

**SHORELINE
SURVEY
REPORT
&
ACTION
PLAN**



Housatonic River

**Lake Lillinonah and Lake Zoar Stream Team
Summer 2002**



Housatonic Valley Association

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LAKE LILLINONAH AND LAKE ZOAR STREAM TEAM REPORT

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Cover photos: From top: Driftwood problem, section 5W, photo by Connie and Michael Kersten. Joanne and Shauna Barry, section 10E, photo by Erin Bertrand. Clear cutting and runoff problems, section 5W, photo by Connie and Michael Kersten. Sean Garrett with aquatic vegetation, section 2W, photo by Bill and Christine Garrett.

I. Introduction: The Lake Lillinonah Stream Team

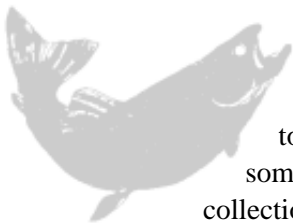
After 25 years of federal, state and local action under the Clean Water Act of 1973, most of the obvious industrial discharges directly into our waterways have been brought under control and the long process of removing contaminated soils from the banks and bottoms of our rivers is well underway. However, many of the rivers and streams tested in New England are still not safe to swim in, and their fish are not safe to eat.

After years of public education and research into water quality issues, we now see more clearly that, in addition to industrial contamination, what each of us does in our daily lives can also affect the quality of the water that supports our communities. In the Housatonic watershed, except for the presence of PCBs, most remaining water pollution problems do not come from easily traceable “point sources” that drain out of the end of a pipe directly into a waterway. Today’s pollution is more likely to come from less precisely located “nonpoint sources,” such as storm water runoff from streets and parking lots, fertilizer and pesticide impacts, failed septic systems, soil erosion from construction sites and stream banks and seepage from abandoned dumps and landfills.

These problems need creative solutions. Today, the focus is on empowering community leaders and concerned citizens to play a larger, proactive role in identifying problems and shaping solutions. State agencies and regional environmental groups are helping communities find answers that make sense. To do this, we must have good local information on the quantity and quality of water flowing through our neighborhoods, and we need to understand the who, what, when and where of pollution that comes from our everyday decisions and actions.

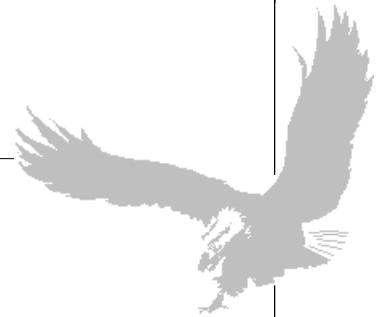
The Lake Lillinonah and Lake Zoar Stream Team is one of the many stream teams being formed by the Housatonic Valley Association (HVA) throughout the Housatonic watershed. This project is funded by the Carolyn Foundation, the Waterbury Foundation, the Ellen Knowles Harcourt Foundation, the Meserve Memorial Fund, and the NewMil Bank Foundation as well as HVA members and other donors.

To date, the Lake Lillinonah and Lake Zoar Stream Team has inventoried the shoreline of the main stem of the Housatonic River from the Bleachery Dam in New Milford to the Stevenson Dam in Oxford. Several areas have been identified for further protection or establishment of educational programs, and other areas have problems that need to be addressed. Team members are prioritizing the importance of these projects, and some volunteers may choose training for further studies including macroinvertebrate collection and water quality monitoring.



Members of the Lake Lillinonah and Lake Zoar Stream Team were trained and advised by HVA staff members and expert volunteers who provided technical guidance and will assist in the analysis and interpretation of stream team findings. Through this project, Stream Team volunteers, neighborhood and community leaders, environmental professionals, the Housatonic Valley Association and its staff, seek to learn together how, in the decades ahead, we may work, build, farm and expand our communities without damaging the clean water and other natural resources that keep our communities strong and healthy and comprise the natural world which sustains us.

II. Descriptions and Summary of Findings for Stream Sections



Section 1E: Bleachery Dam to Lover’s Leap Bridge, eastern shore

Surveyors: Chris Kukk, Elly Kukk, John Cole, Danielle Cole

Distance: 1.9 miles

Tributaries: None

Access Points: Addis Park, Bleachery Dam

Description: The river flows slowly through this section, which is quite wide in some areas. The east bank was eroded in several spots due to clear cutting and probably runoff from Grove Street, which runs parallel to the entire length of section 1E. There were several homes and a park in this section, as well as areas of dense vegetation and forest. There were many trees leaning into the river and a good deal of the bank was shaded. There were herons, geese, and swallows present. There was also a good deal of purple loosestrife along the bank as well as some areas of trash that will require cleanup. The Bleachery Dam and Addis Park provide good access to the river. There was a great deal of recreational use on this section of the river.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Good habitat areas in many sections. ● Addis Park is well used for recreation. ● Bleachery Dam had a well used boat dock, ramp, and good fishing across from the dock. 	<ul style="list-style-type: none"> ● Undercut banks. ● Areas of significant trash. ● Pipes behind houses with unclear purposes. ● Clear cutting in a few locations. ● Possible significantly polluted runoff from Grove Street. ● Purple loosestrife in many areas. 	<ul style="list-style-type: none"> ● Check pipes after rainfall for water flow. ● Check patterns and contents of runoff from Grove Street and train overpass and bridge after rain. ● Investigate nature of pipes that come from house, something seems wrong. ● Look into establishing another access point off of Hine Hill Road as it intersects Grove Street. ● Control spread of purple loosestrife.

Section 1W: Bleachery Dam to Lover’s Leap Bridge, western bank


Surveyors: Bob Rush and Percy Preston

Distance: 1.9 miles

Tributaries: Still River

Access Points: Addis Park, Bleachery Dam

Description: The water flowed about five inches over the Bleachery Dam. The river here is characterized by a very rocky shore with beautiful tree roots wrapped around the rocks, providing plenty of bank shade. The shore soon became an overgrown floodplain by the Kimberly Clark water treatment station. The bank then gets steeper and more wooded as you approach the Still River. The west side of the river has a mostly gravel bottom while the east side’s bottom is comprised of mud and silt. There was very little litter along the way. This area is frequently used by boaters, rowing, motor, and fishing, as well as jet skis and canoes and kayaks. For some time, this section parallels the railroad tracks. There were several culverts along the river as well as several pipes coming from residential areas. Purple loosestrife is prevalent in this section.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Steep, wooded banks, shaded for habitat. ● People using river for boating, camping, fishing, playing horse shoes on bank. ● Habitat for beavers. 	<ul style="list-style-type: none"> ● Pipes draining into river. Pipe 1, near the beginning of the section, is old and should be checked. ● Pipe 2, from the Kimberly Clark parking lot, possible polluted runoff. ● Pipe 4, from a residential home, possible polluted runoff. 	<ul style="list-style-type: none"> ● Section in good condition overall. ● Check into pipes, polluted runoff prevention.

Section 2E: Lover's Leap Bridge to Bridgewater Town Park, eastern shore

Surveyors: Barbara Gomez

Distance: 1.7 miles

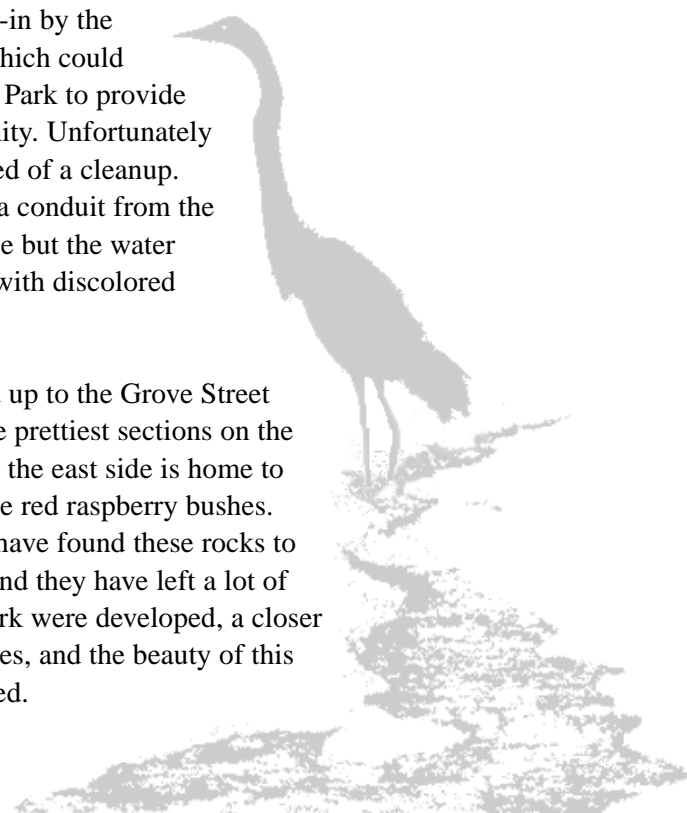
Tributaries: Town Farm Brook, Clapboard Oak Brook

Access Points: Bridgewater Town Park

Description: The river was running slowly at about one-and-one-half feet below the high water mark. The put-in was at Bridgewater Town Park. There was park land on one side and wetlands bordered by a private residence, which provided habitat for blue heron, swans, a few wood ducks and Canadian geese. Just north of this location there were a couple of pipes with no apparent discharge. The banks showed some erosion as conditions alternated between wooded and residential areas. One hose that entered the river looked like it might be used for irrigation of a private residence (again no sign of discharge was evident). Watermilfoil clogged every inlet and pool along the way. Algae built up on top of the water milfoil and rocks in these shallow water areas.

Very few fish were seen by the shore south of the Henry Sanford Road/N. Lillinonah Lake Road junction. North of this location small fish were in abundance by the shoreline. Turtles appeared several times, sunning themselves on rocks and on dead, fallen trees. There is an informal put-in by the inlet off Lover's Leap Road South which could be improved as part of Lover's Leap Park to provide an educational/recreational opportunity. Unfortunately it is also one of the areas most in need of a cleanup. There was water coming in through a conduit from the Town Farm Brook which appears fine but the water below the inflow was foul smelling with discolored algae buildup and an oily sheen.

The area just north of this put-in and up to the Grove Street and Lovers Leap Bridge is one of the prettiest sections on the river. The sharp rise of rock cliffs on the east side is home to evergreens, wild flowers and just-ripe red raspberry bushes. Unfortunately, a few daring anglers have found these rocks to be the perfect place to set up camp and they have left a lot of trash behind. If this Lover's Leap Park were developed, a closer watch could be kept on these activities, and the beauty of this natural place could be better protected.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Good access for boating from Bridgewater Town Park. ● Wetlands and other areas in the section provide great habitat for geese, ducks, heron. ● Lover's Leap Road put-in is great location, not designated as residents only. 	<ul style="list-style-type: none"> ● Most inlets and pools are clogged by water milfoil all along the section. ● Scum, trash, and water milfoil soil Town Farm Brook Inlet. ● Various areas with significant trash. 	<ul style="list-style-type: none"> ● Clean up water milfoil. ● Clean up Town Farm Brook Inlet. ● Make Lover's Leap Road put-in more formal, including the improvement of park land and access road for educational and recreational activities.

Section 2W: Lover's Leap Bridge to Bridgewater Town Park, western shore

Surveyors: William, Christine, and Sean Garrett


Distance: 1.5 miles

Tributaries: None

Access Points: Bridgewater Town Park

Description: We entered at Bridgewater Town Beach, which is on the east bank of the river, and crossed over to our segment, which extended down to Lover's Leap. The bank on this segment is densely wooded with lots of shade provided by overhanging trees. There was no fishy odor, foam, scum, or oily sheen in the water. We did encounter a few spots of hydrilla. There were also two spots along the bank where we noted purple loosestrife. We saw virtually no garbage, only two soda bottles, foam from a dock, and an old wooden dock under the trees. The west side appeared very clean and quite beautiful. We saw a canoeist and also a motor boat with a skier along the way. We did see a blue heron, but it flew away before we could snap a close picture. The west bank appears to be fairly undisturbed and undeveloped, which perhaps explains why it is so clean and beautiful.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Canoe, kayak, and motor boat recreation. ● Good access provided by Bridgewater Town Park. ● Plentiful bird habitat. ● Undeveloped forestland, steep banks. ● Shaded banks for a variety of habitat. 	<ul style="list-style-type: none"> ● Two places of dense hydrilla blooms. ● Purple loosestrife along banks. 	<ul style="list-style-type: none"> ● Manage hydrilla problems. ● Control spread of purple loosestrife. 

Section 3E: Bridgewater Town Park to Hop Brook Inlet, eastern shore

Surveyors: Joe Luzzi and Jerry Rekart

Distance: 3 miles

Tributaries: Hitchcock Mill Brook

Access Points: Bridgewater Town Park

Description: This area was primarily virgin forest on very hilly topography. There were only three areas of housing development. The water flowed slightly through this section. We noted no pipes, dumpings, significant garbage, or significant runoff. The water visibility was up to six feet along some of the shoreline, with occasionally less in some coves and inlets. Algae was sparsely evident (2 percent) in the area and only a few spots of aquatic vegetation were noted. In this area, we noted signs of deer as well as kingfishers and herons. There was heavy fish activity, as they were responding to morning hatches. The homes that we encountered along the river had expansive lawns, coming right down to the water's edge. There was a lack of vegetative buffer zones here. The area was beautiful, as was the weather. We ended up spending most of the day picking up trash.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Well shaded banks provide good, varied habitat. ● Dense forest on majority of banks, as undeveloped land. ● Much fish activity. ● Wildlife habitat including deer, kingfisher, heron. 	<ul style="list-style-type: none"> ● Houses and residential areas with lawns right to water's edge, no vegetative buffer zone. 	<ul style="list-style-type: none"> ● Homeowner education as well as town regulations to plant vegetative buffer zones, thereby prevent polluted runoff, erosion, etc.

