



Charles River Watershed Association

# **NON-POINT SOURCE “FIND IT AND FIX IT” PROGRAM IN THE CHARLES RIVER AND MYSTIC RIVER WATERSHEDS**

## **SHORELINE SURVEY**

Data Sheets



Charles River Watershed Association (CRWA) Staff  
Anna Eleria, Project Manager  
Pallavi Mande, Project Assistant  
CRWA: 781-788-0007 FAX: 781-788-0057

Mystic River Watershed Association (MyRWA) Staff  
Nancy Hammett, Project Manager  
Dara Olmsted, Project Assistant  
MyRWA: 781-316-3438 FAX: 781- 641-2103

*Shoreline Survey Adapted from:*  
Massachusetts Riverways Program, Adopt-A-Stream Program  
Department of Fish and Game

*Program Funded By:*  
Massachusetts Environmental Trust



## Introduction

The Charles River and Mystic River Watershed Associations have partnered to “Find and Fix” pollution problem areas or hot spots in both the Charles and Mystic River Watersheds. The project, funded by a grant from the Massachusetts Environmental Trust (MET), includes shoreline surveys or visual monitoring to identify areas of significant environmental degradation, non-point source pollution, erosion, unmapped outfall pipes and future sites for water quality sampling. During the survey, volunteers will identify problems that require follow up monitoring and/or water quality sampling. Based on the results of these initial surveys and depending on the extent of the issue, problems will be ranked as needing: immediate remediation (without confirmatory sampling), water quality monitoring, continued visual monitoring, or no action. Together, with your help, we can prioritize and effectively address problem areas in the Charles River and Mystic River watersheds.

## Tips for Shoreline Surveyors

### Safety and Legalities

- ◆ Always walk with someone.
- ◆ Watch out for irate dogs. Walk cautiously and practice good dog etiquette.
- ◆ Do not drink the river water.
- ◆ **Lifejackets are required by law** for each person in a canoe.
- ◆ From September 15 to May 15, all canoe or kayak occupants must wear a U.S. Coast Guard Approved PFD.
- ◆ Wear long-sleeved shirts and pants to protect against ticks, mosquitoes, poison ivy and nettles.
- ◆ Wear insect repellent if necessary.
- ◆ Consider landowner rights. Ask permission to cross private land, posted or not.
- ◆ Do not enter posted areas without permission. Take advantage of any public access points.

### Environment:

- ◆ Don't walk on unstable banks; your footsteps could speed erosion.
- ◆ Be aware of wildlife and animal homes, for both of your sakes.

### **NEVER PUT YOURSELF INTO DANGER TO GATHER SURVEY INFORMATION.**

*If at anytime you feel uncomfortable about the stream conditions or surroundings, please STOP your Shoreline Survey. You and your safety are much more valuable than any of the objectives of the Shoreline Survey.*

### Checklist: What to take on your survey

- \_\_\_ A buddy
- \_\_\_ Data sheets and map
- \_\_\_ Clipboard or other surface for writing
- \_\_\_ Two pencils – color is good to mark on maps
- \_\_\_ Long-sleeved, snag-free clothing /pants (for bugs and thorns)
- \_\_\_ Sunblock
- \_\_\_ Sunglasses (polarized to see into the water better)
- \_\_\_ Lifejackets & paddles if canoeing
- \_\_\_ Camera and film
- \_\_\_ Gloves
- \_\_\_ Copy of letter sent out to landowners

### Optional:

- \_\_\_ Rubber boots or waders
- \_\_\_ Yardstick or measuring tape (useful for pipes)
- \_\_\_ Compass
- \_\_\_ Field guides (in ziplock bags)
- \_\_\_ **Food and plenty of water for energy**

### What you need to do:

Tonight: Coordinate with your segment team. Arrange canoes, meeting place, etc.

This weekend: Conduct the survey! Fill out the data sheets while you're on the river. With your team, fill out the *Summary Sheets*—the segment description and the priority sheet--after you are finished surveying your segment. Return all *Data* and *Summary Sheets* (one set per team) to:

---

## INSTRUCTIONS

Please take photos of outfall pipes, eroding banks, polluted areas, poor drainage and other areas you deem noteworthy. Note on the map where the photo was taken and describe the location on the back of the photo or within the file name of a digital shot. Don't forget to include the date. Be specific (reference nearby road or house), so that people can compare later photos. Attached to the survey are aerial maps for your reference. Please locate the following on the attached map using the following key.

