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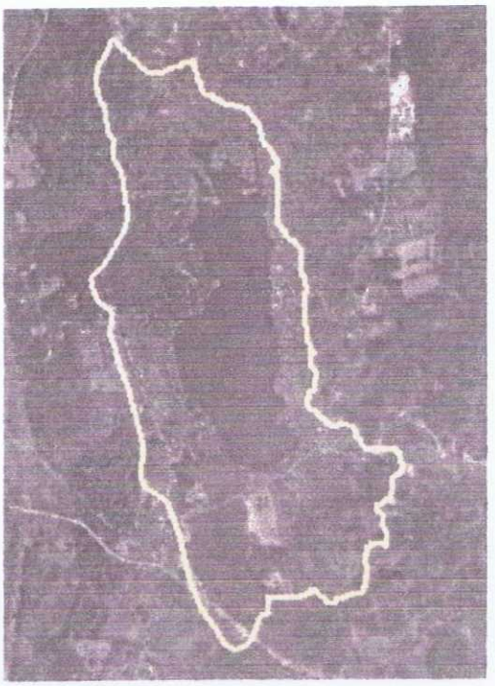
WATERSHED SURVEY FINAL REPORT & ACTION PLAN

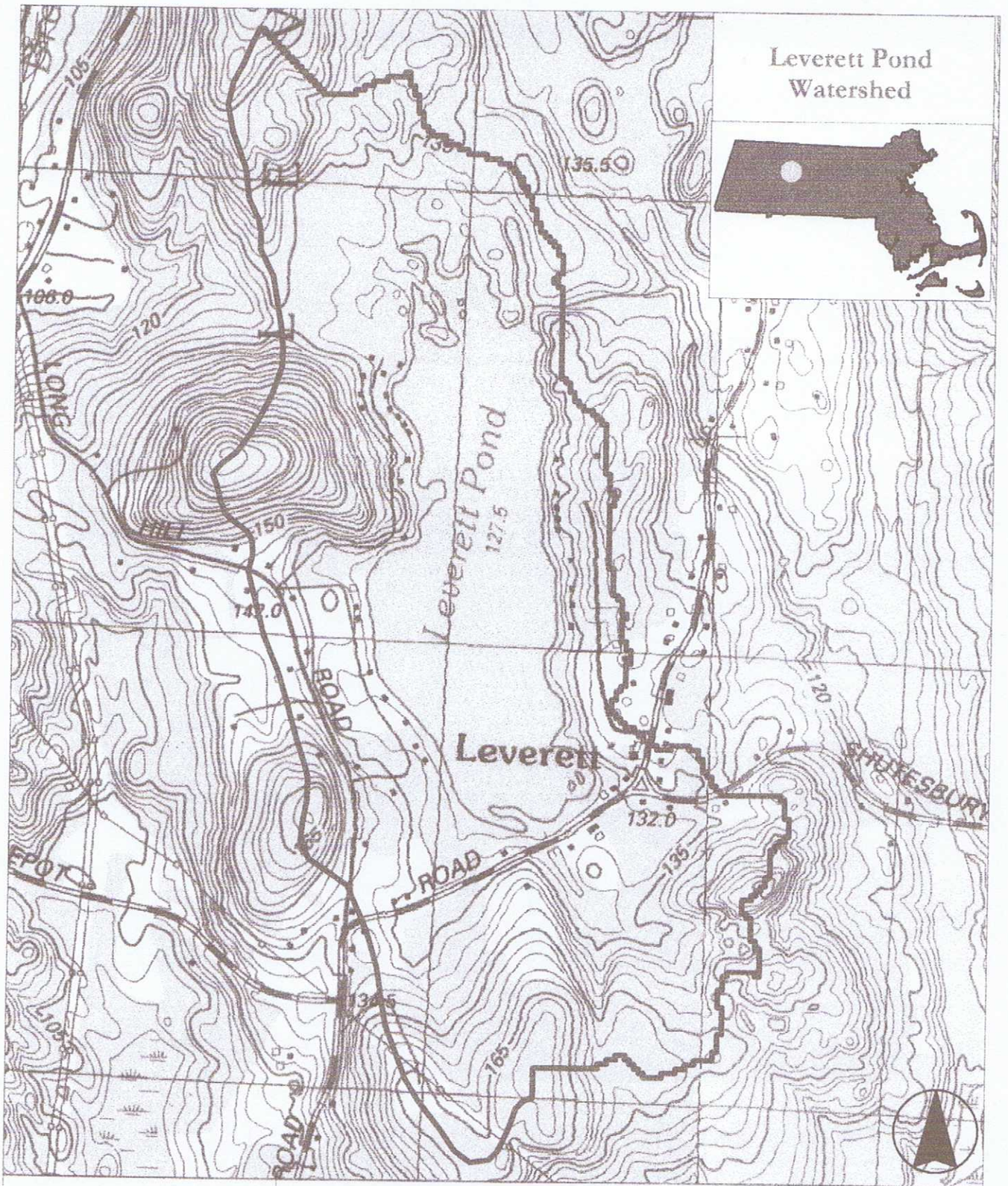


LEVERETT POND WATERSHED

LEVERETT, MASSACHUSETTS

WINTER – SPRING 2003

IN COOPERATION WITH THE MASSACHUSETTS RIVERWAYS PROGRAMS
DEPARTMENT OF FISHERIES, WILDLIFE & ENVIRONMENTAL LAW ENFORCEMENT
LAKE/WATERSHED STEWARDSHIP PROGRAM



This map was produced by the Riverways Programs - May 2003 - 617-626-1540

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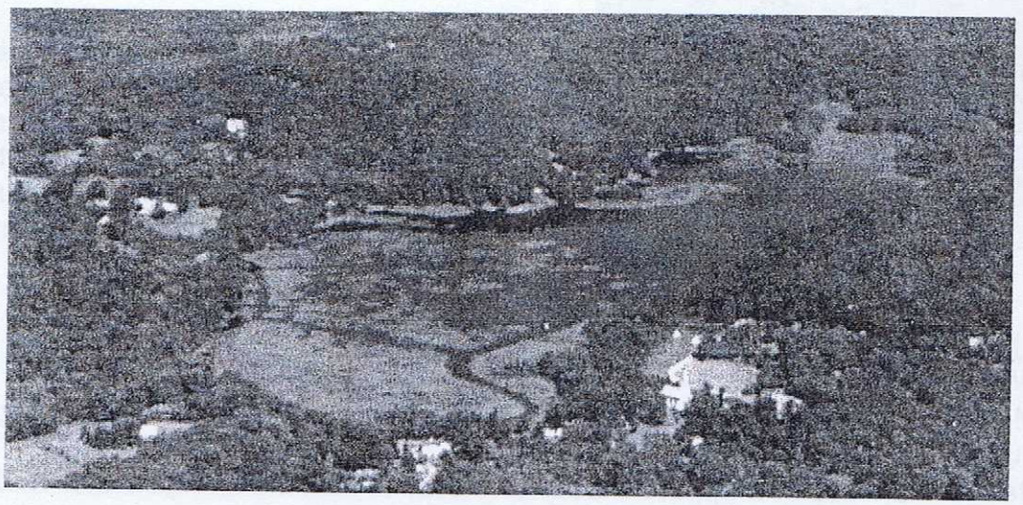
watershed area

This map is for planning and educational uses only. It is not to be used by itself for legal boundary definition, regulatory interpretation or navigational purposes.
DATA SOURCES:
WATERSHED BOUNDARIES: Automated by the Riverways Program using the MassGIS DataViewer and Watershed Delineation tool.

