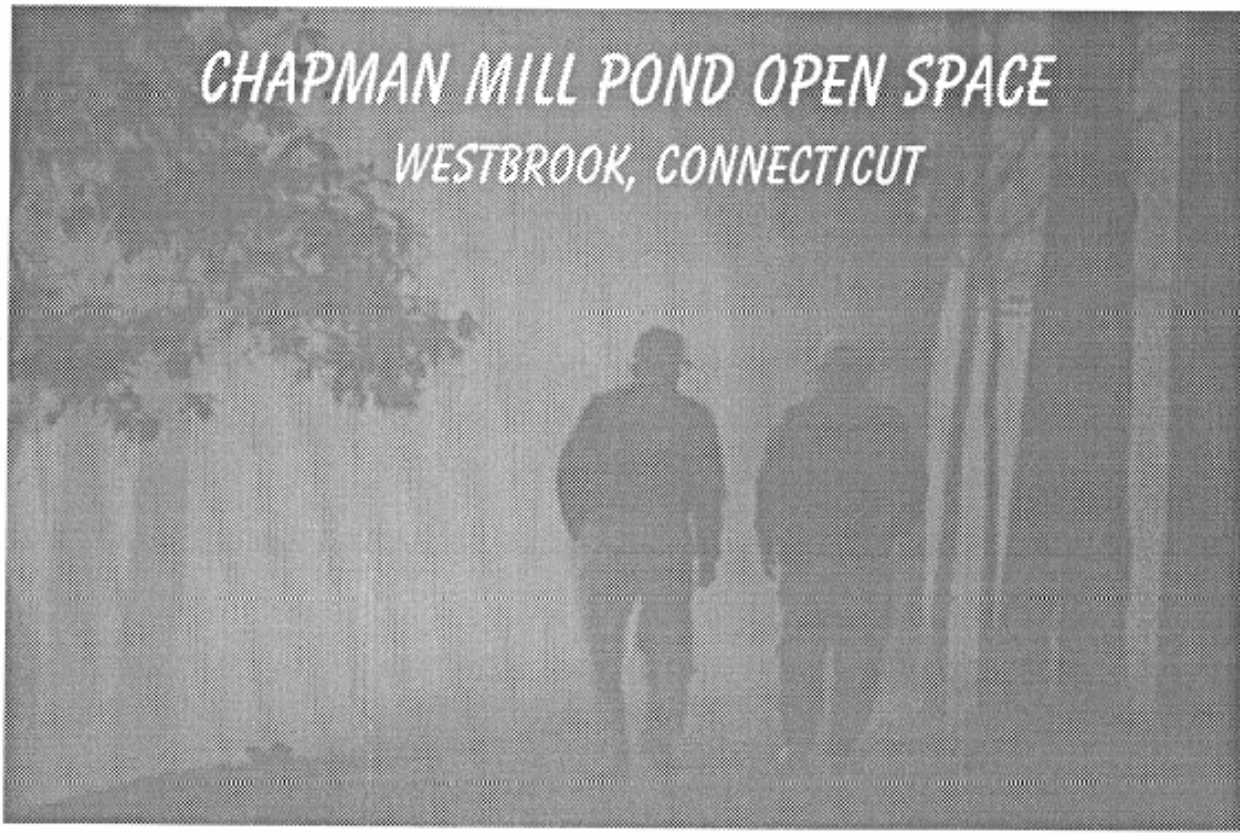

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

CHAPMAN MILL POND OPEN SPACE
WESTBROOK, CONNECTICUT

ENVIRONMENTAL REVIEW TEAM REPORT

PREPARED BY THE
EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM
OF THE EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

FOR THE
CONSERVATION COMMISSION AND THE FOREST COMMISSION
WESTBROOK, CONNECTICUT

APRIL 2004

REPORT NO. 582

CT ENVIRONMENTAL REVIEW TEAMS
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ACKNOWLEDGMENTS

This report is an outgrowth of a request from the Westbrook Conservation Commission and the Westbrook Forest Commission to the Connecticut River and Coastal Conservation District (CRCCD). Thc CRCCD referred this request to the Eastern Connecticut Resource Conservation and Development Area (RC&D) Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The Eastern Connecticut Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Thursday, September 25, 2003.

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I would also like to thank Tom ODell, chairman, conservation commission, Bob Peterson, conservation commission and Randy Bell, conservation commission and chairman of forest commission, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review Team members were given additional maps and information. Some Team members made separate and/or additional visits to the project site. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town. This report identifies the existing resource base and evaluates its significance to potential and existing development, and also suggests considerations that should be of concern to the town and school. The results of this Team action are oriented toward the

development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in the developing a management plan for this open space parcel.

