



Connecticut River Watch Program

CABIN BROOK/MEADOW BROOK/JEREMY RIVER STREAM WALK SUMMARY REPORT



Funded in part by the CT DEP through a US EPA Clean Water Act §319 nonpoint source grant



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Cabin Brook/Meadow Brook/Jeremy River Stream Walk Summary Report
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With funding from the Connecticut Department of Environmental Protection through a US Environmental Protection Agency Clean Water Act §319 non-point source grant, in cooperation with the University of Connecticut Cooperative Extension System Salmon River Watershed Project.

INTRODUCTION

During the summer of 2002 the Connecticut River Watch Program (CRWP), in cooperation with the Salmon River Watershed Committee and the University of Connecticut Cooperative Extension System (CES), conducted a Stream Walk Survey of the lower Jeremy River and tributaries in Colchester. Teams of volunteers, including Jeremy River riparian landowners and other members of the community, walked segments of the Jeremy River, Cabin Brook and Meadow Brook to collect visual information about its physical condition. The survey project was the first component of an effort to assess the health of the Salmon River watershed. It is our hope that the effort will evolve into a long-term community-based monitoring and assessment program, designed to help insure the protection of this valuable resource.

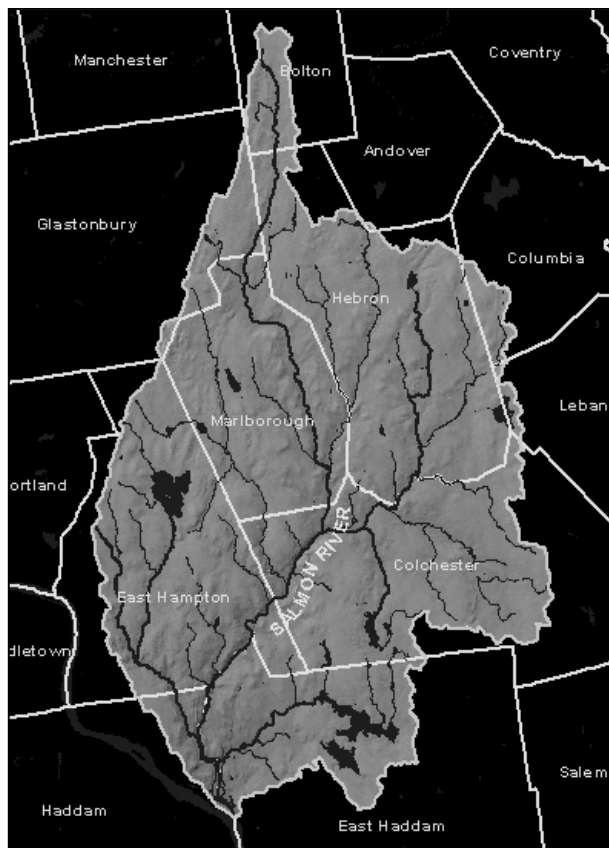
Survey goals included: to establish a baseline of physical conditions; to identify areas of the river in need of protection or restoration; and to raise community awareness of local river resources. Information collected will be used to plan and prioritize conservation and improvement efforts. The CRWP monitoring program was intended to complement and enhance existing education and conservation efforts being conducted as part of the CES Salmon River Watershed Project. Begun in 1999, the watershed project has been assisting the Salmon River watershed communities in protecting their natural resources as they develop their towns.

BACKGROUND

The Salmon River Watershed

The Salmon River is a major tributary of the Connecticut River located in the Tidelands Region of the lower Connecticut. The Salmon River begins at the confluence of the Jeremy and Blackledge Rivers in the town of Colchester, and flows ten miles to its confluence with the Connecticut River in East Haddam. Its watershed comprises a 125 square mile area draining portions of the towns of Marlborough, Bolton, Columbia, Glastonbury, Hebron, Colchester, East Haddam, Haddam and East Haddam.

The Salmon River and its tributaries comprise a system of relatively clean and quick flowing streams, which provide important spawning habitat for blueback herring and alewives. The Salmon is also one of Connecticut's two premier Atlantic Salmon restoration streams, used for reproduction and nursery habitat. Salmon Cove includes an extensive freshwater tidal marsh and flat surrounded by forested upland, which is important to migrating and wintering ducks, home to several rare plant species, a bald eagle winter roost site and an important spawning area for alewives.



Recent water quality assessments of the Salmon River undertaken by the Department of Environmental Protection (DEP), have documented good water quality and a healthy benthic macroinvertebrate

community. In fact, the Salmon River is used by the DEP as a reference stream for benthic macroinvertebrate assessment. The Salmon River watershed is included in Connecticut's Unified Watershed Assessment as a category 2 (protection) watershed, and was recommended for CRWP monitoring/assessment by the Department of Environmental Protection (DEP) ambient monitoring group. The CRWP monitoring program is intended to complement and enhance existing education and conservation efforts in the watershed being conducted as part of the Salmon River Watershed Project.

The Salmon River Watershed Project

The Salmon River Watershed Project, a joint effort of the University of Connecticut Cooperative Extension Program, Connecticut Department of Environmental Protection, USDA Forest Service, and the U.S. Fish and Wildlife Service, was begun in 1999. The project is a non-regulatory effort to use education to balance conservation and growth by identifying, protecting and enhancing priority natural resources of the watershed, and encouraging land use patterns that protect these resources. The project focuses on educating municipal officials and landowners in the watershed about its natural and cultural resources through use of geographic information system (GIS) technology, and promoting use of this information to guide land use decision-makers and watershed property owners. An advisory committee, made up of representatives of the seven major watershed towns (East Haddam, Haddam, Bolton, Colchester, Marlborough, Hebron and East Hampton) and other interests (e.g. local land trusts), provides local input. Financial and other support for the project comes from USDA Forest Service Northeast Area Watershed Focus Funds, and the U.S. Fish and Wildlife Service Silvio Conte Fish and Wildlife Refuge.¹

The Connecticut River Watch Program

The Connecticut River Watch Program (CRWP) is a volunteer water quality monitoring, protection and improvement program for the Connecticut River and its tributaries, sponsored by the Connecticut River Coastal Conservation District (formerly Middlesex County Soil and Water Conservation District). CRWP was initiated in 1992 in cooperation with River Watch Network, a national organization based in Vermont.

