

Mill Brook

Stream Habitat Walk

Cumberland County, Maine
May 31, 2003

Conducted By Members of Presumpscot River Watch, Highland Lake
Association, Casco Bay Estuary Program,
& the Maine Stream Team Program

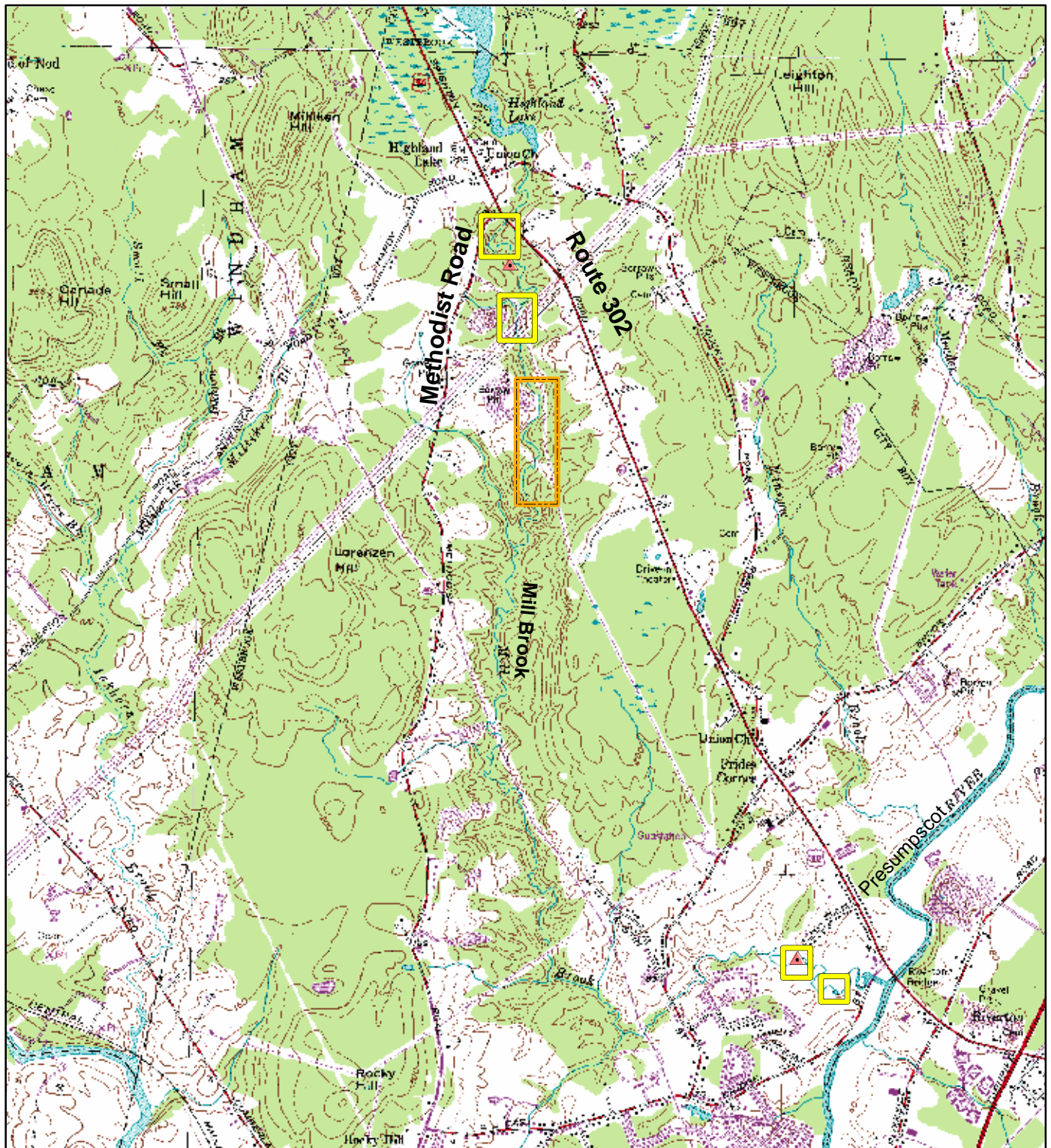
Report Date: September 18, 2003
Prepared by the Maine Stream Team Program






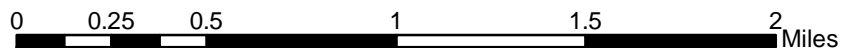
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Mill Brook Survey Sites Stream Habitat Walk 2003

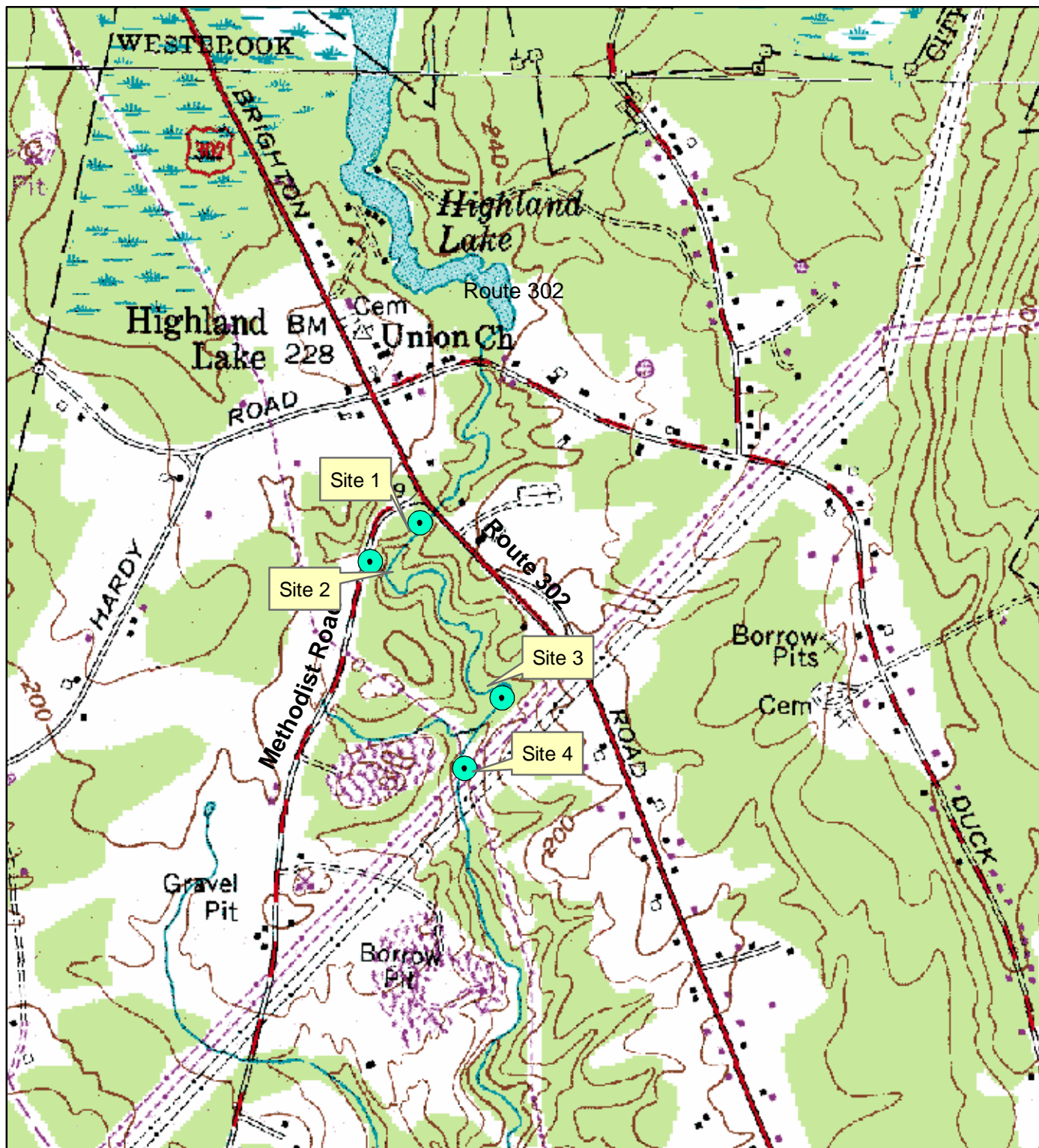


-  Stream Habitat Walk Area
-  Reconnaissance-Only Area
-  Temperature Logger Locations



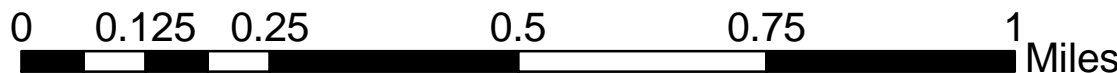
By MaryLee Haughwout
Maine Stream Team Program
July 29, 2003

Mill Brook-Upstream Sites Stream Habitat Walk 2003

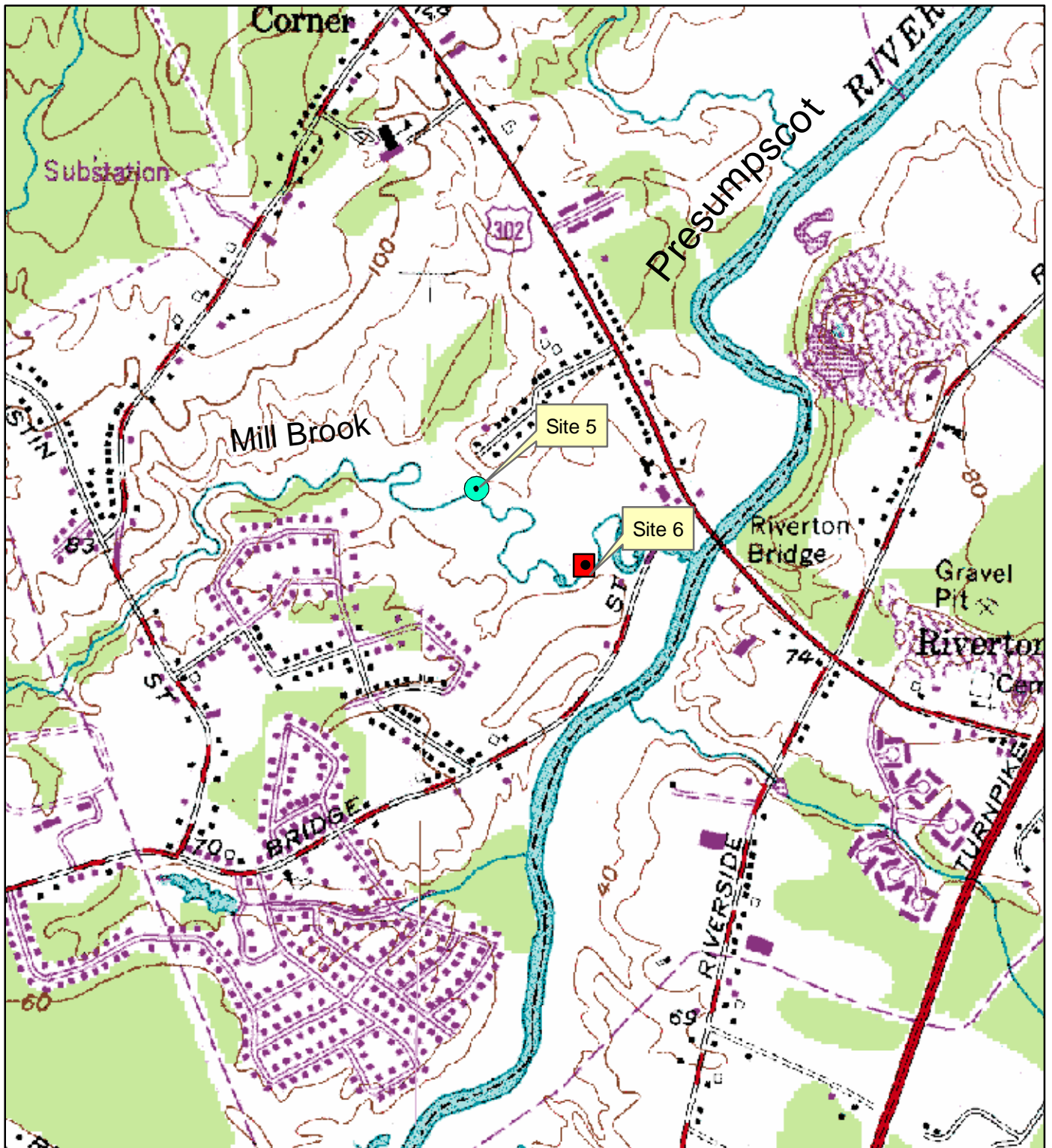




● GPS locations taken in the middle of the 300' survey sections

By MaryLee Haughwout
Maine Stream Team Program
July 21, 2003

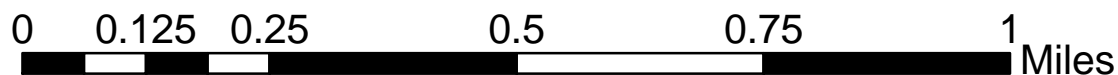


Mill Brook-Downstream Sites Stream Habitat Walk 2003



-  GPS locations taken in the middle of the 300' survey section
-  Approximate GPS location

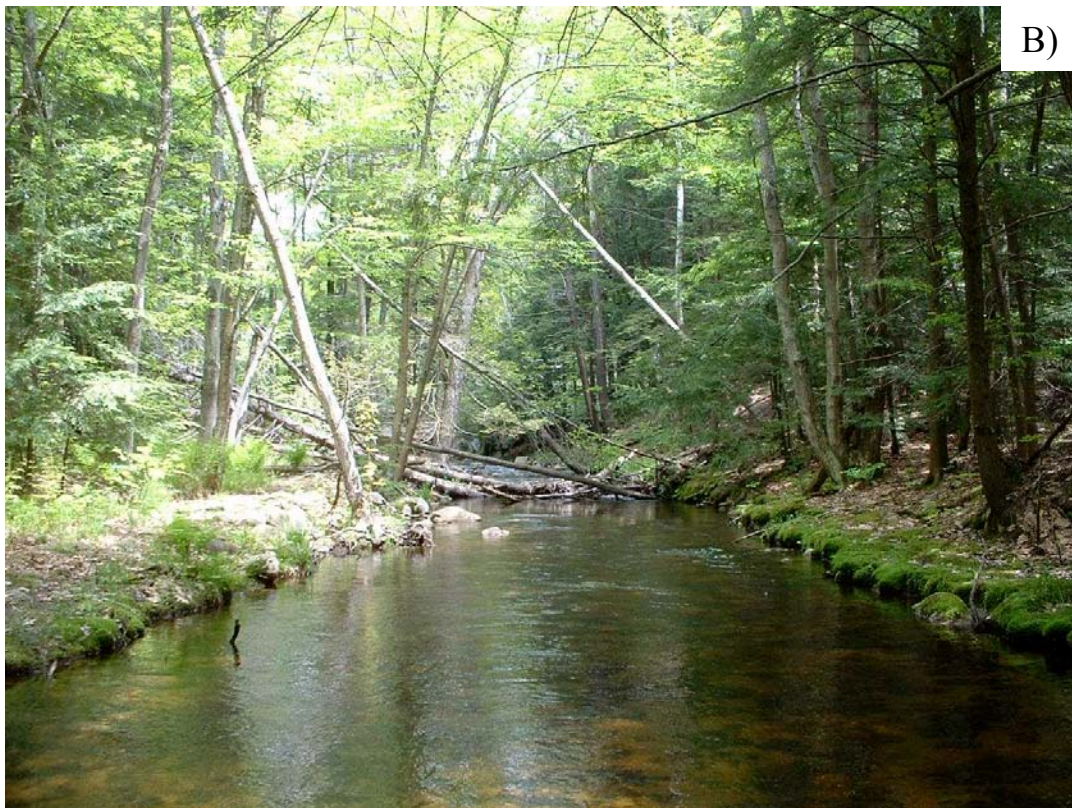
By MaryLee Haughwout
Maine Stream Team Program
July 21, 2003



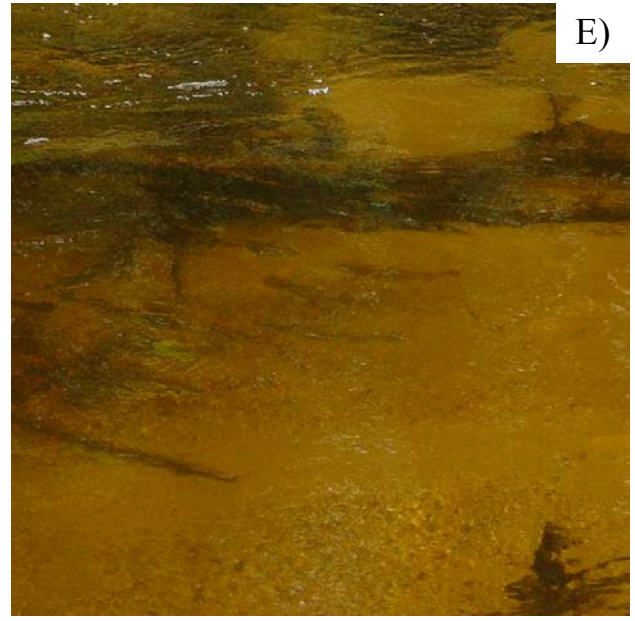
Mill Brook

Stream Habitat Walk Photographs

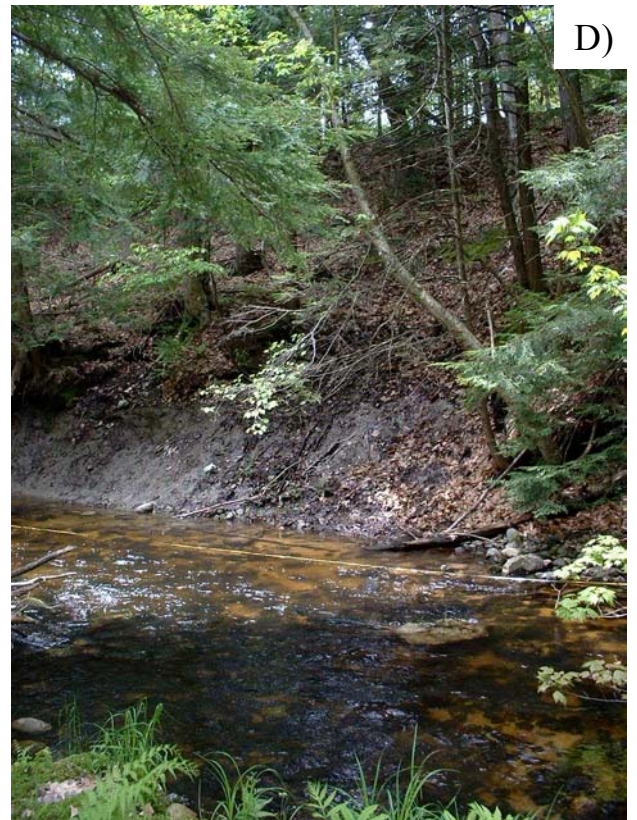
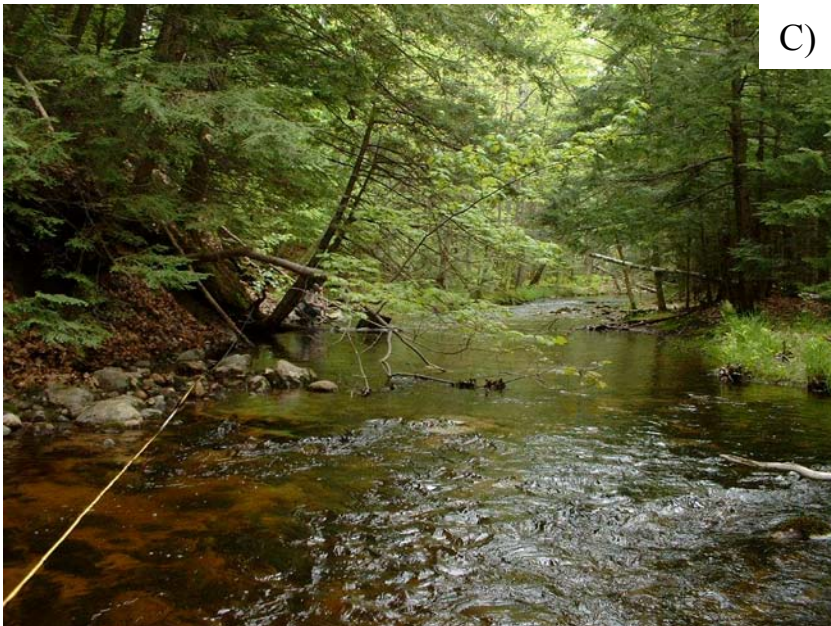
All photographs were taken on May 31, 2003 unless otherwise indicated.