Mitt Romney, Governor
Ellen Roy Herzfelder,
Secretary of Environmental Affairs
David M. Peters, Commissioner

Commonwealth of Massachusetts
Riverways Programs

Leverett Pond Watershed Survey Final Report



Survey Participants:
Richard Brazeau, Jim Field, Steve Freedman, Mitch Mulholland, Janine Roberts, Brooke Thomas, Shirley Thomas, Dillon Tiner, Ralph Tiner, Marie-Françoise Walk

Steering Committee Members:
Richard Brazeau, Leverett Select Board; Jim Field, Friends of Leverett Pond (FLP); Steve Freedman, (FLP); Mitch Mulholland, (FLP); Ralph Tiner, Leverett Conservation; Marie-Françoise Walk, Massachusetts Water Watch Partnership;

Advisors:
Chris Carney, Lake/Watershed Stewardship Program, Riverways Programs (Department of Fisheries, Wildlife and Environmental Law Enforcement); Tracey Miller, Massachusetts Department of Environmental Protection

Funding
This project has been financed with Federal Funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (the Department) under an s. 319 competitive grant. The contents do not necessarily reflect the views and policies of EPA or of the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

LEVERETT POND WATERSHED SURVEY SPRING 2003

I. EXECUTIVE SUMMARY

Introduction

Leverett Pond is a Great Pond, about 95 acres in size. It is a shallow pond, heavily weeded. Eutrophication has resulted in heavy silt buildup resulting in impaired water flow and impaired access by small boats. By creating more shallow areas it may also have contributed to winter fish kills during the winters of 2000/01 and 2002/03. Since the early 1990's pond stewardship has been taken on by The Friends of Leverett Pond, a local group, which has attempted to keep boat channels open and nuisance aquatic vegetation in control through a combination of grant money and local contributions. In April/May 2003 the watershed was divided into six parts, each surveyed by a separate team. Technical assistance and training was furnished by Chris Carney of the Lake/Watershed Stewardship Program, part of the Massachusetts Riverways Program.

Key Findings

- We found no "smoking gun" indicating point source pollution.
- Most residences have lake-friendly landscaping with adequate vegetative buffer
- Beaver handiwork is apparent both at the dam controlling high water at the north end of the pond as well as along the shoreline. There are currently three lodges.
- Many dead fish were spotted along the shorelines.
- Some storm water runoff occurs near the boat launch off of Depot Road. Construction of a new catch basin is planned for this year.

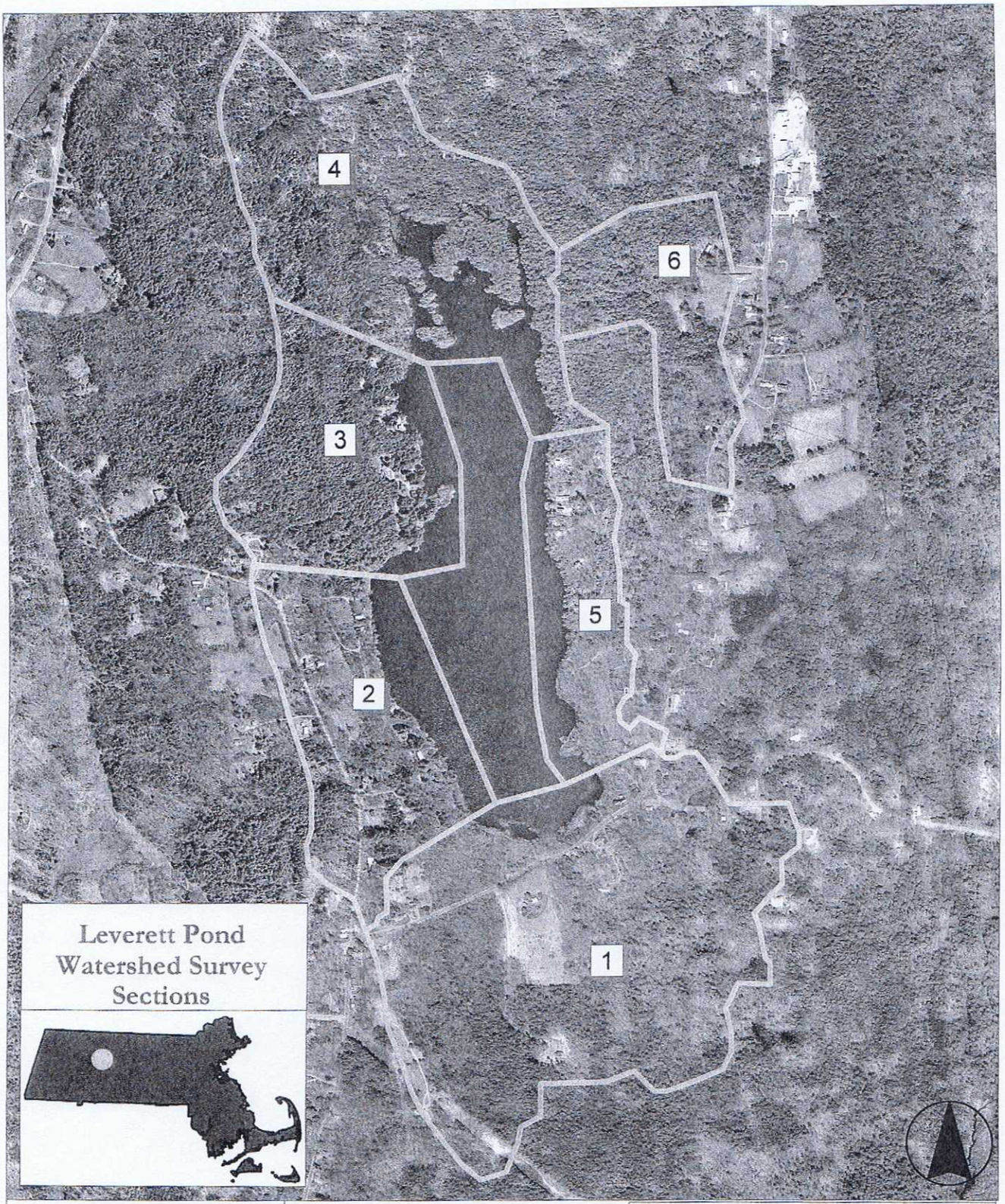
Short Term Actions

- Education of homeowners abutting the pond regarding the importance of vegetative buffer for runoff, use of low and no phosphorous detergents and fertilizers.
- Continue to observe runoff conditions at Depot Road culvert and boat launch area.
- Education of abutters regarding weed identification and weed pulling. Contact Weed Watchers Program for assistance.
- FLP continue to monitor nuisance non-native aquatic vegetation with an eye towards controlling the spread of Eurasian Milfoil.
- Steve Freedman will consult with one property owner regarding better management of storm water runoff.