### KEY

#### PHOTOS

P1, P2, P3, = photo location and number in order of photographs

#### OUTFALLS

①, ②, number in order of observation

EROSION \*trace or delineate extent if practicable. Map scale may be too small.

E<sub>1</sub> = Severe erosion

E<sub>2</sub> = Moderate erosion

E<sub>3</sub> = Mild erosion

GARBAGE (by type?) \*trace extent if practicable

G<sub>1</sub> = Toxic (oil cans, paint, antifreeze containers, etc.)

G<sub>2</sub> = Paper/Styrofoam

G<sub>3</sub> = Metals

G<sub>4</sub> = Other

OIL \*trace extent if practicable

O<sub>1</sub> = Oil sheen visible

O<sub>2</sub> = Oily smell

FISH KILL = FSK

#### SEWAGE / BACTERIA SOURCES

S<sub>1</sub> = Presence of toilet paper, objectionable floatables

S<sub>2</sub> = Sewage smell, no visual signs

S<sub>3</sub> = Bird/waterfowl waste

S<sub>4</sub> = Pet waste

#### FOAM

F<sub>1</sub> = White foam (perfumey smell)

F<sub>2</sub> = "Natural" colored foam (earthy, fishy aroma)

INVASIVE SPECIES (See attached information for plant identification)

I<sub>p</sub> = Phragmites

I<sub>pl</sub> = Purple loosestrife

I<sub>m</sub> = Milfoil

I<sub>f</sub> = Fanwort

I<sub>w</sub> = Water chestnut

I<sub>ww</sub> = Waterweed

#### ACCESS POINTS

D = Docks

B = Boat Launch

#### ALGAE

A<sub>1</sub> = Filamentous algae (mats) \*trace extent if practicable

A<sub>2</sub> = Green-colored water column

#### LAWNS

L<sub>1</sub> = Green, lush

L<sub>2</sub> = Mottled, color change

#### CONSTRUCTION SITE

CS<sub>1</sub> = Exposed, disturbed soils

CS<sub>2</sub> = Negligible sediment introduction

Date: _____
Observers: _____
Today's weather: _____
Weather over past 24 -48 hours: _____

**INSTREAM/ WATERBODY CONDITIONS**

**Stream or Other Waterbody Bottom**

- What is stream/ water body bottom made of? (*mark from 1=most typical to 6=least typical*)
 

___ Organic debris (leaves, twigs)	___ Gravel (1/4 - 2")
___ Silt (mud)	___ Cobbles (2 -10")
___ Sand (1/16 to 1/4")	___ Boulders (> 10")
- What color is the stream/ water body bottom? (*circle one*)
 

Black	Brown	Orange/Red	Yellow	Sandy	Gray	Other
-------	-------	------------	--------	-------	------	-------
- What is the general condition of the base of the stream / water body? (*describe in a few words*)

**Water**

- What color is the water? (*circle*) Cloudy    Tea    Milky    Muddy    Clear    Other \_\_\_\_\_
- What is the water odor? (*circle*) None    Rotten eggs    Musky    Fishy    Gas/Oily    Ammonia    Other
- Problem areas. (*check and describe the location and cause, if apparent. \*Locate on map using key codes*)
 

___ Oily sheen or smell _____
___ Sewage: smell, milky color, toilet paper _____
___ Foam or scum ( <i>White or earthy color? Does a stick break it up?</i> ) _____
___ Fishy odor or fish kill _____
___ Garbage _____
___ Excess sedimentation _____
- From your vantage point, how deep is the water? (*circle*)    < 1'    ≥ 1'    ≥ 2'    ≥ 3'
- How does the water level compare to normal for this time of year? (*circle*)
 

Normal	Higher	Lower	Don't know	If very high or low, can you tell why?
--------	--------	-------	------------	--
- Is the water flowing (*circle*)    Quickly    Slightly    Not flowing
- Number of pools \_\_\_\_\_    Number of riffles \_\_\_\_\_    Don't know
- Is stream flow blocked by...(circle and \*locate on map.)    Trees    Trash    Large objects