Site 1 photographs: A) the Route 302 bridge over Mill Brook and a riffle; and B) a run plus a woody debris dam.



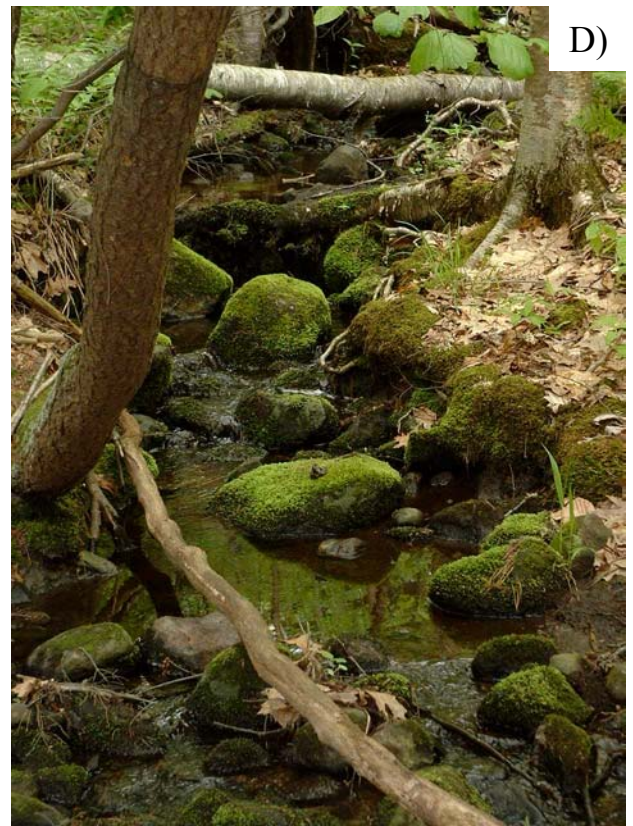
Site 1 photographs: A) scoured tree roots downstream of the Route 302 bridge/culvert; B) a woody debris dam and pool; C) a representative photograph of substrate in a run; D) trash on the streambank; E) alewives; and F) water level in the culvert (approx. 1 inch) (photo F taken on 7/14/03).



Site 2 photographs: A) a riffle, boulder, and pool sequence; B) a riffle; C) run habitat; and D) groundwater seepage out of a bank along with some apparent scour and/or bank sloughing.



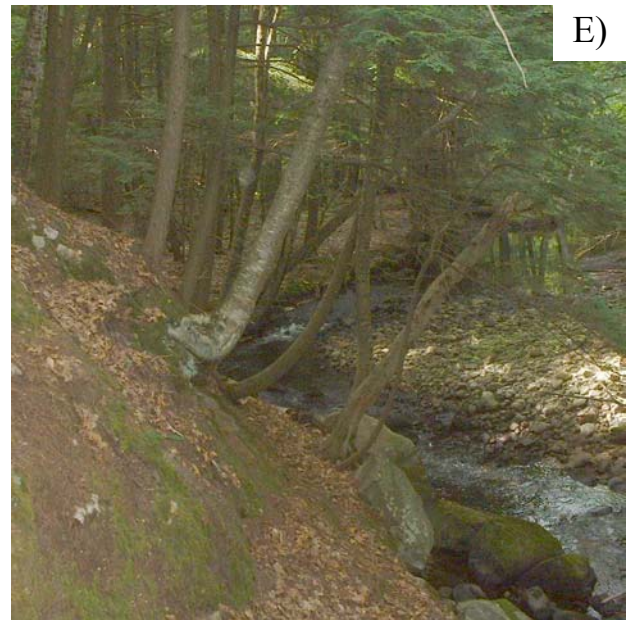
A)



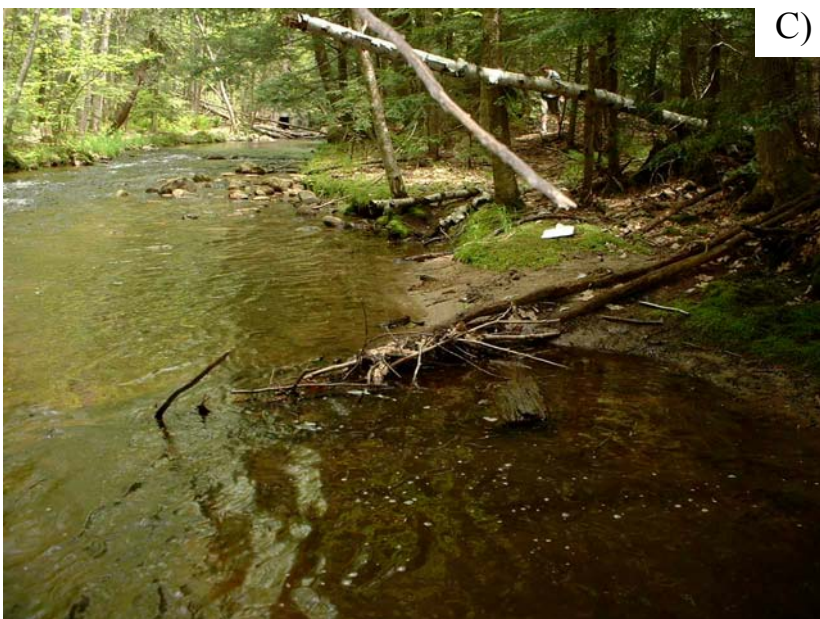
D)



B)

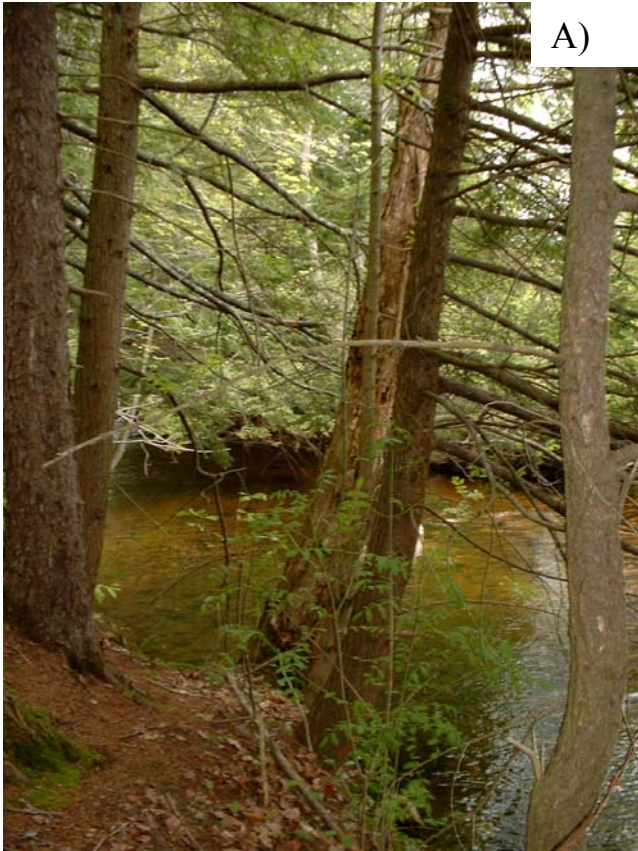


E)

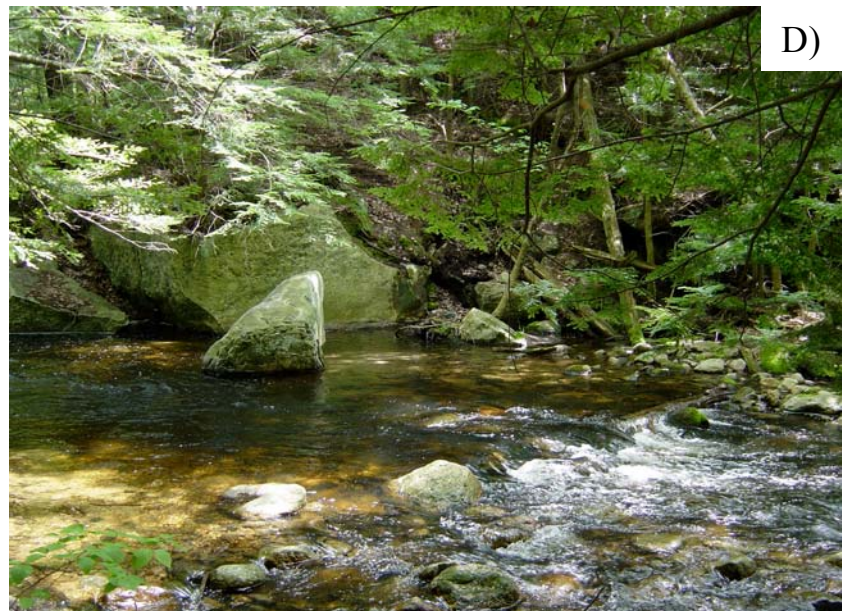


C)

Site 2 photographs: A-B) signs of sediment inputs via a tributary containing some road runoff; C) sediment accumulation on the bank of Mill Creek opposite from the tributary input; D) a close-up photo of the tributary (notice the frog on the rock in the middle); and E) some “J-shaped” tree trunks on a nearby, steep bank, indicating relatively slow hillside erosion rates in the local area.



Site 3 photographs: A-B) view of stream through forested banks (note the J-shaped trees - they suggest that bank erosion rates may be relatively slow in the local area; C) a shaded pool.; and D) a riffle.





A)



D)



B)



E)



C)

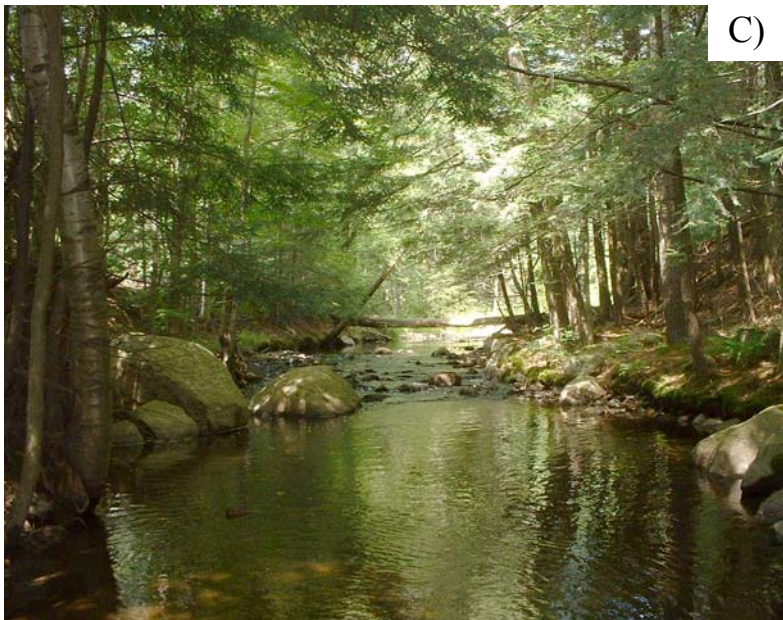
Site 3 photographs: woody debris dams (photos A, B, D, and E were taken on 7/14/03). Fallen large woody debris is important for creating stream habitat diversity and for trapping / retaining food resources for aquatic organisms. However, large numbers of fallen trees may sometimes indicate that the channel is trying to widen, in response to human impacts to the stream. More investigation may be needed to determine the types and stability of processes occurring in Mill Brook.



Site 4 photographs: A) recent riparian cutting along brook in powerline area; B) typical vegetation included bushes less than 10' in height such as young alders; C) *Elodea* sp. (American waterweed) found on July 14th (*Elodea* is an aquatic plant that is native to Maine, unlike Eurasian and variable water milfoil, both of which are exotic/invasive plants); D) Mill Brook in the powerline area, where shade is sparse; and E) looking downhill at the powerline area (the arrows point to where the brook is located; the stream is flowing right to left) (this photo was taken on 7/25/03).



Site 4 photographs of ATV impacts: A & D) ATV bridge over Mill Brook; B) tire ruts alongside the brook; C) ATV crossing through the stream adjacent to the bridge; and E) trail leading to stream.



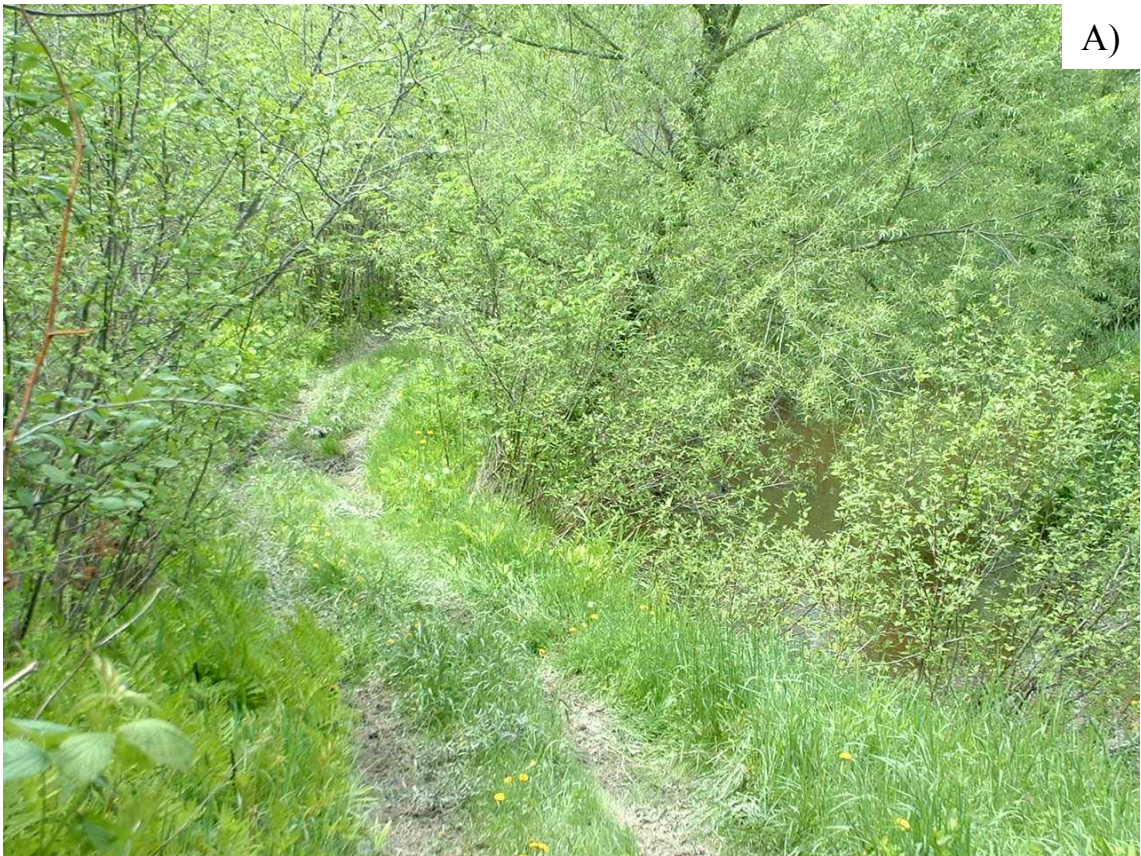
Site 4-B* photographs: A-B) Mill Brook and streamside areas in the vicinity of a gravel mining operation (note the berm wall on one side of the stream - it currently is serving as a barrier between a stormwater detention pond and the stream) and C-D) pools, riffles, and streamside forest. *These photos were taken on July 25, 2003, on a reconnaissance walk of this area, which is located downstream of Site 4 (see the map on page 2).