- Keep south end of pond along Depot Road free from litter by organizing periodic clean-ups.
- Consult with Massachusetts Division of Fisheries and Wildlife to request assistance on updating fish survey and possible re-stocking after recent winter kills.

Long Term Actions

- Secure funding to purchase hydro-rake to control spread of weeds and keep channels open to boaters.
- Maintain a vibrant and community-responsive FLP to sustain good stewardship of the pond and its watershed. Increase membership through education outreach and community volunteer activities, such as weed mapping and litter clean-up.



Leverett Pond Watershed Survey Sections

This map was produced by the Riverways Programs - May 2003 - 617-626-1540

watershed survey sections

400 0 400 800 Feet

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Riverways Programs

III. Narrative Sections

Section 1 – Depot Road and South Shoreline - *Ralph Tiner and Dillon Tiner*
Surveyed on May 5, 2003, cloudy today, sunny warm past few days
We examined a portion of this section as Jim Field was taking care of the area to the south of Depot Road. The area we surveyed included Depot Road north to Leverett Pond. The near-shore area contained two residences with a few more in the vicinity, but the area was dominated by woodland. The woodland was a combination of palustrine forested wetland and upland forest, the former predominating.

The shoreline in this section was entirely vegetated, with the shallow water zone occupied by emerging (herbaceous) growth (mostly by cattail, complete with singing red-winged blackbirds) and the water's edge (seasonally flooded) occupied by shrubs (mostly alder) and trees (e.g. red maple). The lawn of one residence on the eastern side of the pond extended right up to the pond. At the boat launch area, there were signs of road runoff effects – sediment deposits and debris lines. We also noticed sand along margins of Depot Road, yet it did not appear to be a problem for the pond. Also along Depot Road, we saw a fair amount of roadside trash, mainly in the form of cans, bottles, paper, plastic items, and cigarette butts. Despite the proximity of the road, the pond appeared to be well-buffered by its vegetated shoreline. Two tributaries from the south entering the pond appeared to be in good condition (clear, running water, could see the bottom), although it looked like some sand (possibly from winter road care) forms part of the bottom. We did observe some ATV activity in the seepage swamp on the western side of the pond. The deeply rutted trail in the swamp muck was obvious.

Section 1 Upland – *Jim Field*
May 7, 2003
Upland area consists primarily of northern hardwoods: beech, birch, & maple. Upland areas drain to lowland swamp that feeds both feeder streams at culverts #1 & #2. Swamp area is labeled #3 on photo. Upland area is interspersed with some open pasture #4 and light residential.

Three small feeder streams enter the lake from this area (31, #2 & #6 on the map). Area #3A & B encompasses the lowland drainage areas that is the source for these three small streams – upland forest along this drainage area is predominantly northern hardwoods that drain into a swamp that is predominantly hardwoods with skunk cabbage understory. All water sources appear clear and clean. Area #4 is the only unforested section and is maintained as pasture. Heavy vegetative cover was observed throughout. Area #5 is maintained as a storage site for man-made artifacts.

Section 2 – *Mitch Mulholland*
Surveyed section over two days (5/15 & 5/16) under both rainy and dry/clear conditions.
Area is about 50% wooded and 50% forested. Three dirt roads pass through area. Several abandoned agricultural fields area maintained as open land by residents. No major streams. Grass around houses just beginning to grow. Lake is devoid of aquatic vegetation and looks the way we wish it would all year. By July surface vegetation will be thick. The area of the shoreline is approximately 50% lawn (intermittant0) and 50% forest. Lawns are not treated with fertilizer. Two wooden piers are in water. Two tiny drainages are evident. One in extreme north and one in the center. Both streams are intermittent, more or less dry in summer. The southern stream drains a wetland with hummocky vegetation. The wetland is a part of an old pasture and orchard. The north stream flows through a wetland before reaching stream. Several fields are in the area, all used agriculturally at one time. All are now just fields. There are no livestock in this section. No fecal matter observed near pond. Some leach fields are old. Some are planned to be replaced. No evidence of oil or other runoff. No evidence of pipes in water. No pollution evident, although

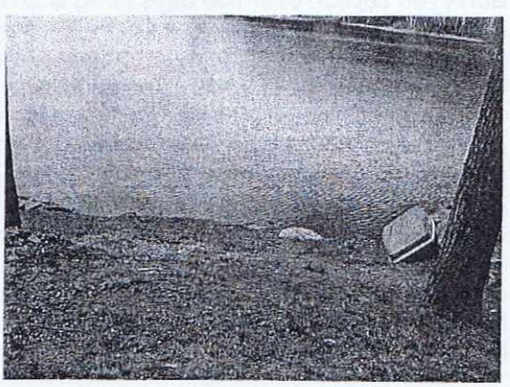
there have been two fish kills after ice-out over the past two years. This and dying aquatic vegetation are obvious pollutants. Culvert on Cider Mill Road allows road to cross 3 foot wide intermittent stream.

Section 3 - *Brooke and Shirley Thomas*
Surveyed May 9, clear today, some rain past 48 hours.
On north and south ends of Section 3 are 2 seasonal tributaries about 1' wide and 0.5' deep. The south tributary comes from springs below the dirt road. Runoff from Long Hill Road could reach this area but there is a lot of vegetative buffering. The dirt road (Camp Rd) was built in the 1950s to access camps built on shoreline. Most remain seasonal (8) and three are year-round. These are on small lots. Ledge is prevalent so even new systems must contribute nutrients to lake. In spite of this density (summer people have not come yet) there is no evidence of erosion, sedimentation, or pollution. The tributaries are running clear. In torrential rains a culvert under the south end of camp road could discharge directly into the lake as could runoff from the logging road. Otherwise an adequate vegetation buffer seems to exist. Now that beavers have raised lake level, shoreline erosion (where lawns come to the shore) could exist.