Section 3W: Bridgewater Town Beach to Hop Brook Inlet, western shore

Surveyors: Edward G. and Edward W. Lasch

Distance: 3.1 miles

Tributaries: None

Access Points: Bridgewater Town Park



Description: We found no pipes, houses, riverfront property, or river access on this section. It is surrounded by very rugged and densely forested land. This is perhaps the reason why trash collected along this section of the river, as there was an abundance of it. There were not many people on the water this day, as the weather was not good, but many recreational opportunities, such as canoeing, fishing, and kayaking exist.

We did encounter several invasive species, such as purple loosestrife and burning bush. Trash is a serious problem on this section, as we found tires, shoes, garbage cans, and pieces of docks in numerous places. There were also several downed trees in the water.

We also saw a number of birds, including herons and seagulls. The water was tea-colored, with a brown bottom comprised mainly of silt, and had a musky odor to it.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Good recreational opportunities, for fishing, motor boating, canoeing, kayaking. ● Provides good habitat for several bird species, including herons, and others. ● Shaded banks provide good habitat on shoreline and at waterline. 	<ul style="list-style-type: none"> ● Much trash on shoreline, so cleanup is needed, but may be difficult due to the rugged, forested, shoreline terrain. 	<ul style="list-style-type: none"> ● Clean up noted areas, most likely by boat, as there is limited pedestrian access.

Section 4E: Hop Brook Inlet to Route 133 Bridge, eastern shore

Surveyors: Cathy Setterlin, Susan Rush



Distance: 2.4 miles

Tributaries: Two unnamed streams

Access Points:

Description: This was a relatively problem-free area with lovely woods that included many hardwoods, beech, birch, maple and oak, as well as hemlocks. There were also a few invasive species among these woods. The development in the area is modest in number, but not in size, as the houses are quite large.

The lake bottom in this section is comprised of mainly cobbles, but also some sand and organic debris. The color of the bottom is brown, but the water has a green tint to it, and is cloudy in many areas. Most of the banks are shaded, providing good habitat for any number of species. There were two pipes off the Route 133 Bridge as well as a number of drains. In one area, there was significant dumping of construction materials by a new home.

All in all, this section is quite beautiful, but the water seemed horribly green. Bridgewater clearly has stricter regulations for development than does its opposite shore counterpart, Brookfield. This is evident in examining the vegetative buffer zones, which are better in Bridgewater on a whole, and close to nonexistent in Brookfield.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Healthy woodland habitat. ● Construction to the north, six new large houses, each of which had large lots, and most of which had good vegetative buffer zones along the water, only one lawn went to the water. ● Good recreational value, fishing (near Route 133 Bridge, can walk down to water and fish) . 	<ul style="list-style-type: none"> ● A little erosion, some trash, floating logs as hazards. ● Pile of construction debris found in Bridgewater. ● Questionable water quality, as it was green and milky/cloudy. ● Erosion from numerous poorly kept footpaths by Route 133 Bridge. 	<ul style="list-style-type: none"> ● Testing and improvement of water quality, establish testing programs to find sources and nature of problem. ● Work to maintain laws to mandate vegetative buffer zone as development continues.

Section 4W: Hop Brook Inlet to Route 133 Bridge, western shore

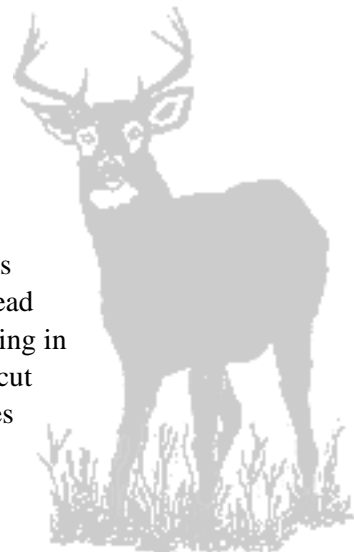
Surveyors: Rachel Goodkind, Jim Novak


Distance: 2.4 miles

Tributaries: Hop Brook, Merwin Brook

Access Points:

Description: Section 4W begins at the Hop Brook inlet, by Cove Road. The water in the cove was cloudy and mucky compared to the water in the main stem of the lake. There was one pipe in the cove from which an offensive odor seemed to radiate. There were several houses with lawns leading into the cove, a nice protected area. The shoreline outside of the cove is mainly woods and tree-lined, with a handful of houses. One dead fish was found in the water here. There were several logs floating in the water along the shoreline. In some areas, there were undercut banks and severe erosion. There were also stands of phragmites and purple loosestrife throughout the section.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Good amount of undeveloped forest area on route. ● Canoeing, kayaking, water skiing and tubing for recreation. 	<ul style="list-style-type: none"> ● Foul odor near pipe. ● Excess tree limbs along shoreline. ● Erosion of bank in some areas. ● Poorly buffered clear-cut lawns. 	<ul style="list-style-type: none"> ● Determine and correct cause of odor from pipe. ● Control shoreline erosion, possibly with rock placement along shore. ● Homeowner education and application of town regulations to curb clear-cutting of lawns and to encourage vegetative buffer zones.

Section 5E: Rt 133 Bridge to Shepaug River Inflow, eastern shore

Surveyors: Tim and Anne Mygatt

Distance: 2.3 miles

Tributaries: Wewaka Brook

Access Points: Rt. 133 Bridge

Description: After the State Boat Launch at Rt. 133 the river is surrounded almost completely by undisturbed forest. There is a 36- to 40-inch culvert pipe under Rt. 133 with no flow. It carries a stream under the road and into the river. There is one private home and dock with a pipe which is used to take water from the river. The shores have many downed trees along the bank. The only overhanging foliage is between the bridge and launch site. Elsewhere, the shores are covered with oak, maple, black birch, locust, dogwood and hemlock trees. There are two infrequently used camp grounds, one of which is a beautiful spot at the junction of the Shepaug and Housatonic, suitable for camping and swimming.

The largest potential pollution sources are the approximately thirty six-inch pipes along the Rt. 133 Bridge and two larger 12-inch pipes at the spot where the bridge meets the eastern shore. Run off from the road empties directly into the river. There is overhanging foliage from the bridge to the launch site. There is also a lot of garbage, plastic bags, and plastic bottles strewn around the launch site, under the bridge and along the river banks on both sides of the site at Rt. 133. There is no garbage can available at the launch site, which is heavily used.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Campsites at some areas, near end of section and one in middle. ● Much undisturbed forest with good habitat areas. 	<ul style="list-style-type: none"> ● Polluted runoff from the Route 133 Bridge. ● Trash at launch site, near Route 133 Bridge. ● Possible illegal drawing of water from river by residential area. 	<ul style="list-style-type: none"> ● Address bridge runoff with DOT or others. ● Conduct cleanup of trash on launch site. ● Determine if the camping spots in this section are on public lands with designated campsites or if campers are using unauthorized areas or trespassing on private property.

Section 5W: Route 133 Bridge to Shepaug River Inflow, western shore

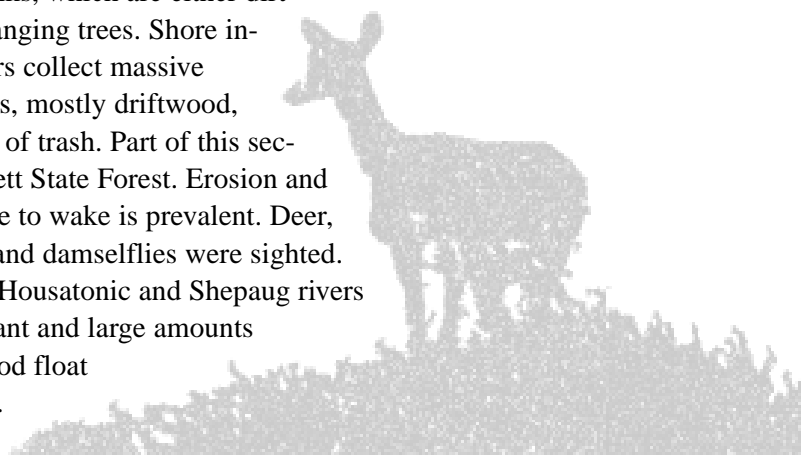
Surveyors: Michael and Connie Kersten



Distance: 2.4 miles

Tributaries: Fred Beer's Brook, Dingle Brook

Access Points:

Description: The Housatonic River in Section 5W is wide and affords many opportunities for various water sports. Only one-third of the western shore is developed with homes and lawns, concrete walls, docks, parks and landings. The majority is woodland down to the riverbanks, which are either dirt or rock cliffs with overhanging trees. Shore indentations and backwaters collect massive amounts of organic debris, mostly driftwood, as well as small amounts of trash. Part of this section borders the Paugussett State Forest. Erosion and undercutting of banks due to wake is prevalent. Deer, heron, bass, dragonflies and damselflies were sighted. At the confluence of the Housatonic and Shepaug rivers the water becomes stagnant and large amounts of organic debris and wood float in the middle of the river.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Boat landings available at the Route 133 Bridge on the east shore (port-a-potty present), Pond Cove, and Lake Lillinonah Park (Newtown residents only.) ● Marked hiking trail. ● Town Park (Brookfield) with floating raft and roped-off swimming area, sand beach, picnic area, play area, port-a-potty, trash receptacles. (Birthday celebration held that afternoon). ● Lake Lillinonah Park (Newtown) is a members-only park with landing and dock, picnic area, trash receptacles and port-a-potty. ● River is wide enough for water skiing, pleasure boating and fishing, and free of aquatic plant pests. 	<ul style="list-style-type: none"> ● Large amounts of driftwood interfere with access to the water from the shore. Floating debris could be a hazard to water skiing and boating. ● Trash collects in the backwaters. Only one sign of illegal dumping was spotted from our canoe – a used gas container from someone’s grill. ● Invasive species seen below brook inlet south of Route 133 Bridge.  <p style="text-align: center;">Debris near the shore</p>	<ul style="list-style-type: none"> ● Clean up of trash and debris. ● Floating debris could be hazardous. Contact FERC and Northeast Generation Services regarding actions to remedy the problem ● Invasive species (phragmites, loosestrife) found below brook inlet south of Route 133 Bridge. ● Developed areas along shore range from clearcut lawn areas to well-planned plantings and shore walls. Information to shore landowners on their role in river conservation and prevention of erosion/pollution would help maintain the shore.
		<p style="text-align: center;">Invasive species</p>