**Vegetation**

- Are there areas of extremely dense or clogging aquatic vegetation in any section? (*circle*)    Yes    No
 

*\*If yes, locate on map and describe cause, if obvious.* \_\_\_\_\_

Species, if known ( <i>circle</i> )	Duckweed	Water chestnut	Other _____
-------------------------------------	----------	----------------	-------------

13. Are there areas covered with algae? (Circle) Streambed Around pipes  
*If algae seems abnormally heavy, \*locate on map using key codes. Draw extent of algae on map.*
14. Are there nuisance plant species? (Circle. \*locate on map using key codes.) Yes No *If yes, are they ... (circle)*  
 Phragmites Purple Loosestrife Milfoil Fanwort Waterweed Water chestnut  
 Other \_\_\_\_\_

**NON-POINT SOURCE POLLUTION**

**Pipes** Please fill out separate pipe survey and mark locations on map as (1, 2, 3) in order of observation.

**Riparian Area and Land Use**

15. Do trees and shrubs overhang the stream and provide shade (in the summer)? (circle) Yes No  
*If yes, estimate what percentage of the bank is shaded*

16. What are the stream bank conditions? (circle all that apply. Put a star\* next to the most common.)

Left Bank: (Looking downstream) (If doing only one bank, indicate which one)

Eroding Moss Trees Exposed Roots Grass Flowers Loosestrife/Phragmites

Beaches Riprap Channelized Shrubs Brambles Wetlands/Marsh

Slope (circle one): Steep Moderate Slight

Right Bank: Eroding Moss Trees Exposed Roots Grass Flowers Loosestrife/Phragmites

Beaches Riprap Channelized Shrubs Brambles Wetlands/Marsh

Slope (circle one): Steep Moderate Slight

17. If banks are eroding, please describe \_\_\_\_\_

\_\_\_\_\_

Describe the riparian area beyond the stream bank. and indicate its condition.

(circle all that apply. Put a star\*next to the most common.)

Left Bank: Shrubs/Grasses Mowed pasture/Meadow Forested/Trees Park with few trees  
 Lawn Exposed dirt or soil

Right Bank: Shrubs/Grasses Mowed pasture/Meadow Forested/Trees Park with few trees  
 Lawn Exposed dirt or soil

If area is not vegetated or only small area is vegetated, please describe condition:

(i.e. parking lot, pavement, roadway, buildings)

Left Bank: \_\_\_\_\_

Right Bank: \_\_\_\_\_

18. If the riparian area is forested or in shrubs and grasses, estimate width of the vegetated area (to a lawn, road, or other change in land use) left bank \_\_\_\_\_ right bank \_\_\_\_\_

19. Are there any construction sites in the area? If so, is there uncovered sand or sediment?

20. Are there any signs of an erosion trail in the riparian area which would indicate the path of water flow?

21. Are there areas of very green, lush lawns? Note on map

22. Are there areas where lawn color or type changes implying manicured versus wild growth? Note on map

23. What are the land uses visible from the river? (*check all that apply and circle the dominant land use type.*)

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Industrial       | <input type="checkbox"/> Parking lots              | <input type="checkbox"/> Golf courses                 |
| <input type="checkbox"/> Commercial       | <input type="checkbox"/> Roads                     | <input type="checkbox"/> Protected/Conservation land  |
| <input type="checkbox"/> Agricultural     | <input type="checkbox"/> Landfills                 | <input type="checkbox"/> Undeveloped/Unprotected land |
| <input type="checkbox"/> Residential      | <input type="checkbox"/> Railroads                 | <input type="checkbox"/> Wastewater treatment plants  |
| <input type="checkbox"/> Park/ Ballfields | <input type="checkbox"/> Junkyards                 | <input type="checkbox"/> Wooded areas                 |
| <input type="checkbox"/> Institutional    | <input type="checkbox"/> Other ( <i>describe</i> ) |   |

24. Do you see runoff or the potential of runoff from any listed below? (*circle, \*If run-off is significant locate on map.*)

