water quality monitoring program collected nutrient data at 35 sites since 1992
- OARS' 20+ year record supported the TMDL and the lowering of phosphorus limits in the 5 wastewater treatment plants that discharge directly to the Assabet River

# Volunteers: Other Programs

Other

- ACECs
- Fish stocking
- Invasives
- NHESP
- Public Access
- Restoration
- RIFLS+

# Volunteers: Other Programs

**Invasives:** Volunteer are very active in documenting the location of invasive species, and managing infestations within available resource limitations.

Photo credit: BRWA

Examples include harvesting:

- Water chestnut in Pepperell Pond, Rice City Pond, a West River impoundment
- Water cress in the Blackstone River and Canal

# Volunteers: Other Programs

**NHESP: Volunteers note the presence of NHESP species in their watersheds and provide the MassWildlife program with the documentation necessary to protect the habitat, including vernal pools**


Photo credit: Ken Butkiewicz

# Volunteers: Other Programs

**Public Access:** **Volunteers work with the Public Access Board to create new lake and riverine access points**

- **The French River Connection, with numerous partners, created the Leovich Landing on the French River in Oxford**
- **The Dudley Conservation Commission created the West Dudley Portage on the Quinebaug River**


Photo credit: Ken Butkiewicz

# Volunteers: Other programs

## Restoration Projects

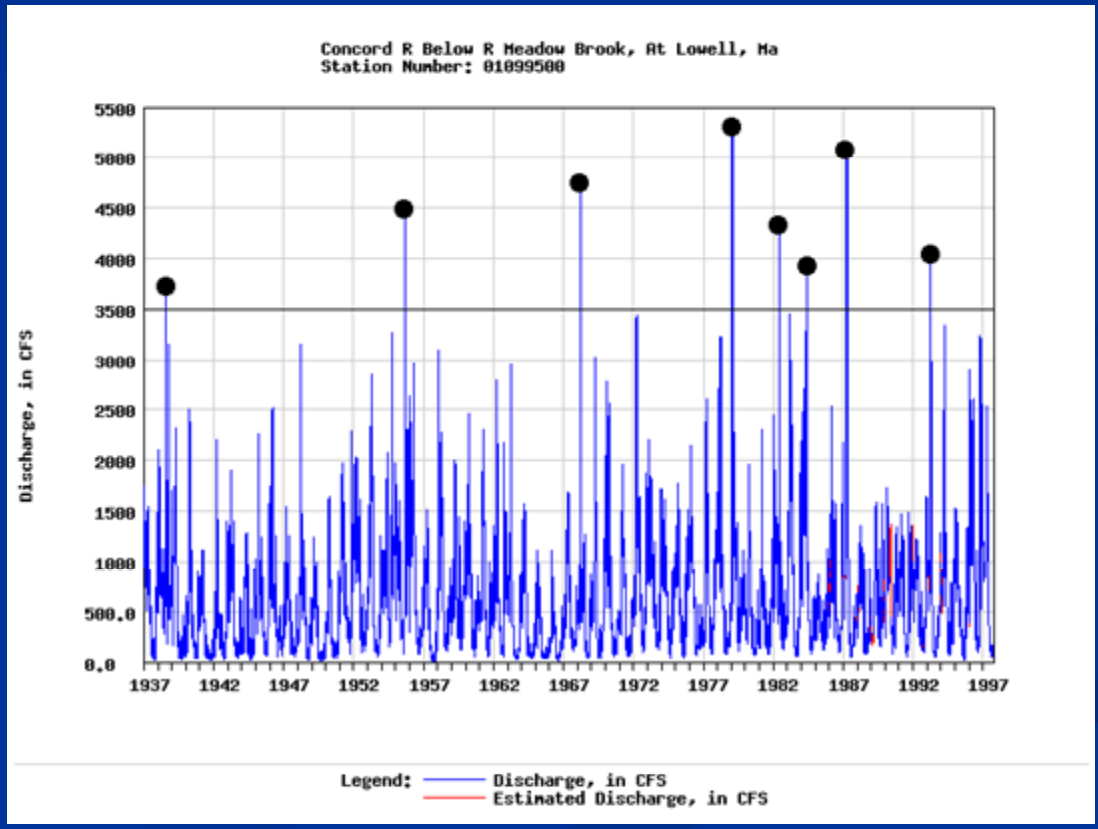
- Daylighting
- Stream restoration
- Stream channel improvements
- Dam removal
- Culvert replacements