Over its first eight years CRWP focused its monitoring activities on the lower Connecticut River main stem and two tributary watersheds, the Mattabesset and the Coginchaug. The program has generated an extensive water quality database for these rivers, and raised local awareness of river resources and water quality issues through public involvement and outreach activities. Information collected through CRWP has been used by towns to investigate potential sources of pollution, and by the state for planning purposes. It has become a model program, with wide support from the local communities and state and federal environmental officials. Funding for CRWP has come primarily from the DEP through grants from the US EPA under Section 319 of the Clean Water Act.

In 1999, CRWP expanded into new watersheds within the Connecticut River basin. Now a regional support service, the program's focus is to initiate, support and coordinate community-based river monitoring, assessment and improvement programs in regional watersheds throughout the basin. Through the new program, CRWP continues to put water quality and physical survey information into the hands of local communities, and support efforts to use that information to direct river and other watershed protection and improvement efforts.

¹ Salmon River Watershed Project website – <http://www.resac.uconn.edu/salmonriver/>

PROJECT SUMMARY

Survey Goals

The Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey was undertaken to initiate a long-term community-based volunteer monitoring program in the Salmon River. This area was chosen for several reasons. The Colchester portion of the Jeremy River had been a focus of the attention of the Salmon River Watershed Committee due to a major, and somewhat controversial stabilization project that was planned there. The stream walk project was also designed to dovetail with a town of Colchester project, "Project Steward," that focuses on promoting the use of local natural resources as an educational tool within the public schools, and incorporating natural resource themes into school curriculum at all grade levels and in all subject areas. A town owned parcel that was used in training a core group of faculty peer group leaders is in Cabin Brook, a headwaters brook of the Jeremy River that was included in the stream walk survey.

The goals of the survey activity include:

- ◆ Develop a baseline of information about the physical characteristics of the Jeremy River and tributary streams in Colchester
- ◆ Raise public interest in and knowledge of the Jeremy River and its watershed, both about the resources it has to offer to the community, the need to protect it, and its place within the Salmon River watershed
- ◆ Develop public awareness of water quality issues and human impacts on our rivers
- ◆ Build awareness among riparian landowners of the importance of maintaining streamside buffer areas
- ◆ Identify areas of concern and potential pollution problems that can be used to plan conservation and improvement efforts
- ◆ Form the basis for additional water quality monitoring activities that can be pursued in the future according to needs, level of interest, ability to commit time, and availability of other resources

Survey Design and Methodology

A Stream Walk survey is a survey of the physical characteristics of a river corridor. The survey is a systematic way to observe and record information about the river channel (water and stream bottom), the stream banks, and the adjacent land. Physical characteristics of streams are important to the aquatic life that a stream supports – physical changes can degrade stream habitat and make the stream inhabitable by naturally occurring plants and animals.

Stream surveys are designed to take place in late summer and early fall, when water flows are low and slower, making it both possible and safe for volunteers to walk through streams to record observations. At this time water temperatures also tend to be warmer and aquatic plant growth is at its most abundant. In addition, emergent plants are tall and trees and shrubs have their leaves, important for estimating the types of streamside vegetation.

Survey sheets were developed to collect visual information on the physical conditions of the streams and surrounding land, and to help identify possible areas of concern. The Cabin Brook/Meadow

Brook/Jeremy River survey form is adapted from the 1998 Mattabeset River Stream Walk Survey form.² Survey sheets include the main survey with questions about general stream corridor characteristics, including water depth and width, stream bank cover, width of riparian corridor, water color/clarity, aquatic vegetation, composition of substrate, adjacent land uses, potential sources of pollution, and recreational use. An additional sheet was used to further describe possible areas of concern (see Attachment A). Detailed instructions for completing the survey were also included on the survey sheet. Survey sheets were copied on waterproof paper for use in the field.

The focus area was delineated into thirteen segments for the Stream Walk Survey, primarily based on access (see Table 1, below).

Table 1. Cabin Brook/Meadow Brook/Jeremy River Watershed Stream Walk Segments

| Stream | Segment # and Location | Distance |
|-------------------------------|---|-----------------|
| Cabin Brook | 1 Route 85 to McDonald Swamp | ~ 0.5 mile |
| Cabin Brook | 2 McDonald Swamp to Route 85 | ~ 0.5 mile |
| Cabin Brook | 3 Route 85 to Route 11 South | ~ 0.3 mile |
| Cabin Brook | 4 Route 11 South to Cabin Road | ~ 0.6 mile |
| Cabin Brook | 5 Cabin Road to town property | ~ 0.4 mile |
| Meadow Brook | 6 Town property to Route 16 | ~ 0.5 mile |
| Meadow Brook | 7 Route 16 to Levi Road | ~ 0.5 mile |
| Meadow Brook | 8 Levi Road to Mill Hill Road | ~ 1 mile |
| Meadow Brook | 9 Mill Hill Road to Prospect Hill Road | ~ 1 mile |
| Meadow Brook/ Jeremy River | 10 Prospect Hill Rd. to Westchester Rd. commuter lot | ~ 1 mile |
| Jeremy River | 11 Westchester Rd. commuter lot to Mill Site | ~ 0.75 mile |
| Jeremy River | 12 Mill Site to Cemetery (Westchester Road) | ~ 0.4 mile |
| Jeremy River | 13 Cemetery to Salmon River confluence | ~ 0.7 mile |

² The Mattabeset survey was adapted from those used for the Quinebaug and Norwalk River watershed stream surveys, developed by the Natural Resources Conservation Service (NRCS) and the New London and Windham County Soil & Water Conservation Districts.

Volunteer Recruitment/Landowner Permission

A mailing was sent to all riparian landowners along the stream segments to request their assistance with the survey project. Landowners were asked to either perform the surveys themselves or give permission for others to perform the survey on their property. A stamped, self-addressed response form (self-mailer) was sent with the letter, along with an information sheet describing the survey project.

A total of 79 landowners of record were contacted. Response to the landowner mailing was limited, though positive. Only 17 responded: 14 indicated their interest in participating or provided permission for others to walk their properties, 2 denied access and 1 indicated that her property did not border the river.