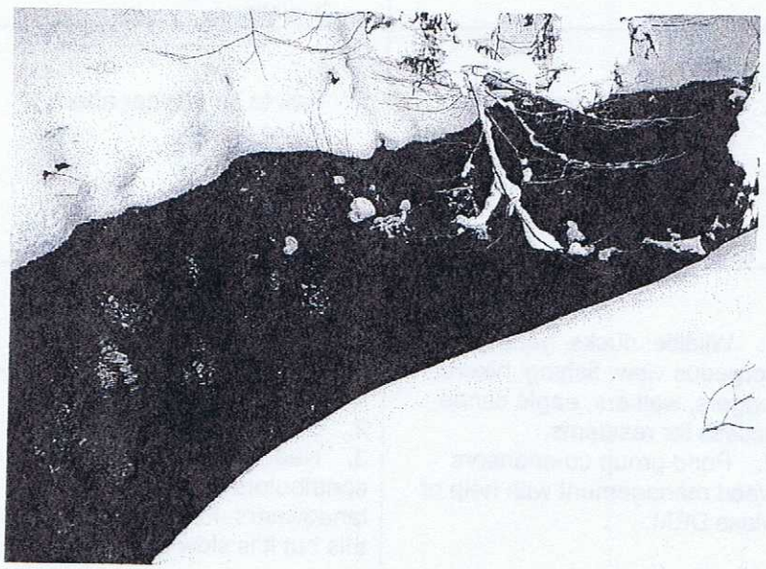
At #1 on the map: Drainage from Long Hill Road follows Camp Road in a ditch cuts under road in a culvert and empties into vegetative buffer. Salt from Long Hill Rd might reach this area but drainage is generally absorbed except in torrential rains. Direct drainage does not connect directly with spring area of tributary #1, however seepage might.
At #2 on the map: Water flowing down 50-plus feet of Camp Road in ditch goes into culvert under road about 50 feet from shoreline and twenty feet above. Rills are seen in vegetative material on steep bank indicating drainage occasionally reaches lake. No serious erosion or sediment is apparent. This part of the road is steep so sand and salt get put on it in the winter.
At #3 on the map: Houses in this area are within 100 feet of the shoreline. Septic and lawn seepage must reach pond. Also with higher lake levels (beaver dam) shore erosion is possible.
At #4 on the map: Runoff comes down driveway/logging road crosses Camp Rd and enters property where a concrete channel has been constructed. This collects drainage from yard and takes right to the lake. Siltation is minimal.

Section 4 - *Jim Field and Janine Roberts*
4-30-03, Mild & Sunny, Rain
All of the upland area is undeveloped forest consisting of typical northern hardwoods and hemlock with white pine. Two trails wander through this area. An old logging road used by snowmobile and bike riders. A foot path runs close to the shore's edge. The area is remarkably pristine (found 1 beer bottle and 1 plastic Clorox container). The area also contains three uninhabited islands. Near water area is heavily vegetated and undisturbed. Water in this area is heavily weeded with some swamp and some areas approaching a bog type. Excellent wildlife habitat throughout.

Section 5
Steve Freedman and Françoise Walk



Section 6 - *Richard Brazeau*
January 7, 2003, snow cover & May 12, 2003
Started survey below dam. Stream 6'-10' wide, 1'deep in center. Clear defined banks. Stream follows a valley between steep wooded side slopes. Base of valley 5o'-75' level wetland / flood plain with mild topography. Valley base hemlock woodlands. Side slopes pine/oak forest. Little disturbance in area. Few hiking trails / wood roads. No disturbed areas until close to Montague Road. Hemlock / shrub swamp follows stream along the rear of the houses along Montague Rd. Two houses area close to the stream and wetland areas. Snow cover prevents inspection of lawns and wetland areas. Snow cover prevents inspection of lawns for septic failure. One house has little room for system upgrade (at road crossing).



IV. Priority Sheets

Problems Found	Natural Resources and Assets Found	Priorities for Action
Section 1 (Shoreline), *Ralph Tiner & Dillon Tiner* 1. Trash along Depot Road, some in wetland. 2. Road runoff into pond at boat launch. 3. Possible nutrient runoff from one lawn adjacent to marsh with no wooded buffer.	1. Good wildlife habitat 2. Significant wooded buffer along most of this shoreline 3. Access to pond for boating and fishing. 4. Scenic view from Depot Road.	1. Eliminate direct road runoff into pond at boat launch. 2. Pick up trash – "adopt-a-____" neighborhood cleanup. 3. Did not access backyard of residence with lawn continuous with cattail marsh. Don't know if there is any dumping of leaves, etc. in wetland.
Section 1 (Upland), *Jim Field* 1. Human activity impinging on resource area around area #5. Does not appear to be impacting at present.	1. Good wildlife habitat throughout. 2. One marked trail observed through area.	1. Talk to landowner about future activity
Section 2, *Mitch Mulholland* 1. Dense aquatic vegetation will be evident in July (includes milfoil) 2. Drastically limits pond use for recreation. 3. Reduces D.O. in winter, 4. Weed die off in winter contributes as fertilizer for next year's weeds	1. Wildlife: ducks, geese, fish, gorgeous view, fishing, hikers, joggers, walkers, eagle canoe access for residents. 2. Pond group co-sponsors weed management with help of Mass DEM.	1. More rigorous removal of pond weeds, better weed management over wider area. 2. See funds to do same. 3. Need wider group of contributors beyond lakefront landowners. FLP is working on this but it is slow going.
Section 3, *Brooke & Shirley Thomas* 1. Drainage from Long Hill Rd follows Camp Rd in a ditch, cuts under road in a culvert, & empties into vegetative buffer. Salt from Long Hill Rd might reach this area but drainage is generally absorbed except in torrential rains. Direct runoff does not connect directly with spring area of tributary #1, however seepage might. 2. Water flowing down 50+ feet	1. Pond has wonderful recreation value that has decreased dramatically in the past decade because of weeds covering large areas of the pond – even in the middle – making boating and swimming difficult. Even fishing is compromised since everything gets tangled in the weeds: lines, motors, caught fish. In recent years (2000/2001 and this year 2002/3) ice cover all winter &	1. Weed density in pond 2. Alert homes near pond about prudent use of detergents, fertilizers, septic cleaning. Increased conversion of the seasonal camps to year round will exacerbate this problem. 3. Maintain vegetative buffer on shoreline to prevent erosion and provide habitat.

of Camp Rd in ditch goes into culvert under road about 50' from shoreline and 20' above. Rills are seen in vegetative material on step bank indicating drainage occasionally reaches lake. No serious erosion or sediment is apparent. This part of the road is steep so sand and salt get put on it in winter. 3. Houses in this area are within 100' of the shoreline. Septic and lawn seepage must reach pond. Also, with higher lake levels (beaver dam) shore erosion is possible. 4. Runoff comes down driveway/logging road, crosses Camp Rd and enters property where a concrete channel has been constructed. This collects drainage from yard and takes it to the lake. Siltation is minimal. 5. Frogs have declined over the last decade. There is a noticeable decline in bullfrog croaking.	high decomposition rates deprived water of O2 leading to large fish kills.	—
Section 4, *Jim Field & Janine Roberts* 1. Algae can form in late summer. Water is trapped by heavy vegetation.	1. All areas excellent wildlife habitat. 2. Canoe access is restricted into summer as weed growth thickens. 3. Walking trail could be better developed. Need landowners approval in one posted section adjacent to dam.	1. Open narrow channel for canoe access. 2. Get landowner permission to develop walking trail.
Section 5, *Steve Freedman and Marie-Françoise Walk* 1. Some runoff from residential areas, but minimal. 2. Excessive plant growth – saw milfoil (maybe_ today. 3. Beaver activity which is removing shoreline vegetation and impeding the dam in another section – keep s water level artificially high.	1. Section is lightly developed, mostly forested – good wildlife habitat.	1. Landowner education on vegetated buffers to prevent runoff from driveways and bare soil. 2. Landowner education on invasive aquatic vegetation (hand pulling, etc.)