Section Maps 1, 2 and 3

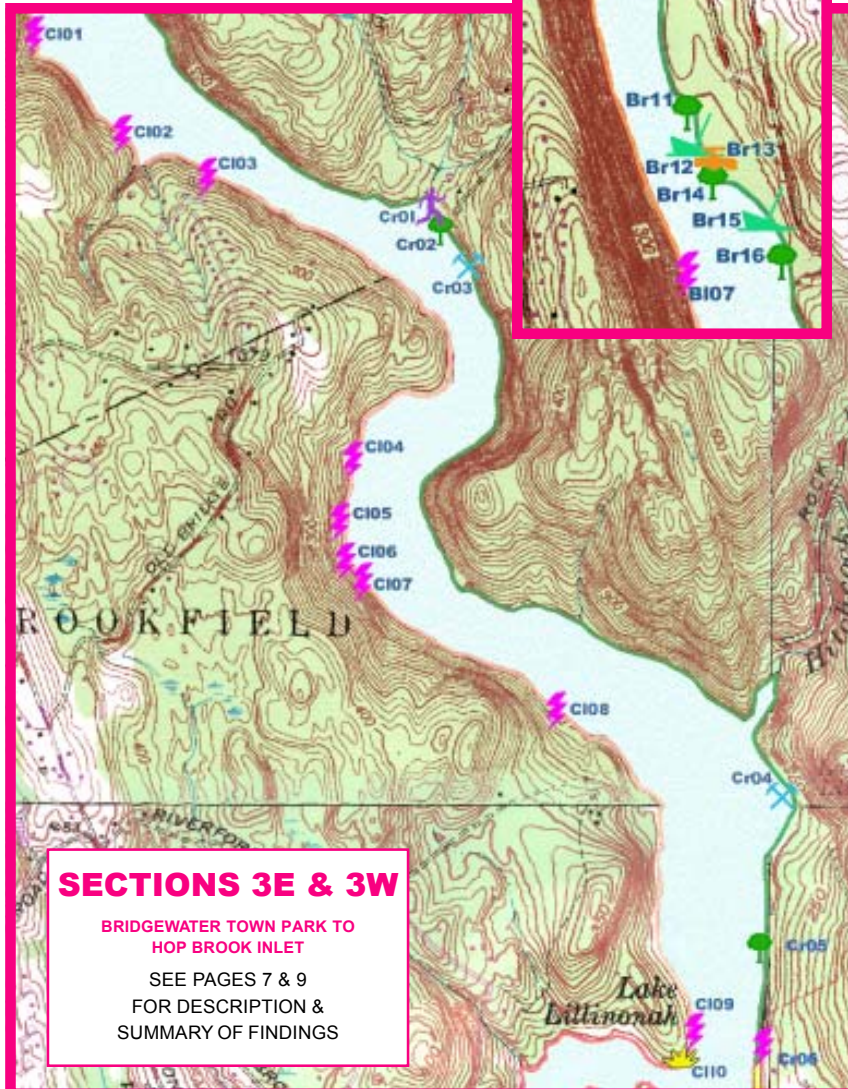


SECTIONS 1E & 1W

BLEACHERY DAM TO
LOVER'S LEAP BRIDGE
SEE PAGES 3 & 4
FOR DESCRIPTION &
SUMMARY OF FINDINGS

SECTIONS 2E & 2W

LOVER'S LEAP BRIDGE TO
BRIDGEWATER TOWN PARK
SEE PAGES 5 & 7
FOR DESCRIPTION &
SUMMARY OF FINDINGS











SECTIONS 3E & 3W

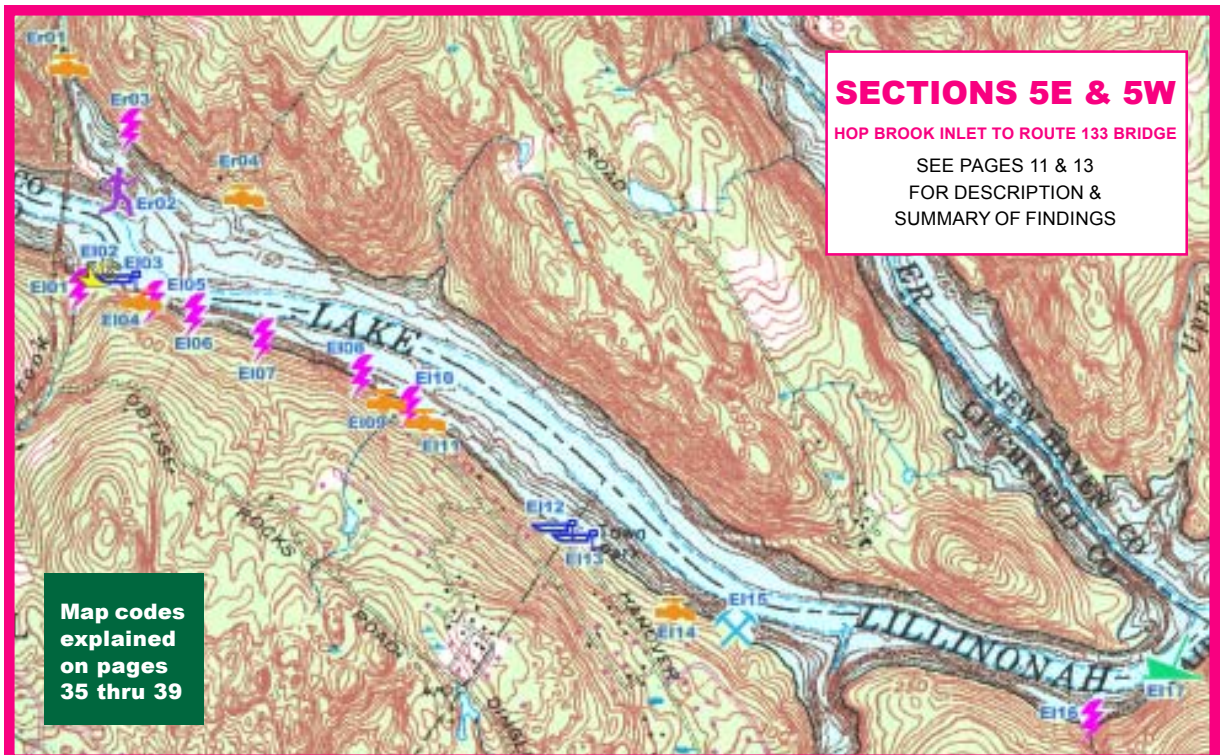
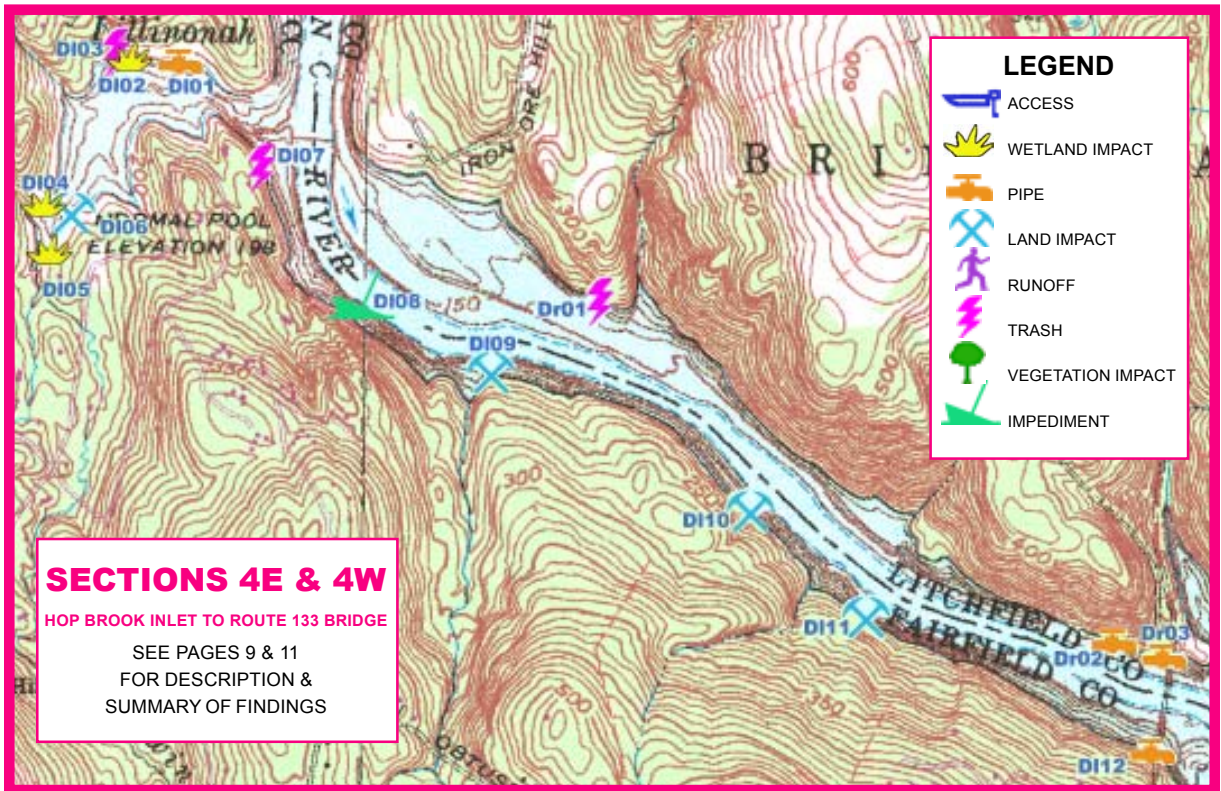
BRIDGEWATER TOWN PARK TO
HOP BROOK INLET
SEE PAGES 7 & 9
FOR DESCRIPTION &
SUMMARY OF FINDINGS

Map codes
explained
on pages
35 thru 39

LEGEND

-  ACCESS
-  WETLAND IMPACT
-  PIPE
-  LAND IMPACT
-  RUNOFF
-  TRASH
-  VEGETATION IMPACT
-  IMPEDIMENT

Section Maps 4 and 5



Section 6: Shepaug River Inflow to Shepaug Dam, both shores

Surveyors: Amy Cox and Aaron Cox

Distance: 2.4 miles

Tributaries: Shepaug River, Purchase Brook, Cavanaugh Brook

Access Points:

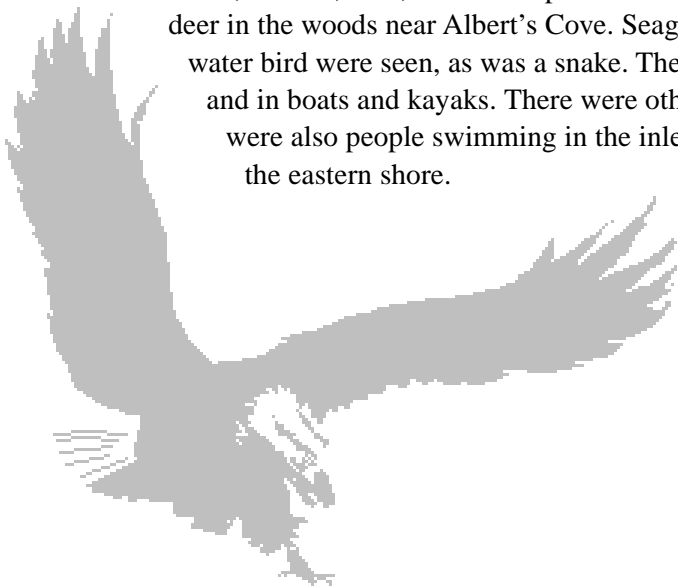
Description: The first day of surveying was 24 to 48 hours after a thunderstorm and the water level was elevated. It was 1.5 feet lower the second day.

The shoreline in this entire section is largely wooded state and private land. Human impact to the shoreline is limited to footpaths, two cleared beaches, and about a half dozen or so campsites. Some invasive species were found at the Albert's Cove area, including a good deal of purple loosestrife.

The bottom of the river was not visible in most places, as it is very deep. Immediately adjacent to the shoreline, the bottom ranged from larger rocks to sand. There were a few small silty, muddy areas in the coves. There are large patches of water milfoil scattered throughout the area.

The most notable negative features were floating garbage and tree debris. This was particularly noticeable in the back corner, southwest, in Albert's Cove and the eastern end of the dam. There were trees and lesser trash in every inlet of the shoreline. The first day, when the water was higher, there were logs and lumber floating in the middle of the lake as well.

Catfish, sunfish, bass, and other species of fish were seen. We heard a turkey and deer in the woods near Albert's Cove. Seagulls, heron, and a third species of water bird were seen, as was a snake. There were fishermen along the shore and in boats and kayaks. There were other boats and water skiers. There were also people swimming in the inlet south of the Shepaug inflow on the eastern shore.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Lots of recreational uses, from swimming to fishing to water skiing. ● Largely wooded and undeveloped shoreline and shaded banks provide extensive habitat. 	<ul style="list-style-type: none"> ● Trash in Albert's cove. ● Invasive species in Albert's Cove. ● Water milfoil throughout the section. ● Trash near eastern end of dam. ● Two washed-up boat docks. ● Trees and lumber floating along shoreline. 	<ul style="list-style-type: none"> ● Organize trash cleanup on eastern end of dam as well as Albert's Cove. ● Control of invasive species populations. ● Investigate removal of trees and logs in water, coordinate with Northeast Generation Services and stay informed about project relicensing with FERC. ● Determine if the camping spots in this section are on public lands with designated campsites or if campers are using unauthorized areas or trespassing on private land.

Section 7E: Shepaug Dam to Glen Road Bridge, eastern shore

Surveyors: Barbara Richards, Amy Richards

Distance: 2.3 miles




Tributaries: Little Pootatuck Brook

Access Points: River Road

Description: Segment 1: Grounds of Shepaug Dam. We got through this section before the water release so it was a gentle, meandering flow. The bank was mostly wooded and tree covered with various sized rocks at the water's edge. There were many types of aquatic vegetation present, including milfoil as well as a variety of pondweeds. We saw a few predatory birds overhead. Once we passed a gated fence, the road came closer to the river, and we observed evidence of erosion

Segment 2: River Road runs along river. By the time we reached this section, we began to feel the effects of the water release from the dam. The water level increased as did the rate of flow. The bank consisted of a short, steep slope very near to River Road. Vegetation was light and the bank is mostly open, with some areas of riprap and areas of significant erosion.

Segment 3: Wooded, steep bank between River Road and water. Water flow is still fairly rapid. We continued to observe an abundance of aquatic vegetation. A lot of waterfowl was observed here. There was also significant erosion on these banks.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Shepaug Dam Eagle Observatory during winter months, also picnic area, fishing, and canoe put-ins. ● Several private docks. ● No major trash problems in water. ● Lots of shade on bank, good habitat, good fishing.  <p data-bbox="155 1062 527 1094">Aquatic vegetation on paddle</p>	<ul style="list-style-type: none"> ● Erosion on some steep slopes, from runoff as well as wake from boats. ● Lots of aquatic vegetation through entire survey area, some invasive species. ● Trash problem on some areas of the bank.  <p data-bbox="1068 1276 1230 1308">Swan family</p>	<ul style="list-style-type: none"> ● Control of underwater vegetation. ● Control bank erosion with more extensive buffer zones, control erosion from boat wakes. ● Remove two large objects from water, boat motor between gated fence and beginning of driveway to dam, as well as a large metal object near Glen Road Bridge.
 <p data-bbox="954 1881 1203 1913">Exposed tree roots</p>		

Section 7W: Shepaug Dam to Glen Rd. Bridge, western shore

Surveyors: Tony Vengrove and Kate Besterman

Distance: 2.9 miles

Tributaries: Pootatuck River

Access Points:

Description: Section 7W has a diverse shoreline. The river flows slowly throughout. Since this section begins at the Shepaug Dam (and it was a dry period with little dam flow) the river starts out fairly shallow with a lot of small rock and boulders visible. As the river flows to the Glen Road Bridge, it gets deeper and more lake-like. Boating is heavy in these southern parts and the river is also used for general recreation (i.e. swimming, fishing and two rope swings). We saw many water skiers and jet skiers. There is also a water ski slalom course set up with buoys. Despite heavy recreational use, the river appears to be in good health. The water flows slowly, but it appears clean and we did not see any signs of oil or gas floating on the water.


This section starts with a lot of wooded, undeveloped shoreline. The middle of the section then becomes highly residential with many houses built close to the shoreline, nearly all having clearcut lawns right to the water's edge. Almost all have boat docks with some having boat ramps. The last part of this section becomes a little more wooded, but is comprised mostly of shrubs and smaller vegetation.

Most of the trees in the upper section are hardwood species but there were scattered mature hemlocks in various parts. There were also scattered ferns in sections where the trees provided shade. Moss was growing on the shoreline rocks and trees.