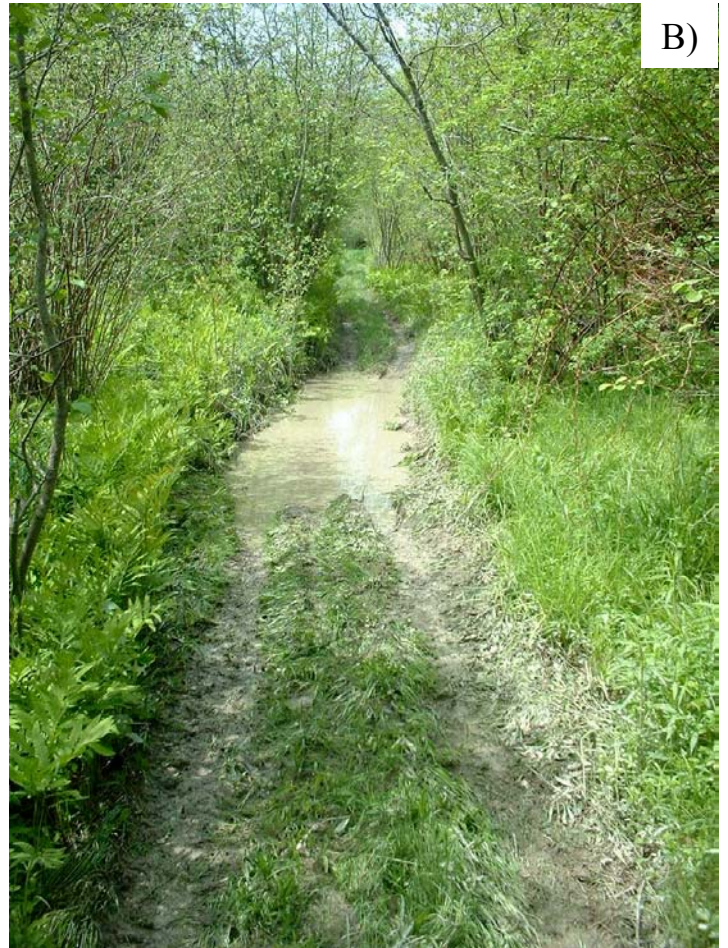
Site 4-B* photographs: A-B) signs of aggradation (that is, sediment accumulation or bar formation) in the middle of Mill Brook's channel and C-D) local ATV trail impacts. *These photos were taken on July 25, 2003, on a reconnaissance walk of this area.



Site 5 photographs: A-B) Looking upstream and downstream from the ATV bridge shown in photo C; C) ATV bridge; and D) a small debris dam perhaps created by beaver.



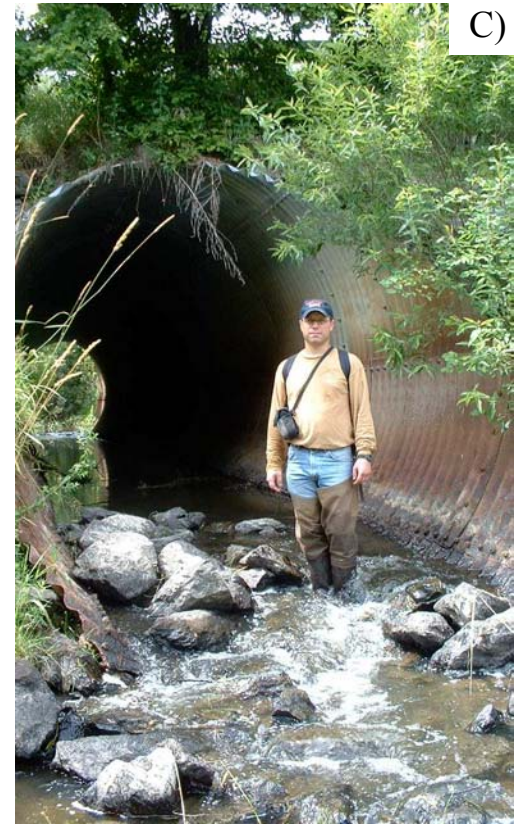
Photographs collected near and between Sites 5 & 6: A-B) muddy ATV trails located a few feet away from Mill Brook. Note that the brook is fairly hidden behind some trees and shrubs on the right side of photo A.



Photographs collected near and between Sites 5 & 6: A-C) muddy ATV trails located a few feet away from Mill Brook. The brook is fairly hidden behind some trees and shrubs in the upper-central location of photo A. Also note the drainage off of the ATV trail into the brook in this photo.



Site 6 photographs: A-C) meandering, low gradient, silty-sandy-bottomed stream; and D) a manhole above a sewer line and an ATV trail near Mill Brook. Photo C was taken on 5/20/03 and it is situated just upstream of Bridge Street.



Photographs of the culverts underneath Bridge Street: A) taken on May 20, 2003; and B-C) taken on July 14, 2003.



A)



B)

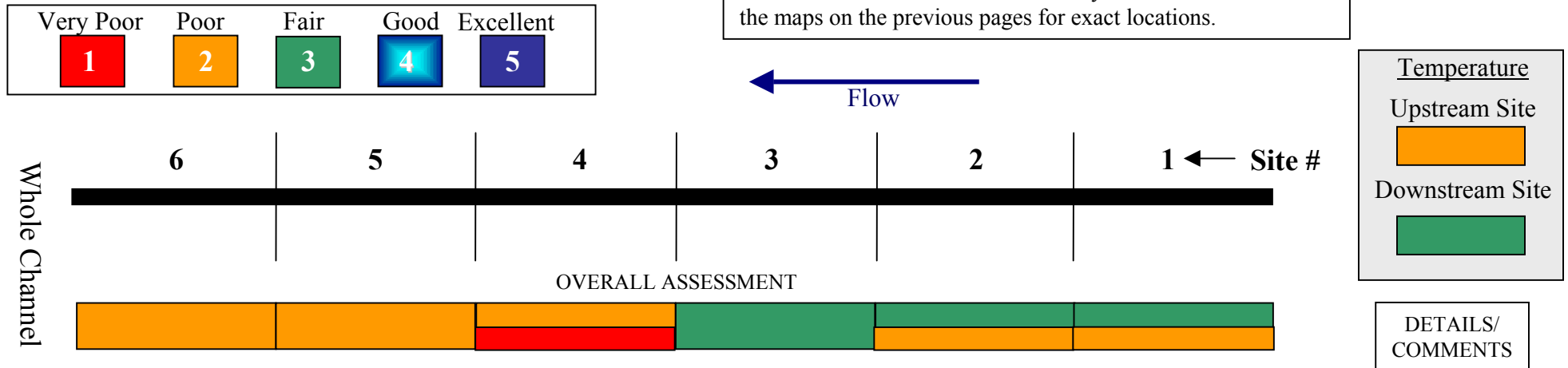


C)

Photographs taken near where Mill Brook drains into the Presumpscot River: A) sandy banks; and B-C) alewives entering Mill Brook.

Figure 1. Overall Assessment.

NOTE: The simple stream drawings (thick black line) on the pages containing Figures 1, 2, and 3 next three pages are not meant to show exact locations of study sites. Please refer to the maps on the previous pages for exact locations.



General Comments:

> A number of land-uses in close proximity to Mill Brook's channel and riparian (streamside) zone area appear to threaten the stream's water quality and in-stream habitat conditions. Some of these land-uses include ATV (all-terrain vehicle) trails, powerlines (and their associated clearings of most vegetation except grasses), roads, a sewer line, and a gravel quarry. Other land-uses known to occur in the area, but that were not detailed in this survey, include a dam and Highland Lake, a dump, a horse farm, and suburban development. For the sites that were included in this survey, ATV trails, roads (sources of polluted runoff), and water warming via powerline clearings and the existence of an upstream lake/dam appeared to be the land-uses most threatening to the brook and its communities.

> On average, the in-stream and near-stream habitats, from a trout and salmon habitat perspective (except for water temperature), generally were "fair" in areas relatively removed from human activities and "poor" to "very poor" in areas near human encroachment. This was concluded, in part, due to the fairly high embeddedness of the much of the larger channel bottom materials (e.g., cobbles and gravels). In other words, potential spawning habitat areas appeared to have lots of sands and silts in the cracks and crevices of the large rocky materials on much of the channel bottom, including the faster riffle areas. This may be due in part to sediment pollution from road runoff, ATV trail erosion, and riparian (streamside) areas. However, it is important to note that this may, in part, be a natural occurrence due to the fact that much of local surficial geology has a large presence of sands and clays (see surficial geology map for more information). From adult trout/salmon and macroinvertebrate (e.g., aquatic insects, crustaceans, etc.) perspectives, habitat was slightly better near sites 1, 2, 3, and 4-B due to their relatively rockier channel bottom, water re-aeration (due to turbulence), and shading conditions. Except for shading, these conditions were partly a result of these sites naturally having a greater slope (gradient) than most of the downstream sites.

> Temperature data from continuously-recording data loggers suggested that water temperatures generally are sub-optimal, at best, for trout and salmon. The relatively healthy riparian zone in much of the stream does appear to help cool the waters as it moves from upstream to downstream locations. Highland Lake, its dam, and the relatively open and shallow area downstream of the dam, which are at the upstream end of the stream, likely are the features primarily responsible for warmer waters in the upper reaches of the stream.

Recommendations:

- > Further investigation regarding the riparian zone is recommended - especially at the powerline areas (near sites 4 and 4-B) and the lower brook sites (near sites 5 and 6). It would be worth knowing whether these areas, especially at the lower, apparently minimally-disturbed sites, would the vegetation type naturally be just a mix of shrubs, grasses, and smaller riparian trees (e.g., alder) as a result of what might be locally moist, hydric soils, or should there also be larger conifer and deciduous trees in the area? There may have historically been a large-scale tree harvest, perhaps about the time the sewer line was put in place. Another question might be: “Could anything be done to enhance the riparian vegetation conditions?”. In other words, are the conditions right for doing riparian vegetation restoration projects at the lower brook sites or powerline areas (assuming the landowners would permit it)?
- > Further investigation into why so much of Mill Brook’s channel bottom is embedded is also recommended. This includes investigation into the influence of local geologic conditions versus the contribution of sediment pollution from roads and erosion.
- > Conduct a fluvial geomorphological investigation of the watershed. This investigation would lend insight into the current degree of stability of the stream as well as the potential impact of erosion and sediment inputs into the stream and riparian zone alterations as well as the influence of water and in-stream-sediment regulation (by the dam) and the local geologic setting on the stability and quality of in-stream and streamside habitats.
- > Keep the existing, intact riparian (streamside) forest areas protected in order to insure provision of shading, bank stability, and small / large organic matter to the stream. Small and large organic matter, such as leaves, twigs, and logs, is a source of habitat diversity as well as both food and protective cover to aquatic organisms in streams and rivers.
- > Investigate potential fish passage issues at all the culverts on the stream.
- > Conduct more stream walks on sites not included in this survey, including small tributaries to Mill Brook which might provide cold water to certain areas of the brook that can provide cold-water refugia to fish such as salmonids during warm periods of the year.

Site Specific Comments

Site 1) Major concerns: Sediment and other associated pollutants from nearby roadways. Also, trash was a problem here. The stream in this area appears as though it may have been straightened (channelized) historically, and the right bank appears as though it may have had fill added to it to turn it into a berm.

Site 2) Major concerns: Input of sediment and other associated pollutants from nearby roadways and drainage as well as some steep banks.

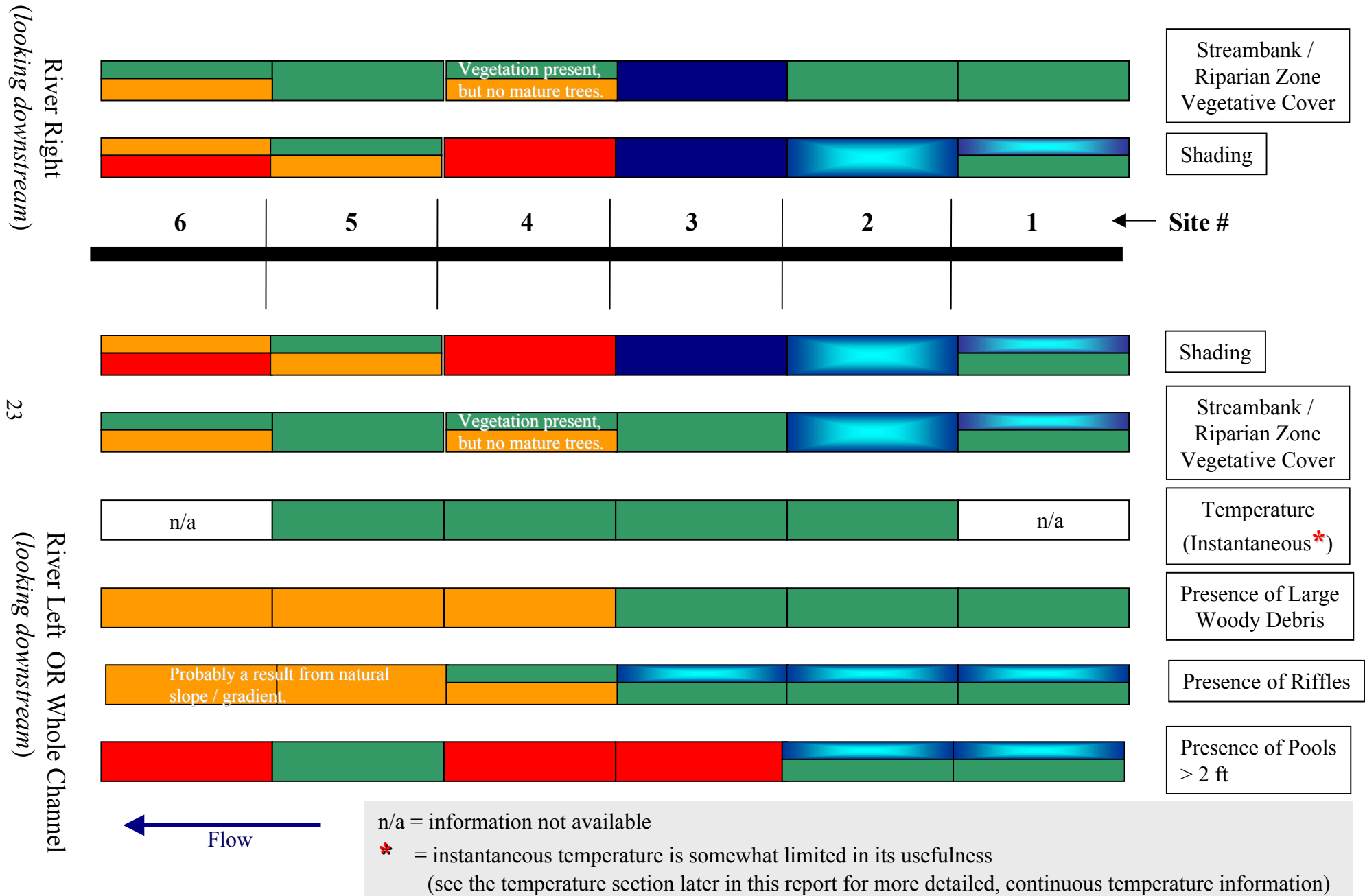
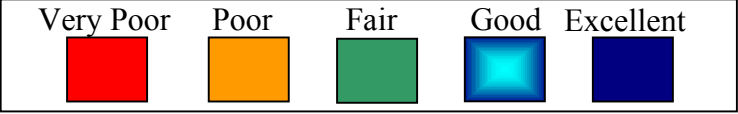
Site 3) As the stream approaches the powerline area, the landform shapes suggest that this particular stretch of stream may have been straightened or channelized in the past. This might explain why this section of stream appears to be quite wide and shallow, and also why so many trees appear to be falling into the stream.

Site 4) This area has been heavily disturbed by powerline-area clearing and associated ATV trail use. There is a high potential for erosion and sedimentation, as well as stream shading/temperature, problems here.

Site 4-B) This site only was only subjected to a reconnaissance walk. However, this rapid survey discovered that sedimentation appears to be a problem, which is likely due to ATV trail use, upstream sources of erosion, as well as possibly a nearby gravel pit (although sediment settling basins are present here).

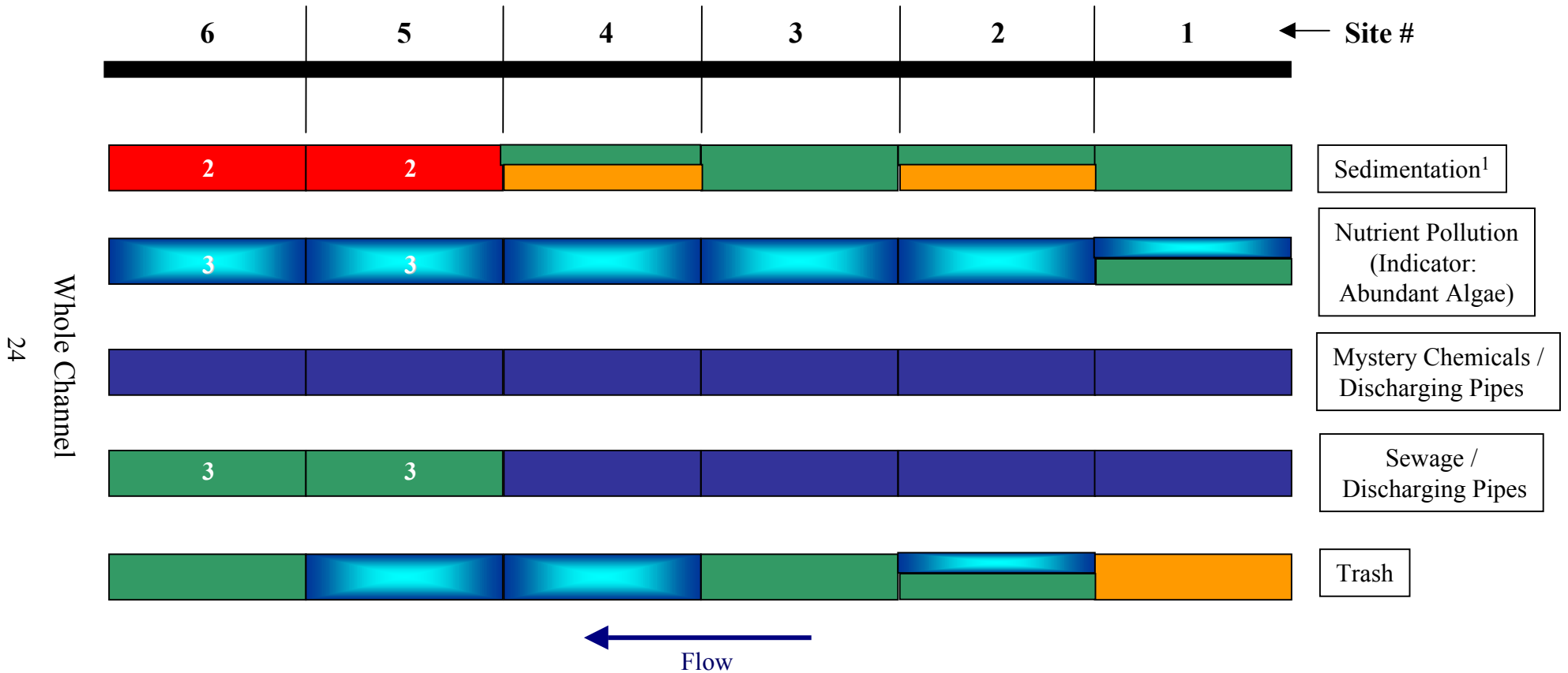
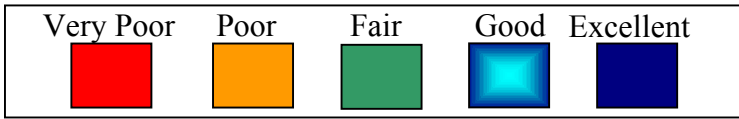
Sites 5 & 6) Major concerns: Sediment pollution from badly eroding ATV trails, thermal stress from a general lack of many mature, tall trees in the riparian zone, and potential sewer line leaks.