If you require additional information please contact:

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INTRODUCTION

INTRODUCTION

The Westbrook Conservation Commission and the Westbrook Forest Commission have requested assistance from the Eastern Connecticut Environmental Review Team in conducting a natural resource inventory and providing information for the development of a management plan for the Chapman Mill Pond Open Space parcel.

The 83 acre site was recently purchased by the town for open space. It is located on the Westbrook/Clinton town line approximately one half mile north of Interstate 95 on Route 145 (a.k.a. Horse Hill Road). Access to the property is from Route 145 through a 50' right-of-way. The property had been in the process to receive approvals for a 19 lot subdivision but the landowner had expressed an interest in preserving the land.

Chapman Mill Pond is also known as Lake Laconia. It is a Menunketesuck River impoundment that is fed by small tributaries originating in several towns. The river ultimately flows into Long Island Sound. The 83 acre open space includes over 3000 feet of water frontage.

OBJECTIVES OF THE ERT STUDY

The ERT has asked to assist the town in devising a management plan that will meet the objectives of the town which include water quality protection, wildlife habitat protection, and recreation and educational opportunities for the public. Specific information requested included a review of soils, geology, water quality, wetlands, watershed significance, erosion and sediment control, fisheries habitat,

forestry management, trail development and archaeological and historical values for education and protection.

THE ERT PROCESS

Through the efforts of the conservation commission this environmental review and report was prepared for the Town of Westbrook.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the applicant.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on Thursday, September 25, 2003. Some Team members made individual and/or additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

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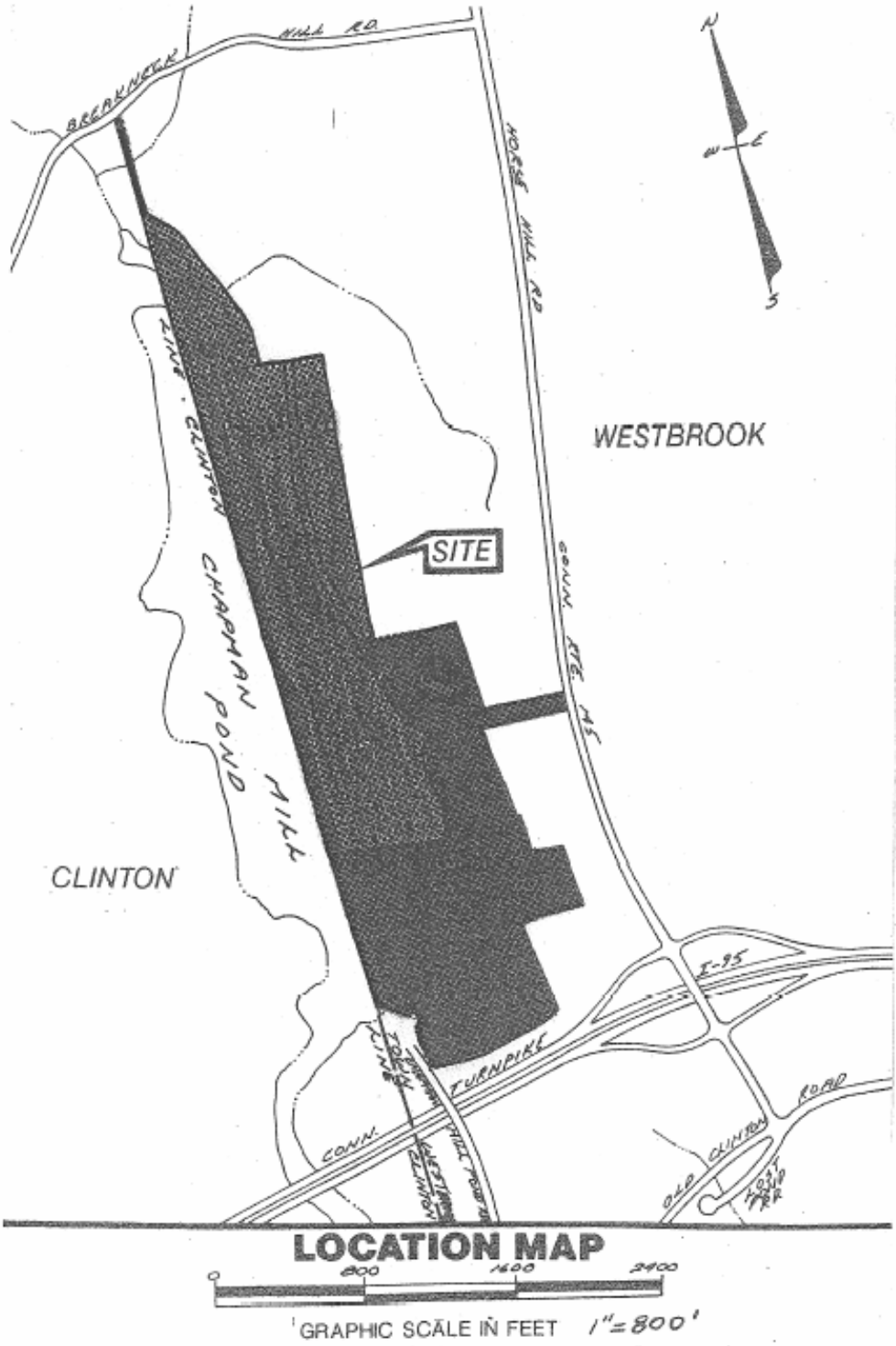
Topographic Map