Additional volunteers were solicited through a list of Salmon River Watershed forest landowners, through the Colchester land use commissions, and through the Colchester schools as part of "Project Steward."

Volunteer Training and Participation

Prior to conducting their surveys, volunteers were trained in assessment procedures. Six people attended the Stream Walk training, held on June 8, 2002 at the Colchester Town Hall. Training included both indoor and field components, and was modeled after the training format developed for the 1999 Shetucket River stream survey. Cooperative Extension System and Conservation District staff conducted the training.

The training agenda included: an introduction to the Salmon River Watershed Project; an introductory video on Stream Walks³; a presentation on use of topographic maps; and a review of survey questions and slide presentation illustrating stream characteristics and areas of concern. Etiquette and safety issues were also reviewed, as were the contents of volunteer packets (see below). Volunteers were offered the opportunity to sign up as Earth Team Volunteers, a program sponsored by the USDA Natural Resources Conservation Service (NRCS), to receive coverage for tort claims and injuries incurred during volunteer activities.

The training included a field review of the survey sheet at the Jeremy River. Instructors demonstrated assessment procedures, including substrate classification, describing river profile, estimating stream width and depth, and identifying vegetation and aquatic organisms. Preparation tips were given to participants and questions addressed.

Volunteers signed up for specific river segments and received materials and supplies. Volunteers were given a Stream Walk Training Manual, providing both instructions and background information on physical characteristics used to describe streams, and physical conditions indicative of water quality problems or stream habitat degradation. The training manual was adapted from the manual developed by NRCS and the Conservation Districts for the Quinebaug and Shetucket River surveys. In addition to the survey sheets and training manual, volunteers received a packet of materials that included safety information, fact sheets about the Stream Walk Survey project and the Connecticut River Watch Program to give to interested residents, and color topographic maps of the area of the stream segment to be walked to be used for reference in the field and to mark the location of photographs and areas of concern. They were also provided film and asked to take pictures of areas identified as potential areas of concern, as well as areas representative of the character of the stream.

³ This training video was produced for the Quinebaug-Shetucket Stream Walk Survey project by the New London and Windham Soil & Water Conservation Districts and the Natural Resources Conservation Service.

Training staff recommended that volunteers walk their stream segments upstream to downstream. If possible, they were advised to walk their entire segment prior to recording any observations on survey sheets. This would allow them to define the different stream sections, or reaches, in their segment; a separate survey form was to be filled out every time there was an abrupt change in the physical characteristics of the stream, including slope, width, depth, substrate materials, streamside vegetation, channel pattern, etc.). The minimum length for a stream reach is defined as 1000 feet.

Actual Stream Walks took place in June and July, according to individual schedules. Property owners and other volunteers worked in teams to complete their surveys. Six volunteers from the community participated in the Stream Walks.

SURVEY RESULTS

Stream Walk survey results are summarized in a table format (Attachment B). Five of the thirteen (13) segments identified originally were surveyed, including all of the Jeremy River segments and two of the Meadow Brook segments. None of the Cabin Brook segments were surveyed. In all but three cases, the entire segments were surveyed. Each segment summary includes data and notes recorded on the survey sheets. Topographic segment maps are included with the summary table. Selected stream walk photographs are provided in Attachment C.

The summaries provide a good picture of the general condition of the River, existing and potential recreational uses, and possible areas of concern requiring further investigation. As the technical expertise of the volunteers varies, so do the descriptions. Some volunteers were more thorough than others and noted additional information.

Observations about the Jeremy River include:

- ◆ The River's profile is most commonly high gradient (1-3%), with a glide flow or pool-riffle sequence.
- ◆ Streambank cover included a variety of vegetation, with conifers, deciduous trees and small trees and shrubs most abundant. Natural Rock/Ledge was also noted as a common streambank cover. Lawns were noted as few in number in two sections of two segments, #11 (Westchester Road commuter lot to Mill Site) and #12 (Mill Site to Cemetery).
- ◆ Unspecified invasive non-native species were noted in all but the downstream Jeremy River segment, though few in number.
- ◆ Riparian buffers were most commonly >100 feet in width, in particular on the left bank (looking downstream). On the right bank, they tended to be 25-100 or <25 feet.
- ◆ The water condition was clear with no smell, with two exceptions. In the downstream section of segment 11 (Westchester Road commuter lot to Mill Site), some rusty-red color and a minor oil slick were noted, and in the upstream section of segment 12, some yellow-brown, rusty-red and foamy water were noted.
- ◆ Algae growth was noted most frequently "in spots," and aquatic plants "absent." Exceptions include the downstream segment, where algae growth was noted "everywhere."
- ◆ Substrate materials were primarily boulders, cobbles, gravel and sand, with two exceptions. In the upstream section (the second section of segment 10, downstream of the confluence of Meadow Brook and the Jeremy River), sand was the dominant material, and in the downstream section of segment 11, silt/clay, cobbles, concrete/riprap and organic materials were predominant.
- ◆ Primary land uses include Undeveloped (forested), Recreational, and Rural Residential, with some Agricultural, Protected Open Space, Non-residential Roads, Industrial and Commercial.
- ◆ Potential sources of contamination identified were primarily parking lots, roads, lawns/gardens, yard waste. Other potential concerns noted included local dumping, storm pipes, an abandoned mill, an auto body shop, an old industrial dump, a hay field (fertilized?), and fertilizers.
- ◆ Recreational activities included fishing (noted frequently), biking, dirt biking and other ATV use, swimming, horseback riding and kayaking and canoeing. Potential off road parking and access were noted in all segments. Potential boating opportunities were limited in all but the most downstream section due to the numerous boulders.

- ◆ Reports of wildlife were varied, though not very specific. Of note included numerous fish reports (brown trout, bass, sunfish, and juvenile Atlantic salmon), including several reports of dead trout.