- |         |              |                 |              |             |       |
|---------|--------------|-----------------|--------------|-------------|-------|
| Manure  | Pet waste    | Goose droppings | Parking Lots | Sewage      | Roads |
| Bridges | Construction | Plowed fields   | Lawns        | Other _____ |       |

**Garbage:** 25. Approximate number of litter items in stream section and locate garbage on map.

	0	1-10	11-50	50+
Paper, small trash				
Cans, bottles				
Tires, carts, other large items				
Hazardous (oil, antifreeze, paint cans, etc)				

If there is a majority of a certain litter item, what is the source, if known (ie. Dunkin Donuts)?

~~~~~  
**WILDLIFE / HABITAT**

**Recreation**

26. Is there designated public access to the stream? Is it appropriate for... (*circle and \*locate on map.*)

- Canoeing      Fishing      Swimming      Walking      Bicycling      Other \_\_\_\_\_

27. If there are no designated public access points, are there any informal or potential access areas?  
No      Yes-      *Describe and \*locate on map.*

**“Find it and Fix it” Pipe Survey of \_\_\_\_\_ River/Brook**

Segment # \_\_\_\_\_

Segment Begins: \_\_\_\_\_

Date: \_\_\_\_\_

Segment Ends: \_\_\_\_\_

Names of observers: \_\_\_\_\_

Weather today: \_\_\_\_\_

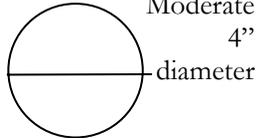
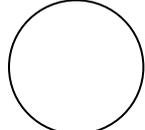
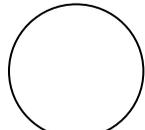
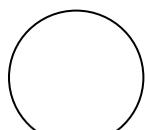
Weather over past 24-48 hours: \_\_\_\_\_

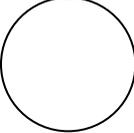
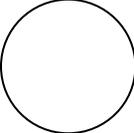
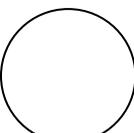
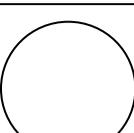
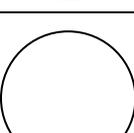
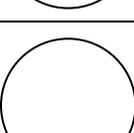
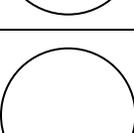
**Rating System**

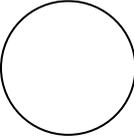
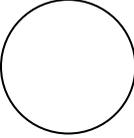
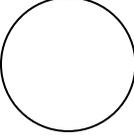
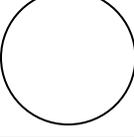
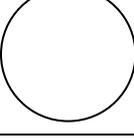
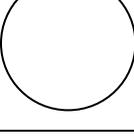
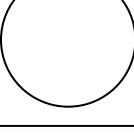
**0** = No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment. Pipe in good repair

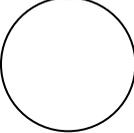
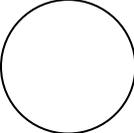
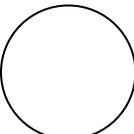
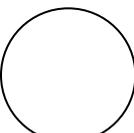
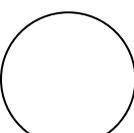
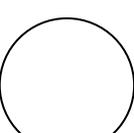
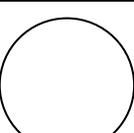
**1** = Needs rechecking (Some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae. Pipe in moderate condition

**2** = Impairment – Needs investigation (Malodorous flow, foam, solids, turbidity or oily sheen, considerable sediment deposition, algae or debris, pipe in poor repair, blocked catch basins or drain.

| Pipe# & Location<br>(in stream, top of bank, in bank, under bridge, etc) | Time    | Pipe material and condition<br>(concrete, steel, PVC, clay, other) | Flow level (indicate on circle), flow rate and pipe size                            | Color, Odor<br>(clear, turbid, oily, foamy, colored) | Algae below pipe?<br>Yes or No<br>Describe extent                                 | Erosion, Sediment accumulation at outfall? | Pipe need to be rechecked? Describe geographic location | Rating (0-2) (see above) | Surrounding land use (road, parking lot, farm, etc) |