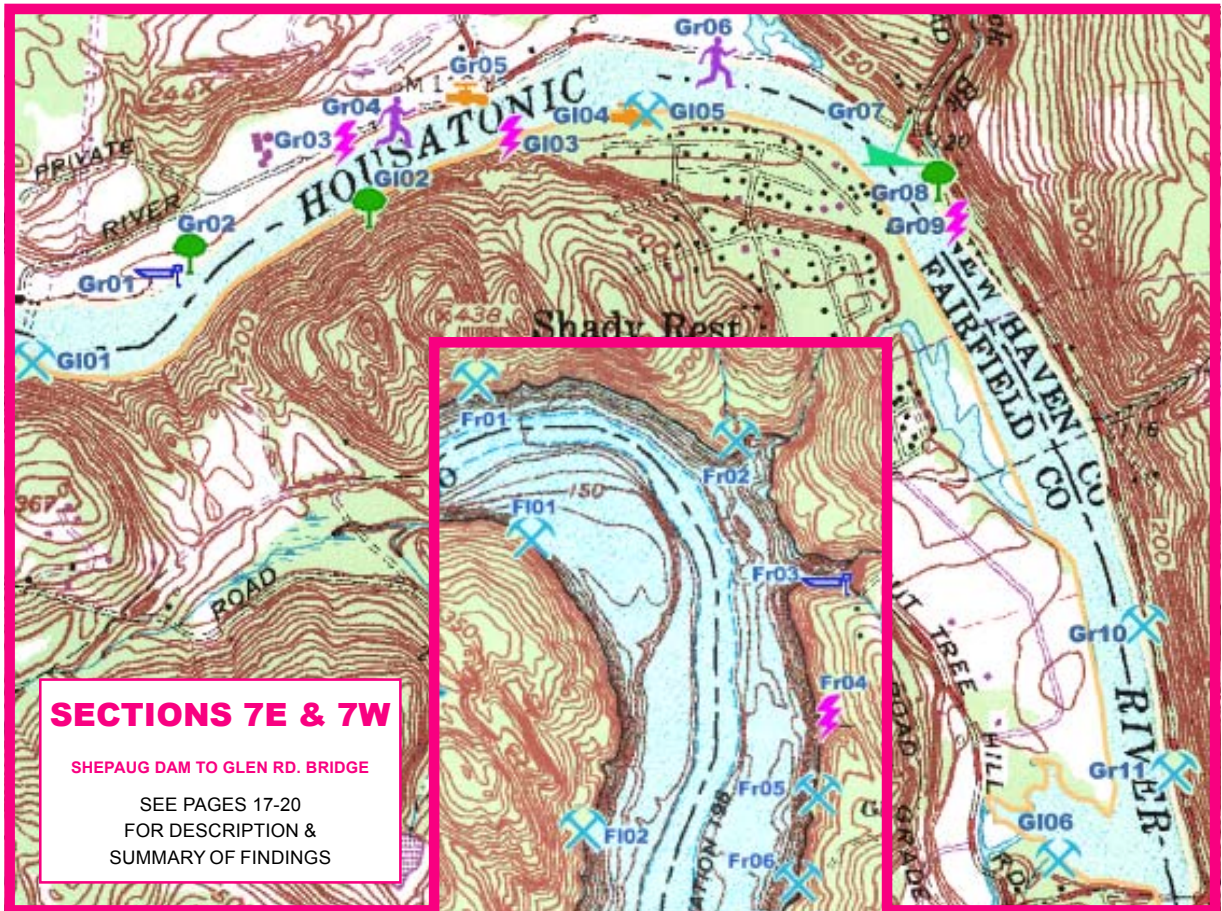
There were virtually no garbage or litter issues in this section. In some of the residential sections, some retaining walls showed signs of erosion. The retaining walls varied in construction, some were poured concrete while others were stonewall-like. There were several fallen trees along the shoreline, but not to the degree where immediate action is needed.

There were few pipes entering the water. Most seemed to be storm drains. We recommend that the residential sections be revisited once again during a time of the year and day when residents are not readily outside. We felt very uncomfortable getting up close to photograph and measure pipes at houses where residents were sitting on the docks. We got suspicious looks and felt uncomfortable proceeding and investigating further. One dock in particular appeared to have a two-inch PVC discharge pipe that drained directly into the water. It was not flowing and it is assumed to be a discharge pipe of some sort, but can't say what its purpose is.

There are no industrial uses on this stretch of the river, with the exception of the Shepaug Dam and a gas pipeline that crosses the river.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● In undeveloped sections, there is good natural habitat, wooded sections including trees that hang over the water, providing shade. ● Several scattered mature hemlocks should be protected. ● There is a beach area with a nice sandy beach and bottom and a buoyed swim area. This beach is only for residents in a private community. There is a covered picnic area with trashcans. ● There is a rope swing that is used by many people in a wooded area, with no trash issues. ● The river is calm and wide enough for boaters and water skiers. It seemed boaters were navigating safely. ● Despite clearcutting of most of the residential land, it appears landowners are respecting the river. 	<ul style="list-style-type: none"> ● South of dam, significant erosion is visible from the water. ● Just south of dam on a small island, purple loose-strife is abundant and spreading to shoreline. ● Further south, there was a lot of hydrilla growth. ● PVC discharge pipe at residential dock. ● The small inlet by the Glen Road Bridge has a very muddy and shallow bottom; could be a hazard to boaters. ● New construction with clearcutting and a steep grade, which might have erosion and runoff issues. ● Given all of the residential areas, the possibility of heavy lawn fertilizing exists, compounded by the lack of vegetated buffer zones. ● Several retaining walls in the residential areas looked like they were eroding. 	<ul style="list-style-type: none"> ● Have a team take a closer look at discharge pipes in the residential areas at a time when personnel would feel comfortable about approaching these areas. ● Consider a mailing to residents about the hazards of overfertilizing lawns with phosphorous-based fertilizers. If not already done, measure phosphorous levels in the lake. ● Investigate the necessity of increased signage for boaters at the natural gas pipeline. ● Investigate retaining walls in residential sections for significant erosion. Inform landowners of regulations regarding these. ● Determine if hydrilla growing along the shoreline needs to be addressed. Could impact boaters if it continues to spread out into the river.
		<p>Lawn cleared to retaining wall at the water's edge.</p>

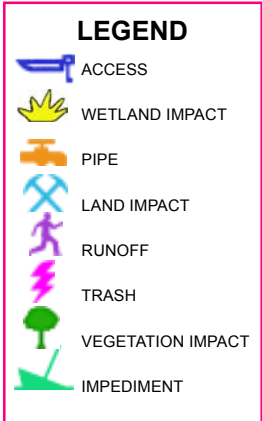
Section Maps 6 and 7



SECTIONS 7E & 7W
 SHEPAUG DAM TO GLEN RD. BRIDGE
 SEE PAGES 17-20
 FOR DESCRIPTION &
 SUMMARY OF FINDINGS

Map codes explained on pages 35 thru 39

SECTION 6
 SHEPAUG RIVER INFLOW TO SHEPAUG DAM
 SEE PAGE 16
 FOR DESCRIPTION &
 SUMMARY OF FINDINGS



Section 8E: Glen Road/River Road Bridge to Southbury Boat Launch, eastern shore

Surveyors: Ryan Bogan, Beth Mannion

Distance: 2.5 miles

Tributaries: Pomperaug River

Access Points:

Description: The Housatonic flows slowly through this section. About 50 percent is residential, with poorly maintained docks, crumbling concrete, stone walls, and some times nothing, dividing the banks and the back yards. Because the area is extremely hilly, with very steep yards, the possibility of intense runoff on rainy days exists.

The other 50 percent of this section is located directly on River Road, with nothing to protect the banks and the water quality from runoff from the road and the vehicles that drive on it. In some places, there was a fishy odor and several dead fish were found. The bank is well shaded here, providing good habitat. The bridges that the river flows under in this section contain numerous pipes, presumably carrying runoff directly from the road. There were some invasive species along this section including purple loosestrife, reed canary grass and phragmites. The wetlands in this section are degraded by pipes, trash, and the previously mentioned invasive species. We also noted an abundance of beavers. Four or five were spotted in two hours, as well as turtles, aquatic insects, and mallard ducks.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Some very well kept residential areas near I-84 Bridge. ● Landowners or recreationists using river for fishing. ● Moderate use by kayakers. ● Some good habitat including sandbars with small fish, beavers, and vegetation. 	<ul style="list-style-type: none"> ● Numerous pipes, from River Road Bridge as well as the I-84 Bridge. ● Pipes from residential areas, presumably lawn runoff. ● Runoff from steep residential areas as well as River Road. ● Invasive plants in wetlands, purple loosestrife, reed canary grass, and phragmites. ● Unmarked shallow and rocky areas for boaters, possibly dangerous. ● Clearcutting and unbuffered lawns. 	<ul style="list-style-type: none"> ● Hold cleanup of banks – trash and debris, including a lot of graffiti, tires, clothing, and lawn chairs. ● Look into preventing runoff from River Road. ● Work to eliminate pipes on I-84 and River Road Bridges. ● Mark off shallow and rocky areas for boater safety. ● Cleanup and improve Southbury Town Park.

Section 8W: Glen Road/River Road Bridge to Southbury Boat Launch, western shore

Surveyors: Ann Clark, Laurie Paivo, Taylor Clark-Paivo, Penny Buckman, Melissa Jones, Laurie Dale, Cindy Palkimas

Distance: 2.6 miles

Tributaries: Pole Bridge Brook

Access Points:




Description: This section starts at the steel bridge (Glen Road) that crosses Lake Zoar. The bridge has numerous runoff pipes. The shoreline is sandy at first with a quick drop of more than three feet. The area is residential with many runoff pipes, some from homes as well as from roads. There are two pipes that carry runoff from Pootatuck Mountain. The area is basically free of garbage with the exception of some sort of engine right at the old railroad bridge crossing. Some tires and rusted pipe were also seen.

Continuing down the river there is dense forest and very steep banks. The bank is comprised mainly of large rock. The water is deep. There are many ducks in this area. As we approach the I-84 Bridge there are a few residential homes high on the hill. There is clearcutting here, as well as dead trees and garbage. There is also extremely dense aquatic vegetation in this area. The I-84 bridge has runoff pipes.

Right after the I-84 bridge, there is residential property again. The houses are close to the water. Most homes have retaining walls and the water is deep. There are few pipes, mostly for runoff, from gutters. There is one runoff pipe from the road as well as one from I-84. There is some clearcutting. A sandbar and large amounts of silt have been accumulating at the bend in the river. Here, extremely dense aquatic vegetation and algae grow in the silt. There is a beach area as well.

After the beach area, the grade of the bank gets steep. There are still residential homes, but they are high off the water, with dense forest between. The bank is sandy with a quick drop of more than three feet. There are some dead trees. Some garbage was also seen. Section 8W ends with a stream that flows into the river.

Section 8W has many homes, but also forested area. It's used for swimming, boating of all types and fishing. Wildlife includes aquatic insects, snapping turtles, clams, geese, swans, beavers, and ducks. It even has an endangered species, the bald eagle. Fish include sunny, catfish, eels, trout, carp and bass. With the exception of the algae, the water in this section was clear with no odor. There is a problem with the silt buildup and aquatic vegetation as shown on the map. The silt buildup covers a large area around the state boat ramp. The water here is only about three-feet deep. The water is murky in this area because motor boats churn up and get stuck in the silt.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Much of the section is forested. ● It is suitable for swimming, boating of all types and fishing. ● Wildlife includes aquatic insects, snapping turtles, clams, geese, swans, beavers, and ducks as well as the bald eagle. ● Fish include sunny, catfish, eels, trout carp and bass. ● With exception of algae, water is clear and clean. 	<ul style="list-style-type: none"> ● Much polluted runoff from bridges, Glen Road as well as I-84. ● Silt buildup near boat ramp, shallow waters. ● Areas of dense, clogging vegetation. 	<ul style="list-style-type: none"> ● Look into actions to control silt near boat ramp. At least, place warning signs to boaters as the problem will only worsen. ● Control aquatic vegetation. ● Look into action against bridge runoff, possibly application of recent laws. <p>Motor dumped in lake</p>

Section 9E: Southbury Boat Launch to Kettletown State Park Beach Area, eastern shore

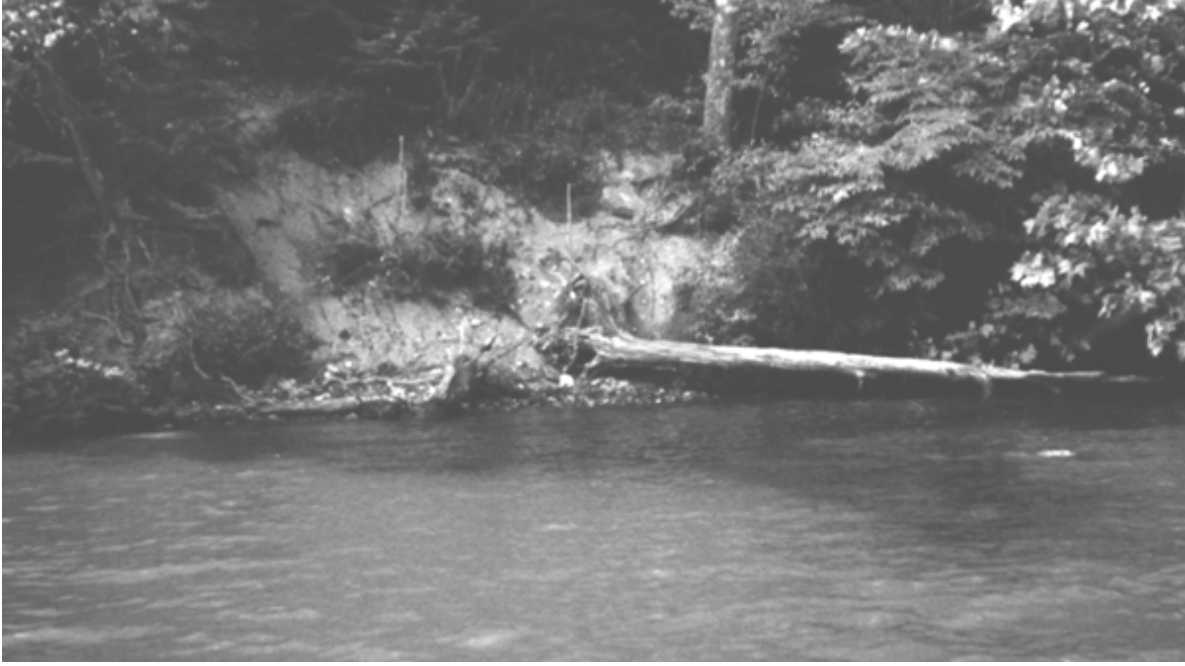
Surveyors: Fredrick Dielman, Walter Johnson