Observations about Meadow Brook (based on the two segments surveyed) include:

- ◆ The River's profile is most commonly flat slope (>1%), with a glide flow or pool-riffle sequence.
- ◆ Streambank cover included a variety of vegetation consisting primarily of deciduous trees, small trees and shrubs and grasses/emergent. No lawns were noted in the segments surveyed.
- ◆ Unspecified invasive non-native species were noted in both segments, though few in number.
- ◆ Riparian buffers were >100 feet in width in segment 9 (Mill Hill Road to Prospect Hill Road), and in the segment 10 section (Prospect Hill Road to Jeremy River confluence), 25-100 feet (on the left) and <25 feet (on the right).
- ◆ The water condition was clear with no smell.
- ◆ Algae growth and aquatic plants were noted either "in spots," or "absent."
- ◆ Substrate materials were primarily silt/clay, with some cobbles, sand and organic materials.
- ◆ Primary land use was Undeveloped (forested), with some Agricultural and Non-residential Roads.
- ◆ Potential sources of contamination identified were primarily roads and farms/nurseries. Other potential concerns noted included a discharge pipe (from an auto repair shop?) and excavation/dumping on the streambank.
- ◆ No recreational activities were noted; potential for access was noted in both segments.
- ◆ Reports of wildlife were limited (song birds and other small birds, minnows and fingerlings, raccoon tracks, damsel and dragonflies).

Stream Walk observations raise several issues related to water quality and watershed management:

- ◆ In areas where the width of riparian vegetation is less than 25 feet, and lawns, roads, and agricultural uses exist near the river, buffering from adjacent activities may not be adequate.
- ◆ The presence of non-native invasive species throughout the river, though few in number, suggests the need for eradication and restoration projects before they spread, as well as education about the harm caused by use of non-native invasives in landscaping.
- ◆ Threats from adjacent lawns and agricultural activities are evident in the downstream segment of the Jeremy River, which exhibits signs of nutrient loading (excessive algae growth).
- ◆ The potential impacts to the Jeremy River of the abandoned mill site and old industrial dumping site should be evaluated.
- ◆ Excavation/dumping activities on Meadow Brook (if still active) should be investigated and the impacts to the Brook evaluated.
- ◆ A large dam on the river suggests the need to address possible obstruction of fish passage.

RECOMMENDATIONS

The information collected from the Stream Walk Survey not only provides a baseline against which we can measure future changes, but also can be used for planning purposes for local and watershed-based improvement and protection efforts. While the Jeremy River appears to be in relatively good condition, a number of potential concerns and threats to the health of the river and aquatic life were identified in the survey. They include adjacent agricultural uses, lawns mowed to the edge of the river, excessive algae growth, non-native invasive plant species, inadequate stream buffers, old industrial sites and a dump, and a large dam. If threats are addressed in a timely way, the river can be protected from degradation, avoiding costly restoration and improvement efforts in the future.

As a follow-up to the Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey, general recommendations include:

- ◆ Complete the collection of baseline information by conducting surveys of the remaining un-surveyed segments;
- ◆ Complete the survey of the Jeremy River in upstream segments, and expand the survey to include other streams in the Salmon River watershed;
- ◆ Investigate areas of concern identified to determine the extent of problems and to plan improvements;
- ◆ Develop and implement a community education program to inform residents and streamside property owners of the importance of maintaining naturally vegetated streambanks;
- ◆ Identify areas for non-native species eradication and restoration projects and educate residents, nurseries and landscapers about the harm caused by use of non-native invasives in landscaping;
- ◆ Investigate potential river access areas identified and assess both the need for and feasibility of development;
- ◆ Community members interested in the health of the river should
 - contact their municipal government to urge education of residents, restoration of degraded areas, and improved river protection regulations (e.g. minimum setbacks), and
 - support the cooperative efforts of the Salmon River Watershed Committee;
- ◆ Conduct additional river monitoring activities to assess in-stream health, including benthic macroinvertebrate surveys, and analysis of water samples for chemical, physical and biological indicators of water quality;
- ◆ Monitor river segments periodically to assess conditions. This could be accomplished through a stream segment adoption program whereby volunteers make visual observations on an annual basis and file a written status report.

For assistance and further information, please contact:

*Connecticut River Coastal Conservation District
deKoven House – 27 Washington Street
Middletown, CT 06457
860/346-3282
ctrivercoastal@ct.nacdnet.org*

ACKNOWLEDGEMENTS

The Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey would not have been possible without the assistance of our volunteers and cooperating agencies. Our sincere thanks to all of the following who have contributed to the survey project.

Stream Walk Survey Team Volunteers

John Cellini
Alannah and George Coshow
Len Guitar
Jim Nikodemski
Chuck and Ted Savitski

Cooperating Organizations, Businesses and Municipalities

Salmon River Watershed Committee

Town of Colchester: Special thanks to *Alicia Lathrop*, who coordinated use of the town hall for our volunteer training session.

Natural Resources Conservation Services: Special thanks to *Javier Cruz*, who wrote the Quinebaug River Survey Streamwalk Training Manual that we adapted for our use; and *Seth Lerman*, who provided us with a copy of the training video.

University of Connecticut Cooperative Extension System: Special thanks to *Tom Worthley*, who provided critical support to the project by coordinating with the Salmon River Watershed Committee and the town of Colchester, helping to plan the overall project, and coordinating contact with streamside landowners and other prospective volunteers; and Joel Stocker, who produced maps of the stream walk area, and assisting in compiling a database of streamside landowners, contacting landowners, and tracking responses.

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Connecticut Department of Environmental Protection through a US Environmental Protection Agency Clean Water Act §319 non-point source grant;

US Fish and Wildlife Service through the Silvio O. Conte National Fish and Wildlife Refuge;

USDA Forest Service through Northeast Area Watershed Focus Funds.

Attachment A

Stream Walk Survey Form

CABIN BROOK/MEADOW BROOK/JEREMY RIVER STREAM WALK SURVEY

NAME(S): _____ NAME OF STREAM: _____
 _____ CURRENT WEATHER: _____
 PHONE(S): _____ PREVIOUS 3 DAYS WEATHER: _____
 DATE: _____

DID YOU SURVEY THIS WHOLE SECTION OF THE STREAM? YES NO – Which section(s) were not surveyed? Why?

Make all observations facing DOWNSTREAM.

NOTE: Items marked with an asterisk (*) may indicate an area of concern. If observed, you may need to describe further on the attached Areas of Concern sheet.