Scale 1" = 2000'

Location Map



TOPOGRAPHY AND GEOLOGY

TOPOGRAPHY

Chapman Mill Pond occupies a north-northwest/south-southeast trending topographic trough that reflects the structural grain of the underlying bedrock as modified by erosion and sedimentation during and immediately following the last Ice Age. The pond is an impoundment of the Menunketesuk River that flows, in this area, against the east side of a broad steep-sided valley that is parallel to the strike of the underlying bedrock and which was deepened by glacial erosion along fracture zones in the bedrock. Most of the valley, to the west of the mill pond, is filled with debris (stratified, sand and gravel) deposited by glacial melt-water streams and the topography is quite hummocky. Immediately east of the mill pond stands a steep-sided bedrock ridge which is about 125 feet higher than the pond level. The ridge provides spectacular views of the mill pond, especially in winter when trees are naturally defoliated. East of the ridge lies a narrow valley that contains wetlands, including several vernal pools.

BEDROCK GEOLOGY

Bedrock was observed during a walk along the steep-sided ridge immediately east of Chapman Mill Pond. It consists of rusty and non-rusty weathering medium-grained gray gneiss and rusty-weathering schist. It is mapped as the Monson Gneiss by Lundgren (1964) but is more lithologically-similar to the Brimfield formation which Lundgren indicates is found immediately east of the bedrock ridge (sec Geologic Sketch Map). The contact (boundary) between the two formations likely is gradational and the rocks underlying the ridge are part of that gradation. Lundgren indicates that the Monson Gneiss is composed of light Gray plagioclase-quartz-biotite-hornblende gneiss interbedded with amphibolite.

The Brimfield Formation consists of poorly exposed rust-stained biotite-orthoclase-sillimanite-garnet schist and gneiss. Rusty weathering is caused by iron-sulfide minerals that weather to iron oxides.

The Brimfield and Monson Formations are Ordovician in age (~450 million years) and are part of the Iapetus (North-American) Terrane (see Bell, 1985, ch. 8). Just south of Chapmans Pond are rocks that are 1 b.y. in age that were formed as part of another continent (Baltica) which is referred to as Avalon Terrane. The two terranes became juxtaposed about 350 mya by plate tectonic processes. The Avalonian rocks were thrust under Iapetus rocks. The boundary is a major discontinuity called the Lake Char Fault (zone) in eastern Connecticut and the Honey Hill Fault (zone) in southern Connecticut (actually one discontinuity with two names). The two fault zones (both currently inactive) join in North Stonington. The plate tectonic activity involved with the juxtaposition of the two terranes produced a huge mountain range (since eroded) and caused earthquakes and either the metamorphism or remetamorphism of the rocks of both terranes.

Rodgers (1985) believed that rocks of the Monson Formation in this area to be part of the Avalon suite of rocks, indicating that the discontinuity between the two terranes actually passed through the Chapman Pond open space area. This assignment is in error as proved by recent Ordovician-age determinations (Robert Wintsch, Indiana U. Prof., pers. com.) for rocks west of Chapman's Pond by one of his students.

SURFICIAL GEOLOGY

Glacial till forms a thin veneer over bedrock along the eastern high lands of the open space parcel and stratified sand and gravel cover the low lands west of Chapman Mill Pond and form a thin veneer over the bedrock in the north and south parts of the open space parcel (Flint, 1971).

Glacial till is a poorly sorted mixture of mud, sand and gravel, possibly including boulders, that formed beneath glacial ice ±20,000 years ago. The deposit is generally less than 10 feet thick.

Stratified sand and gravel were deposited ±14,000 years ago by glacial meltwater streams during the global warming at the end of the last Ice Age. Left-over blocks of ice littered much of the valley and sand and gravel were deposited against this ice in many places. Later melting of the left-over ice produced the hummocky topography. The stratified deposit is both porous and permeable and is a shallow aquifer. In addition it is a valuable construction raw material.

REFERENCES

Bell, Michael, 1985, *The Face of Connecticut*. Geol. and Nat. Hist. Survey, Bulletin 110, 196p.