|--------------------------------------------------------------------------|---------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------|--------------------------|-----------------------------------------------------|
| <i>(Example)</i><br>① in bank                                            | 9:33 AM | Concrete in good shape                                             |   | brown, turbid, faint sewage smell                    | Green growth coating rocks across the entire stream width and 100 yards upstream. | Sand accumulation at outfall               | Should be rechecked. Downstream of Jones St. Bridge     | 1                        | Strip Mall, parking lot                             |
|                                                                          |         |                                                                    |   |                                                      |                                                                                   |                                            |                                                         |                          |                                                     |
|                                                                          |         |                                                                    |  |                                                      |                                                                                   |                                            |                                                         |                          |                                                     |
|                                                                          |         |                                                                    |  |                                                      |                                                                                   |                                            |                                                         |                          |                                                     |

| <b>Pipe# &amp; Location</b><br><small>(in stream, top of bank, in bank, under bridge, etc)</small> | <b>Time</b> | <b>Pipe material and condition</b><br><small>(concrete, steel, PVC, clay, other)</small> | <b>Flow level (indicate on circle), flow rate and pipe size</b>                     | <b>Color, Odor</b><br><small>(clear, turbid, oily, foamy, colored)</small> | <b>Algae below pipe?</b><br><small>Yes or No<br/>Describe extent</small> | <b>Erosion, Sediment accumulation at outfall?</b> | <b>Pipe need to be rechecked? Describe geographic location</b> | <b>Rating (0-2)</b> | <b>Surrounding land use</b> <small>(road, parking lot, farm, etc)</small> |