Figure 2. Habitat measures.



n/a = information not available
 * = instantaneous temperature is somewhat limited in its usefulness
 (see the temperature section later in this report for more detailed, continuous temperature information)

Figure 3. Evidence of Pollution or Other Impacts.



¹ Embeddedness is high in many places, although the fact that the local surficial has a lot of sands and clays in it may be a large influence.

² The substrate at these sites was almost entirely sands and silts. This may be due to natural factors such as local surficial geology, gentle slope, beaver activity in addition to erosion from ATV trails and poorly vegetated areas.

³ A sewer line was close to the stream in these areas, which possibly could contribute nutrients, bacteria, and viruses if leaks were to occur.

Woody Debris Counts

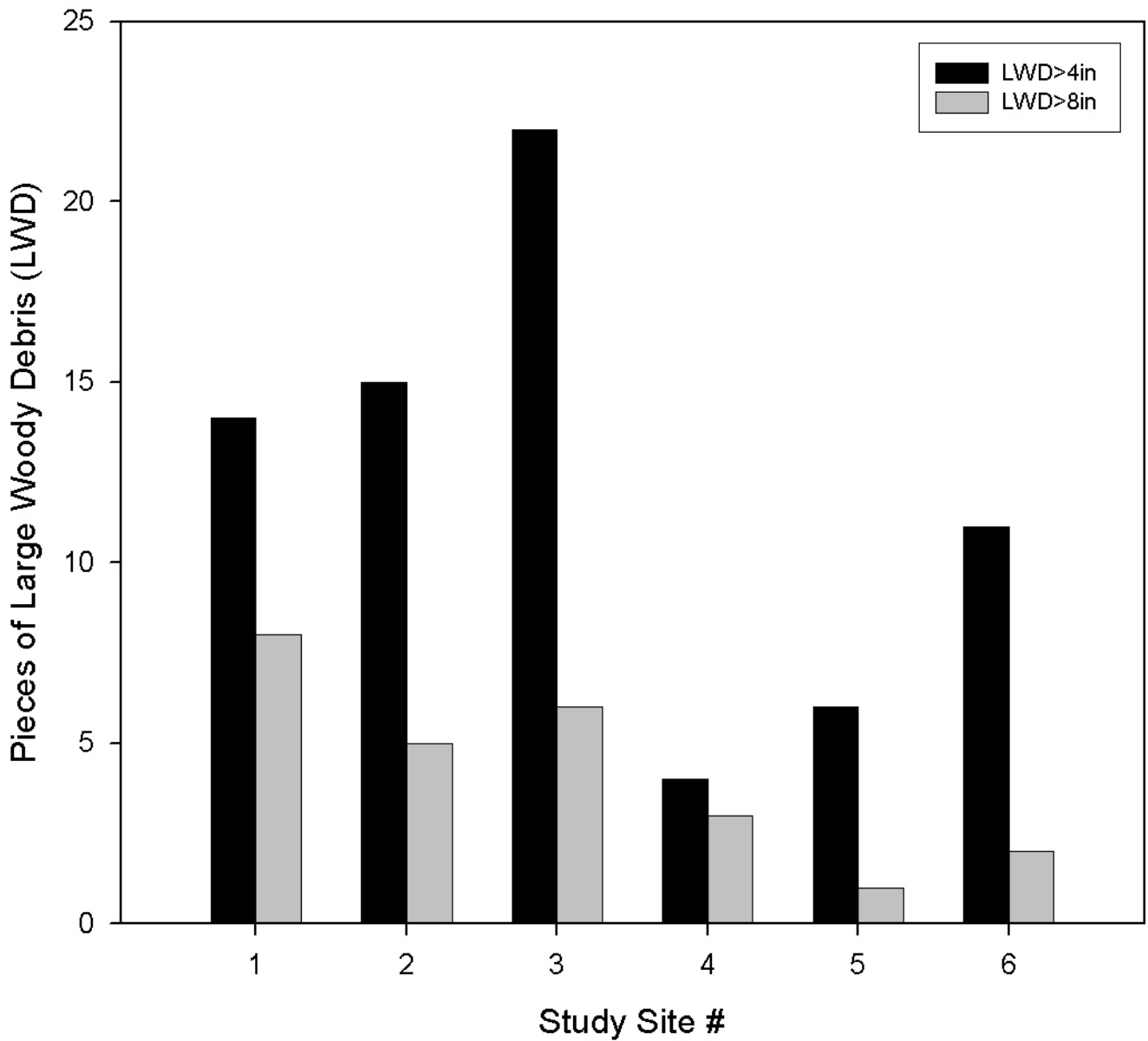


Figure 4. Number of pieces of large woody debris (logs and large branches) having average diameters greater than or equal to 4 and 8 inches at the study sites in the Mill Brook watershed.

Surficial Geology Map Key

Below is a key to surficial geology types in close proximity to Mill Brook (see Figure 5) taken from Thompson et al. (1997). Note that much of the stream flows through “Pp” (Presumpscot Formation) materials.

Ha - “Stream alluvium” – sand, silt, gravel, and organic material; deposited on floodplains of modern streams.

Pemc - “End moraine complex” – cluster of closely spaced end moraines deposited at the receding margin of the last glacial ice sheet; composed of till and/or sand and gravel; locally includes ice-marginal submarine fan deposits.

Pmf - “Marine fan deposit” – sand and gravel deposited on the sea floor at the glacier margin during the late-glacial marine submergence.

Pp - “Presumpscot Formation” – silt, clay, and minor sand deposited on the sea floor during the late-glacial marine submergence.

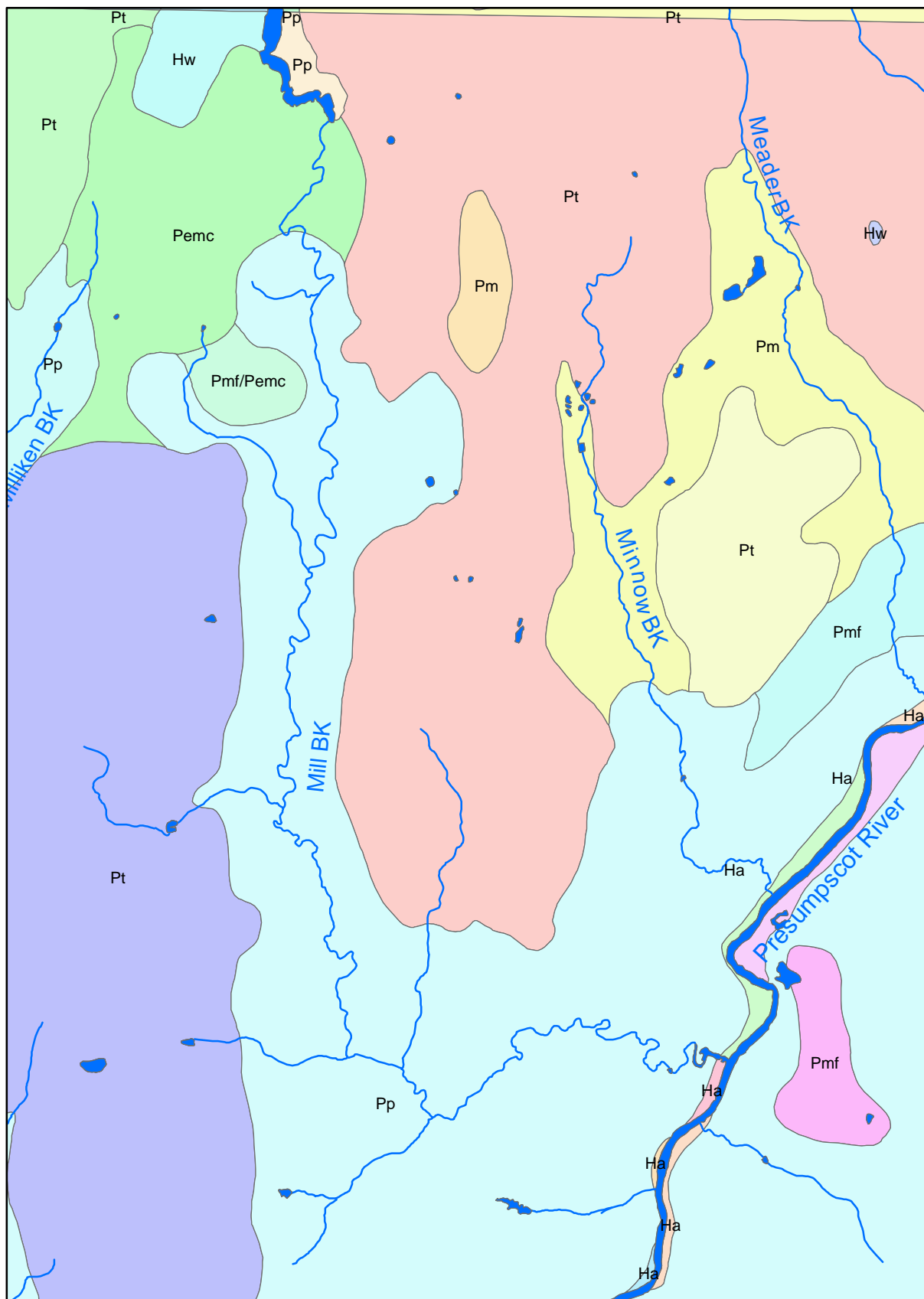
Pt - “Till” – loose to very compact, poorly sorted, mostly non-stratified mixture of sand, silt, and gravel-size rock debris deposited directly from glacial ice; locally contains lenses of water-laid sediment.

Temperature Monitoring

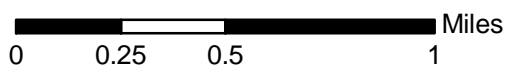
Some information describing temperature preferences and tolerances of salmonids is available in the literature. Danie et al. (1984) did a review of the literature and found that juvenile **Atlantic salmon** (*Salmo salar*) will tolerate temperatures up to 27°C, at which point they will move to colder water, while the lethal temperature is 32°C. The optimum temperature range of juveniles was found to range between 15 – 19°C. For adults, mortality occurs at temperatures > 28°C and disease resistance is reduced at temperatures between 20 – 27°C. Adults were observed to rarely be caught by angling at temperatures above 20°C. A review by McCullough (1999) found that among a number of studies, the upper limit of temperatures where **brook trout** were observed in the field ranged between 19.0 to 25.6°C. A study analyzed a large national database of brook trout presence/absence data and weekly mean temperatures (Eaton et al. [1995] as cited in McCullough [1999]). The authors eliminated the upper-end 5% of temperatures where brook were found to be present to get a more conservative estimate of an upper thermal tolerance limit. After eliminating the upper-end 5%, they found the 95%-ile thermal tolerance temperature to be 22.3 °C.

Only one year of continuous temperature data was collected for this study, and this summer, air temperatures happened to be relatively cool when compared to recent previous years. However, it does appear as though Mill Brook's water temperatures may be warmer than are optimal for salmonid fish species including brook trout and Atlantic salmon (Figs. 6, 7). Although more study and literature review is necessary to draw any substantive conclusions, this data suggests that temperature may be a limiting factor on the habitat suitability for certain species in Mill Brook. Having said that, it is encouraging to see that the tall trees in the mostly intact riparian forests (minus some severe clearing areas) alongside the brook are doing a good job of cooling waters as they move downstream. Protecting these forests will help ensure that these waters do not warm any more. Further, investigation and protection of small tributaries to Mill Brook are recommended in order to protect any sources of cold water refugia for salmonid fish species migrating to or inhabiting the stream.

Figure 5. Mill Brook watershed surficial geology.



Created by
Jeff Varricchio
Maine Department of Environmental Protection
September 17, 2003



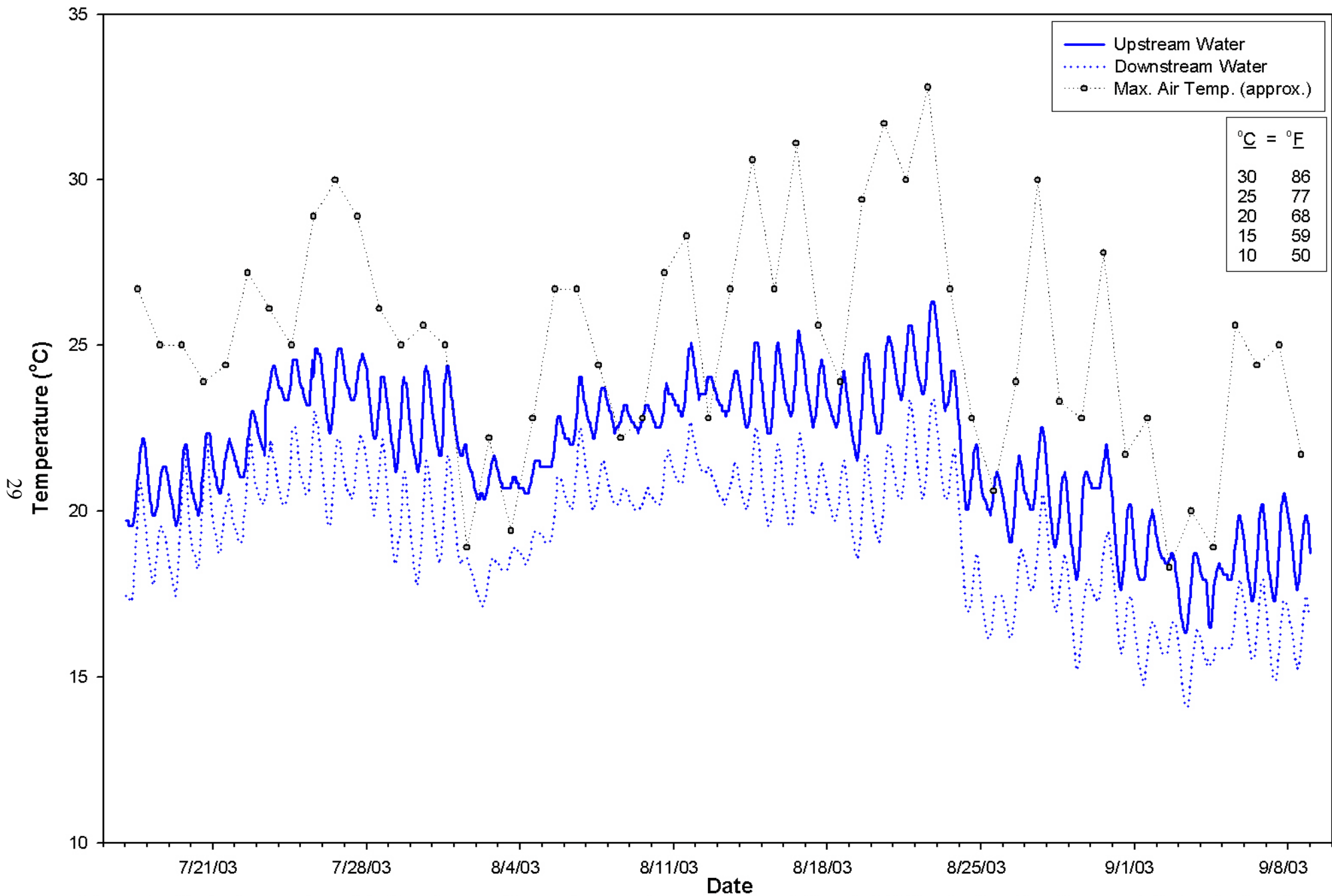


Figure 6. Water temperature data from two continuous temperature monitoring stations in Mill Brook. See the site map at the beginning of this report for station locations. Daily maximum air temperature points represent readings collected at the Portland Jetport. Temperature loggers were calibrated against a National Institute of Standards and Technology (NIST) thermometer. The thermometer reading was 21.0°C while both loggers recorded 21.52°C.