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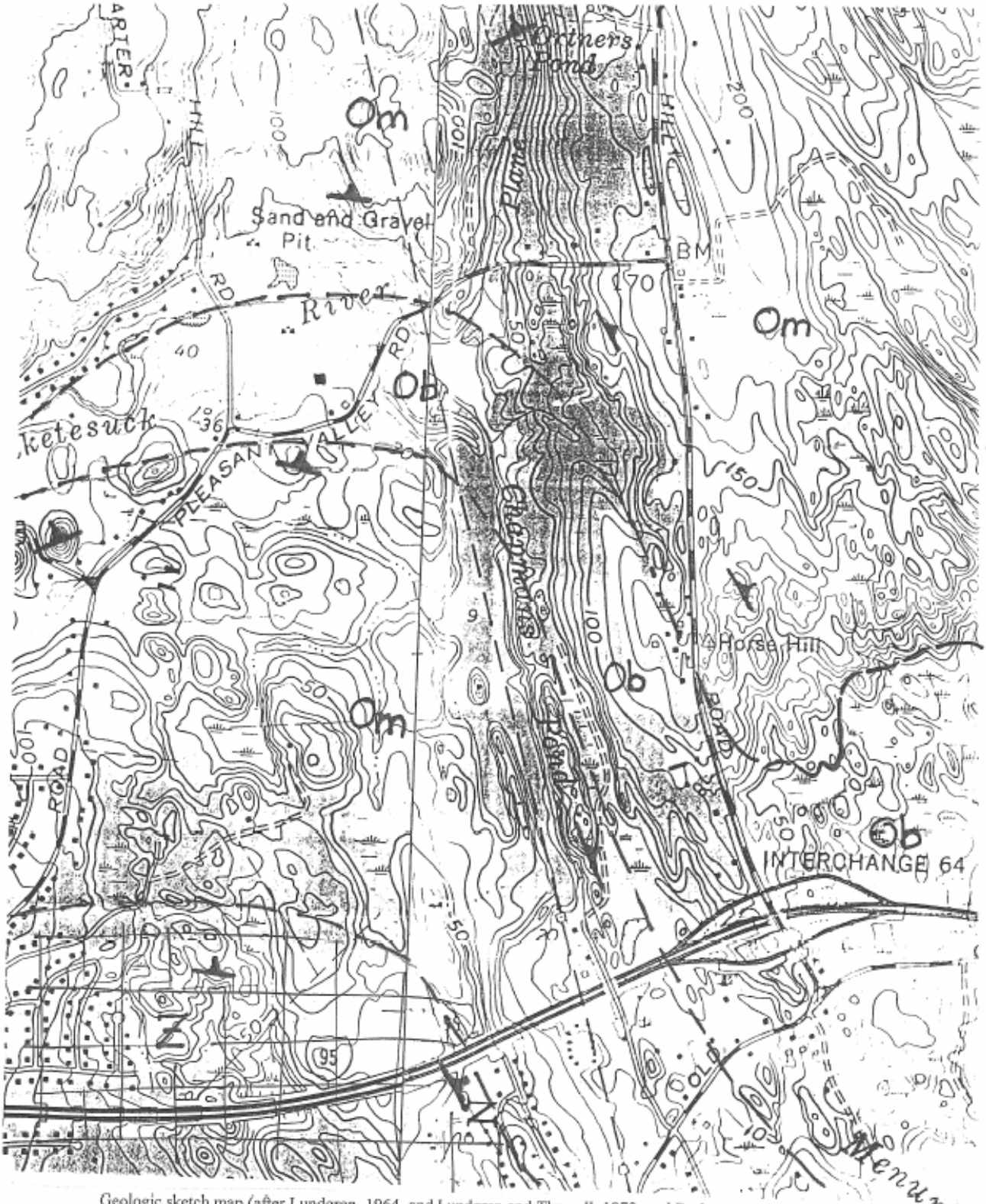
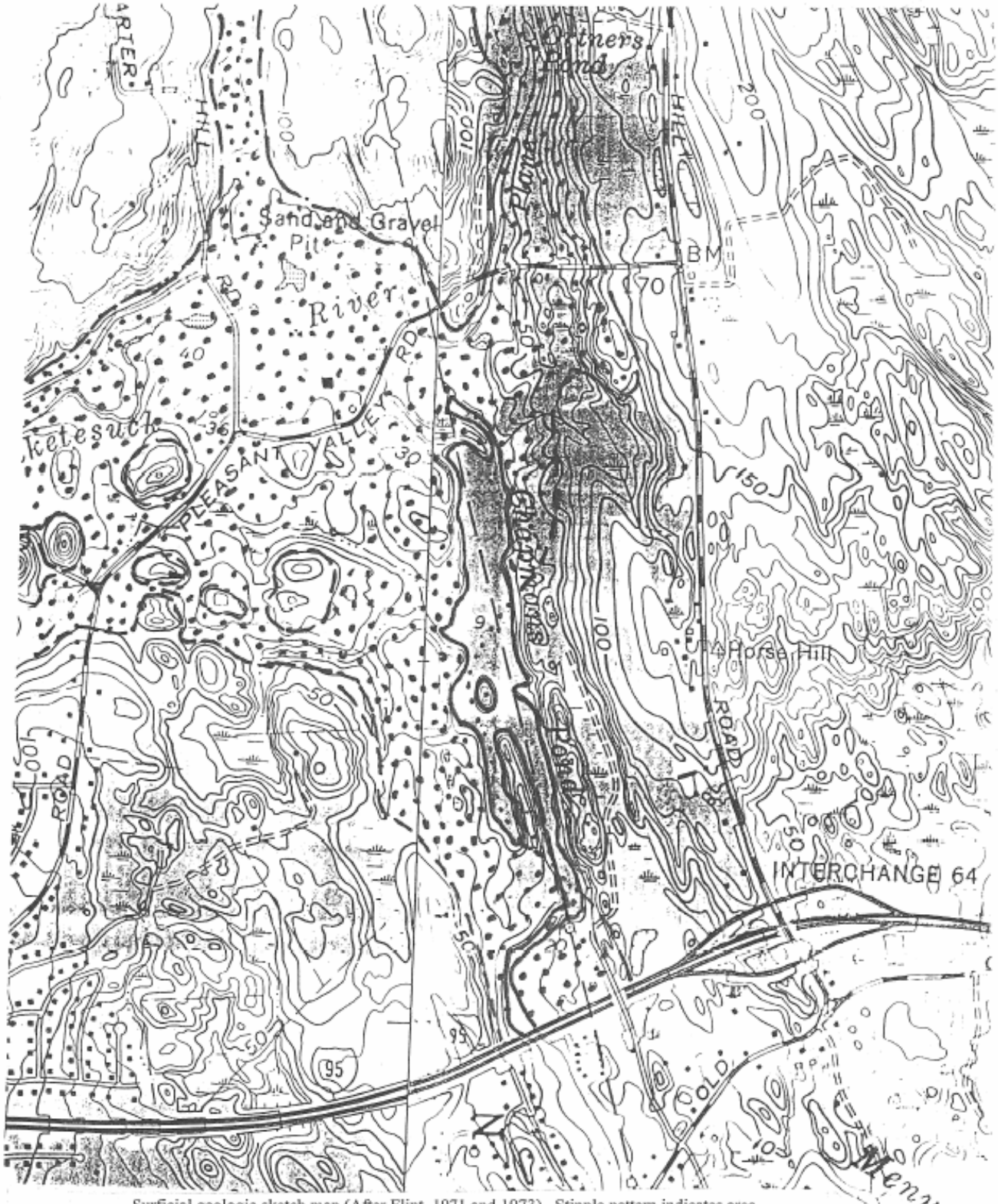