|----------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------|---------------------|---------------------------------------------------------------------------|
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |   |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |

| <b>Pipe# &amp; Location</b><br><small>(in stream, top of bank, in bank, under bridge, etc)</small> | <b>Time</b> | <b>Pipe material and condition</b><br><small>(concrete, steel, PVC, clay, other)</small> | <b>Flow level (indicate on circle), flow rate and pipe size</b>                     | <b>Color, Odor</b><br><small>(clear, turbid, oily, foamy, colored)</small> | <b>Algae below pipe?</b><br><small>Yes or No<br/>Describe extent</small> | <b>Erosion, Sediment accumulation at outfall?</b> | <b>Pipe need to be rechecked? Describe geographic location</b> | <b>Rating (0-2)</b> | <b>Surrounding land use</b> <small>(road, parking lot, farm, etc)</small> |
|----------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------|---------------------|---------------------------------------------------------------------------|
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |   |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |

| <b>Pipe# &amp; Location</b><br><small>(in stream, top of bank, in bank, under bridge, etc)</small> | <b>Time</b> | <b>Pipe material and condition</b><br><small>(concrete, steel, PVC, clay, other)</small> | <b>Flow level (indicate on circle), flow rate and pipe size</b>                     | <b>Color, Odor</b><br><small>(clear, turbid, oily, foamy, colored)</small> | <b>Algae below pipe?</b><br><small>Yes or No<br/>Describe extent</small> | <b>Erosion, Sediment accumulation at outfall?</b> | <b>Pipe need to be rechecked? Describe geographic location</b> | <b>Rating (0-2)</b> | <b>Surrounding land use</b> <small>(road, parking lot, farm, etc)</small> |
|----------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------|---------------------|---------------------------------------------------------------------------|
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |    |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |   |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |
|                                                                                                    |             |                                                                                          |  |                                                                            |                                                                          |                                                   |                                                                |                     |                                                                           |