1. Segment code (e.g. 1A): _____ Locate starting point of segment on map, and label using segment code letter (e.g. – A)

Describe location and extent of segment (i.e. from ___ to ___). If possible, use landmarks and road names.

2. AVERAGE WATER DEPTH _____ feet AVERAGE WATER WIDTH _____ feet

3. HOW WOULD YOU DESCRIBE THIS SECTION OF THE STREAM? CHECK ANY THAT APPLY:

- A. ___ Cascade ___ Step-Pool sequence ___ Pool-Riffle sequence ___ Glide ___ Run
 B. ___ Steep (slope > 3%) ___ High Gradient (1% ≤ slope ≤ 3%) ___ Flat (slope < 1%)
 C. ___ Closely associated with an inland or riverine wetland (marsh, meadow, swamp).
 ___ Flood control or water reservoir area or lake (>5ac.)
 ___ Piped* ___ Channelized* ___ Lined (stone, concrete)*
 ___ Other (Describe):

4. STREAMBANK COVER/VEGETATION:

| Type | Few | Common | Abundant | Absent |
|---|-------|--------|----------|--------|
| Conifers (pines, higher than 20 ft.) | _____ | _____ | _____ | _____ |
| Deciduous (oaks/maples, higher than 20 ft.) | _____ | _____ | _____ | _____ |
| Small trees and shrubs (smaller than 20 ft.) | _____ | _____ | _____ | _____ |
| Grasses/Emergent (cattails/rushes) | _____ | _____ | _____ | _____ |
| Lawns* | _____ | _____ | _____ | _____ |
| Natural Rock/Ledge | _____ | _____ | _____ | _____ |
| Artificial (concrete/riprap/walls/buildings)* | _____ | _____ | _____ | _____ |
| Non-native invasive plants (purple loosestrife, phragmites, other? – please note) | _____ | _____ | _____ | _____ |

Are streambank soils mostly exposed? Yes* No

Does vegetation appear natural or cultivated? _____

5. LOOKING DOWNSTREAM, ESTIMATE THE AVERAGE, UNINTERRUPTED, WIDTH OF RIPARIAN VEGETATION:

Right side: ___ <25'* ___ 25-100' ___ >100'
Left side: ___ <25'* ___ 25-100' ___ >100'

6. ESTIMATE THE NUMBER OF:

Impoundments (Small ponds, Dams)* _____ Discharge pipes* _____ Stream Crossings _____

*Height of Dam:

7. VISUALLY DESCRIBE WATER CONDITIONS:

___ Clear ___ Turbid* ___ Green* ___ Rusty - Red*
___ Yellow - Brown* ___ Foamy* ___ Oil Slicks* ___ Milky*

If water is a color other than clear, does anything appear to be affecting water quality?

YES* NO

COMMENTS:

8. DESCRIBE AQUATIC VEGETATION:

A. ALGAE GROWTH:

| | | | | |
|---------------|----------------|-------------------|--------------|-------------------------|
| Where? | ___ Absent* | What kind? | ___ Floating | ___ Matted on substrate |
| | ___ In spots | | ___ Hairy | ___ Brown |
| | ___ Everywhere | | ___ Scum | ___ Green |

B. Large Aquatic Plants:

| | | | | |
|---------------|-----------------|-------------------|--|----------------------------------|
| Where? | ___ Everywhere* | What kind? | ___ Floating free (duck weed) | ___ Submerged rooted (eel grass) |
| | ___ In spots | | ___ Floating rooted (water lily) | ___ Emergent (cattails, rushes) |
| | ___ Absent | | ___ Submerged free (coontail, milfoil) | |

Does anything appear to be contributing to the algae blooms (discharge pipes, runoff)?

YES* NO

COMMENTS:

9. APPROXIMATE COMPOSITION (%) OF SUBSTRATE MATERIALS (SUM SHOULD EQUAL 100%):

| | | |
|------------------------------|--|----------------------|
| ___ % Silt or Clay (smooth)* | ___ % Sand (gritty)* | ___ % Gravel (.1-2") |
| ___ % Cobbles (2-10") | ___ % Boulders (>10") | ___ % Bedrock |
| ___ % Concrete or Riprap | ___ % Organic (Plant debris, muck, and shells) | |

Does anything appear to be contributing to excessive fine sediment deposits on the streambanks, or sediment deltas (storm pipe outlets, tributaries, or runoff)?

YES* NO

COMMENTS:

10. DESCRIBE THE SMELL OF WATER AND SEDIMENTS:

| | | | |
|--------------|-----------------------|-------------|-----------|
| ___ None | ___ Rotten Eggs* | ___ Sewage* | ___ Musky |
| ___ Oil/Gas* | ___ Other (describe): | | |

11. IMMEDIATELY ADJACENT LAND USES:

Label: 1 = most 4 = least 0 = none

Rural Residential Suburban Agricultural Industrial
 Urban Residential Forest Commercial Recreational
 Schools Non Residential Roads Protected Open Space

12. INDICATE SPECIFIC POTENTIAL SOURCES OF POLLUTION ALONG THE STREAM:

Lawns/Gardens Parking Lots Roads
 Commercial Dumpsters Farms/Nurseries Yard Waste
 Golf Courses Failing Septic System Other (describe):

13. RECREATIONAL USE AND OPPORTUNITIES:

Visible human activities as evidenced by litter, bike & hiking trails, roads, camping areas.
Do you see people using the river for recreation? How many? Describe activities.

Potential off road parking within 500 ft of the stream

Existing or potential access to the stream without disturbance to residents.

Watercourse is at least 10 feet wide and 1 foot deep, and for the most part is free of obstructions for non-powered boating. Describe any visible boating activity.