Distance: 2.5 miles

Tributaries: Lee Brook, Kettletown Brook

Access Points: Southbury Boat Launch

Description: Access from the Southbury Boat Launch and at Kettletown State Park. This is a flatwater paddle, half of which is along developed areas and the other half beside a mostly wooded shoreline. The lake is wide and affords many opportunities for motorized and nonmotorized water sports. The undeveloped shore is wooded down to the riverbanks, which are either dirt or rock outcrops with overhanging trees. The lake bottom is sandy, and the water is clear and odorless. Herons were observed along the shoreline.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● The area is easily accessible for boating, fishing, and hiking. ● The Pomperaug Trail and a network of other hiking-only trails, managed and maintained by the volunteers of the Connecticut Forest and Park Association, traverse Kettletown State Park. The Pomperaug Trail is a link in the Housatonic RiverBelt Greenway. 	<ul style="list-style-type: none"> ● Two pipes were noted in the residential area just south of the Southbury Boat Launch. No discharge was noted at either location. ● An area of hydrilla, an invasive aquatic plant, was observed in the cove at Lakeside. An area of purple loosestrife, an invasive wetland plant, was noted a few hundred yards north of the northern boundary of Kettletown State Park. ● Erosion was noted just south of the last residential lot before Kettletown State Park. 	<ul style="list-style-type: none"> ● No priority actions.
<p data-bbox="289 1213 457 1243">Eroded Bank</p> 		

**Section 9W: Southbury Boat Launch to Kettletown State Park Beach Area,
western shore**

Surveyors: Ann Clark, Taylor Clark-Paivo, Laurie Dale, Laurie Paivo, Penny Buckman and Melissa Jones

Distance: 2.3 miles

Tributaries: Two unnamed streams

Access Points: Southbury Boat Launch

Description: This section starts at a stream that flows into Lake Zoar. This is the area directly across the river from the state boat launch. It is at this bend of the river where another sand bar is located. The start of the section is residential and then becomes Paugusset State Forest property at the end across from Kettletown State Park.

The water is deeper on this shore than by the boat launch. It starts off fairly shallow, but then drops to more than three-feet deep. The water is clear and odorless with the exception of areas with numerous dead fish, which have a fishy smell.

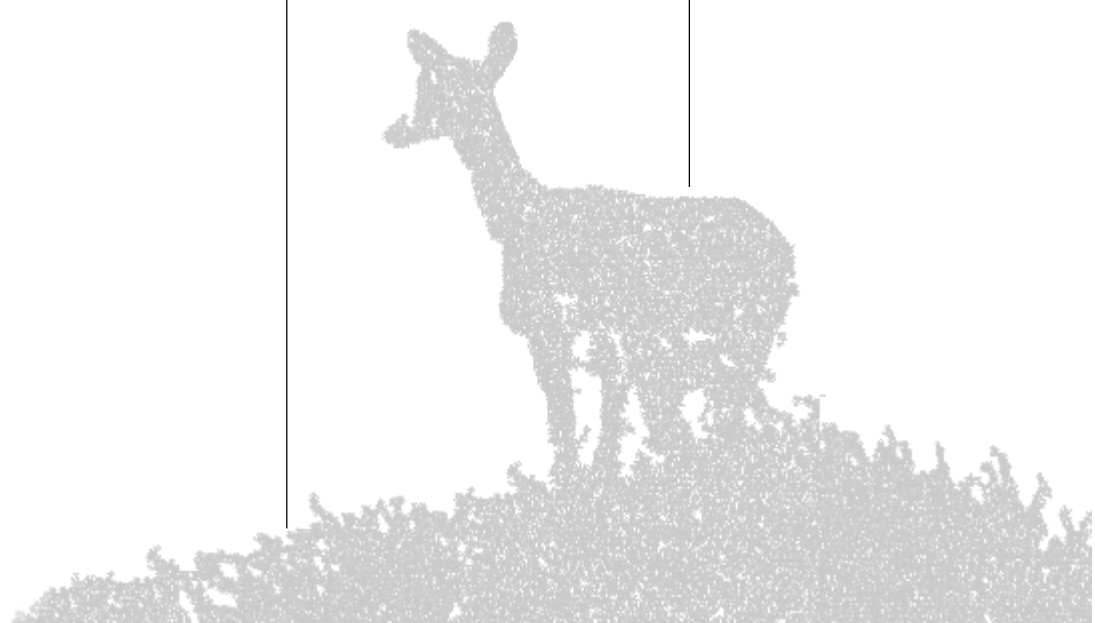
This side of the river has a steep bank and homes are either at the top of the hill or built closer to the shore. In order to build near the shore, the land was clearcut to build homes, driveways and access roads. The most obvious problem in this stretch of the river is the clearcutting done by homeowners or developers. Only one area is a fresh cutting for a new home. All the other five clearcut areas seem to be at least a few years old. It appears that none of these five clearcut areas have been retained in any fashion. On one property, the clearcutting seems to already be an issue. There is a large amount of bare dirt with no vegetation on the owner's property from the shoreline upward.

A dead tree area is also an issue in Section 9W. In this section, there are more than five pine trees still standing, but they are bare. A number of trees are also down in this area, some of which are in the water at the shoreline. There are also areas with fallen trees that protrude from the water and block direct access to the shoreline. There is a tree branch protruding from the water at the end of Section 9W across from Kettletown Park that appears to have been there for many years, but which is hard to see from any distance.

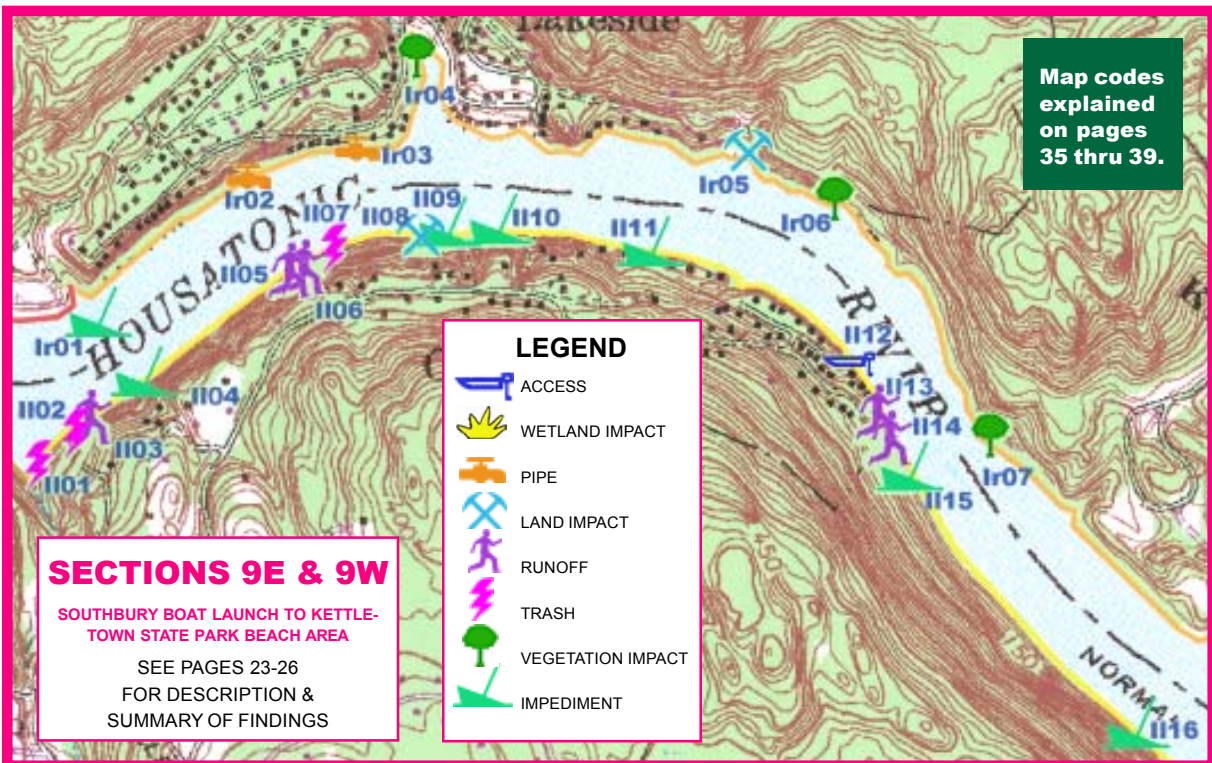
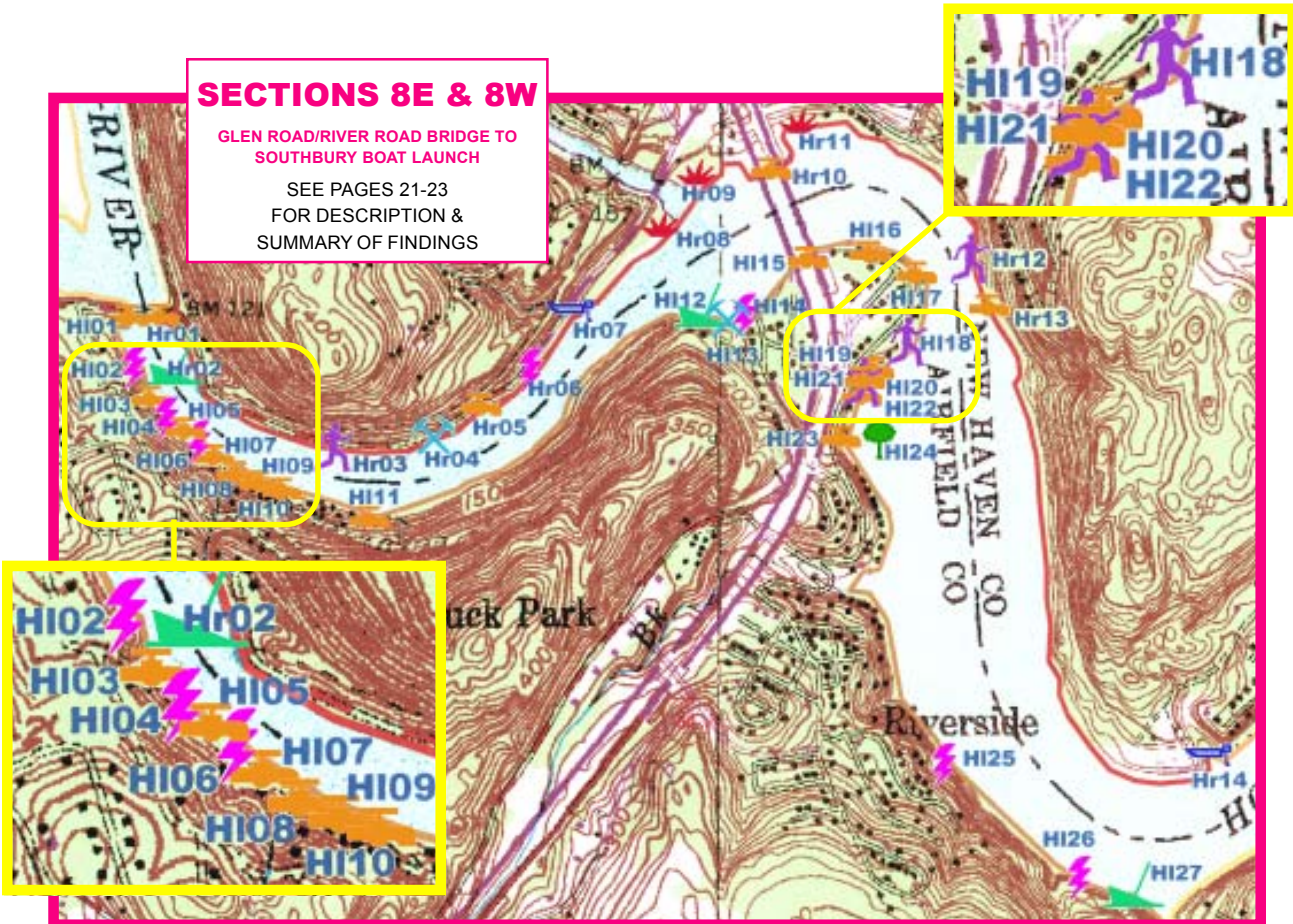
Garbage or metal waste is also seen on the shoreline. In particular, we saw rusted barrels, possibly a washing machine or kitchen appliance and metal pipes.