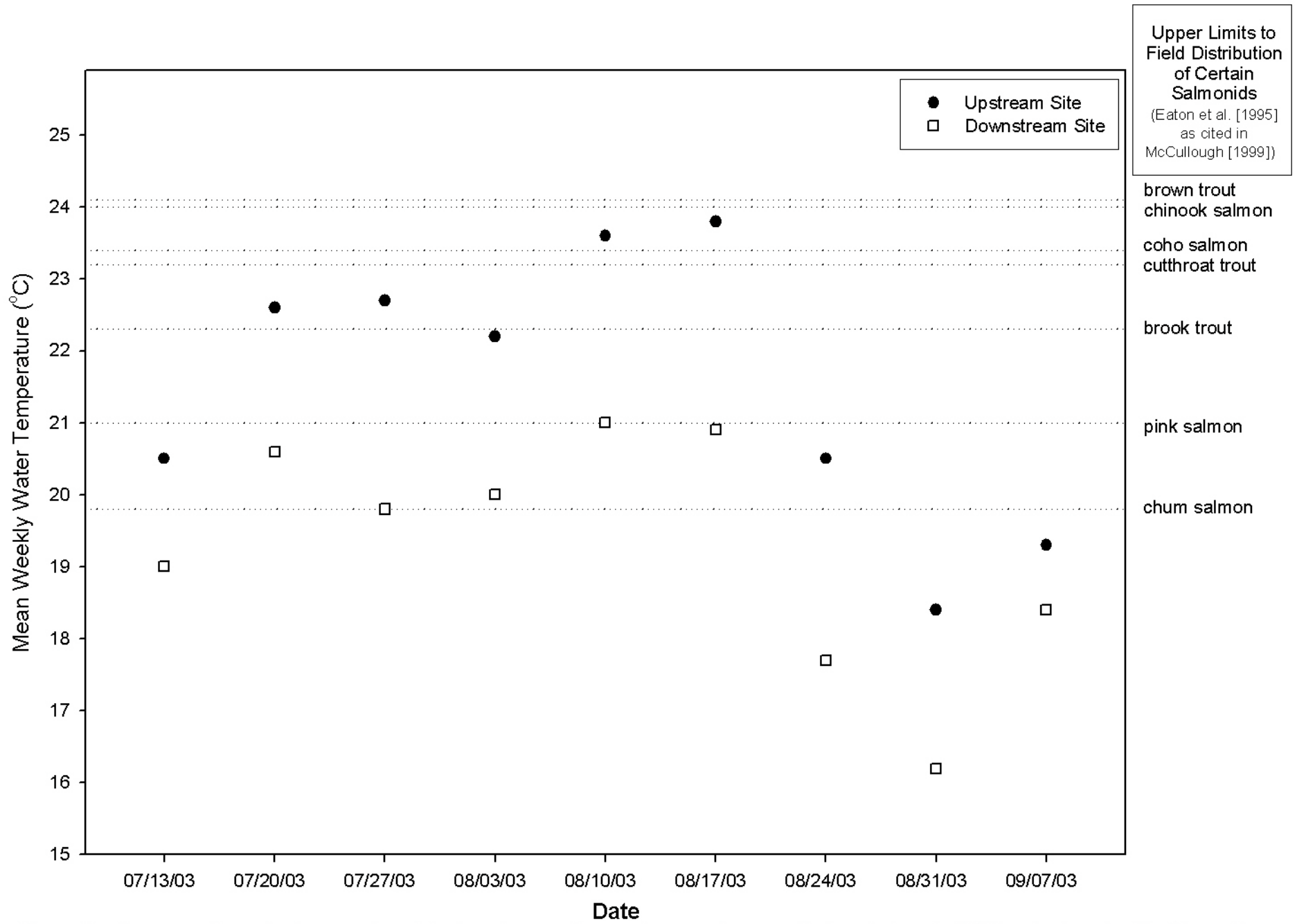


Figure 7. Mean weekly water temperature data from two continuous temperature monitoring stations in Mill Brook described in Figure 6. Reference lines indicate 95th percentile, upper-limit, mean weekly temperatures from a national database of presence/absence field observations of a variety of salmonid fish species since data for Atlantic salmon (*Salmo salar*) were not readily available. Temperature data included in the analysis were those collected between 7/15/03 and 9/12/03.

References

- Danie, D. S., J. G. Trial, and J. G. Stanley. 1984. Species profiles: life histories and environmental requirements of coastal fish and invertebrates (North Atlantic) – Atlantic salmon. U.S. Fish and Wildlife Service – FWS/OBS-82/11.22. U. S. Army Corp of Engineers, TR EL-82-4. 19 pp.
- Eaton, J. G, J. H. McCormick, B. E. Goodno, D. G. O’Brien, H. G. Stefany, M. Hondzo, and R. M. Scheller. 1995. A field information-based system for estimating fish temperature tolerances. *Fisheries* 20(4):10-18.
- McCullough, D. A. 1999. A review and synthesis of effects of alterations to the water temperature regime on freshwater stages of salmonids, with special reference to chinook salmon. Prepared for the USEPA, Seattle, WA. EPA 910-R-99-010. 279pp.
- Thompson, W. B., R. A. Johnston, and R. D. Tucker. 1997. Portland West Quadrangle, Maine (surficial geology map). Maine Geological Survey Open File No. 97-51.

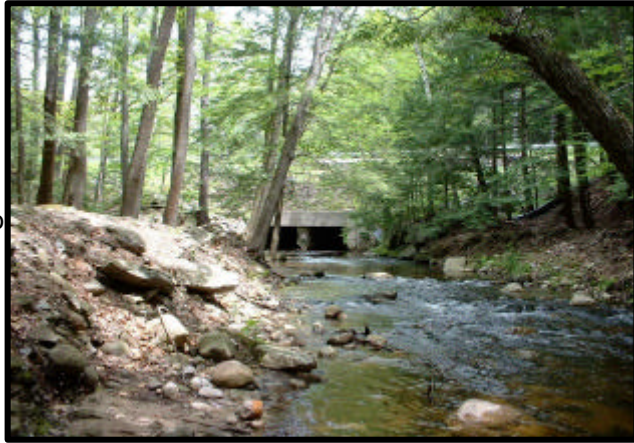
RAW STREAM HABITAT WALK DATA

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0
Stream name: Mill Brook
**Stream Team/
Group involved:** Presumpscot River Watch
Site investigators: Jeff Varricchione, Ralph Jo
Tim Bennett
Stream Team #: 0
Date: 5/31/2003
Time: 11:30



Stream/Site Location Information:

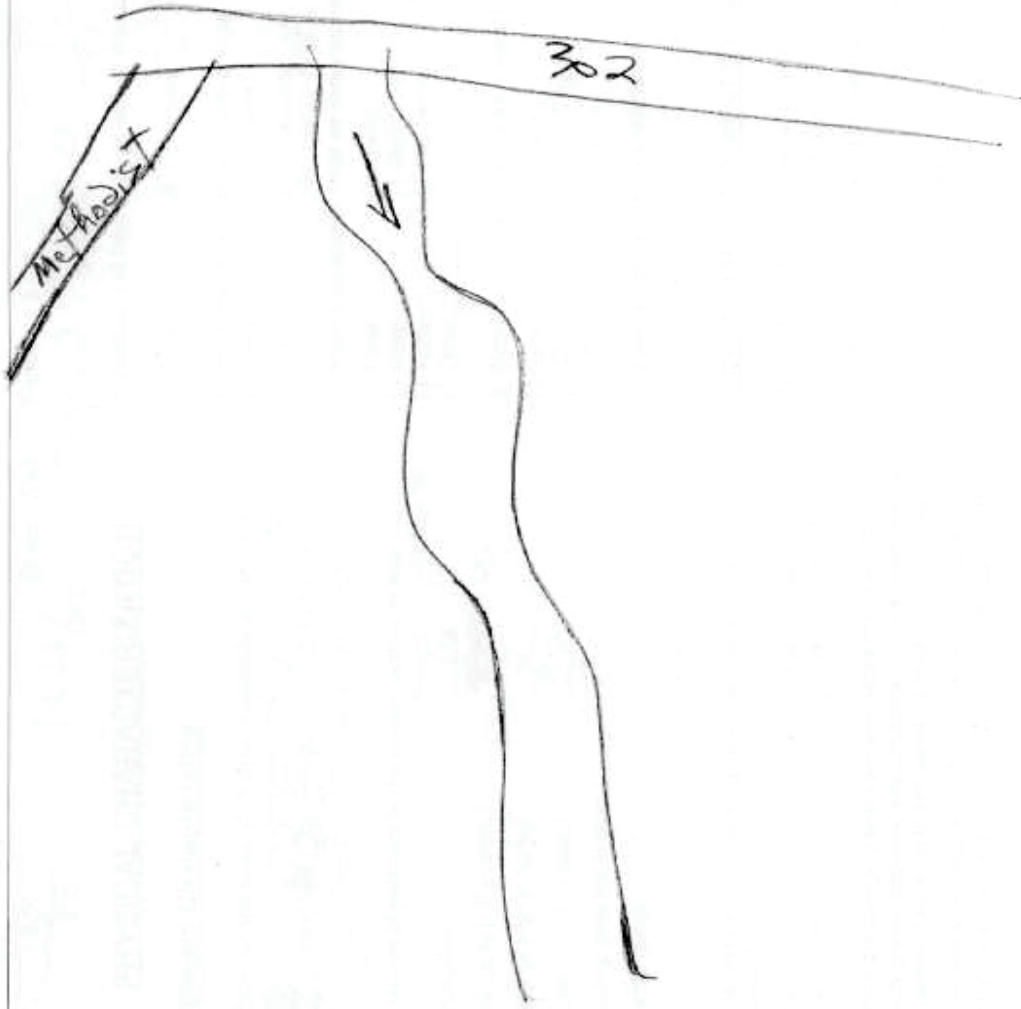
HUC/Watershed:	Presumpscot	Site or Map #:	1
Latitude:	43° 44.478' N	Longitude:	70° 21.210' W
County:	Cumberland	State:	ME

Stream reach location: Immediately below Rt 302 road crossing.

Summary:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Dead fox; reportedly moose, deer, squirrel, etc. Old bridge remnants protected banks during 1996 flood. Large pool below bridge.

Weather Conditions:

Past 24 hours: showers

Weather Now: Overcast

In Stream Characteristics:

- | | |
|-------------------------------------------------------------|---------------------------------------|
| 1. Stream habitats present: | 20% pools, 40% riffles, 40% runs |
| 2a. Stream bottom type: | see chart on p. 4 |
| 2b. Silty covering on top rocks in channel? | No |
| 3. Embeddedness: | 75% |
| 4. Stream bank sinks beneath feet? | No spots |
| 5. Presence of logs & large woody debris: | occasional |
| 6. Presence of naturally occurring organic material: | occasional |
| 7. Water appearance: | tea-color |
| 8. Water odor: | none |
| 9. Water temperature: | 0% |
| 10a. Approximate depth of runs: | 1-2 ft |
| 10b. Approximate depth of pools: | 2-3 ft |
| 11. Approximate width of stream channel: | 18 ft |
| Approx. width of channel from bank to bank: | 18 ft |
| 12. Stream velocity (ft/sec): | 1.6 ft/sec |
| 13a. Shape of streambank: | L: Steeply sloping R: Steeply sloping |
| 13b. Extent of artificial bank modifications: | L: 0-25% R: 0-25% |
| 13c. Shape of the channel: | Wide, shallow |

14a & 14b Streamside cover along water's edge:

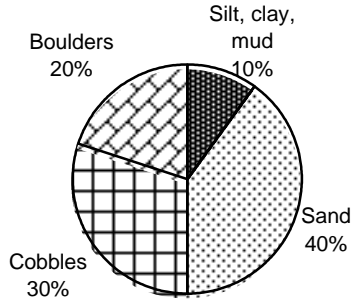
see chart on p. 4

15. Extent to which vegetation shades stream:

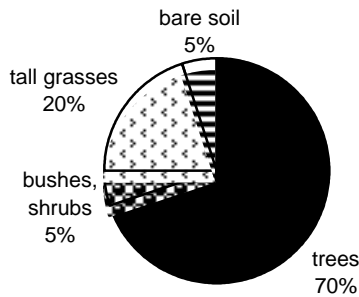
60%

Charts:

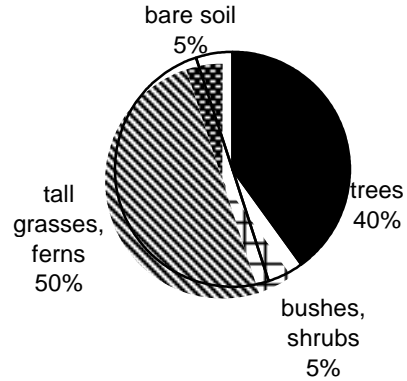
2a. Stream Bottom Type



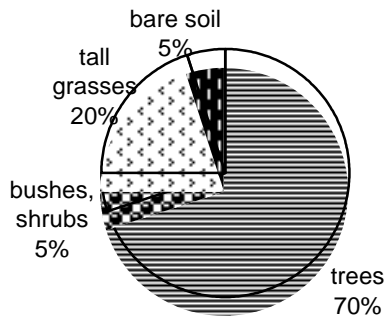
14a. Streambank Cover-Left Bank



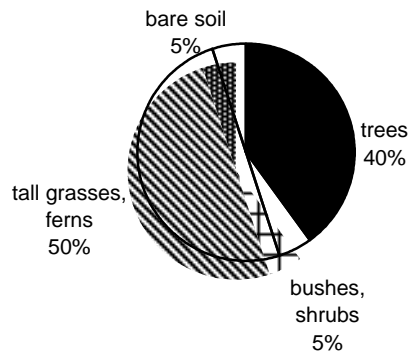
14a. Streambank Cover-Right Bank



14b. Streamside Cover Out 25 yards-Left Side



14b. Streamside Cover Out 25 yards-Right Side



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	0	0
Banks collapsed/eroded:	1	0
Garbage/junk adjacent to stream:	1	2
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	0	0
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings, etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	0	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	0
Multi-family housing:	0
Lawns:	1
Commercial/institutional:	0

Roads, etc.

Paved roads or bridges:	2
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 1
Hiking/paths: 0

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

Visual Biological Survey

18. Fish present in the stream: Yes, abundant, alewives (8 in.)

19. Barriers to fish movement: None, possibly the culvert

20. Aquatic plants in the stream: attached, occasional, stream margin

21. Extent of algae in the stream

a) Presence of materials coated with a layer of "algal slime": occasional, light-coating

b) Presence of filamentous algae: (string-like algae) occasional

c) Presence of detached "clumps" of algae on water's surface: none

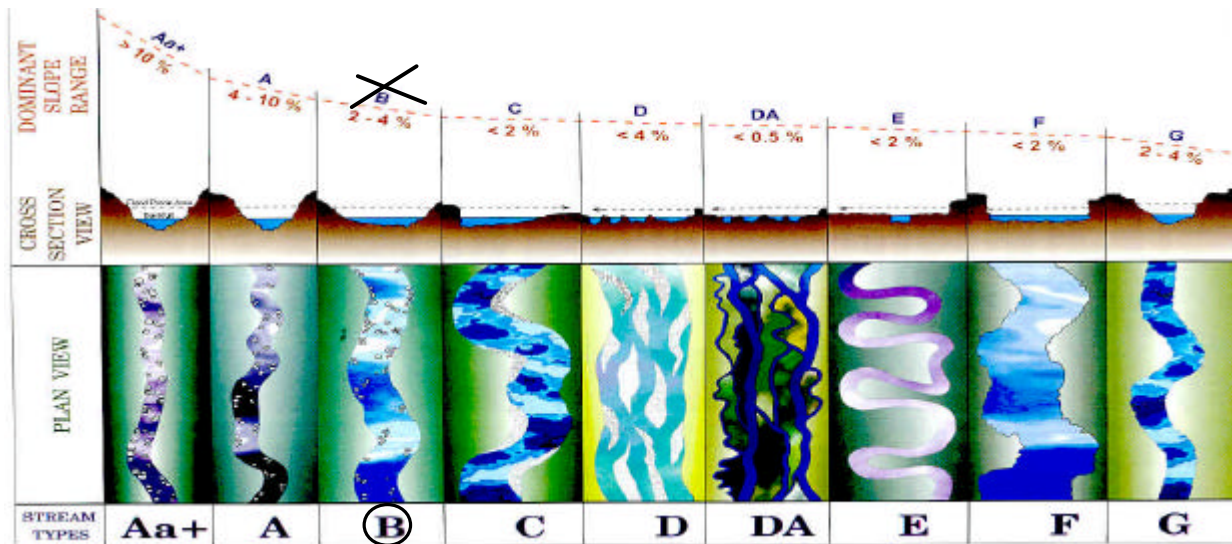
Stream Morphology

22. Shape of stream

a) Slope of the stream at your site: 3-4%

b) Cross-section view marked with an X B

c) Birds-eye view marked with a circle B



Woody Debris

23. Highly-valuable large woody debris

a) HV-LWD (small end diameter \geq 4 in) 14

b) HV-LWD (small end diameter \geq 8 in) 8

Comments

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0

Stream name: Mill Brook

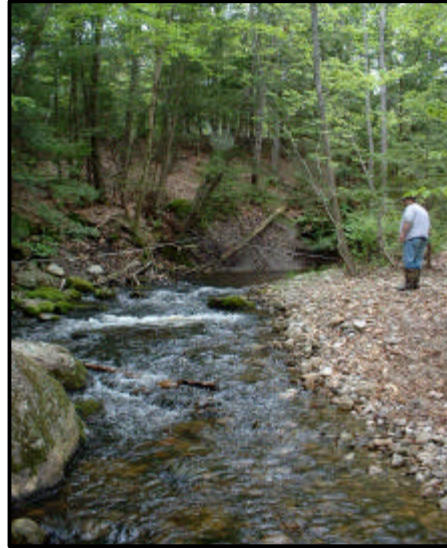
**Stream Team/
Group involved:** Presumpscot River Watch

Site investigators: Jeff Varricchione, Ralph Johnston,
Tim Bennett

Stream Team #: 7

Date: 5/31/2003

Time: 12 Noon



Stream/Site Location Information:

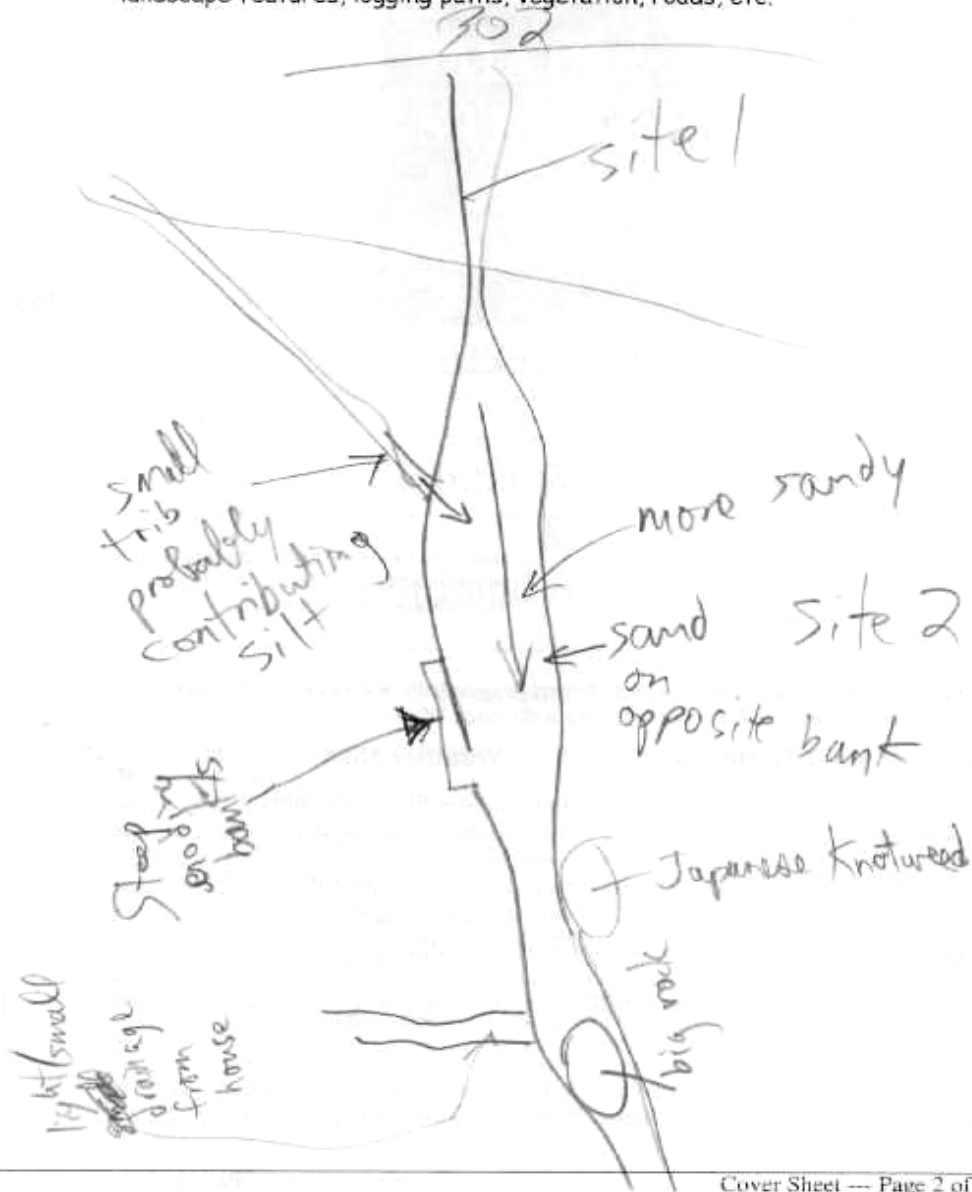
HUC/Watershed:	Presumpscot	Site or Map #:	2
Latitude:	43° 44.432' N	Longitude:	70° 21.289' W
County:	Cumberland	State:	ME

Stream reach location: Downstream of Rt 302 approximately 1/4 mile.