14. (Optional) FISH AND WILDLIFE - IF YOU ARE ABLE, LIST AND ESTIMATE NUMBERS OF ANY FISH AND WILDLIFE THAT YOU CAN IDENTIFY UNDER THE FOLLOWING CATEGORIES, AND MAKE NOTE OF NESTS AND NESTING BOXES:

- A. Birds of Prey (osprey, hawks, etc.)
- B. Water Fowl (wood ducks, mallards, Canada geese*, etc)
- C. Riverine Fur-Bearers (muskrat, beaver, otter, etc.)
- D. Water Birds (herons, egrets, etc.)
- E. Song Birds & Other Small Birds (black birds, robins , blue jays, etc.)
- F. Amphibians & Reptiles (salamander, snakes, etc.)
- G. Fish (trout, bass, alewife, etc.)
- H. Aquatic Insects (mayflies, stoneflies, caddisflies, etc.)
- I. Mollusks (clams, mussels, snails)

15. ADDITIONAL COMMENTS OR OBSERVATIONS:

Please return completed surveys and film to the Middlesex County Soil and Water Conservation District, deKoven House – 27 Washington Street, Middletown, CT 06457

Further Description of Areas of Concern

| Site Number | Type of Concern(s) | Description of Location (Locate & Label on Map) | Description of Site |
|-------------|--------------------|--|---------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Label: Assign a number to each impaired site you identify starting with the number 1.

Areas of Concern: Excessive algae growth, Barriers to fish passage (dams, culverts above low flows, obstructions higher than 8 inches), Litter, Sedimentation, Streambank erosion, Lack of riparian vegetation, Discharges (from pipes or channels), Channelization or Streambank manipulation, etc.

Location: Approximate distance and direction from nearest landmarks (i.e.- Roads, Buildings, Power lines, etc.).

Description: Describe conditions - water colors, smells, algae and large aquatic plant growth, adjacent land uses, potential sources of pollution, etc.

INSTRUCTIONS:

The purposes of this form are to collect information about the overall characteristics of a particular section of the stream, and to identify impaired sites where restoration efforts can be pursued. **A separate survey sheet should be filled out every time you observe abrupt changes in the physical characteristics of the stream** (gradient, width, depth, substrate materials, streambank vegetation, channel pattern, etc.), which would indicate that you are in a different segment of the stream. Use questions 2, 3 and 4 as guidelines.

The minimum length of a stream segment should be **1000 feet**. Large ponds (>5 acres), lakes, or reservoirs should have a separate survey sheet.

Write the name of the stream as it appears on the topographic map. If the stream does not have a name, write **unnamed**, and describe its location. Use capital letters in alphabetical order to label stream segments as you survey the stream. Make sure to mark the segments on the topographic map. Because the survey may be conducted by canoeing or walking, **observations should be recorded facing downstream** to maintain consistency.

1. With as much detail as possible describe the location and the extent of the area that is being covered. When possible, use road names or landmarks.
 2. Measure or estimate the average water width and depth of the stream.
 3. Select the statements that best describe this section of the stream. If you do not feel it meets the provided descriptions, describe under *other*.
- Cascade:** narrow and steep channel, fast turbulent flows, rocky substrate. **Step:** Steep stairway pattern channel, fast turbulent flows, large substrate materials. **Riffle:** shallow fast running water, substrate mostly composed of cobble and gravel. **Pool:** slow flowing area, deeper than adjacent areas, but not wide enough to change the character of the stream (not a pond). **Glide:** section with smooth flowing deep water, substrate materials tend to have little influence on the flow of surface water. **Run:** long channels, somewhat turbulent and fast flow in low to moderate slopes, with occasional riffles and diversity of substrate materials.
4. Describe the presence and type of streamside cover. This description helps define the section's ecosystem and health.
 5. **Riparian** zones are areas adjacent to watercourses. Riparian vegetation refers to the plants that naturally occur in riparian zones. Lawns and mowed areas should not be considered natural riparian vegetation. Estimate the uninterrupted width of riparian **vegetation** on both sides of the stream.
 6. As you walk, keep count of any discharge pipes, small ponds (<5 acres), and dams. At the end of the section, record the total numbers observed.
 7. Water color and clarity could indicate pollution problems in the stream. Also note floating foam or slicks in the water.
 8. **Algae** are mostly single cell plants. They can color the water green, and they can grow in colonies that can form long filamentous bodies or can form a mat on the stream's substrate. Algae are usually green and slimy and do not have any visible structural characteristics. Algae growth can point to nutrient problems in the stream. **Aquatic plants** are visible to the naked eye and have distinct features such as stems, leaves, and flowers. Their presence is a sign of biological productivity and of slow water flows.
 9. **Substrate:** the material that makes up the bottom (or floor) of a stream. There is a direct relationship between the stream's substrate and the rate of water flow. The composition of the substrate is indicative of fish habitat quality. Visually estimate in percentage the relative proportion of each of the substrate types listed.
 10. **Odors:** describe how the stream smells.
 11. Adjacent land uses can impact the water quality of a stream, especially through storm water discharges. Concentrate on describing the areas closer to this section of the stream. Label the four most abundant land uses, use 1 for the most abundant land use and 4 for the least.
 12. Indicate, from your observation, possible sources of pollution along the stream.
 13. If people are currently using the stream, describe this. If you see opportunities for recreational use, please describe.
 14. (Optional) If you are familiar with wildlife please fill out this section to the best of your ability.
 15. Please make note of any additional observations not noted in the preceding spaces.

Additional Sheet: Areas of concern are sections of the stream where the physical characteristics are indicative of conditions adverse to aquatic life and human uses. The concern should affect at least 50 feet of the stream. Use numbers to label every site you identify starting with the number 1.

NOTE: Sewage spills should be immediately reported to town officials. Oil or chemical spills should be immediately reported to DEP at (860) 424-3338.