Geologic sketch map (after Lundgren, 1964, and Lundgren and Thurrell, 1973, and Rodgers, 1985) showing major lithologic boundaries. Ob = Brimfield Formation (Ordovician; Iapetus terrane), Om=Monson Gneiss (Ordovician; Iapetus Terrane), Z=Potter Hill Granite Gneiss (Pre-Cambrian, Avalon Terrane?)

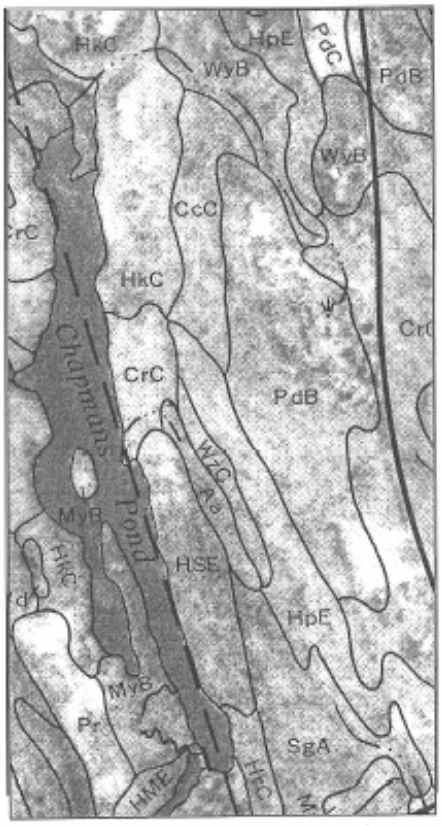


Surficial geologic sketch map (After Flint, 1971 and 1973). Stipple pattern indicates area covered by stratified sand and gravel. Bedrock either crops out or is covered by a thin mantle of till in most of remaining area. Modern sediments (swamp mud and stream alluvium) not shown.