Problems Found	Natural Resources and Assets Found	Priorities for Action
Section 6, *Richard Brazeau* 1. Two houses close to stream and wetland areas. 2. Beaver dams.	1. Majority of watershed intact woodlands with no disturbance. 2. Vegetated buffer at the rear of most houses. 3. Only two houses close to brook. 4. Montague Road drainage all sheet flow.	1. Check septic systems of last two houses adjacent to Montague Road crossing. 2. Beaver control. 3. FLP to work to obtain land or easements to gain access to the existing dam location. Future projects should include repair of the dam structure and access to dam site to allow for continuous maintenance.

V. ACTION PLAN

Based on the April / May 2003 Watershed Survey of the Leverett Pond Watershed and the May 2003 Action Planning Meeting, facilitated by the Riverways Programs.

I. Immediate / Reporting Issues:

1. **To Department of Public Works / County**
   Culvert headwall at Montague Road stream crossing is damaged – potential for the wall to collapse and crush the culvert. Request that the headwall be repaired. *Rich Brazeau has contacted the DPW.*

2. **To the Massachusetts Public Access Board**
   Boat access to Leverett Pond at Depot Road needs improvement and stabilizations, but should be kept at its current size to allow only car-top canoe and kayak access. Request assistance from P.A.B. to improve the site. *Chris Carney will contact P.A.B.*

II. Short Term Actions:

1. **Residential**
   Most residences have lake-friendly landscaping. One property is in need of minor corrections for improved stormwater management. Steve Freedman will consult the property owner.

2. **Road Runoff**
   Some stormwater runoff occurs off of Depot Road near the boat launch. Much of this is likely to be addressed with the construction of a new catch basin near the site. Continue to observe runoff conditions, request that good street sweeping practices continue.

3. **Education – Watershed Issues**
   Increase awareness of Leverett Pond among town residents and educate watershed homeowners about good lake-friendly housekeeping practices. Work to do this by including a Friends of Leverett Pond column in the town's quarterly newsletter and by establishing a central location for lake information and flyers.
   Potential topics include:
   - use of low-phosphorus and no phosphorus detergents and fertilizers
   - septic cleaning
   - the importance of lakeshore vegetative buffers
   - the need for increased membership for the Friends of Leverett Pond.

4. **Education - Aquatic Plants**
   Work to educate residents to identify common native and non-native invasive aquatic plants. Contact the Weed Watchers Program to request assistance (DEM Lakes and Ponds).

5. **Leverett Pond Fish Population**
   For two of the last three years, Leverett Pond has had a major fish-kill related to very thick ice from long cold winters. This does not seem to have happened with such severity in the past few decades, even during cold winters with thick ice. Work with Massachusetts Division of Fisheries and Wildlife to better understand the causes for these fish kills, and request an updated fish survey of Leverett Pond.

6. **Litter Cleanup**
   Although most of the watershed is relatively free of trash and litter, trash was found along the south shore and Depot Road. Work to organize a volunteer cleanup for this section during the summer, annually if needed.

III. Long Term Actions:

1. **Access**
   Section 4, the undeveloped north shore of Leverett Pond, is both very scenic and abundant with wildlife. Consider pros and cons of developing a rustic walking trail around section 4. This would require consent from the landowners and could bring in an unwanted level of human use of the area, but could also raise awareness of the unspoiled nature of the section and foster the continued protection of the lakeshore as undeveloped open space.

2. **Canoe access**
   Consider plans to improve canoe access among the shallow areas at the north end of the pond.

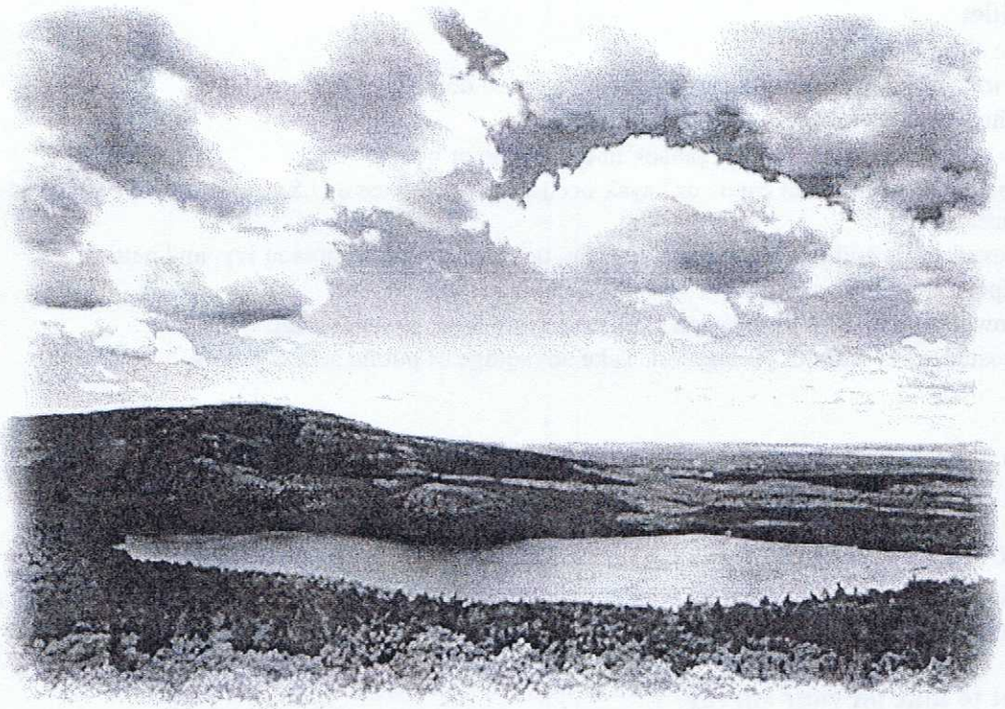
3. **Sediments**
   Consider options for addressing the high-nutrient content bottom sediments, including the growing layer of dead plant matter. Investigate funding to purchase a hydro rake and other equipment.

4. **Friends of Leverett Pond**
   To sustain good stewardship for the pond and its watershed, work to build the capacity of group, including the number of actively participating members. Work to do this in conjunction with plans for education outreach and through volunteer events such as the proposed litter clean-up.

5. **Septic systems**
   Work to address the potential inputs of bacteria and nutrients from failing or aging septic systems. Leverett could work to develop a town-wide septic system inspection and testing program.

SURVEYING A LAKE WATERSHED

Data Collection Forms



GUIDANCE FOR COMMUNITY VOLUNTEERS IN MASSACHUSETTS

Data sheets based on materials from

Massachusetts Department of Environmental Protection
Massachusetts Riverways Programs, Adopt-A-Stream Program,
Department of Fisheries, Wildlife, and Environmental Law Enforcement
Massachusetts Water Watch Partnership
Maine Department of Environmental Protection

2001

Tips for Surveying a Lake and Pond Watershed

The purposes of this survey are to organize residents and officials of communities to work together to solve problems and to protect resources of lakes and ponds. The survey, a cooperative venture, is a primary step in this process. In addition, the success of the survey depends upon volunteers and landowners. Before the survey takes place, all landowners need to be invited to participate in the survey, notified of purposes of the survey, and have an opportunity to give permission for volunteers to walk their property.