Summary:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Forested riffle, pool system.

Weather Conditions:

Past 24 hours: showers

Weather Now: overcast

In Stream Characteristics:

- | | |
|-------------------------------------------------------------|-----------------------------------------|
| 1. Stream habitats present: | 33% pools, 33% riffles, 33% runs |
| 2a. Stream bottom type: | see chart on p. 4 |
| 2b. Silty covering on top rocks in channel? | Yes (somewhat present) |
| 3. Embeddedness: | 75% |
| 4. Stream bank sinks beneath feet? | A few spots |
| 5. Presence of logs & large woody debris: | occasional |
| 6. Presence of naturally occurring organic material: | occasional |
| 7. Water appearance: | tea-color |
| 8. Water odor: | none |
| 9. Water temperature: | 17C |
| 10a. Approximate depth of runs: | 1-2 ft |
| 10b. Approximate depth of pools: | 2-3 ft |
| 11. Approximate width of stream channel: | 20 ft |
| Approx. width of channel from bank to bank: | 22 ft |
| 12. Stream velocity (ft/sec): | 1.6 ft/sec |
| 13a. Shape of streambank: | L: Vertical/undercut R: Steeply sloping |
| 13b. Extent of artificial bank modifications: | L: 0-25% R: 0-25% |
| 13c. Shape of the channel: | wide, shallow |

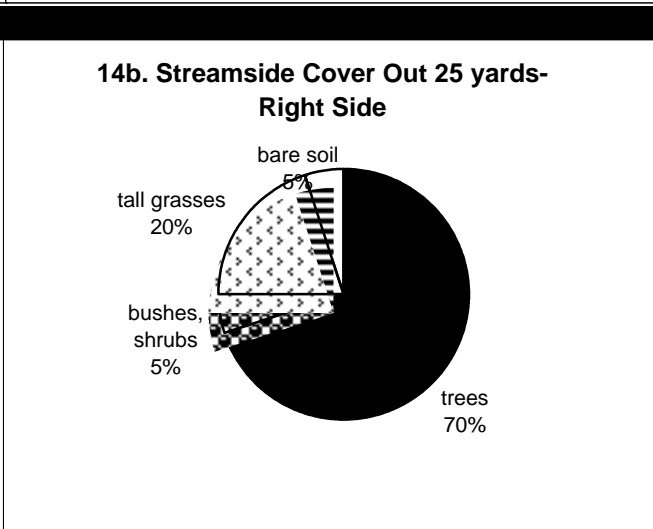
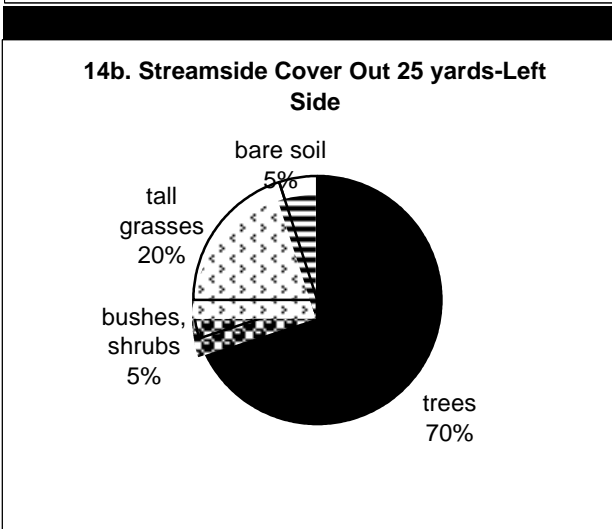
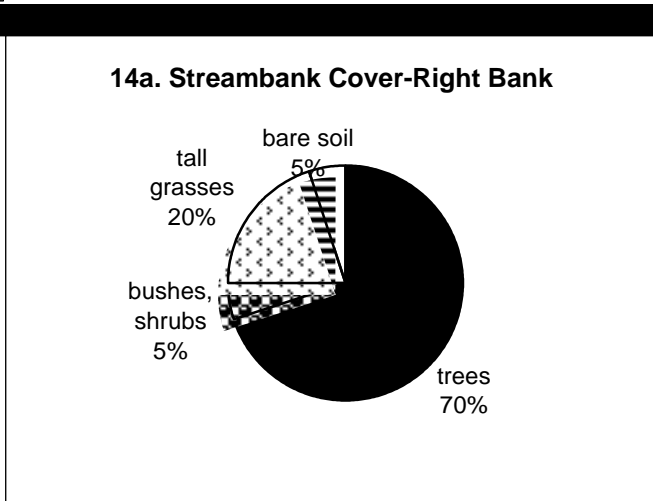
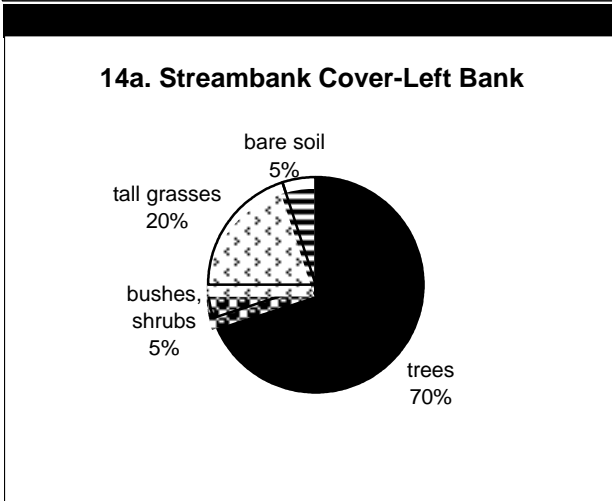
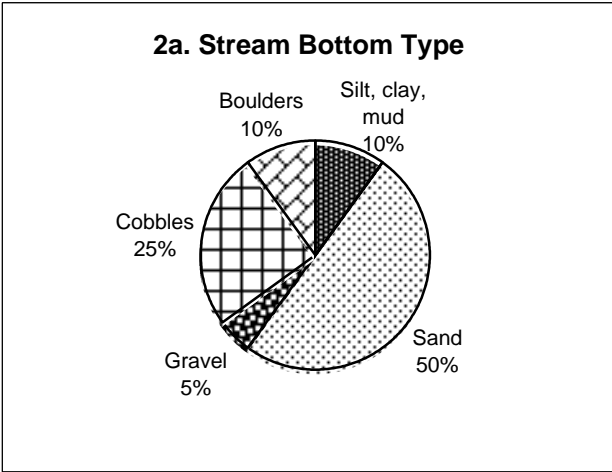
14a & 14b Streamside cover along water's edge:

see chart on p. 4

15. Extent to which vegetation shades stream:

75%

Charts:



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	0	0
Banks collapsed/eroded:	0	2
Garbage/junk adjacent to stream:	1	0
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	0	2
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings, etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	0	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	1
Multi-family housing:	0
Lawns:	0
Commercial/institutional:	0

Roads, etc.

Paved roads or bridges:	1
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 1
Hiking/paths: 1

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

Visual Biological Survey

18. Fish present in the stream: Yes, abundant (3-7 in.)
19. Barriers to fish movement: None
20. Aquatic plants in the stream: None
21. Extent of algae in the stream
a) Presence of materials coated with a layer of "algal slime": occasional, light coating
b) Presence of filamentous algae: none
(string-like algae)
c) Presence of detached "clumps" of algae on water's surface: none

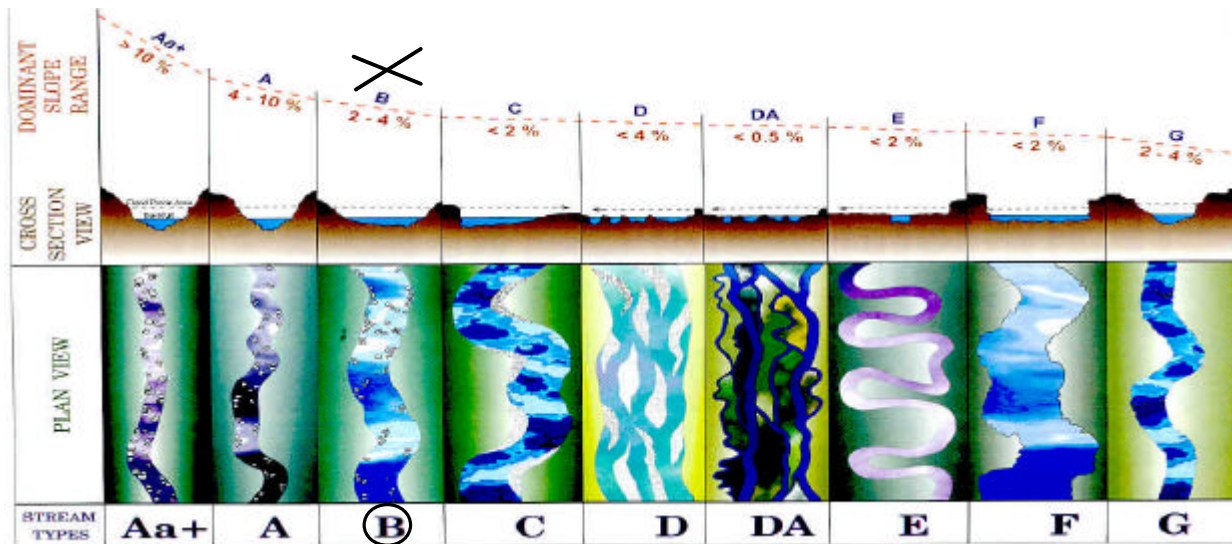
Stream Morphology

22. Shape of stream

a) Slope of the stream at your site: 3-4%

b) Cross-section view marked with an X B

c) Birds-eye view marked with a circle B



Woody Debris

23. Highly-valuable large woody debris

a) HV-LWD (small end diameter \geq 4 in) 15

b) HV-LWD (small end diameter \geq 8 in) 5

Comments

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0

Stream name: Mill Brook

**Stream Team/
Group involved:** Presumpscot River Watch

Site investigators: Karen Young, ML Haughwout,
John and Eunice Wilcox, Lynda
and Paul Reed, Julie Motherwell

Stream Team #: 7

Date: 5/31/2003

Time: 11:00



Stream/Site Location Information:

HUC/Watershed:	Presumpscot	Site or Map #:	3
Latitude:	43° 44.275' N	Longitude:	70° 21.073' W
County:	Cumberland	State:	ME

Stream reach location: Approximately 1/2 mile downstream from Rt. 302 crossing

Summary:

Site Sketch:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Forested, riffle, run section with fast moving water. Decent slope.

Weather Conditions:

Past 24 hours: showers/overcast

Weather Now: Clear/sunny

In Stream Characteristics:

- | | |
|-------------------------------------------------------------|-----------------------------------------|
| 1. Stream habitats present: | riffles, runs |
| 2a. Stream bottom type: | see chart on p. 4 |
| 2b. Silty covering on top rocks in channel? | No |
| 3. Embeddedness: | 50% |
| 4. Stream bank sinks beneath feet? | No spots |
| 5. Presence of logs & large woody debris: | Occasional |
| 6. Presence of naturally occurring organic material: | Occasional |
| 7. Water appearance: | Clear |
| 8. Water odor: | None |
| 9. Water temperature: | 16.5C |
| 10a. Approximate depth of runs: | >2 ft |
| 10b. Approximate depth of pools: | no pools |
| 11. Approximate width of stream channel: | 25 ft |
| Approx. width of channel from bank to bank: | 25 ft |
| 12. Stream velocity (ft/sec): | .83 ft/sec |
| 13a. Shape of streambank: | L: Gradual/no slope R: Gradual/no slope |
| 13b. Extent of artificial bank modifications: | L: 0-25% R: 0-25% |
| 13c. Shape of the channel: | Narrow, deep |

14a & 14b Streamside cover along water's edge:

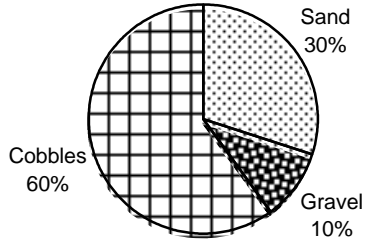
see chart on p. 4

15. Extent to which vegetation shades stream:

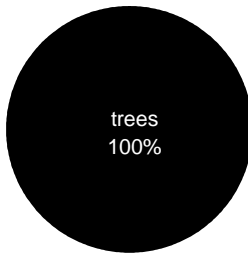
100%

Charts:

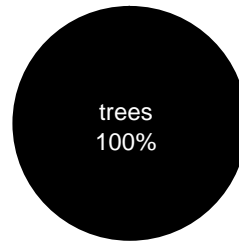
2a. Stream Bottom Type



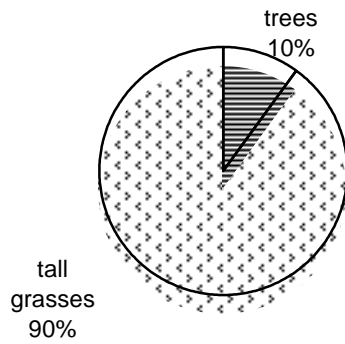
14a. Streambank Cover-Left Bank



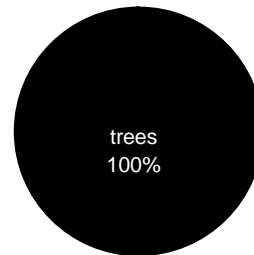
14a. Streambank Cover-Right Bank



14b. Streamside Cover Out 25 yards-Left Side



14b. Streamside Cover Out 25 yards-Right Side



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	0	0
Banks collapsed/eroded:	0	0
Garbage/junk adjacent to stream:	1	1
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	0	0
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings, etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	0	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	1
Multi-family housing:	1
Lawns:	1
Commercial/institutional:	0

Roads, etc.

Paved roads or bridges:	0
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 0
Hiking/paths: 0

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

Visual Biological Survey

18. Fish present in the stream: Yes, medium (3-6 in)
19. Barriers to fish movement: None
20. Aquatic plants in the stream: stream margin
21. Extent of algae in the stream
a) Presence of materials coated with a layer of "algal slime": none
b) Presence of filamentous algae: none
(string-like algae)
c) Presence of detached "clumps" of algae on water's surface: none

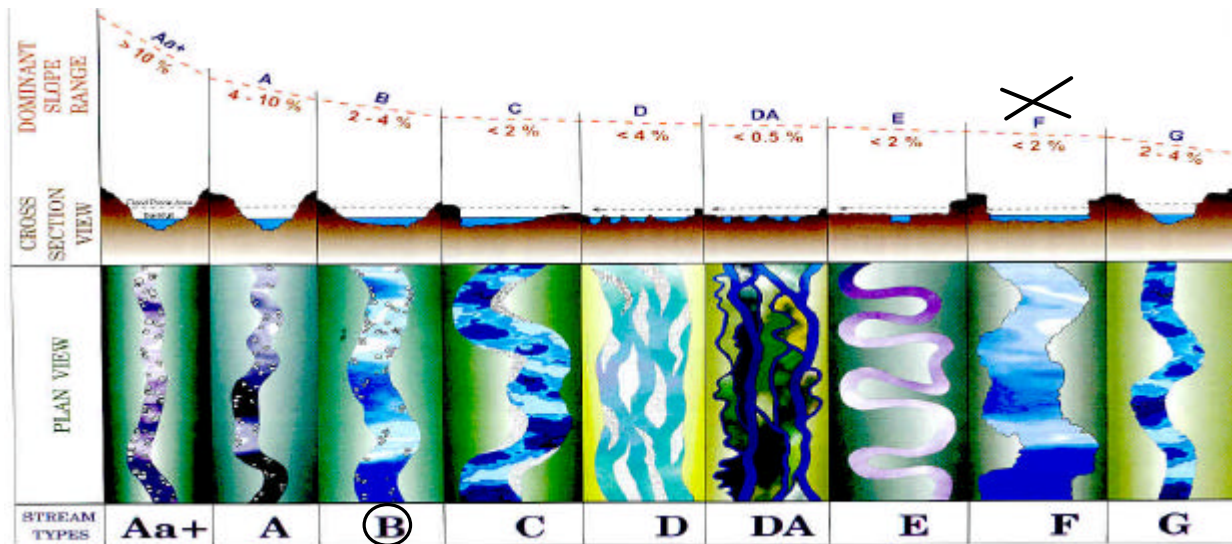
Stream Morphology

22. Shape of stream

a) Slope of the stream at your site: 3-4%

b) Cross-section view marked with an X F

c) Birds-eye view marked with a circle B



Woody Debris

23. Highly-valuable large woody debris

a) HV-LWD (small end diameter ≥ 4 in) 22

b) HV-LWD (small end diameter ≥ 8 in) 6

Comments

Evidence of beavers. Caddisflies and mayflies found on cobbles.