CONSERVATION DISTRICT REVIEW

The following are general comments and recommendations regarding the Town of Westbrook's Chapman Mill Pond property. Information used to develop this report includes site topography and wetlands mapping from subdivision plans prepared in 1988; Soil Survey Maps for Middlesex County (USDA/SCS); Official Soil Series Descriptions from the USDA/NRCS Soil Survey Division; and a site visit conducted on September 25, 2003. This report is advisory in nature and is intended to assist the Westbrook Conservation and Forest Commissions in their charge.

CURRENT SITE CONDITIONS



The Chapman Mill Pond property consists of low-lying seasonally flooded wooded swamps bordered by steep wooded uplands. The site's natural features, including two broad wetlands, two small isolated wetlands, bedrock outcrops, a series of high points, and a pronounced ridge, are generally in a north-south orientation parallel to the Chapman Mill Pond.

The General Soil Survey Map for Middlesex County (USDA/SCS) shows that Chapman Mill Pond lies in an area of two map units. To the east of the pond is the Paxton-Woodbridge map unit which consists of

nearly level to steep, well to moderately well drained loamy soils with a compact substratum found on drumloidal glacial till uplands and broad glacial till plains. To the west of the pond is the Canton-Hollis Charlton map unit, which consists of steep, somewhat excessively and well drained loamy soils on glacial till uplands.

Specifically, two wetland and ten upland soils (or soil complexes) are shown within the property boundaries on the county soil survey maps. These maps are at a 1:15,840 scale, which means that the smallest area delineated is approximately 2.5 acres. Caution should be taken when using the soil survey maps for site-level planning since at this scale soils in a single mapped unit can differ in slope, depth, drainage, and stoniness.

Wetlands are primarily Leicester, Ridgebury, and Whitman extremely stony fine sandy loams (LG), although the large central wetland has two distinct areas of Adrian muck (Aa). Soils in gently sloping uplands are Merrimac, Paxton, Montauk, Sudbury, Woodbridge, and Hinckley sandy loams. Soils in steeper sloping uplands are Canton, Charlton, and Hollis sandy loams and bedrock outcrops.

Descriptions of soil series located in and around the Chapman Mill Pond property[1] are as follows:

Aa - Adrian muck, 0-2%

The Adrian series consists of very deep, very poorly drained soils. Generally adjacent to sandy uplands, these soils are formed in herbaceous organic material over sandy deposits. This series in generally found in shallow closed depressions primarily on outwash plains, lake plains, lake terraces, and flood plains, but also

[1] Soil Survey Division's (USDA/NRCS) Official Soil Series Descriptions (available online at: http://ortho.ftw.nrcs.usda.gov./osd/) and the Soil Survey Maps for Middlesex County (USDA/Soil Conservation Service).

within moraines and till plains. Areas of Aa are mainly round or irregular in shape and can range from 3 to 80 acres in size. Permeability is moderately slow to moderately rapid in the organic material but rapid in the sandy material below. The potential for surface runoff is negligible, and the soil is wet for most of the year with ponding after heavy rains and during the fall and spring. Most of the Aa series is wooded with red maple, ash or alder; and supports native marsh grasses (including sedges, reeds, and grasses) and shrubs. Cultivation or community development[2] is limited by severe wetness and difficulty in keeping areas successfully drained.

LG - Leicester, Ridgebury, and Whitman extremely stony fine sandy loams, 0-5% These nearly level to gently sloping, poorly and very poorly drained soils are found in drainageways and depressions of glacial till uplands. Areas of LG are often narrow or irregular shaped, and can range from 3 to 200 acres in size. As a unit LG generally consists of 40% Leicester, 25% Ridgebury, 15% Whitman, and 20% other soils, although areas can contain only one, two, or all three of the major soils. The soils in this unit are poorly suited for crop cultivation, suited for trees (although the high water table can cause shallow rooting and therefore problems with windthrow), and have poor potential for community development. The two major limitations are wetness and stoniness (more than 3% to the soil surface is covered with stones and boulders).

The **Leicester** series consists of very deep, poorly drained loamy soils formed in friable acid glacial till derived mostly from schist, gneiss, and granite. They are nearly level or gently sloping soils found in drainageways and in low-lying areas along hill slopes. Permeability is moderate or moderately rapid in the upper soil profile and moderate to rapid in the substratum. These soils have a water table at or near the surface much of the year and generally have slow surface runoff. Many areas of Leicester remain wooded with common trees including red maple,

[2] Community development suitability includes ability to support onsite septic systems, buildings, roads, and other infrastructure associated with development activities.

red oak, elm, aspen, gray birch, white pine, balsam fir, red spruce, and ironwood, although some areas have been improved for haying and pasture.