This survey form is designed for use with the *Massachusetts Volunteers Guide for Surveying a Lake Watershed and Preparing an Action Plan* (2001). To ensure that the survey is successful, volunteers should be aware of the following safety tips.

Safety and Legalities

- Always walk with someone.
- Watch out for irate dogs. Walk cautiously and practice good dog etiquette.
- Do not drink the water.
- Lifejackets are required by law for each person in any canoe or boat.
- From September 15 to May 15 all canoe or kayak occupants must wear a U.S. Coast Guard Approved Personal Flotation Device.
- 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 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 IN DANGER TO GATHER SURVEY INFORMATION.

If at anytime you feel uncomfortable about the bank or waterbody conditions or surroundings, please STOP your survey. You and your safety are much more valuable than any of the objectives of the watershed survey.

Checklist: What to take on your survey

___ A buddy
___ Data forms and topo 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
___Flashlight for checking culverts

Optional

___ Rubber boots or waders
___ Yardstick or measuring tape (useful for pipes)
___ Compass
___ Field guides (in ziplock bags)
___ Food, for energy!

Fill out your data sheets, get them to your team leader, and attend action planning meeting, which will be held on: _____ Section Team Leaders will forward completed data sheets (with priority sheets) to:

Chris Carney
Lake/Watershed Stewardship Program
Riverways (DFWELE)
251 Causeway Street, Suite 400
Boston, MA 02114

christopher.carney@state.ma.us
617-626-1547

Water Quality 101

Clean Water Act (CWA) – A federal law establishing comprehensive national policies for water quality management. The essence of the CWA is to have all US waters "fishable and swim able".

303(d) List – The list of waterbodies in Massachusetts or any other state that fail to meet water quality standards.

Total Maximum Daily Load (TMDL) – The greatest amount of a pollutant that a waterbody can accept and still meet water quality standards. TMDLs are established by Massachusetts Department of Environmental Protection (DEP) as the major key to remediation plans for impaired lakes and stream- the remedial plan itself is also generically called a TMDL. The U.S. Environmental Protection Agency requires that TMDLs be developed for every waterbody on the 303(d) list.

This program was developed to deal with lakes and ponds that, *like yours*, are on the 303(d) list and have TMDLs from Massachusetts DEP that call for reductions in phosphorous.

Phosphorus – A nutrient often serving as the limit to plant/vegetation growth in freshwater systems. Excessive amount of phosphorus in a water body can lead to a condition of unchecked plant and algae growth known as eutrophication.

What are major sources of phosphorous?

- Phosphorous is found in lawn fertilizers, sewarage, motor oils, and some detergents.
- Phosphorous is very abundant in stormwater runoff.
- Phosphorous binds to soil and sand particles and other sediments.

What are some ways phosphorous gets to the lake or stream?

- Picked up by stormwater and carried directly to the water overland or through storm drains.
- Scoured out with sediments by erosion.
- Leach through groundwater from failing septic systems.

Other important terms:

Best Management Practices (BMPs) – Techniques which may be nonstructural, structural or managerial capable of effectively and economically reducing nonpoint sources of pollution.

Nonpoint Source Pollution (NPS) – Pollution originating from multiple and diffuse sources – as opposed to point source pollution which can be traced to a pipe or other single, discrete source. **Storm water runoff** is a significant contributor of nonpoint pollutants since it washes pollutants from impervious surfaces such as roadways, roofs, lawns and other surfaces.

Sedimentation and siltation- An increase, above natural levels, in the amount of sand and silt carried to a water course. This increase can lead to impairments including loss of habitat, loss of spawning areas, decrease in light penetration, increase in scour and an increase in bacterial and other pollutants. Also, nutrients such as phosphorous can bind to sand and silt particles and can be carried into the waterbodies along with the sediments.

Watershed – The geographic region within which all water drains to a particular river, lake, wetland or other water body. It includes an area of land contributing all its runoff and drainage to this common point. Large watersheds may be divided into smaller sub-watersheds.

PRE-SURVEY

LAKE and POND **WATERSHED** FORM

Lake and Watershed Name: _____
Survey Area Name & Number: _____
Surveyors Names: _____

A. Description of the Area from a Topographic Map *(Maps will be available at the training session.)*

1. Consider the developed *(white)* and undeveloped areas *(green)* on your map? What % of each do you see?
   _____% developed _____ % undeveloped
2. Are there steep slopes in the sub-watershed, indicating a potential for increased runoff or erosion? (*How close together are the contour lines*?)
   ____Yes ____No
3. How many tributaries enter or cross your area?___
4. What kinds of development are shown on the map?
   (Include major development in the watershed, as well as the shoreline, that could have an impact on the lake.)

B. General Categories of Land Uses in your Area – (From general knowledge)

___% Construction
___% Residential
___% Roads
___% Other (*please specify, e.g. , rural, open, or recreational)*_____
___% Agricultural land
___% Commercial, Industrial and Urban Areas
___% Logging/forestry

C. If Residential *(Estimate % of area; information will be available at the training.)*

___Multifamily
___<1/4 acre lots
___1/2-1 acre lots
___>1 acre
____year round
____seasonal

D. Is the area sewered? _____ or unsewered _____?
Do you know of any major discharges to the waterbody or its tributaries? (e.g., permitted, stormwater)

E. Watershed History and Characteristics *What do people know about this area?*
General description: _____
_____
Historical information:_____
_____

Problems to look for during site visit: *(e.g., If there is a new development near a stream, you will want to look upstream and downstream of the site for evidence of erosion and sedimentation and excessive vegetation in the stream. If you see erosion downstream of the development you may be able to track the problem back to its source.)*

1. _____
   _____
2. _____
   _____
3. _____

CONTINUE YOUR SURVEY:

- If your survey section is a **near-shore area**, continue on to the next page and fill out the near shore area field sheets (the yellow page).
- If your survey section is an **upland watershed area**, skip the next page and use the upland watershed area field sheets (the orange page).

FIELD SHEETS – NEAR-SHORE

LAKE and POND **WATERSHED SURVEY** FORM – **NEAR SHORE AREA**

Lake and Watershed: _____ Survey Date: _____
Surveyors Names: _____ Area Name & Number: _____
Weather Today: _____ Weather (past 2-5 days) _____
Landowners Contacted During Survey: ____yes ____no

A. General Categories of Land Uses Around and Upstream of Your Survey Section *(Identify the land use category on the site. May be more than one land use.)*

___ % Construction
___ % Residential
___ % Roads
___ % Other *(please specify, e.g. , rural, open, or recreational)* _____
___ % Agricultural land
___ % Commercial, Industrial and Urban Areas
___ % Logging/forestry

A.1. Specific Land Use on the Your Survey Section *(Estimate % of site in each use. May be more than one land use.)*

___commercial
___industrial
___junk yard
___railroad
___bridge
___highway
___dirt road
___local road
___parking lot
___golf course
___grazing/pasture
___park or beach
___protected open space
___undeveloped land
___meadow
___forest
___wetland
___other *(specify)* _____