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0

Stream name: Mill Brook

**Stream Team/
Group involved:** Presumpscot River Watch

Site investigators: Karen Young, ML Haughwout,
John and Eunice Wilcox, Lynda
and Paul Reed, Julie Motherwell

Stream Team #: 7

Date: 5/31/2003

Time: 11:00



Stream/Site Location Information:

HUC/Watershed:	Presumpscot	Site or Map #:	4
Latitude:	43 44.192 N	Longitude:	70 21.131 W
County:	Cumberland	State:	ME

Stream reach location: Approximately 1/2 mile downstream from Rt. 302 crossing at the Powerline

Summary:

Site Sketch:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Powerline crossing. Recent cutting in the riparian zone. Mostly bushes, fast water movement and a riffle/run system.

Weather Conditions:

Past 24 hours: showers/overcast

Weather Now: Clear/sunny

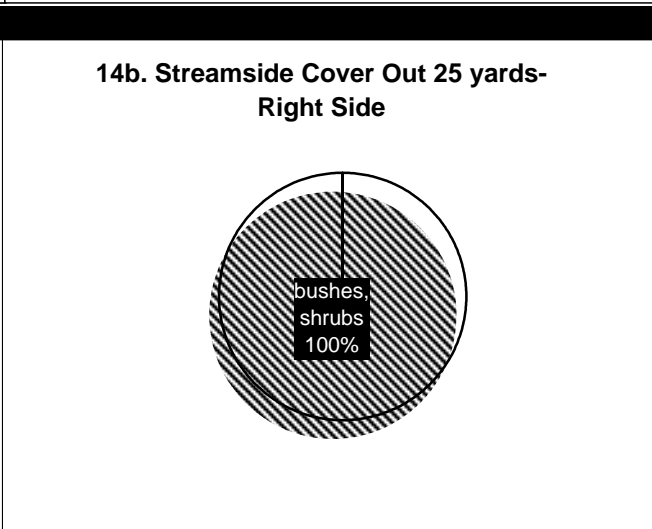
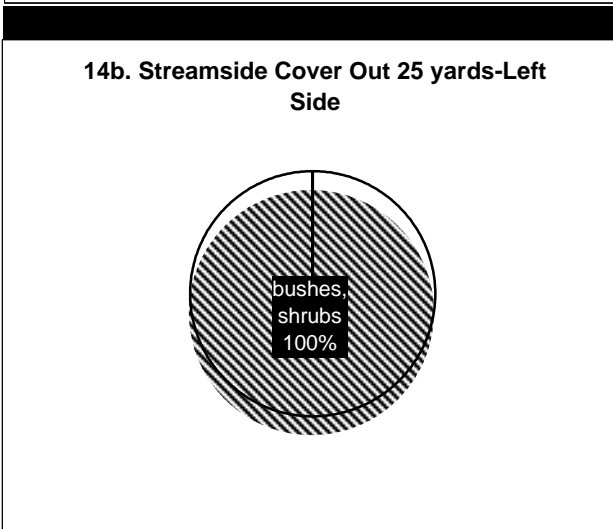
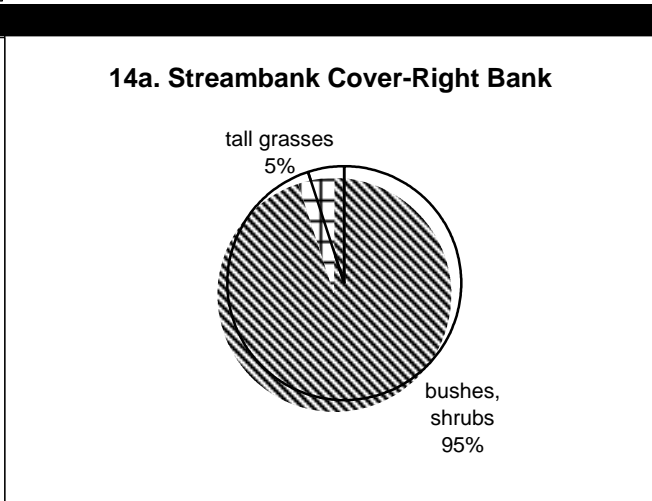
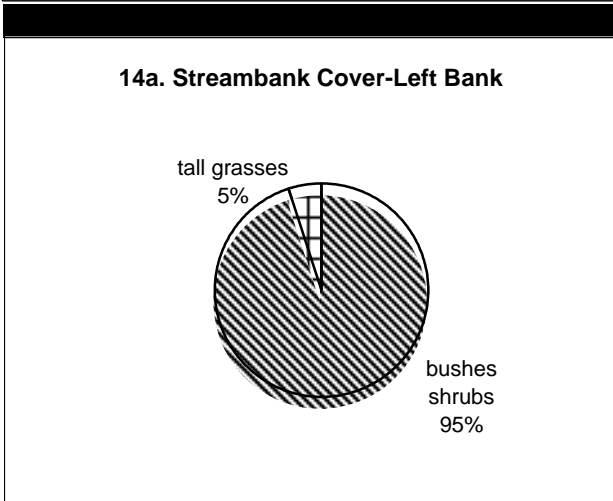
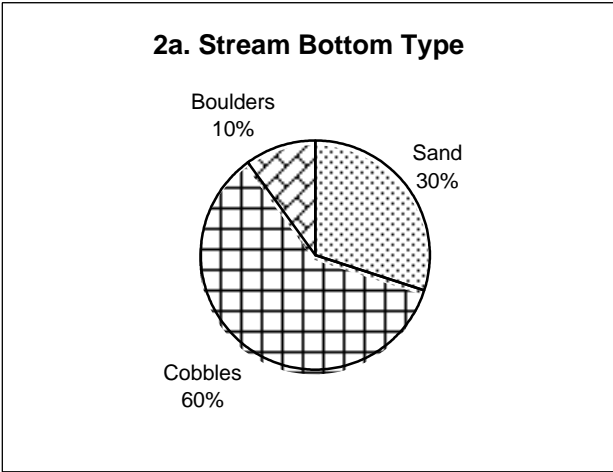
In Stream Characteristics:

- | | | |
|-------------------------------------------------------------|--------------------|--------------------|
| 1. Stream habitats present: | riffles, runs | |
| 2a. Stream bottom type: | see chart on p. 4 | |
| 2b. Silty covering on top rocks in channel? | No | |
| 3. Embeddedness: | 0-25% | |
| 4. Stream bank sinks beneath feet? | No spots | |
| 5. Presence of logs & large woody debris: | none | |
| 6. Presence of naturally occurring organic material: | none | |
| 7. Water appearance: | Clear | |
| 8. Water odor: | none | |
| 9. Water temperature: | 17C | |
| 10a. Approximate depth of runs: | 1-2 ft | |
| 10b. Approximate depth of pools: | 0 | |
| 11. Approximate width of stream channel: | 15 ft | |
| Approx. width of channel from bank to bank: | 20 ft | |
| 12. Stream velocity (ft/sec): | 1.6 ft/sec | |
| 13a. Shape of streambank: | L: Steeply sloping | R: Steeply sloping |
| 13b. Extent of artificial bank modifications: | L: 0-25% | R: 0-25% |
| 13c. Shape of the channel: | Narrow, deep | |

14a & 14b Streamside cover along water's edge: see chart on p. 4

15. Extent to which vegetation shades stream: 0%

Charts:



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	2	2
Banks collapsed/eroded:	0	0
Garbage/junk adjacent to stream:	0	0
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	0	0
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings,etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	0	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	1
Multi-family housing:	1
Lawns:	1
Commercial/institutional:	0

Roads, etc.

Paved roads or bridges:	0
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 0
Hiking/paths: ATV use

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

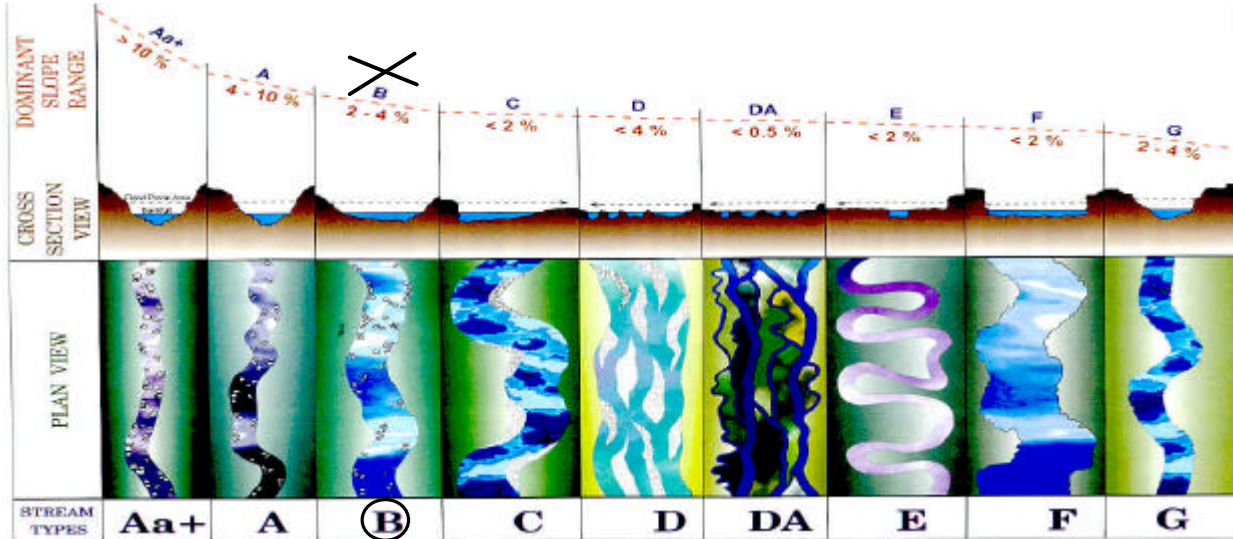
Visual Biological Survey

18. Fish present in the stream: yes
19. Barriers to fish movement: none
20. Aquatic plants in the stream: occasional, attached, stream margin
21. Extent of algae in the stream
a) Presence of materials coated with a layer of "algal slime": none
b) Presence of filamentous algae: none
(string-like algae)
c) Presence of detached "clumps" of algae on water's surface: none

Stream Morphology

22. Shape of stream

- a) Slope of the stream at your site: 3-4%
- b) Cross-section view marked with an X B
- c) Birds-eye view marked with a circle B



Woody Debris

23. Highly-valuable large woody debris

- a) HV-LWD (small end diameter ≥ 4 in) 4
- b) HV-LWD (small end diameter ≥ 8 in) 3

Comments

East side of study area "hilly" powerline property. All vegetated but no trees. Bushes no higher than 10'. ATV use in Powerline trails. Trail crosses in stream but a bridge is available. Crayfish found on second visit. Many fish seen.

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0
Stream name: Mill Brook
**Stream Team/
Group involved:** Presumpscot River Watch
Site investigators: Jeff Varricchione
Stream Team #: 7
Date: 5/31/2003
Time: 13:40



Stream/Site Location Information:

HUC/Watershed:	Presumpscot	Site or Map #:	5
Latitude:	43° 42.253' N	Longitude:	70° 19.887' W
County:	Cumberland	State:	ME

Stream reach location: Approx. 1/2 mile up from Bridge St. Mid-point is the snowmobile bridge crossing

Summary:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Low gradient, meandering, lots of snowmobile and ATV trails along stream

Weather Conditions:

Past 24 hours: showers

Weather Now: clear/sunny

In Stream Characteristics:

- | | |
|-------------------------------------------------------------|-----------------------------------------|
| 1. Stream habitats present: | 25% pools, 75% runs |
| 2a. Stream bottom type: | see chart on p. 4 |
| 2b. Silty covering on top rocks in channel? | Yes (common and thick) |
| 3. Embeddedness: | 100% |
| 4. Stream bank sinks beneath feet? | Many spots |
| 5. Presence of logs & large woody debris: | very few |
| 6. Presence of naturally occurring organic material: | occasional |
| 7. Water appearance: | turbid, tea-color |
| 8. Water odor: | none |
| 9. Water temperature: | 0% |
| 10a. Approximate depth of runs: | >2 ft |
| 10b. Approximate depth of pools: | >3 ft |
| 11. Approximate width of stream channel: | 20 ft |
| Approx. width of channel from bank to bank: | 20 ft |
| 12. Stream velocity (ft/sec): | 1.3 ft/sec |
| 13a. Shape of streambank: | L: Gradual/no slope R: Gradual/no slope |
| 13b. Extent of artificial bank modifications: | L: 0-25% R: 0-25% |
| 13c. Shape of the channel: | wide, deep |

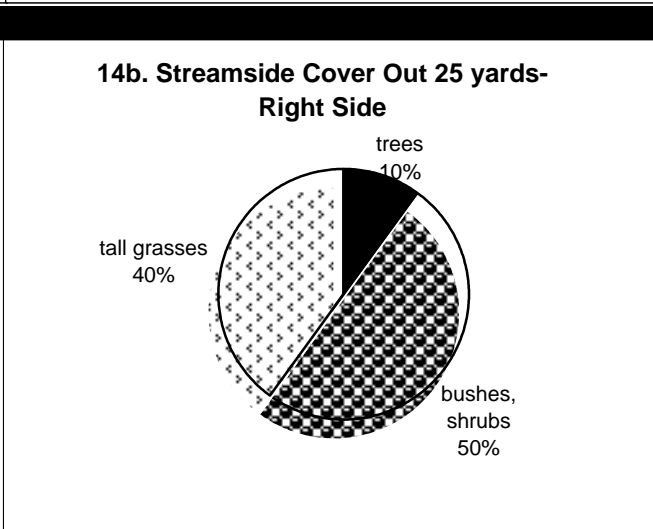
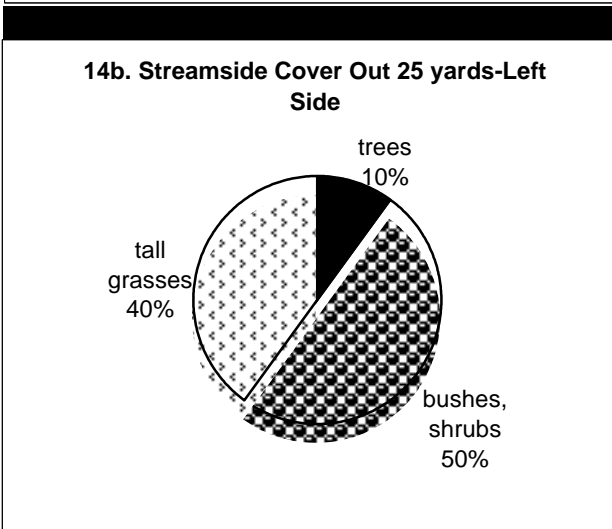
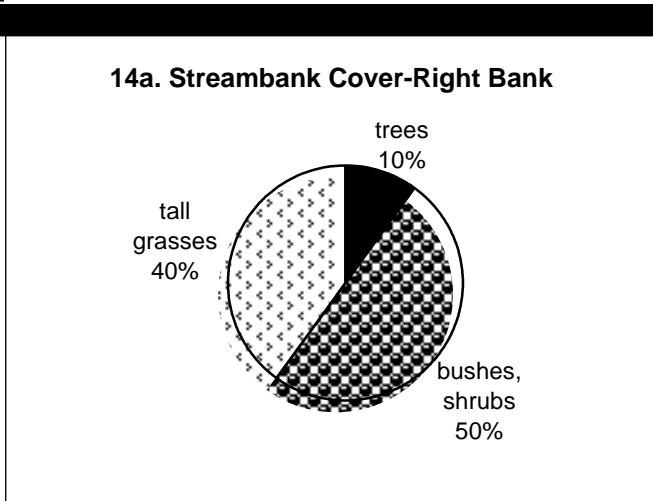
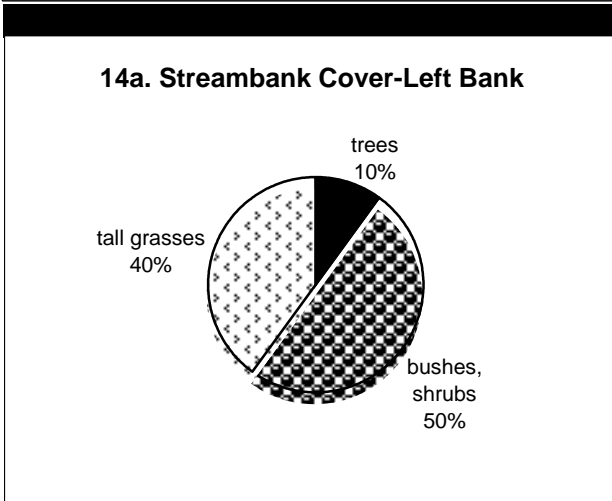
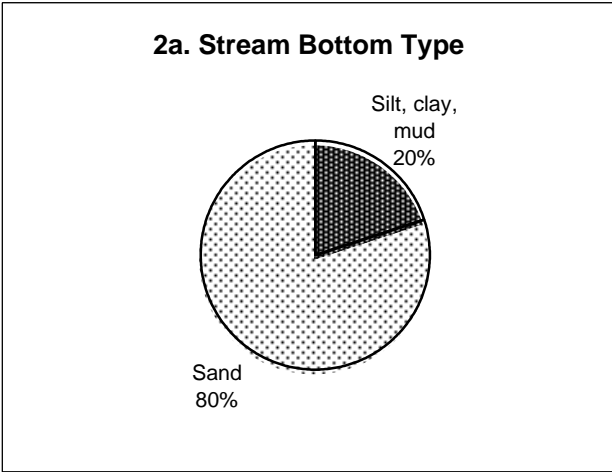
14a & 14b Streamside cover along water's edge:

see chart on p. 4

15. Extent to which vegetation shades stream:

50%

Charts:



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	1	1
Banks collapsed/eroded:	0	0
Garbage/junk adjacent to stream:	0	0
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	0	0
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings, etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	sewer line & smell (2)	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	0
Multi-family housing:	0
Lawns:	0
Commercial/institutional:	0

Roads, etc.