**\*\*Optional\*\***

**Additional comments and notes**

**Segment number:** \_\_\_\_\_

*As much as we try, our Shoreline Survey Forms do not always cover all possible questions and angles. If there are additional potential problems or features that your Stream Team decided were not adequately addressed, please make note of them here. Or, use this space for extra notes as you do your survey.*

# Shoreline Survey Summary Sheet

Segment number: \_\_\_\_\_

|                                       |
|---------------------------------------|
| Date: _____                           |
| Observers: _____                      |
| Today's weather: _____                |
| Weather over past 24 -48 hours: _____ |

*These sheets are designed to give the “big picture” of your segment. They provide the basis of the narrative description of segments in the Shoreline Survey report.*

## NARRATIVE DESCRIPTION

SAMPLE 1: The river flows slowly through this segment. The banks on the south side are eroded for a distance of about 100 yards (a football field), with parkland behind it. On the other side of the river, the banks have cement walls, industrial buildings and parking lots. There was a marsh at the lower end. A small stream came into the river, and the water quality seemed worse after it entered. Bits of oil floated on the water, and the stream smelled like asphalt. There were a few gulls in the industrial section, and there were turtles, a muskrat hole and a great blue heron in the wetland/marsh.

SAMPLE 2: Segment 2 flows quickly through conservation land, with several small riffles. We saw several anglers along the banks. There were many downed trees in the stream, which provide good habitat for fish. Vegetation along the stream is thick, second-growth forest with an old dirt road providing good access for walking or mountain biking. There are several old appliances in the river near the Rt. 20 bridge.

*Describe your segment in a paragraph:*

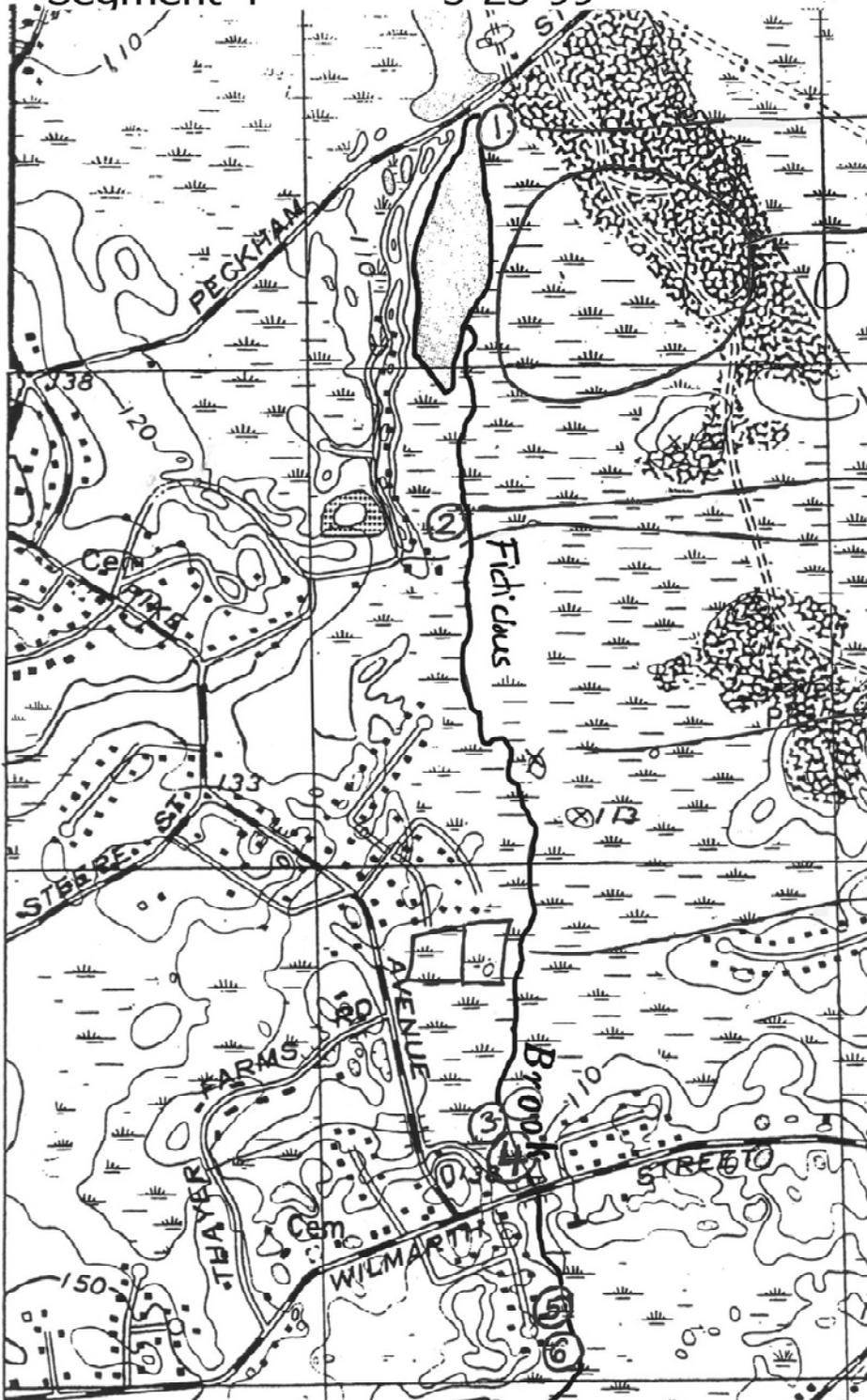


# SAMPLE SHORELINE SURVEY MAP

Fictitious Brook, Anytown

Segment 4

5-23-99



Pipe ① - bridge culvert

Town conservation land  
Possible education trail

Pipe ②

New construction  
- no silt fence

Great wetland habitat

New soccer field  
& play grounds

Pipe ③

Pipe ④ - bridge culvert

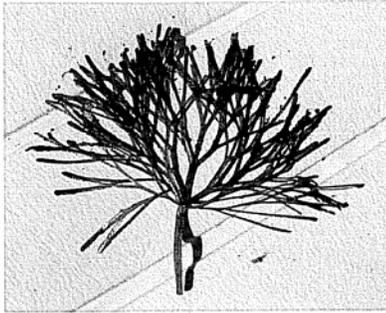
Pipe ⑤

Pipe ⑥

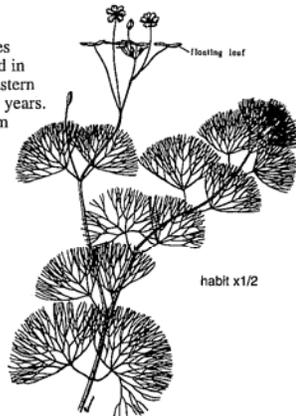
# Common Nuisance Plant Species in the Charles and Mystic River Watersheds

## FANWART

*Cabamba caroliniana*



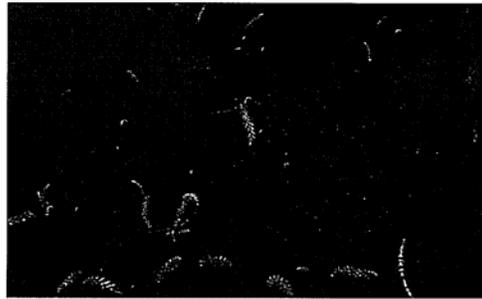
This southern United States native has been established in the acid water ponds of eastern Massachusetts for over 50 years. The plant is separated from the small white flowers and leaves that arise from a small stem. This gives the leaves a fan-like appearance.