A.2. If Residential *(Estimate % of site that is...)*

___Multifamily
___<1/4 acre lots
___1/2-1 acre lots
___>1 acre *(400 x 100 feet)*
___year round
___seasonal

B. Site characteristics

1. Dominant shoreline material is...
   ___gravel ___sand ___silt ___clay ___dark organic muck & peat ___other

2. Slope of site is... ___flat ___moderate ___steep

3. The shoreline or riverbank is... *(Check a or b, if there is a stream, ditch, shoreline, or steep bank on site.)*
   a)___vegetated with...
   ___exposed roots
   ___shrubs and native grasses (< 20 feet)
   ___trees taller than 20 feet
   b)___unstable and...
   ____undercut
   ____eroded

4. Vegetated Cover:
   a) How much of the near-shore water is shaded by trees and shrubs? *(estimate shading from 10 AM - 2 PM)*
      ___0-25% ___25-50% ___50-75% ___75-100%
   b) The % of the bank area that is covered by each of these vegetation types is...
      ___% grasses ___% shrubs ___% trees (>20 feet) ___% little or none
   c) How far back from the shoreline does the band of trees, shrubs, or grasses extend?
      ___0-5 feet ___5-50 feet ___50-100 feet ___greater than 100 feet

C. Site drainage

1. **Site runoff is directly to...**
   ___lake ___stream ___ditch ___ catch basin ___vegetated buffer ___wetland other *(describe)* _____

Over

FIELD SHEETS – NEAR SHORE

LAKE and POND **WATERSHED SURVEY** FORM – **NEAR SHORE AREA**

C. Site drainage, ***continued***

2. **Site runoff is from…**

Construction: ___disturbed areas <1 acre) ___disturbed areas >1 acre ___exposed soil
___altered drainage pathways ___absence/failure of erosion controls

Residential: ___driveways ___lawns (____ <1 acre ___ >1 acre)
___lush lawns ___exposed soil ___evidence of erosion
___pet waste ___pipe drains

Roads: ___pavement to catch basin ___bridge ___shoulders/country drainage
___drainage to waterbody ___evidence of erosion ___sand build up in road
___sediment in ditches/culverts/drains

Agricultural: ___field ___animal grazing area ___manure storage area
___exposed soil ___animals in waterbody ___storage areas uncovered

Commercial, Industrial & Urban: ___parking lot ___vehicle maintenance yard ___industrial area
___waste storage area ___drain pipes to waterbody ___sediment in ditches/culverts
___paved areas ___trash/waste storage near waterbodies

Logging/ Forestry: ___logging yard ___roads/trails ___stream crossings
___forested areas ___exposed soil ___poor roads
___brush/slash near waterbodies

Other: ___*(specify)* _____

D. Land disturbances that affect water quality

1. Do you see evidence of excess nutrients? *(Check all that apply)*

___**Soil erosion:** ___silt ___sand ___soil ___stockpiled soil
___**Evidence of runoff:** ___rills ___gullies ___channel ___sedimentation
___**Evidence of nutrients:** ___pet waste/manure ___fertilizer use ___green lawns other*(specify)* _____

2. Do you see any of the following? *If there are tributaries, catch basins drain pipes, and/or culverts on the site, explain your observation.*

___Tributaries bringing in siltation: _____
___Pipes/culverts (*describe conditions*): _____
- Describe what is going into the pipe *(Add color and odor)*: _____
- Describe any discharge from the pipe *(Add color and odor)*: _____

___Full catch basins: full with *(circle)*: trash sand pet waste oil other_____
**Note problem catch basins on your map.*

E. Water quality concerns *(Check all that apply, describe the location and cause, and indicate site on map)*

___Oily sheen or smell: _____
___Sewage: *(odor, milky color, toilet paper)* _____
___Foam or scum: (*does a stick break it up? If it does, foam is probably natural.)* _____
___Fishy odor or fish kill: _____
___Algae or aquatic weeds (*excessive growth*): _____
___Floating trash: _____
___Obvious sedimentation: *(e.g., sand)* _____

F. Habitat and wildlife *(Evidence of…)*

___Fish: (fish, fish nests, anglers) *Identify species if known* _____
___Other aquatic life: __insects, __turtles, __frogs, __snails, __mussels, __clams, other: _____
Identify species if known: _____
___Waterfowl: __herons, __ducks, __geese, __loons, other _____
___Areas of good habitat with wildlife: *Describe* _____

End of Near Shore Area Field Sheets: Skip the next page, go to Pipe, Narrative, Priority & Map Pages

FIELD SHEETS - UPLAND

LAKE & POND **WATERSHED SURVEY** FORM – **UPLAND WATERSHED AREA**

Lake/Watershed: _____ Survey Date: _____
Surveyors' Names: _____ Area Name & Number: _____
Weather Today: _____ Weather – past 2-5 days: _____

A. General Categories of Land Uses in Your Survey Section *(Identify the land use category on the site. May be more than one land use.)*

___ % Construction
___ % Residential
___ % Roads
___ % Other (*please specify, e.g. , rural, open, or recreational)* _____
___ % Agricultural land
___ % Commercial, Industrial & Urban Areas
___ % Logging/forestry

A.1. Specific Land Use in Your Survey Section *(Estimate % of site in each use. May be more than one land use.)*

___commercial
___industrial
___junk yard
___railroad
___bridge
___highway
___dirt road
___local road
___parking lot
___golf course
___grazing/pasture
___park or beach
___protected open space
___undeveloped land
___meadow
___forest
___wetland
___other *(specify)*_____

A.2. If Residential *(Estimate % of site that is…)*

___Multifamily
___<1/4 acre lots
___1/2-1 acre lots
___>1 acre (*400 x 100 feet)*
___year round
___seasonal

C. Site drainage

1. **Site runoff is directly to…**

___lake ___stream ___ditch ___ catch basin ___vegetated buffer ___wetland other *(describe)*_____

2. **Site runoff from…**

Construction Sites

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see:
___Exposed soil and erosion.
___Alteration to drainage pathways or alteration near waterbodies or wetlands.
___Absence or ___Failure of erosion controls, such as silt fences and hay bales.
___Evidence of erosion, such as gullies or rills on the surface of the soil.
___Cloudy or discolored water in ditches, streams, wetlands, or lake.
___Sediment build-up in ditches, streams, wetlands, or lake.
___Construction on overly steep slopes.

Describe most important issues found in the field in your narrative & on priority sheet and note on your maps.

Roads:

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see:
___Absence of vegetation or buffer between road and waterbody.
___Roads located on steep slopes.
___Street drains, storm sewers, and pipes that discharge directly to streams, lake, or wetland. **See Pipe Survey**
___Full or clogged catch basins? Full with *(circle)*: trash sand pet waste oil other_____
**Note problem catch basins on your map.*
___Damaged or eroded pipe or culvert outlets.
___Sediment buildup below pipe or along roadside.
___Washouts and crumbling pavement on roads and sidewalks.