The **Ridgebury** series consists of very deep, poorly drained (and sometimes the wetter part of somewhat poorly drained) soils formed in loamy till derived mainly from granite, gneiss and schist. These nearly level to gently sloping soils are found in slightly concave areas and shallow drainageways of till covered uplands. Permeability is moderate or moderately rapid in the upper soil profile and slow or very slow in the dense till below. A perched, fluctuating water table above the dense till saturates the upper soil layers at or near the surface for 7 to 9 months of the year. Most areas of Ridgebury are forested, with common trees including gray birch, yellow birch, red maple, hemlock, elm, spruce and balsam fir.

The **Whitman** series consists of very deep, very poorly drained soils formed in glacial till derived mainly from granite, gneiss, and schist. These soils are nearly level or gently sloping soils in depressions and drainageways of glacial uplands. They are shallow to a compact dense till, with permeability is moderate or moderately rapid above the dense till and slow or very slow within it. Runoff potential is negligible, ponding often occurs, and perched water tables or excess seepage water can be found at or near the surface for about 9 months of the year. Nearly all areas are forested (common trees include alder, gray birch, red maple, hemlock, elm, spruce, balsam fir), although there is some areas have been cleared and drained for pasture. Sedges, rushes, cattails, and other water-tolerant species are the principal vegetation found in Whitman soils.

CcC - Canton and Charlton very stony fine sandy loams, 8-15% slopes

These sloping soils are found on hills and ridges of glacial till plains. Generally between 0.1 and 3% of the surface is covered with stones and boulders. Areas of CcC extend from 5 to 60 acres, are irregular shaped, and have smooth slopes. These soils pose a severe erosion hazard. They are limited by stoniness and

steepness, and are poorly suited to cultivated crops, suitable for trees, and have a good potential for community development.

The **Canton** series consists of very deep, well drained soils found on glaciated plains, hills, and ridges. These soils developed in fine sandy loam mantle over acid sandy glacial till derived mainly from granite and gneiss and some fine-grained sandstone. Permeability is moderately rapid in the upper surface profile and rapid in the substratum, with medium surface runoff and internal drainage. These soils warm up and dry out early in the spring, and unlimed areas are extremely to medium acid.

The **Charlton** series consists of very deep, well drained loamy soils found on till plains and hills. These soils are formed in acid till derived mainly from schist, gneiss, or granite. Permeability is moderate or moderately rapid throughout, and surface runoff is medium to rapid. These soils warm up and dry out early in the spring, and unlimed areas are very strongly to medium acid.

CrC - Charlton-Hollis very stony fine sandy loams, 3-15% slopes

This complex consists of Charlton (50%), Hollis (30%), other soils and bedrock outcrops (20%) in intricate patterns that are not practical to map separately. The soils in this complex are well to somewhat excessively drained. Areas of CrC are oblong to irregular shaped, range from 5 to 250 acres, and have smooth or complex slopes. The erosion hazard is moderate to severe, although permanent vegetation helps control erosion. The complex is poorly suited for cultivated crops, suited for orchards or pastures, and has fair potential for community development. The major limitations are stoniness, bedrock outcrops, and shallow depth to bedrock in many areas.

The **Charlton** series is as described above.

The **Hollis** series consists of shallow (depths to hard bedrock at 10 to 20 inches) well drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from gneiss, schist, and granite. These upland soils can be nearly level to very steep on bedrock-controlled hills and ridges modified by glacial action. Permeability is moderate or moderately rapid, surface runoff is negligible to very high, and available water capacity is low. Unless limed, the organic horizon is extremely acid to moderately acid and the mineral horizon is very strongly acid to moderately acid. Tree windthrow is a concern in Hollis soils because rooting depths are shallow due to the underlying bedrock.

HpE - Hollis-Charlton extremely stony fine sandy loam, 15-40% slopes

This complex consists of moderate to very steep, somewhat excessively drained and well drained soils found on ridges where the relief is affected by the underlying bedrock on glacial till plains. Areas of HpE can be 5 to 250 acres and are irregularly shaped with smooth to complex slopes. The erosion hazard is severe, and this complex is not suited to cultivated crops, poorly suited to trees, and has a poor potential for community development. The main limitations are steep slopes, shallow depth to bedrock, rock outcrops, and stoniness.

The **Hollis and Charlton** series are as described above.