Section 9W has fewer homes than Section 8W. The homes are much further apart than in Section 8W. This area is used for swimming, boating of all types and fishing. Like Section 8W, the wildlife includes aquatic insects, snapping turtles, clams, geese, swans, beavers, and ducks, as well as an endangered species, the bald eagle. Fish include sunny, catfish, eels, trout carp and bass. There is also a private boat launch in a residential area.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Much of the area is protected forest. ● This area is used for swimming, boating of all types and fishing. ● Wildlife includes aquatic insects, snapping turtles, clams, geese, swans, beavers, and ducks, as well as an endangered species, the bald eagle. ● Fish include sunny, catfish, eels, trout carp and bass. There is also a private boat launch in a residential area. 	<ul style="list-style-type: none"> ● Many clearcut lawns without vegetative buffer zones. ● Dead and downed trees, hazardous to boaters. ● Much garbage and metal debris. ● An apparently abandoned home is slowly falling down the steep bank across from the boat launch. 	<ul style="list-style-type: none"> ● Homeowner education on the importance of buffers. ● Removal of select trees as hazards. ● Several areas are good candidates for cleanups. ● Investigate floating debris issues. Stay in contact with Northeast Generation Services. ● Inquire about removal of or action on abandoned house before it falls into the water.



Section Maps 8 and 9



Section 10E: Kettletown State Park Beach Area to Jackson Cove, eastern shore

Surveyors: Joanne Barry, Shauna Barry

Distance: 1.2 miles

Tributaries: Three unnamed streams

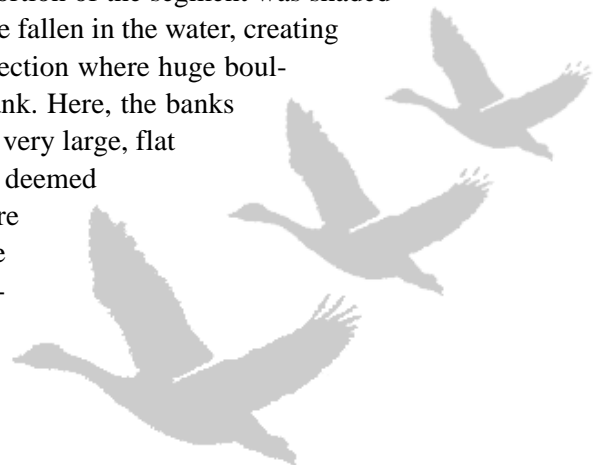
Access Points: Jackson Cove


Description: The water quality in this section on Lake Zoar seemed questionable to us. Although people were boating, skiing, fishing, and swimming, it seemed wildlife such as ducks and geese may know better and were nowhere to be seen. The only bird we observed was one lonely seagull sitting on the dock at Jackson Cove. The water was brownish green, muddy, and cloudy, and had a slight fishy smell. We saw a 20-inch dead fish floating off shore near the Kettletown campground. We saw several other dead fish along the bank as well as floating in the water. We also observed one live fish, about seven-inches long near Jackson Cove boat launch area. The water seemed to be a bit clearer once we progressed down to Jackson Cove and the beach area there.

Purple loosestrife and Eurasian Water milfoil were observed all along this section in various locations, particularly outside Jackson Cove.

There were a few small beaches along this segment in addition to the two larger beaches that mark the starting and ending points of the section. Paths to these smaller beaches didn't seem to be specified or designated, just worn and eroded from use. We observed a trail bridge and a charcoal pit before reaching Jackson Cove, part of the Pomperaug Trail. The Jackson Cove beach area was very flat, with a large new pavilion. There was an insufficient buffer zone along the shore where there was no designated beach.

There were a few areas of bank erosion, as noted on the map, as well as some trash and a metal barrel in the water. A good portion of the segment was shaded with oaks, hemlocks and other trees, some fallen in the water, creating good wildlife habitat. There was also a section where huge boulders and slick rock faces make up the bank. Here, the banks are steep and very high. There was also a very large, flat rock sticking out into the water, which we deemed the perfect sitting rock. In this area, there was also the "lizard rock" — a creative piece of graffiti that was colorfully displayed on a rock.



Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Recreational use by boaters, fishermen, and swimmers. ● Access to area is good. ● Good bank habitat. 	<ul style="list-style-type: none"> ● Various spots of purple loosestrife. ● Areas of severe erosion. ● Lack of sufficient buffer zones in some areas, Jackson Cove, for instance. See map. 	<ul style="list-style-type: none"> ● Kettletown State Park could address erosion from many undesignated paths to water by creating a few well-kept access paths around camping areas. ● Work with the town of Oxford to create a buffer zone at Jackson Cove, possibly to serve as a plantings display and example to homeowners.

Section 10W: Kettletown State Park Beach Area to Jackson Cove, western Shore

Surveyors: Don de Lambert, Liz de Lambert

Distance: 1.1 miles

Tributaries: One unnamed stream

Access Points: Jackson Cove

Description: On this part of the lake/river, the shoreline was heavily forested by elms, maples, birches, oaks and hemlocks. There was little or no groundcover under these trees. The bank is quite steep and completely shaded, providing good habitat. Some fallen trees and rotting wood from boat docks and other things could be seen at the water's edge. A small amount of trash was seen, including plastic bottles and a few bags. Most noticeable was the damage to the hemlock trees, most likely from hemlock wooly adelgid infestation. Several hemlocks close to the waterline were dead. As we approached the area across from Jackson Cove, mountain laurel, ferns, and moss appeared more prevalent, and granite ledge rock dominated the bank. There was some graffiti on the ledge across from Jackson Cove.

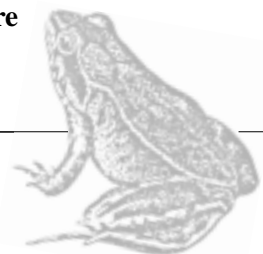
The only structure that we observed was about 120 yards past the last house, near the beginning of the survey. Someone had cleared the bank and erected a climbing platform from which a fire hose that hung in a dead tree could be used to jump into the water.

The water in this section seems cloudy and almost green, but it looks cleaner than that of the previous section and opposite shore.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● This area is almost entirely state forest. There are many hiking trails here, although not on this bank. ● Fishermen, powerboats, and jet skiers use the lake. 	<ul style="list-style-type: none"> ● Small amounts of litter at spots along the waterline. ● Hemlock woolly adelgid infestation. 	<ul style="list-style-type: none"> ● Clean up trash, even though amount is small. ● Look into current actions on adelgid infestation.

Section 11E: Oxford Town Beach to Stevenson Dam, eastern shore

Surveyors: Keith Vaughn, Linda Rapp




Distance: 2.5 miles

Tributaries: Two unnamed streams

Access Points: Oxford Town Beach

Description: This segment is characterized by very steep (50-70 percent) slopes, heavily wooded with hardwoods and conifers. The rock-cobble shoreline slopes quickly into deep (ten-feet plus) water. Wetland vegetation is almost nonexistent due to brush and trees overhanging water as much as ten feet in some areas, from Jackson Cove to the gravel pit. Directly adjacent to the large gravel mining operation are a series of small, sandy-bottomed beaches. These beaches are separated from the gravel mining operation by a small, approximately half-acre strip of rolling, wooded area that seems to have been traditionally used by boaters for recreation, as there are lots of broken bottles and fire pits. This area could make a good canoe take-out. The erosion control for the gravel mining operation is in need of repair and/or replacement.

As the segment progresses, it becomes characterized by less steep slopes (20 to 45 percent) and older lakeside residences and watercraft dockage. A few (eight to ten) pipes were observed, but appeared to be groundwater and retaining wall drains. No noxious or suspicious outfalls were observed. The lawn areas on the lakeside residences were small and in most cases did not extend to the waterline. Small isolated pockets of purple loosestrife, multiflora rose, and hydrilla were noted, although no large concentrations were found. What was found could easily be harvested by hand in an afternoon. There was no new construction in the area surveyed.

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Lack of access in beginning area insures lack of development. ● Area by gravel pits have very good potential for canoe trail/take-out and campground. ● Steepness of slope and depth of water restricts area available for, and discourages growth of, invasive wetland species. <p style="text-align: right;">Sand and gravel mine</p>	<ul style="list-style-type: none"> ● Possible erosion problem from gravel mining operation. ● Garbage, broken bottles, and fire pits in beach areas by gravel mine. 	<ul style="list-style-type: none"> ● Repair or replace erosion control devices at gravel mine operation. ● Clean up beach areas below gravel mine. ● Pursue easement of these beach areas.

Section 11W: Oxford Town Beach to Stevenson Dam, western shore

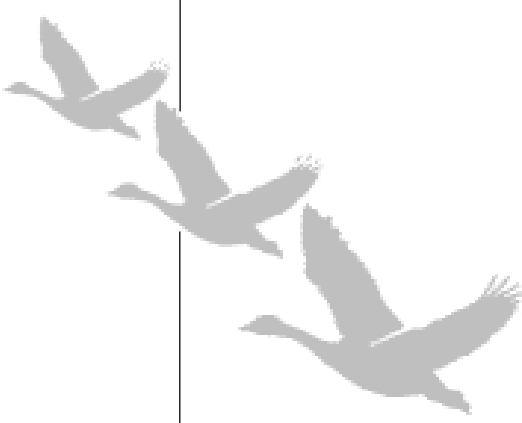
Surveyors: Elaine LaBella and Gale Courey Toensing

Distance: 2.5 miles

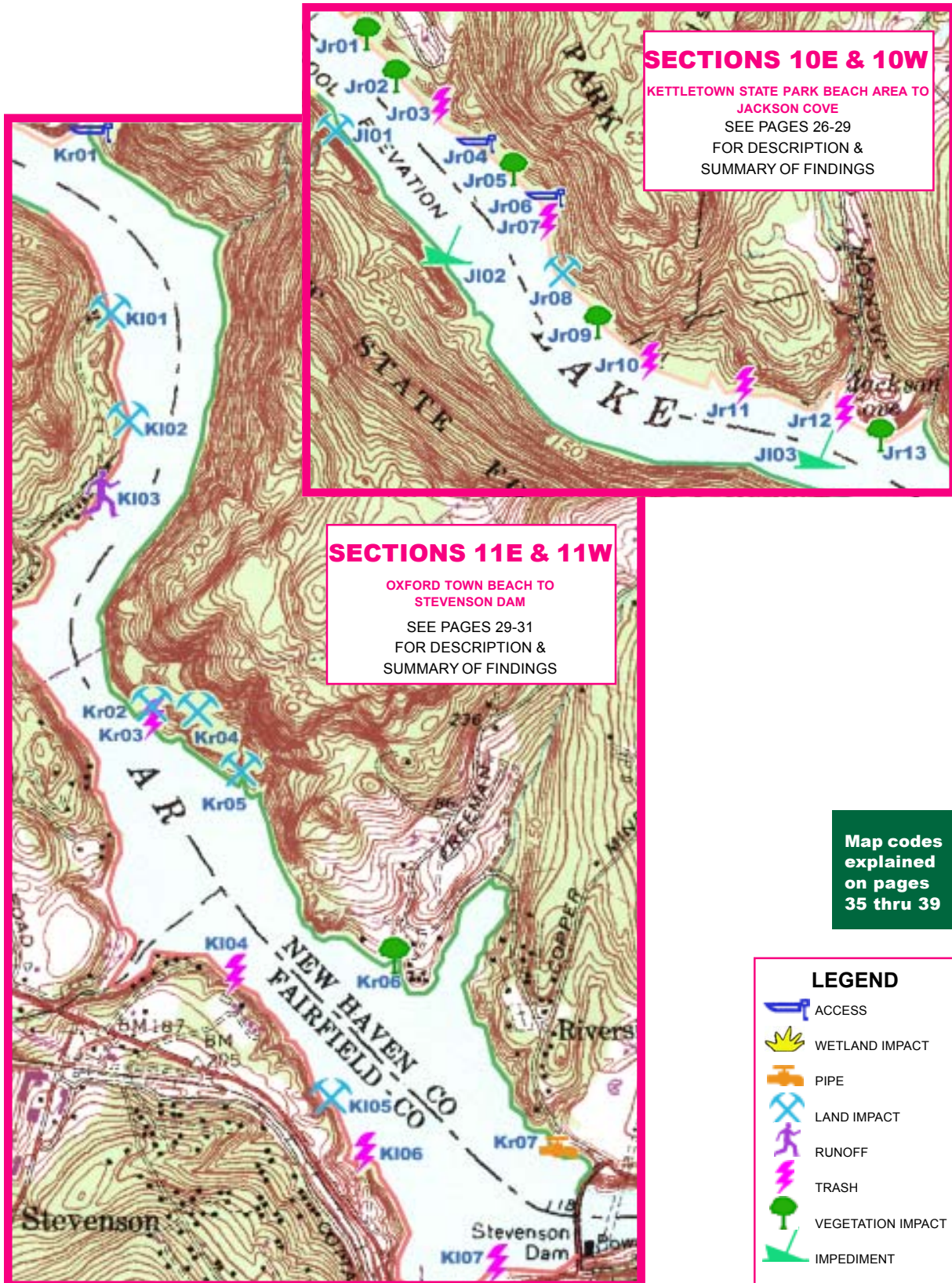
Tributaries: Halfway River

Access Points: Jackson Cove

Description: Section 11W follows the west shore of Lake Zoar from the Stevenson Dam to the Paugussett State Forest opposite from Jackson Cove. This is a flatwater paddle along a mostly-wooded shoreline. The lake is wide and affords many opportunities for motorized and non-motorized water sports. About one-quarter of the western shore is developed with homes and lawns, concrete walls, docks, landings, and a quarry. The undeveloped shore is wooded down to the riverbanks, which are either dirt or rock outcrops with overhanging trees. The water is clear and odorless

Natural Resource and Assets	Problems	Priority Actions
<ul style="list-style-type: none"> ● Erosion and undercutting of banks due to wake is prevalent, however the steep sand banks provide habitat for birds that dig nesting cavities into the soil. ● A pair of red-tailed hawks soared overhead. ● The Zoar Trail, a hiking-only trail managed and maintained by the volunteers of the Connecticut Forest and Park Association, traverses a portion of the shore in Paugussett State Forest. The Zoar Trail is a link in the Housatonic RiverBelt Greenway. 	<ul style="list-style-type: none"> ● Garbage, large pieces of wood, metal debris, and household waste noted at every point where the shore was accessible. In particular, the shore near the developed area just north of the Stevenson Dam needs to be cleaned up. Trash and an overflowing garbage barrel noted near the confluence of the Boys Halfway River and Lake Zoar. ● Trash also noted at the quarry site, although no public trail to the shore was evident. ● Trash was evident where the Zoar Trail passed close to the shore. ● The team also noted that on the eastern shore where the former Lane property is being developed there are some instances of clearing along the shore which may be greater than the Oxford Planning and Zoning Commission approved. 	<ul style="list-style-type: none"> ● Clean up near the Stevenson Dam, near the Boys Halfway River, and the Zoar Trail. ● Investigate the extent of the cutting along the shore at the former Lane property. 