Attachment B

Summary of Survey Data

Connecticut River Watch Program
 2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 9 – Meadow Brook – Mill Hill Road to Prospect Hill Road
 Survey Date: 6/21/02 Weather: Clear, warm

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/ Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|---|--------------------------|-------------------|---------------------|--|----------------------------|------------------------|---|--|--------------------------|--|-------------------|----------------------------------|
| 9A Mill Hill Road to mid-segment | 20 feet | 1.5 feet | Glide Flat slope | Deciduous (C) Small trees/shrubs (A) Grasses/Emergent (A) Non-native invasives* (F) | R >100 L >100 | Clear No smell | Algae in spots Aquatic plants absent | Silt/clay (80%) Sand (10%) Organic (10%) | Undeveloped (forested) | Discharge pipe enters brook above Mill Hill Road bridge (from auto repair shop?) | | Song birds and other small birds |
| 9B Mid-segment to Prospect Hill Road | 20 feet | 1.5 feet | Glide Flat slope | Deciduous (C) Small trees/shrubs (A) Grasses/Emergent (A) Non-native invasives* (F) | R >100 L >100 | Clear No smell | Algae absent Aquatic plants in spots | Silt/clay (80%) Sand (10%) Organic (10%) | Undeveloped (forested) | Roads | Potential access | Song birds and other small birds |

Connecticut River Watch Program
2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 10 – Meadow Brook and Jeremy River – Prospect Hill Rd. to Westchester Rd. commuter lot
 Survey Dates: 7/5/02, 7/11/02 Weather: Clear, warm

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|---|--------------------------|-------------------|---------------------------|---|----------------------------|------------------------|---|--|---|---|--|---|
| 10A Prospect Hill Road to 750 feet upstream of Jeremy River confluence | 10 | 1 foot | Pool-Riffle Flat slope | Deciduous (C) Small trees/shrubs (A) Natural Rock/Ledge (F) Non-native invasives (F) | R <25 L 25-100 | Clear No smell | Algae in spots: matted on substrate Aquatic plants absent | Silt/Clay (50%) Cobbles (30%) Sand (20%) | Undeveloped (forested) Non-residential roads Agricultural | Farms/Nurseries Excavation/dumping on streambank just downstream of Prospect Hill Road | Potential access | Raccoon tracks Many minnows and fingerlings Damsel/dragon flies; water scooters |
| 10B Jeremy River confluence to Westchester Rd. commuter lot | 12 | 1.5 feet | Pool-Riffle Flat slope | Conifers (C) Deciduous (C) Small trees/shrubs (A) Natural Rock/Ledge (F) Riprap (adjacent to Route 2) | R 25-100 L >100 | Clear No smell | Algae absent Aquatic plants absent | Sand (60%) Cobbles (20%) Boulders (10%) Bedrock (10%) | Undeveloped (forested) Non-residential roads | Roads | Evidence of human use: fishing access trail, trash Potential parking and access | Frogs Trout (6") |

Connecticut River Watch Program
2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 11 – Jeremy River – Westchester Rd. commuter lot to Mill Site
 Survey Dates: 10/1, 10/15, 11/5/00 Weather: Clear, sunny and cool, some rain on 10/12/01

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/ Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|---|--------------------------|-------------------|------------------------------|---|----------------------------|------------------------|---|--|--|--|---|---|
| 11A Westchester Rd. commuter lot to large pool ~1000 feet downstream | 30 | 1.5 feet | Pool-Riffle High gradient | Conifers (F) Deciduous (A) Small trees/shrubs (C) Natural Rock/Ledge (C) Purple Loosestrife (?)* (F) | R 25-100 L >100 | Clear No smell | Algae in spots: scum, matted on substrate Large aquatic plants absent | Boulders (50%) Cobbles (25%) Gravel (15%) Sand (10%) | Undeveloped (forested) Recreational (bike path) | Parking Lots | Evidence of use: some fishing, litter Potential parking and access Too rocky for boating, though deep and wide enough | Raccoon tracks Abundant song birds and other small birds Small trout, bass, minnows Mayfly hatch, stonefly |
| 11B Large pool to large island that splits the river | 30 | 1.5 feet | Pool-riffle High gradient | Conifers (C) Deciduous (A) Small trees/shrubs (C) Natural Rock/Ledge (C) Non-native invasives (F) | R 25-100 L >100 | Clear No smell | Algae in spots: hairy, matted on substrate Large aquatic plants absent | Boulders (50%) Cobbles (25%) Gravel (15%) Sand (10%) | Undeveloped (forested) Recreational | Roads Small area of local dumping 50' from water | Evidence of use: fishing Access from bike trail Too rocky for boating, though deep and wide enough | Raccoon tracks Abundant song birds and other small birds Trout & bass fry Aquatic insects noticeable under most stones |
| 11C Large island to small island | 30 | 1.5 feet | Pool-riffle High gradient | Conifers (C) Deciduous (A) Small trees/shrubs (C) Natural Rock/Ledge (C) Non-native invasives (C) Grasses/Emergent (F) Artificial (F) | R 25-100 L >100 | Clear No smell | Algae in spots: hairy, matted on substrate Large aquatic plants in spots: submerged free & rooted | Boulders (45%) Cobbles (25%) Gravel (10%) Sand (10%) Silt/Clay (10%) | Undeveloped (forested) Recreational Rural Residential | Roads Yard Waste Fertilizer Runoff? Storm pipe | Evidence of use: fishing Potential parking and access Too rocky for boating, though deep and wide enough | Raccoon Abundant song birds and other small birds Fish evident Aquatic insects evident |

Connecticut River Watch Program
 2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 11 cont. – Jeremy River – Westchester Rd. commuter lot to Mill Site
 Survey Dates: 10/1, 10/15, 11/5/00 Weather: Clear, sunny and cool, some rain on 10/12/01

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/ Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|---|--------------------------|-------------------|--|--|----------------------------|--|---|--|--|--|--|---|
| 11D Small island to Westchester Road Mill site (dam) | 50 | 6 feet | Glide Flat slope Lined near building and dam | Conifers (C) Deciduous (A) Small trees/shrubs (C) Grasses/Emergent (F) Lawns (F) Natural Rock/Ledge (C) Artificial (C) Non-native invasives (F) | R <25 L 25-100 | Clear; some rusty-red; minor oil slick No smell | Algae in spots: green Large aquatic plants in spots: submerged free, submerged rooted & rooted | Silt/Clay (20%) Cobbles (20%) Concrete/Riprap (20%) Organic (20%) Sand (10%) Boulders (10%) | Undeveloped (forested) Industrial Rural Residential | Lawns/Gardens Parking Lots Roads Abandoned Mill | Evidence of use: fishing Potential parking and access Boating possible | Raccoons Songbirds and other small birds evident Amphibians and reptiles evident Bass Aquatic insects evident |

Connecticut River Watch Program
2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 12 – Mill Site to Cemetery (Westchester Road)