Paved roads or bridges:	0
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 0
Hiking/paths: ATV trails (2)

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

Visual Biological Survey

18. Fish present in the stream: Yes, abundant (3-7 in)

19. Barriers to fish movement: none

20. Aquatic plants in the stream: occasional, attached

21. Extent of algae in the stream

a) Presence of materials coated with a layer of "algal slime": none

b) Presence of filamentous algae: none
(string-like algae)

c) Presence of detached "clumps" of algae on water's surface: none

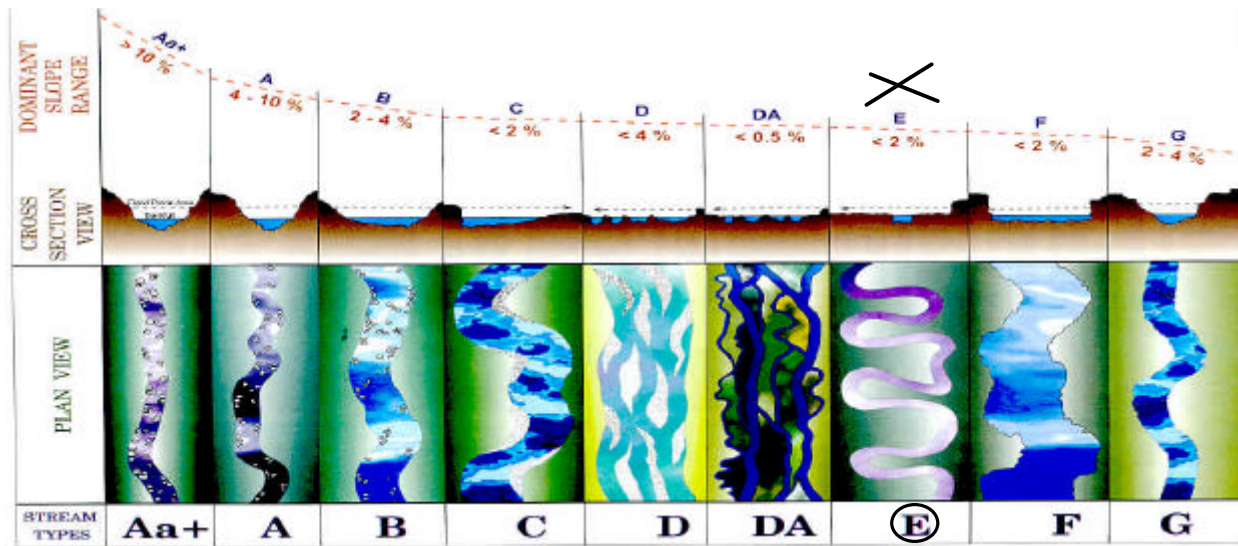
Stream Morphology

22. Shape of stream

a) Slope of the stream at your site: 0-2%

b) Cross-section view marked with an X E

c) Birds-eye view marked with a circle E



Woody Debris

23. Highly-valuable large woody debris

a) HV-LWD (small end diameter \geq 4 in) 6

b) HV-LWD (small end diameter \geq 8 in) 1

Comments

ATVs come close to stream destroying riparian areas. Leaky-sewer line. Smell evident in wet, screwed up ATV areas.

Stream Habitat Walk Report

Maine Stream Team Program

General Information:

Project #: 0
Stream name: Mill Brook
**Stream Team/
Group involved:** Presumpscot River Watch
Site investigators: Tim Bennett, Ralph Johnston
Stream Team #: 7
Date: 5/31/2003
Time: 13:20



Stream/Site Location Information:

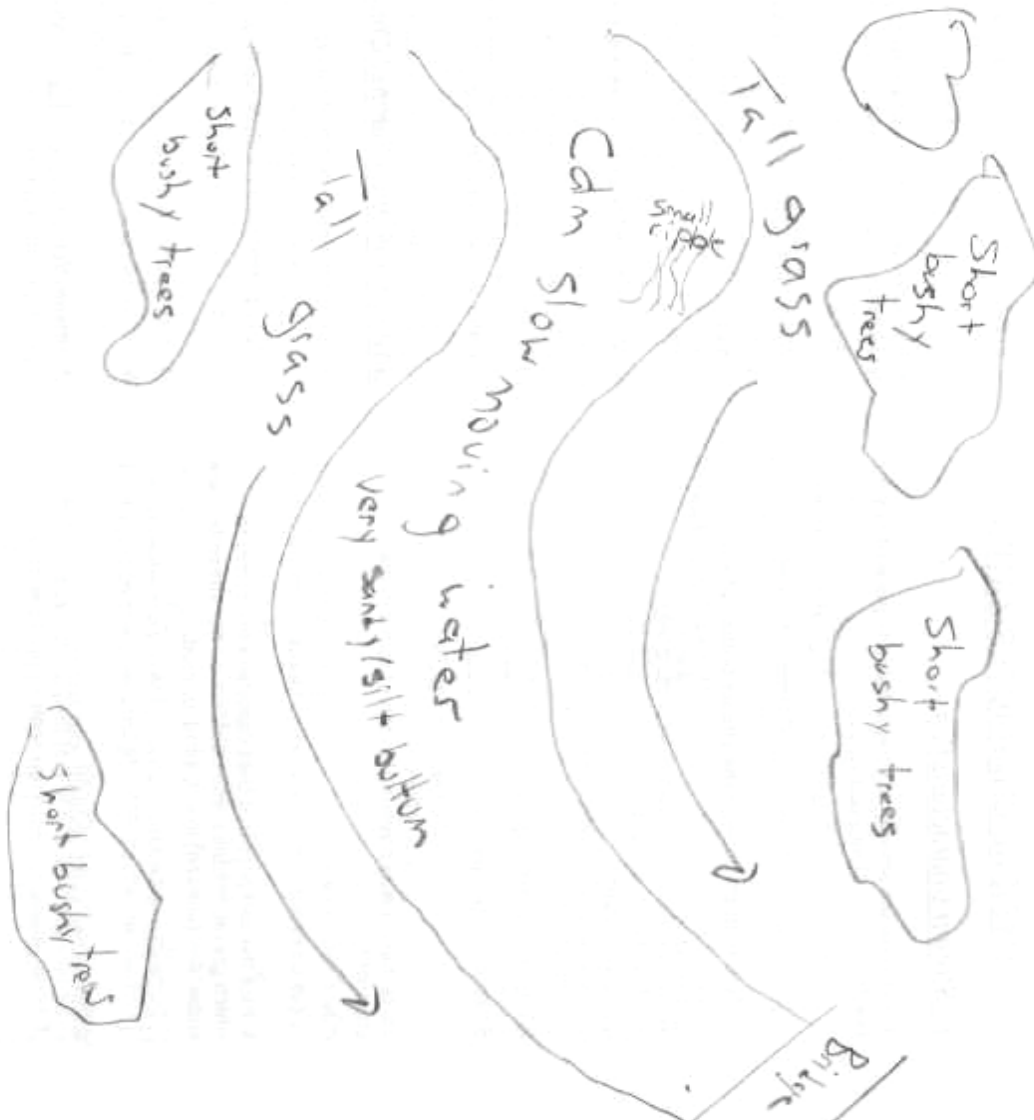
HUC/Watershed:	Presumpscot	Site or Map #:	6
Latitude:	estimated on map	Longitude:	estimated on map
County:	Cumberland	State:	ME

Stream reach location: Upstream from Bridge St. road crossing.

Summary:

Sketch of Site

On your sketch, note features that affect stream habitat, such as: riffles, runs, pools, ditches, wetlands, dams, riprap, outfalls, pipes, tributaries, landscape features, logging paths, vegetation, roads, etc.



Stream Reach Description:

Low gradient, meandering, lots of snowmobile and ATV trails along stream

Weather Conditions:

Past 24 hours: showers

Weather Now: clear/sunny

In Stream Characteristics:

- | | |
|-------------------------------------------------------------|-----------------------------------------|
| 1. Stream habitats present: | 5% riffles, 95% runs |
| 2a. Stream bottom type: | see chart on p. 4 |
| 2b. Silty covering on top rocks in channel? | Yes (common and thick) |
| 3. Embeddedness: | 100% |
| 4. Stream bank sinks beneath feet? | No spots |
| 5. Presence of logs & large woody debris: | occasional |
| 6. Presence of naturally occurring organic material: | occasional |
| 7. Water appearance: | clear |
| 8. Water odor: | none |
| 9. Water temperature: | 0% |
| 10a. Approximate depth of runs: | 1-2 ft |
| 10b. Approximate depth of pools: | 0 |
| 11. Approximate width of stream channel: | 10 ft |
| Approx. width of channel from bank to bank: | 11 ft |
| 12. Stream velocity (ft/sec): | 1.6 ft/sec |
| 13a. Shape of streambank: | L: Gradual/no slope R: Gradual/no slope |
| 13b. Extent of artificial bank modifications: | L: 0-25% R: 0-25% |
| 13c. Shape of the channel: | Narrow, shallow |

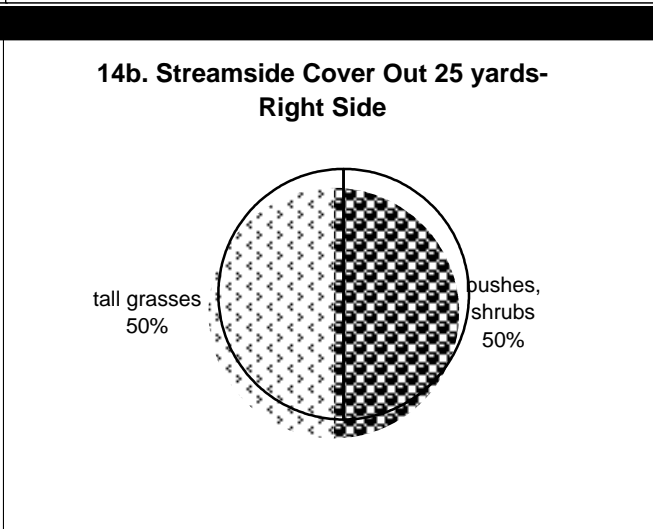
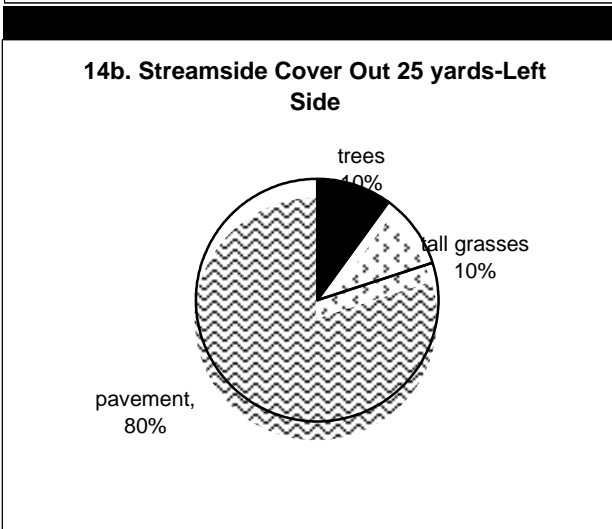
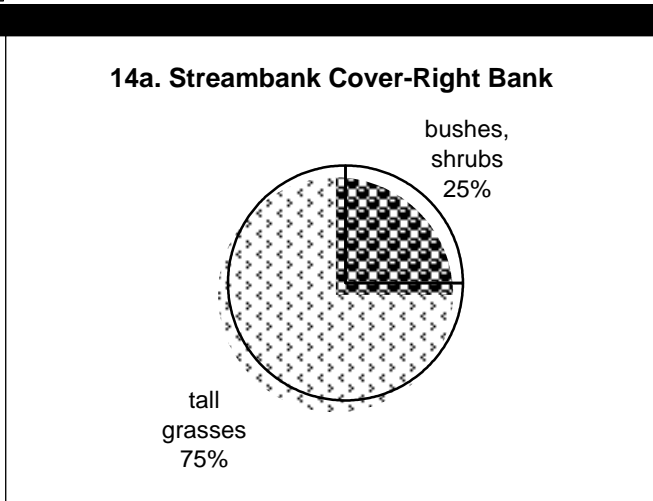
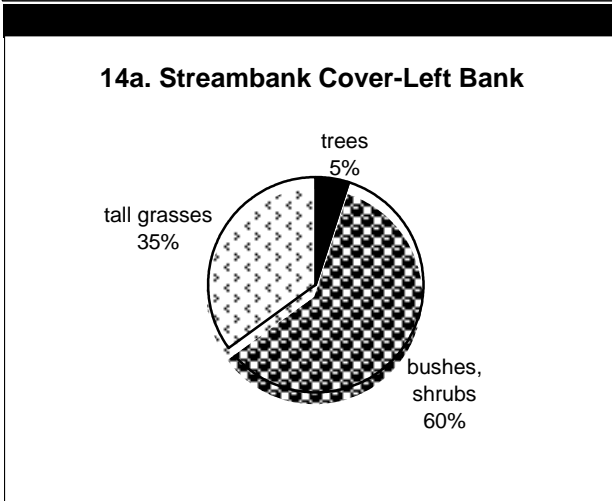
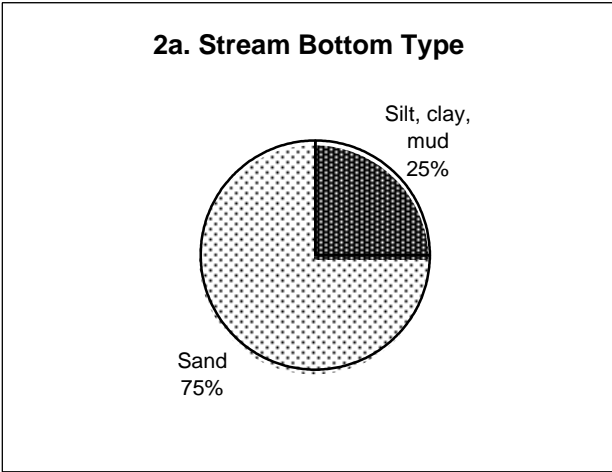
14a & 14b Streamside cover along water's edge:

see chart on p. 4

15. Extent to which vegetation shades stream:

0%

Charts:



16. Noted General Conditions

General Conditions of Stream Banks (1=present, 2=severe problem clearly evident):

	<u>Left side</u>	<u>Right side</u>
Natural streamside plant cover degraded:	0	0
Banks collapsed/eroded:	0	0
Garbage/junk adjacent to stream:	1	0
Foam or sheen on bank:	0	0

General Conditions of Stream Channel:

	<u>Left side</u>	<u>Right side</u>
Mud, silt, or sand in or entering the stream:	2	2
Garbage/junk in the stream:	0	0

Other General Conditions:

	<u>Left side</u>	<u>Right side</u>
Yard waste on bank (grass clippings,etc.):	0	0
Livestock in or with access to stream:	0	0
Actively discharging pipe(s):	0	0
Other pipe(s) entering the stream:	0	0
Ditches entering the stream:	0	0

17. Land Uses in Local Watershed

(within about 1/4 mile of the site; adjacent and upstream)

Residential (1=present, 2=clearly having an impact on the stream)

Single-family housing:	0
Multi-family housing:	1
Lawns:	0
Commercial/institutional:	1

Roads, etc.

Paved roads or bridges:	1
Unpaved roads:	0

Construction underway on

Housing development:	0
Commercial development:	0
Road/bridge construction/repair:	0

Agricultural

Grazing land:	0
Feeding lots or animal holding areas:	0
Cropland:	0

Inactive agricultural land/fields: 0

Recreation

Power boating: 0
Golfing: 0
Camping: 0
Swimming/fishing/coanoeing: 0
Hiking/paths: 0

Other

Mining or gravel pits: 0
Logging: 0
Industry: 0
Oil and gas drilling: 0
Trash dump: 0
Landfills: 0

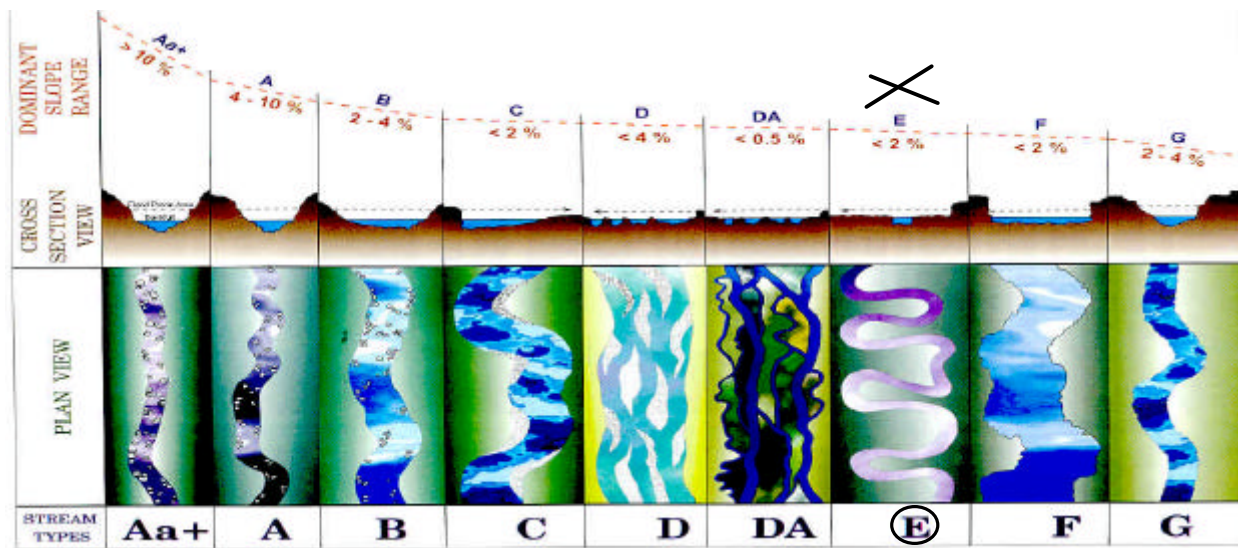
Visual Biological Survey

18. Fish present in the stream: No
19. Barriers to fish movement: none
20. Aquatic plants in the stream: none
21. Extent of algae in the stream
a) Presence of materials coated
with a layer of "algal slime": none
b) Presence of filamentous algae:
(string-like algae) none
c) Presence of detached "clumps"
of algae on water's surface: none

Stream Morphology

22. Shape of stream

- a) Slope of the stream at your site: 0-2%
- b) Cross-section view marked with an X E
- c) Birds-eye view marked with a circle E



Woody Debris

23. Highly-valuable large woody debris

- a) HV-LWD (small end diameter \geq 4 in) 11
- b) HV-LWD (small end diameter \geq 8 in) 2

Comments

At the end of the 300' section there is a parking lot within 15' of stream on a steep slope. Fairly good vegetated buffer though.