Section Maps 10 and 11



III. Lakes Zoar and Lillinonah Stream Team Feature Data

(USE WITH STREAM TEAM MAPS)

CODE	FEATURES	ATTRIBUTES	NOTES
AI01	Pipe		embedded in concrete foundation
AI02	Access		
AI03	Access		by Kimberly Clark water treatment station
AI04	Trash	bulky	
AI05	Pipe		culvert
AI06	Trash	bulky	
AI07	Pipe		drain pipe
AI08	Trash	dumpsite	
AI09	Land Impact	erosion	testing equipment on shore
Ar01	Access	official	motorboat dock
Ar02	Vegetation Impact	loosestrife	
Ar03	Access	official	boat ramp
Ar04	Impediment	tree	overhanging branches
Ar05	Impediment	tree	overhanging branches
Ar06	Pipe		under roadway
Ar07	Trash	litter	also loosestrife
Ar08	Land Impact	erosion	
Ar09	Pipe		
Ar10	Access	official	boat ramp
Ar11	Pipe		by road
Ar12	Vegetation Impact	phragmites	
Ar13	Land Impact	erosion	also loosestrife
Ar14	Access	unofficial	evidence of boat ramp, also trash
Ar15	Pipe		culvert
Ar16	Pipe		two pipes from house
Ar17	Trash	litter	under bridge
BI01	Wetland Impact	loosestrife	
BI02	Impediment	tree	
BI03	Wetland Impact	loosestrife	
BI04	Trash	litter	
BI05	Trash	bulky	foam from washed-out dock
BI06	Impediment	tree	
BI07	Trash	bulky	old dock
Br01	Impediment	tree	
Br02	Impediment	dam	
Br03	Trash	litter	park needs to be cleaned up
Br04	Pipe		
Br05	Vegetation Impact	millfoil	
Br06	Vegetation Impact	millfoil	
Br07	Pipe		
Br08	Impediment	tree	
Br09	Vegetation Impact	millfoil	
Br10	Vegetation Impact	millfoil	
Br11	Vegetation Impact	millfoil	
Br12	Impediment	tree	

CODE	FEATURES	ATTRIBUTES	NOTES
Br13	Pipe		
Br14	Vegetation Impact	millfoil	
Br15	Impediment	tree	
Br16	Vegetation Impact	millfoil	
CI01	Trash	bulky	tire
CI02	Trash	bulky	tire
CI03	Trash	litter	shoes, cups, bottles
CI04	Trash	litter	shoes, cups, bottles
CI05	Trash	litter	
CI06	Trash	litter	
CI07	Trash	bulky	piece of dock
CI08	Trash	bulky	pallet
CI09	Trash	bulky	tire
CI10	Wetland Impact	invasive	loosestrife
Cr01	Runoff	lawn	
Cr02	Vegetation Impact	invasive	loosestrife
Cr03	Land Impact	erosion	
Cr04	Land Impact	erosion	
Cr05	Vegetation Impact	invasive	loosestrife
Cr06	Trash	litter	
DI01	Pipe		
DI02	Wetland Impact	phragmites	
DI03	Trash	litter	
DI04	Wetland Impact	loosestrife	
DI05	Wetland Impact	phragmites	
DI06	Land Impact	clearcut	future lawn
DI07	Trash	bulky	propane tank
DI08	Impediment	log	
DI09	Land Impact	erosion	
DI10	Land Impact	erosion	
DI11	Land Impact	erosion	
DI12	Pipe		
Dr01	Trash	dumpsite	
Dr02	Pipe		
Dr03	Pipe		
EI01	Trash	litter	
EI02	Wetland Impact	phragmites, loosestrife	
EI03	Access	unofficial	fishing
EI04	Pipe		
EI05	Trash	litter	
EI06	Trash	litter	
EI07	Trash	litter	
EI08	Trash	bulky	
EI09	Pipe		
EI10	Trash	litter	
EI11	Pipe		
EI12	Access	official	swimming, boating, Brookfield

CODE	FEATURES	ATTRIBUTES	NOTES
E113	Access	official	swimming, boating, Newtown
E114	Pipe		
E115	Land Impact	erosion	
E116	Trash	litter	
E117	Impediment	driftwood	floating debris
Er01	Pipe		
Er02	Runoff		
Er03	Trash	litter	
Er04	Pipe		water outtake
FI01	Land Impact	erosion	undercut banks
FI02	Land Impact	erosion	
FI03	Vegetation Impact	invasive	autumn olive
FI04	Land Impact	erosion	evidence of camp site
FI05	Land Impact	erosion	
FI06	Trash	litter	trails
FI07	Trash	bulky	
FI08	Land Impact	erosion	undercut bank
FI09	Wetland Impact	invasive	milfoil
FI10	Wetland Impact	invasive	loosestrife, evidence of campsite
FI11	Wetland Impact	invasive	milfoil, loosestrife
FI12	Land Impact	erosion	campsites
Fr01	Land Impact	erosion	
Fr02	Land Impact	erosion	
Fr03	Access	unofficial	swimming
Fr04	Trash	bulky	
Fr05	Land Impact	erosion	
Fr06	Land Impact	erosion	
Fr07	Access	official	fishing, Waldo State Park
Fr08	Wetland Impact	invasive	milfoil
Fr09	Trash	litter	town park
GI01	Land Impact	erosion	
GI02	Vegetation Impact	invasive	
GI03	Trash	litter	
GI04	Pipe		
GI05	Land Impact	erosion	
GI06	Land Impact	fill	
Gr01	Access	official	portage around dam
Gr02	Vegetation Impact	invasive	milfoil, hydrilla
Gr03	Trash	litter	
Gr04	Runoff	road	
Gr05	Pipe		
Gr06	Runoff	road	
Gr07	Impediment	tree	
Gr08	Vegetation Impact	invasive	loosestrife
Gr09	Trash	litter	
Gr10	Land Impact	erosion	
Gr11	Land Impact	riprap	

CODE	FEATURES	ATTRIBUTES	NOTES
HI01	Pipe		
HI02	Trash	bulky	engine
HI03	Pipe		three pipes
HI04	Trash	bulky	tires
HI05	Pipe		
HI06	Trash	dumpsite	
HI07	Pipe		
HI08	Pipe		culvert
HI09	Pipe		
HI10	Pipe		
HI11	Pipe		
HI12	Impediment	tree	
HI13	Land Impact	clearcut	
HI14	Trash	dumpsite	
HI15	Pipe		
HI16	Pipe		
HI17	Pipe		
HI18	Runoff	residential	
HI19	Pipe		
HI20	Pipe		
HI21	Runoff	residential	
HI22	Pipe		
HI23	Pipe		
HI24	Vegetation Impact	invasive	
HI25	Trash	litter	
HI26	Trash	bulky	
HI27	Impediment	tree	a few trees
Hr01	Pipe		
Hr02	Impediment	abutments	old bridge
Hr03	Runoff	road	all along River Road
Hr04	Land Impact	erosion	all along River Road
Hr05	Pipe		
Hr06	Trash	litter	all along River Road
Hr07	Access	official	town park
Hr08	Wetland Impact	phragmites, loosestrife	
Hr09	Wetland Impact	phragmites, loosestrife	
Hr10	Pipe		
Hr11	Wetland Impact	phragmites, loosestrife	
Hr12	Runoff	residential	
Hr13	Pipe		
Hr14	Access	official	boat launch
II01	Trash	bulky	washing machine
II02	Trash	bulky	barrels
II03	Runoff	residential	
II04	Impediment	tree	
II05	Runoff	residential	
II06	Runoff	residential	

CODE	FEATURES	ATTRIBUTES	NOTES
II07	Trash	litter	
II08	Land Impact	erosion	
II09	Impediment	tree	
II10	Impediment	tree	
II11	Impediment	tree	
II12	Access	unofficial	
II13	Runoff	residential	
II14	Runoff	residential	
II15	Impediment	tree	
II16	Impediment	tree	
Ir01	Impediment	sandbar	
Ir02	Pipe		
Ir03	Pipe		
Ir04	Vegetation Impact	invasive	hydrilla
Ir05	Land Impact	erosion	
Ir06	Vegetation Impact	invasive	loosestrife
Ir07	Vegetation Impact	invasive	milfoil
JI01	Land Impact	erosion	
JI02	Impediment	tree	
JI03	Impediment	driftwood	floating debris
Jr01	Vegetation Impact	loosestrife	
Jr02	Vegetation Impact	milfoil	
Jr03	Trash	litter	
Jr04	Access	unofficial	beach area
Jr05	Vegetation Impact	loosestrife	
Jr06	Access	unofficial	trails
Jr07	Trash	bulky	barrel
Jr08	Land Impact	erosion	
Jr09	Vegetation Impact	invasive	hydrilla, pond weed
Jr10	Trash	litter	
Jr11	Trash	litter	
Jr12	Trash	litter	
Jr13	Vegetation Impact	invasive	loosestrife
KI01	Land Impact	erosion	undercutting banks
KI02	Land Impact	erosion	
KI03	Runoff	residential	hole in seawall
KI04	Trash	litter	from quarry
KI05	Land Impact	erosion	trash pit
KI06	Trash	bulky	erosion, overuse by public
KI07	Trash	bulky	shoreline cleanup needed
Kr01	Access	official	swimming, boating, town park
Kr02	Land Impact	sedimentation	caused by gravel mining
Kr03	Trash	litter	
Kr04	Land Impact	mining	gravel
Kr05	Land Impact	sedimentation	caused by gravel mining
Kr06	Vegetation Impact	invasive	hydrilla
Kr07	Pipe		water outtake pump

IV. ACTION PLAN

Based on Summer 2002 Shoreline Surveys
of the Lake Lillinonah and Lake Zoar Stream Team

A. Short Term/High Priority Projects

We recommend the following short-term projects, as we feel that they are high priority, or because they can be completed in a few months. Because there are many suggestions, the stream team will select some for 2002 and others as time permits.

1. Contact the gravel mining company on Section 11E about replacing and/or repairing their erosion control devices along the river.
2. Contact the Connecticut Department of Transportation and town highway departments about polluted runoff from bridges, as current laws for new construction disallow pipes discharging directly into the river from the bridge and roadway, as is currently the situation on most of the bridges over this section.
3. Work with the Southbury Highway Department to correct runoff problems from River Road into Lake Zoar.
4. Identify and map invasive species. Take preliminary steps in looking into control of these species.
5. Organize cleanups of shoreline, beginning with Section 3 as well as the large trash objects found in Sections 7 and 9 and the litter in Section 11.
6. Look into necessity of better signage to warn boaters of the gas pipeline in Section 7.
7. Consider training Stream Team volunteers to pay personal visits to homes where excess fertilization and lack of a buffer zone may be affecting water quality, to inform owners of the hazards of overfertilization of lawns and the importance of a buffer zone.
8. Inform the local Boards of Health about the pipe with possible sewage odor in Section 4W, the questionable pipe at the beginning of Section 1W, as well as any other pipes that the Stream Team would like to report to determine if action needs to be taken by an onsite visit and test.

B. Long-Term/Ongoing Projects

These activities serve as the glue that holds the Stream Team together.

They are our long-term action issues.

- 1) Contact Inland Wetlands Commissions in all the surrounding towns. Inform them, and advocate the idea, of mandatory buffer zones as part of their regulations. Show how this has been effective in the town of Sherman.
- 2) Work with the Lake Lillinonah and Lake Zoar Authorities and area towns to develop a landowner education program on the importance of the vegetated buffer zone.
 - A) Provide information about streamside buffers including information stations on the importance of a buffer, what types of plants are best to include, as well as how wide a buffer should be depending upon the individual characteristics of each piece of property.

- B) Consult the managers of a similar project on Candlewood Lake for advice.
 - C) Possible sites for this include a section of shoreline just downstream of the beach area at Jackson Cove, the Oxford Town Beach, in Section 10E, as well as a section of Addis Park in New Milford, in Section 1E.
- 3) Pursue development of low-impact recreational areas.
- A) Investigate an easement for beaches in Section 11E near the gravel mine, for possible canoe access.
 - B) Investigate possibility of making the Lover's Leap Road access and put-in more formal. Improve condition of existing facilities, including improvement of access road for educational and recreational activities.
 - C) Further investigate other areas for the establishment of greenways.
- 4) Develop program of macroinvertebrate collection and identification for water quality monitoring in the tributaries of the river in this area, possibly including:
- Town Farm Brook, Section 2E
 - Clapboard Oak Brook, Section 2E
 - Hitchcock Mill Brook, Section 3E
 - Hop Brook, Section 4W
 - Merwin Brook, Section 4W
 - Fred Beers Brook, Section 5W
 - Little Pootatuck Brook, Section 7E
 - Lee Brook, Section 9E
 - Kettletown Brook, Section 9E
 - a) Do this following the Connecticut Department of Environmental Protection (CT DEP) guidelines for kick sampling and rapid bio-assessment collection and identification procedures.
 - b) Determine quality of water by diversity and type of organisms found and report to CT DEP with findings.
- 5) Stay in contact with Northeast Generation Services about the Line Diffuser Oxygenation System as proposed in their relicensing application to FERC for the Shepaug Project.
- A) This would help correct the dissolved oxygen problem in Lake Zoar, which is contributing to many problems in the lake, including the increased number of dead fish that were observed by the Stream Team.
- 6) Contact Kettletown State Park and Connecticut Forest and Park Association about correcting erosion problems from undesignated access to river.
- A) Creation of one to three hardened access points to the water near the camping areas would help eliminate the excess erosion caused by people traveling down many steep, undesignated paths.
- 7) Stay in contact with lake authorities to investigate water vegetation problems and actions to correct these problems.