Survey Dates: 7/6/02

Weather: Sunny, hot

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/ Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|--|--------------------------|-------------------|--|--|----------------------------|---|---|---|--|---|---|--|
| 12A Mill Site to narrowing in river (~1000 feet downstream) | 35 | 2.5 feet | Pool riffle High gradient Lined at beginning | Deciduous (A) Small trees/shrubs (A) Lawns (F) Natural Rock/Ledge (A) Artificial (F) Non-native invasives (F) | R 25-100 L <25 | Clear; some yellow-brown, rusty-red, foam No smell | Algae in spots: matted on substrate Aquatic plants absent | Boulders (50%) Cobbles (20%) Gravel (20%) Sand (10%) | Rural Residential Agricultural Commercial Non Residential Roads | Lawns/Gardens Roads Auto body shop Old industrial dumping area | Evidence of use: fishing Potential parking and access | Hawks Evidence of beaver Blue jays, blackbirds Trout, bass, sunfish Stoneflies, caddisflies, and other nymphs evident |
| 12B Narrowing in river to Cemetery | 40 | 2 feet | Pool riffle High gradient Closely associated with inland or riverine wetland Left side steep; right opens to meadow | Conifers (C) Deciduous (A) Small trees/shrubs (A) Grasses/Emergent (F) Natural Rock/Ledge (C) | R >100 L >100 | Clear No smell | Algae in spots: hairy, matted on substrate Aquatic plants absent | Boulders (50%) Cobbles (25%) Gravel (15%) Sand (10%) | Undeveloped (forested) Rural Residential Agricultural Recreational | Fertilized hay field | Evidence of use: fishing, dirt bike trail Potential parking and access Too rocky for boating, though deep and wide enough | Birds of prey on occasion Waterfowl seldom Evidence of beaver Abundant songbirds and other small birds Many bass and possibly trout fry Aquatic insects evident |

Connecticut River Watch Program
2002 Cabin Brook/Meadow Brook/Jeremy River Stream Walk Survey – Summary of Survey Data

Segment 13 – Cemetery (Westchester Road) to Salmon River confluence (1st 1400 feet not walked)

Survey Dates: 7/1 & 7/5/02

Weather: Sunny, hot

| <i>Section Code & Location</i> | <i>Avg. Width (feet)</i> | <i>Avg. Depth</i> | <i>Profile</i> | <i>Streambank Cover/ Vegetation</i> <i>*invasive species</i> | <i>Buffer Width (feet)</i> | <i>Water Condition</i> | <i>Aquatic Vegetation</i> | <i>Substrate Materials</i> | <i>Primary Land Uses</i> | <i>Potential Pollution Sources and Concerns</i> | <i>Recreation</i> | <i>Wildlife</i> |
|--|--------------------------|-------------------|--|--|----------------------------|------------------------|--|--|---|--|---|--|
| 13A 1400 feet downstream of cemetery to ~1100 feet downstream (length of parcel 895) | 50 | 2 feet | Cascade Step-Pool Pool-Riffle Glide Run High gradient | Conifers (A) Deciduous (C) Small trees/shrubs (A) Natural Rock/Ledge (C) Streambank soils mostly exposed | R >100 L >100 | Clear No smell | Algae everywhere: scum, matted on substrate, brown Aquatic plants absent | Cobbles (50%) Sand (30%) Boulders (15%) Organic (5%) | Undeveloped (forested) Protected Open Space Recreational | Lawns/Gardens Roads Yard Waste Fertilizers Dead/dying hemlocks | Evidence of use: dirt bikes, ATVs, swimming, bicycling, hiking, horseback riding, fishing, kayaking, canoeing | Juvenile Atlantic salmon (about 12--recently stocked); Brown trout (about 24, 2 dead) |
| 12B ~2500 downstream of cemetery to confluence with Salmon River (length of parcel 901) | 50 | 2 feet | Cascade Step-Pool Pool-Riffle Glide Run High gradient | Conifers (A) Deciduous (C) Small trees/shrubs (C) Grasses/Emergent (F) Natural Rock/Ledge (C) | R <25 L >100 | Clear No smell | Algae everywhere: scum, matted on substrate, brown Aquatic plants absent | Cobbles (50%) Sand (30%) Boulders (10%) Gravel (5%) Organic (5%) | Undeveloped (forested) Agricultural Protected Open Space Recreational | Lawns/Gardens Roads Yard Waste Fertilizers Dead/dying hemlocks | Evidence of use: fishing, non-motorized boating Potential parking and access | Yellow finches |

Attachment C

Stream Walk Photographs



In the downstream section of Meadow Brook (just downstream of Prospect Hill Road), volunteers discovered an area of excavation or dumping of soil adjacent to the stream.

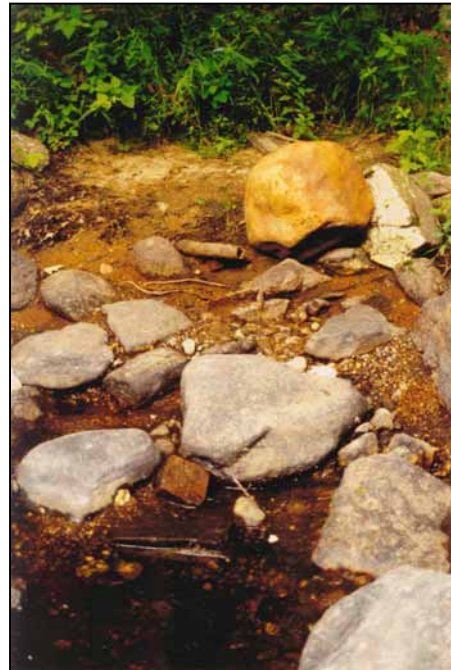
The Jeremy River was typically rocky with boulders a predominant component of the substrate material.



In the downstream segment of the Jeremy River, natural rock ledges were more common on the streambank, and dying hemlocks were noted as a potential concern.



The abandoned mill site at Westchester Road was not only an eyesore, but was noted as a potential source of pollution to the Jeremy River.



A 100-foot section of Jeremy River steambank was stained a rust color, with old metal debris embedded in the bank. In the same area, flakes of a colored substance (paint, dye?) were observed near the river.



An ATV/dirt bike trail along the Jeremy River in the downstream segment appears to be contributing to streambank erosion and sedimentation of the stream.