**Town Brook Stream Restoration During and After**

**River Continuity Surveys - Topsfield**

# Volunteers: Other programs

**RIFLS:** River Instream Flow Stewards, or RIFLS

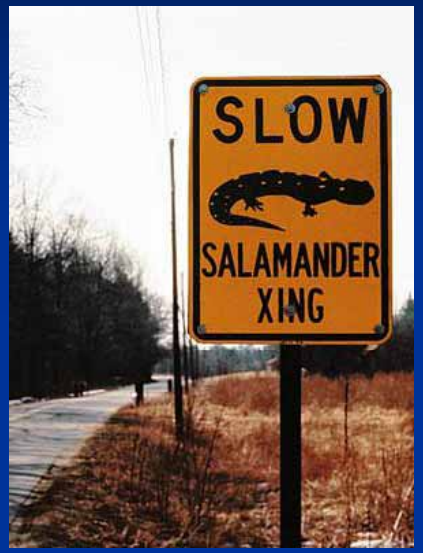


# Volunteers: Other programs

## RIFLS encourages communities to develop methods to protect streamflow

- **Water restriction triggers linked to streamflow***(Georgetown, Hingham, Kingston)*
- **Water conservation programs** *(Rainbarrel Program)*
- **Dam release / management** *(Hinsdale, Pittsfield, Stockbridge, Lynnfield, Hopkinton)*
- **Water supply planning & management** *(Westboro, Scituate, Saugus, Montague, Kingston)*
- **Bylaws for stormwater infiltration & wastewater treatment** *(Lancaster)*
- **Pollutant Loading Studies** (*Taunton area, Rockland, Hopkinton)*

# Volunteer Actions




# Volunteer Actions: Cleanups

**The Worcester Telegram & Gazette**
**French River cleanup in Webster yields 2 tons of trash**
By John Dignam, T&G Staff
June 15, 2004
WEBSTER - Kenneth A. Parker prefers walking along the banks of the French River, but he doesn't mind wading in and pulling out a tire or chair or barrel, if the need arises.

He needs a little help with the sofas, though.

"They must weigh a couple hundred pounds when they're wet," he says.

In May, Mr. Parker organized a cleanup in which 16 people extracted an estimated two tons of trash from the river, including 80 plastic bags of rubbish, 30 tires, four box springs, four reclining chairs, a dryer, refrigerator, gas grills and barrels.

But late last week he pointed to a dark, sodden sofa down river from the Perryville Road bridge.

# Volunteer Actions: Beaver

# Volunteer Actions: Stewardship!


# Volunteer Actions: Outreach

- Ban on phosphate detergents!
- Zoning!
- Big Night!
- Canoe Trails and Maps!
- Blueways!

# MassDEP Support of Volunteers

- Funding
- Technical Expertise
- Connecting

# MassDEP Support of Volunteers

**FUNDING!**

- **MassDEP-administered grant programs**
  - **319**
  - **104(b)(3)**
  - **604(b)**
- **Supplemental Environmental Projects**
- **Letters of support for other grants**

# MassDEP Support of Volunteers

**TECHNICAL EXPERTISE!**

- Select monitoring program stations, parameters, frequency…
- Give presentations on technical topics
- Review and approve QAPPs
- Conduct field audits
- Distribute press clips

# MassDEP Support of Volunteers

**CONNECTING:**

- Connect volunteers with agency programs and staff
  - State agencies e.g., field equipment maintenance and use; grant program; regional regulatory programs; biology staff; spill response
  - Federal agencies e.g., EPA; US F&WS; ACOE; USGS

# MassDEP Support of Volunteers

**CONNECTING:**

- Connect volunteers with each other by annual Summits
  - Round robin discussion among groups of each year's successes and challenges
  - Presentation on subject of interest to all groups

Presentation topics:

- Bacteria source tracking
- Clean Water Act
- Cold water management
- Grants / funding
- Data management
- Data presentation
- Data assessment

# Summary

Volunteers are the “Eyes and Ears” of our watersheds

- Define water quality status
- Discover hot spots
- Distinguish WQ trends
- ID sources of contamination
- Restore impaired waters
- Protect clean waters
- Define effectiveness of BMPs