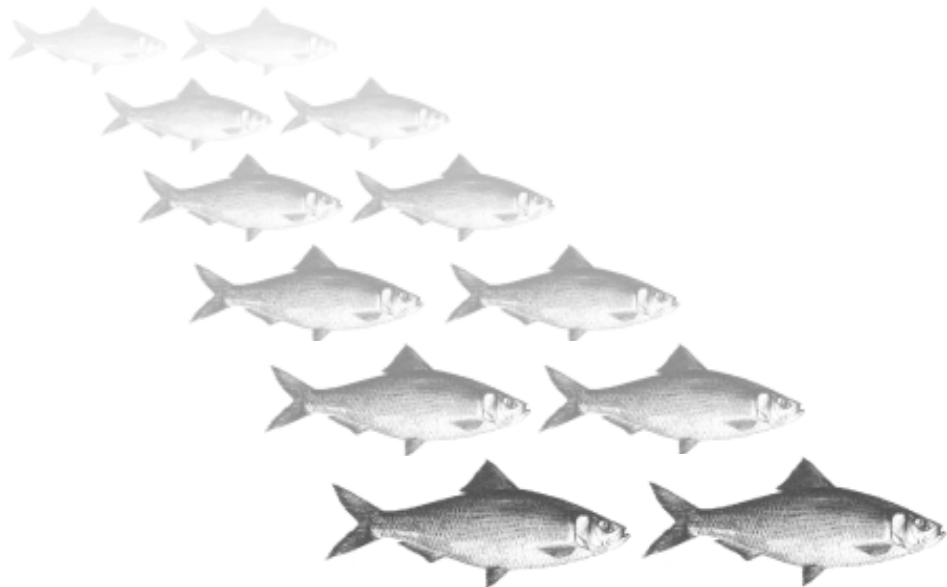
- 8) Stay in contact with Northeast Generation Services about removing floating debris, downed trees and logs, which are hazards to boaters.

Stream Team Volunteers should monitor the process of, and provide suggestions to, FERC regarding the relicensing of Northeast Generation Service's Shepaug Project. Concerns, especially about floating debris, water quality and dissolved oxygen should be expressed. Visit the HVA Web site, www.hvathewatershedgroup.org for details on how to go about participating in the process.

V. Data Collection Examples

The following multi-page Shoreline Survey form and Summary Sheet illustrate how Stream Team members record their observations along the river. These notations, along with locations identified on large-scale field reference maps and photographs taken by Stream Team members, form the permanent record of each shoreline survey and are on file at the Cornwall Bridge office of the Housatonic Valley Association. Eventually, all shoreline survey data will be converted into data layers by Stream Team volunteers and HVA staff, and will be widely available through the HVA Geographic Information System (GIS).

Information from the Lake Lillinonah and Lake Zoar Shoreline Survey has been entered into HVA's GIS.

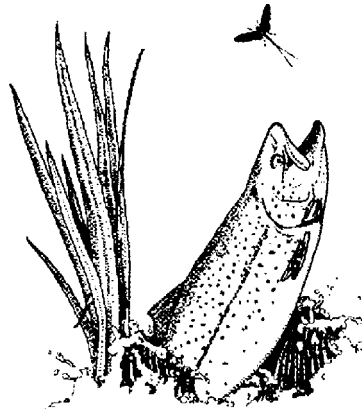


Adopt a Stream

SHORELINE SURVEYS

A Stream Team Monitoring Project and Action Tool

Data Sheets



Riverways/Adopt-A-Stream Program Staff
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Adapted from Shoreline Surveys Leaders' Manual, Publication No.1779-94-500-2.08 CIR
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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 the canoe.
- 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 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 IN 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 pens/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, 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:

Return by: _____

This month: Attend action planning meeting, which will be held: _____

Adopt a Stream

SHORELINE SURVEY FIELD DATA SHEET

Segment begins: _____

Segment ends: _____

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

If you take photographs, mark the location on the map, and write it on the backs of the photos, along with date. Be specific (reference nearby road or house), so that people can compare later photos.

INSTREAM CONDITIONS

Stream bottom

1. What is stream 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")
2. What color is the stream bottom? (*circle one*)
Black Brown Orange/Red Yellow Sandy Gray Other _____

Water

1. What color is the water? (*circle*) Cloudy Tea Milky Muddy Other _____
2. What is the water odor? (*circle*) None Rotten eggs Musky Fishy Oily Ammonia Other _____
3. Problem areas. (*checkmark, describe location and cause, if apparent *Locate on map*)
_____ Oily sheen or smell _____
_____ Sewage: smell, milky color, toilet paper _____
_____ Foam or scum (describe. Does a stick break it up?) _____
_____ Fishy odor or fish kill _____
_____ Floating garbage _____
4. How deep is the water? (*circle*) Less than 1 ft. More than 1 ft. More than 2 feet More than 3 feet
5. 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?
6. Is the water flowing (*circle*) Quickly Slightly Almost still
7. Number of pools Number of riffles Don't know
8. Is stream flow blocked by... (*circle and *locate on map.*) Trees Trash Large objects

Vegetation

1. 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 (*circle*) Duckweed Water chestnut Other _____
2. Are there areas covered with algae? (*Circle*) streambed around pipes
*If algae seems abnormally heavy, *locate on map.*
3. Are there wetlands? (*Circle. *locate on map.*) Yes No If yes, are they degraded by ... (*circle*)
Phragmites Purple Loosestrife Fill Blockages Ditches
Sediment Disturbed banks Pipes Trash Other _____

STREAM CORRIDOR CONDITIONS

Stream Bank and Land Use

1. Do trees and shrubs overhang the stream and provide shade? (*circle*) Yes No
If yes, estimate what percentage of the bank is shaded.
2. What are the stream bank conditions? (*circle*. Put a star* next to the most common.)
Eroding Buildings/pavement Dense Forest Wetlands I marsh
Beaches Riprap/channelized Shrubstbrambles Lawns
3. Are there places that have fill or clear-cutting? (*circle*) Yes No
If yes, mark locations on map as fill F1, F2, E3. etc.) or clear-cutting CCI CC2, CC3, etc).
4. What land uses are visible from the river?
(*Checkmark all uses and circle the dominant land use type.*)
___ Industrial ___ Parking lots ___ Golf courses
___ Commercial ___ Roads ___ Protected/conservation land
___ Agricultural ___ Landfills ___ Undeveloped/unprotected land
___ Residential ___ Railroads ___ Wastewater treatment plants
___ Park / ballfields ___ Junkyards ___ Other (*describe*)
5. Do you see runoff from any of the following? (*Circle. *If runoff is significant locate on map.*)
Manure Pet / goose droppings Lawns Sewage Roads
Bridges Construction Plowed fields Parking lots Other _____

Pipes: Please fill out separate pipe survey and mark locations on map as **P1, P2, P3, etc.**

Trash: Describe any potential cleanup areas. *Locate on map.

Recreation

6. Is there designated public access to the stream? Is it appropriate for... (*circle and *locate on map.*)
Canoeing Fishing Swimming Walking Bicycling Other _____
_____ *If there are areas which are informal or potential access points, describe and *locate on map.*

7. For what activities do people use the stream and its banks?
Fishing Rowing Sailing Swimming Walking
Motorboating Bicycling Rollerblading Canoeing Other _____

WILDLIFE

Aquatic Species

1. Fish or evidence of fish? (*describe*) _____
Estimate number _____. *If possible, describe species & size.* _____
2. Other forms of aquatic life? (*circle, identify species if known*)
Aquatic insects Turtles Salamanders Snails Mussels Clams Other _____

Land Species

1. Animals or evidence of animals? (*circle*) Beaver Muskrat Otter Other _____
2. Birds? (*circle*) Herons Mallard ducks Wood ducks Canada geese Other _____
3. Do you know if there are rare & endangered species of plants or animals in your segment?
If so, identify.

Adopt a Stream

Shoreline Survey Summary Sheet

River: _____ Segment Begins: _____ Segment Ends: _____
Date: _____ Today's Weather: _____ Weather over past 48 Hours: _____
Observers' Names: _____

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 one side are eroded, 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 (7) 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:

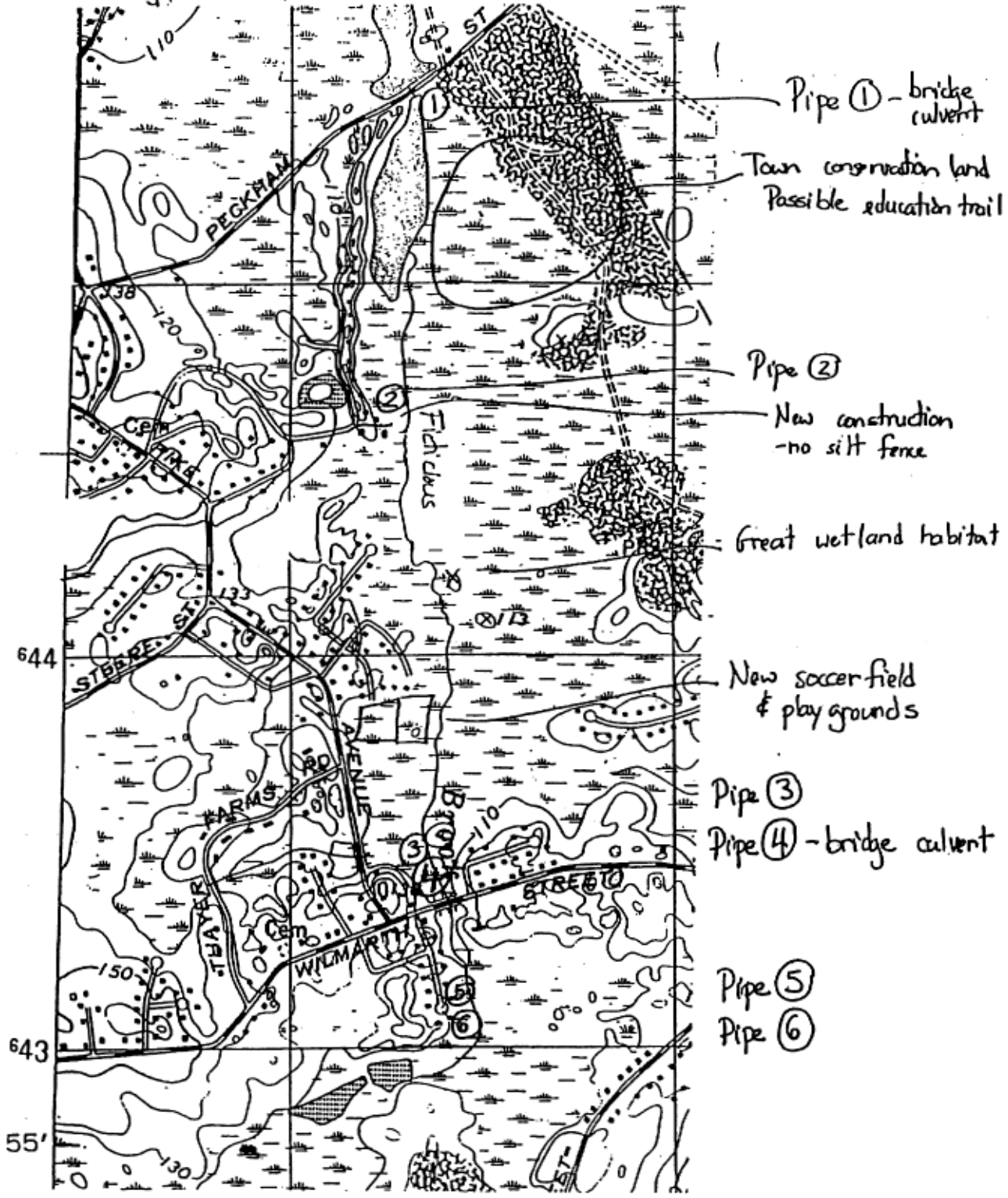
Adopt a Stream

Shoreline Survey: Priorities for Action

Look back at your Field Data sheet and include your observations. The information from these sheets will be used to develop the Action Plan.

<p>Problems found in your segment, such as: pipes discharging in dry weather erosion, runoff, trash, dense algae, water quality problems (odor, color, oil, foam, sewage), degraded wetlands (phragmites, loosestrife), other problems (describe, give location)</p> <ol style="list-style-type: none"> 1. 2. 	<p>Assets found in your segment, such as: Good habitat, wildlife species, businesses or landowners using the river (in a friendly way), recreational access (canoe, trails, parks), potential recreational access, potential park/conservation land (describe, give location)</p> <ol style="list-style-type: none"> 1. 2. 	<p>Priorities for action: (List items from problems/assets columns that you feel need more work.)</p> <ol style="list-style-type: none"> 1. 2.
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Sample Shore line Survey Map
 Fictitious Brook, Anytown
 Segment 4, 5-23-97



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