Over

LAKE & POND **WATERSHED SURVEY** FORM – **UPLAND WATERSHED AREA**

C. Site drainage

2. **Site runoff from…**

Roads: ***continued***

___Ditch, culvert, or pipe washouts, undercutting, or gullies and rills along sides and bottom of road or ditch.
___Exposed soil in ditch channel.
___Long ditches without discharge points into vegetated areas.
___Erosion around inlets and outlets of culverts.
___Washed out or damaged culvert

Describe most important issues found in the field in your narrative & on priority sheet and note on your maps.

Residential areas:

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see:
___Areas of bare soil.
___Turbid (cloudy) water.
___Evidence of erosion on driveways or other areas, such as gullies or rills on the surface of the soil, or sediment accumulation in ditches and streams.
___Bank instability—bare soil, slumping, or undercut banks.
___Removal of vegetation near shoreline, resulting in increased vulnerability to erosion.
___Absence of vegetation or vegetated buffer.
___Evidence of septic system problems— lawn with green patch, soggy or wet lawn, and/or sewage odor.
___Lush lawns.
___Pet waste.
___Improperly stored trash (e.g., trash barrels or dumpsters) or organic debris (grass clippings, leaves, compost) near a waterbody.

Describe most important issues found in the field in your narrative & on priority sheet and note on your maps.

Commercial, Industrial and Urban Areas:

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see:
___Street drains, storm sewers, and pipes that discharge directly to streams, lake, or wetland. **See Pipe Survey**
___Full or clogged catch basins? Full with *(circle)*: trash sand pet waste oil other_____
**Note problem catch basins on your map.*
___Damaged or eroded pipe or culvert outlets. ___Sediment buildup below pipe or along roadside.
___Eroded or undercut banks due to increased stormwater volumes and flows.
___Cloudy, discolored, or smelly water in ditches,
___Green scum, oily sheen, or floatables on water.
___Absence of vegetation or vegetated buffer near waterbody.
___Altered and paved areas near waterbodies.
___Trash, vehicles, manure, or waste storage near waterbodies.
___Lush lawns.
___Pet waste problems.

Describe most important issues found in the field in your narrative & on priority sheet and note on your maps.

Agricultural:

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see: ___exposed soil ___lack of vegetated buffer between fields and water body
___livestock in waterbody ___ manure storage area not enclosed

Logging / Forestry:

Is there a direct pathway for runoff to reach the lake, streams or wetlands?_____
Do you see: ___exposed soil ___eroding roads/trails ___clear-cut near waterbody/wetlands
___evidence of erosion at stream crossings ___turbid (cloudy) water in stream
___brush/slash near waterbodies

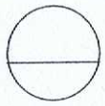
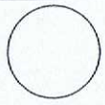
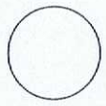
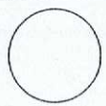
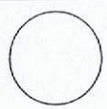
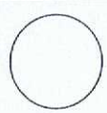
End of Upland Watershed Area Field Sheets: go to Pipe, Narrative, Priority & Map Pages

Lake Watershed Survey of _____ Watershed

Survey Section Name & Number_____ Date: _____ Names of observers: _____

Weather today: _____ Weather over past 48-72 hours: _____

PIPES

Pipe#	Time	**Pipe material and condition**	**Pipe size & amount of flow**	**Is pipe a storm drain ?**	**Color/ Odor of Flow**	**Algae below pipe?** Yes No Describe extent	**Sediment below pipe**	**Comments? If pipe should be rechecked-describe location**
Sample #1	9:33 AM	Concrete in good shape	 Constant Moderate Flow 1' diameter	Yes	Red-brown / fetid	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
								
								
								
								
								

Lawns

Tally of lush lawns in your surveys section _____

Roof runoff

Tally of homes with roof drainage to pavement or other impervious surfaces _____

Lake Watershed Survey
Area Summary Sheet 1: Narrative

Date:_____ Survey Section :_____

Surveyors:_____

Today's weather:_____

Weather over past 24-48 hours:_____

These sheets are designed to (1) give the "big picture" of your area, and (2) describe the problems you have seen that could contribute to impaired water quality in the waterbodies of your watershed. The problems you have seen should be marked on your map (A, B, C, D) and described here. Identify the source of the problem whenever possible. This information provides the basis of the narrative description in your Lake or Pond Watershed Survey Report.

NARRATIVE DESCRIPTION

Sample.
We surveyed the south side of the pond from Oak to John Street. **(A)** There is a small stream, (about 1.5 feet across and 0.5 inches deep) that comes in just east of 3 Oak Street. The stream has a deep tea color but does not smell or have any algae. The bottom of the lake in this area is covered with decaying leaves/muck. This area also has woods coming up to the pond edge- a really well established vegetated buffer and lots of songbirds. **(B)** From 3 to 17 Oak Street, people's lawns come up to the edge of the water-no buffer. Some dumping of yard wastes close to the shoreline.

(C) Lots of illegal dumping- at the end of the maintenance access road for Rte. 13 (mostly construction type stuff)! There are 3 large erosion gullies beneath the pipes sticking out of the embankment (from the storm drains on the highway), and there is a large delta of sand forming in the water beneath the embankment. Smells like gasoline and there was a sheen in the water trapped by the tires. This area could be cleaned up and it would make a great boat ramp area. Plant a few trees and it would be a nice place to sit-the view is nice. Can we get permission from Mass Highway to do clean up work near Rte. 13?

(D) There is a thick coating of duckweed along the edge of "Ball Park Cove" and the rest of the cove is thick with milfoil, (a neighbor says it is milfoil-we are not sure). The storm drain across from a new subdivision, (intersection of Oak and John Streets), is clogged with dirt from the construction site.

Describe your area:

MAPPING PAGE

Survey area:_____

Surveyors:_____

Date:_____ Weather today:_____ Weather past 48 hours:_____

Draw a birds-eye view of your problem site, showing vegetation types and canopy along the streambank or shoreline, land uses, and other features. Include any details such as pipes, drainage ditches, or connections to wetlands or tributaries. Add assets such as habitat, recreation, and open space. If there is enough room write a brief description next to the problems found on site. If you need more room, label the problems A,B, C, on the map and describe these problems on the Narrative Summary Sheet. Be sure to include the following information : (1) where you have taken photos --use arrow showing direction, include photo number, (2) Mark problems, assets, and photo numbers on topographic map of your area.

Lake Watershed Survey
Area Summary Sheet 2: Priorities for Action

Surveyor's Names:_____
Section Name & Number:_____

Look back at your data sheets and include your observations. The information from this sheet will be used to develop the Watershed Survey Report and Action Plan.

PROBLEMS: Problems found in your area, such as pipes or culverts discharging in dry weather, erosion, runoff, trash, dense algae, water quality problems (odor, color, oil, foam, sewage), and degraded wetlands (phragmites, loosestrife) *(Describe and give location).*	ASSETS: Assets found in your area, such as good habitat, wildlife species, businesses, or landowners using the river (in a friendly way), recreational access (canoe, trails, parks), potential recreational access, and potential park/conservation land, scenic views *(Describe and give location).*	PRIORITIES FOR ACTION: List items from problems/assets columns that you feel need more work.
1.	1.	1.
2.	2.	2.

Based on sheets provided by the Massachusetts Riverways Programs/DFWELE