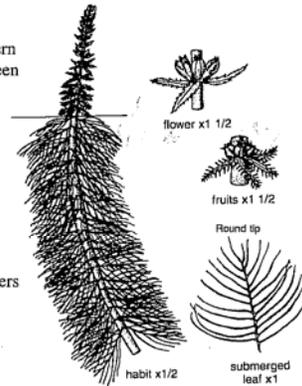
ESTABLISHED

## VARIABLE WATERMILFOIL

*Myriophyllum heterophyllum*



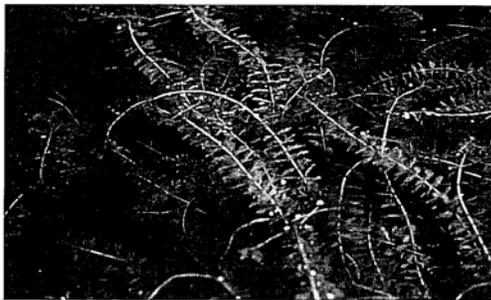
This southern and western U.S. species has long been established in the acidic waters of eastern Massachusetts. This species is identified by the leaf-whorls being located closely together along the stem and with large leaf-like bracts on the emergent stems that are longer than the flowers or fruits.



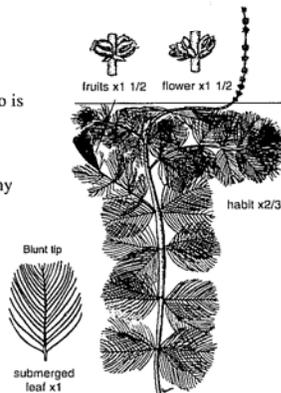
ESTABLISHED

## EURASIAN WATERMILFOIL

*Myriophyllum spicatum*



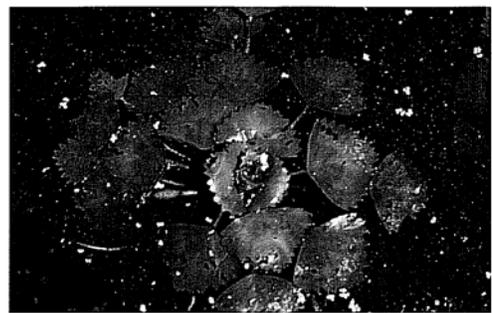
This Eurasian species is extremely abundant in the alkaline waters of Berkshire County, but also is aggressive in the eastern counties. It is identified by the widely-spaced whorled leaves and the tiny emersed bracts that are much shorter than the flowers and fruit.



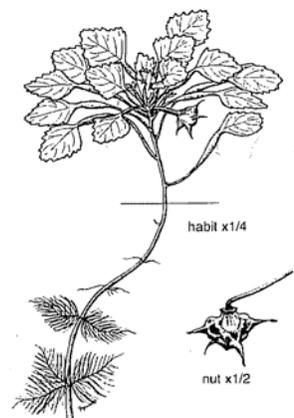
ESTABLISHED

## WATER CHESTNUT

*Trapa natans*



Water chestnut is a major nuisance in the Concord River and Charles River systems of eastern Massachusetts, and it appears to be spreading rapidly elsewhere in the State. Large populations have been noted in the Connecticut River, and it has been found in Berkshire County. It is believed that ducks and geese may be the major means of dispersal. Canada geese have been observed with the spiny nuts attached to their feathers.

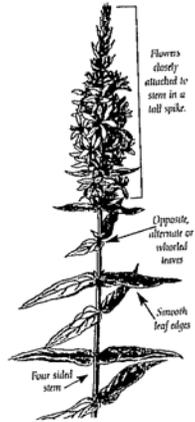


ESTABLISHED

**PURPLE LOOSESTRIFE**  
*Lythrum salicaria*



Purple Loosestrife is an invasive non-native plant from Europe and Asia that was introduced almost 200 years ago. When purple loosestrife is introduced into wetlands, it outcompetes native plants such as cattails, sedges, bulrush and ferns. As these wetlands become infested with purple loosestrife, desirable food and nesting sites for wildlife are lost, there are fewer stopover sites for migrating birds, and key habitat is lost for other wetland organisms.

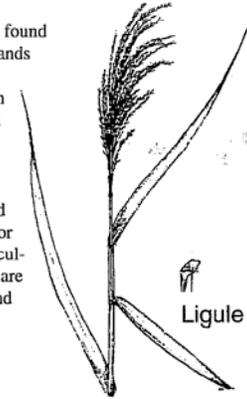


**ESTABLISHED**

**COMMON REED**  
*Phragmites australis*



The Common Reed is often found along roadsides and in wetlands areas. The reed is able to grow in freshwater, brackish water and saline marshes. It grows in large dense stands that can reach 15 or more feet high. This reed out-competes native wetland species in the competition for resources, creating a mono culture. Stands of *Phragmites* are poor habitat for most wetland animals.

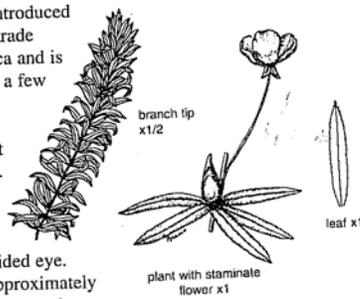


**ESTABLISHED**

**SOUTH AMERICAN WATERWEED**  
*Egeria densa*



This species was introduced into the aquarium trade from South America and is now naturalized in a few areas of eastern Massachusetts. It appears as a robust *Elodea canadensis*. The leaves are whorled and the margins appear smooth to the unaided eye. The flowers are approximately 1 inch across as compared to the much smaller *Elodea*.



**ESTABLISHED**