HrC - Hollis-Rock outcrop complex, 3-15% slopes

This complex consists of gently sloping and sloping, excessively drained soils and areas of exposed bedrock found in upland areas where the relief is affected by the underlying bedrock. It is an intricate mix of 50% Hollis, 30% Rock outcrop, and 20% other soils. Areas of HrC can be 5 to 150 acres of irregular shape with 3-25% of the surface covered with stones and boulders, bedrock outcrops, a few narrow intermittent drainageways, and small wet depressions. The erosion hazard is severe, and this complex is not suited to cultivated crops, poorly suited to trees, and has a poor potential for community development. The main limitations are steep slopes, shallow depth to bedrock, rock outcrops, and stoniness.

The **Hollis** series is as described above.

HSE - Hollis-Rock outcrop complex, 15-40% slopes

This complex consists of moderate to very steep somewhat excessively drained soils and areas of Rock outcrop. This complex is steeper than the HrC complex described above but otherwise has the same characteristics.

HkC - Hinckley gravelly sand loam, 3-15%

The **Hinckley** series consists of very deep, excessively drained soils formed in water-sorted sand and gravel derived principally from granite, gneiss, and schist. This undulating, gently sloping to sloping, soil is found on terraces, outwash plains, deltas, kames, and eskers. Areas of HkC are irregular in shape and range from 5 to 100 acres in size. Permeability is moderately rapid or rapid in the upper soil profile and rapid or very rapid in the substratum. Surface runoff is negligible to low, and this soil dries out and warms up early in the spring. Unlimed areas are extremely to medium acid. Droughtiness and slope are the major limitations of Hinckley soils. They are poorly suited for cultivated crops, suited for trees, and have good potential for community development.

MyA - Merrimac sandy loam, 0-3% slopes

The Merrimac series consists of very deep, somewhat excessively drained soils formed in water sorted gravelly and sandy material derived mainly from granitic, gneissic and some schistose rocks. They are found on glacial outwash plains, valley trains, and associated kames, eskers, stream terraces and water deposited parts of moraines. Areas of MyA are irregular in shape and range from 5 to 75 acres. Permeability is moderately rapid or rapid in the upper soil profile and rapid or very rapid in the substratum. Surface runoff is slow or medium. Unlimed areas are extremely to medium acid. The erosion hazard is slight, and this soil is well suited for cultivated crops, suited for trees, and has good potential for community development. The major limitation is short periods of drought

that during the summer that can make establishing vegetation difficult without irrigation.

PdB - Paxton and Montauk very stony fine sandy loam, 3-8% slopes

These gently sloping soils are found on till plains, hills, and drumlins of glaciated uplands. These very stony soils generally have between 0.1 and 3% of the surface covered with stones and boulders. Areas of PdB extend from 5 to 200 acres, are oblong or irregular shaped, and have smooth to convex slopes. These soils pose a moderate erosion hazard. They are poorly suited to cultivated crops, suited for trees, and have a fair potential for community development. The main limitations are stoniness and wetness due to limited substratum permeability.

The **Paxton** series consists of well drained loamy soils formed in acid subglacial till derived mostly from schist, gneiss, and granite. They are very deep to bedrock and moderately deep to a densic contact. Permeability is moderate in the surface layer and subsoil and slow or very slow in the dense substratum. Surface runoff is negligible to high. Unlimed areas are strongly to slightly acid.

The **Montauk** series consists of very deep, well drained soils formed in thick, moderately coarse or medium textured glacial till (derived primarily from granitic materials) underlain by firm sandy till. Permeability is moderate or moderately rapid in the upper soil profile and slow or moderately slow in the substratum. Surface runoff is low to high. Unlimed areas are extremely to medium acid.

SgA - Sudbury sandy loam, 0-5% slopes

The Sudbury series consists of very deep, moderately well and somewhat poorly drained soils formed in water sorted sandy and gravelly materials derived mainly from granitic, gneissic, and schistose rocks. These soils are found on nearly level to strongly sloping soils in slight depressions on broad glacial

outwash terraces and narrow stream valleys. Areas of SgA are irregular in shape, extend from 3 to 40 acres, and have smooth slopes. Permeability is moderately rapid in the upper part of the upper soil profile and is rapid in the lower part of the upper soil profile and in the substratum. A seasonal high water table at about 20 inches from late autumn until midspring restricts the internal drainage of this soil. Surface runoff is slow and unlimed areas are extremely to medium acid. SgA is well suited for cultivated crops, suited for trees, and has fair potential for community development. The major limitation is a seasonally high water table and the instability of steep slopes of excavations.

WzC - Woodbridge extremely stony fine sandy loam, 3-15% slopes

The Woodbridge series are moderately well drained loamy soils formed in acid till derived mostly from schist, gneiss, and granite. They are found on side slopes of drumlins and glacial till uplands, are very deep to bedrock, and are moderately deep to a densic contact. Areas of WzC are oblong to irregular shaped and range from 3 to 150 acres in size. Permeability is moderate in the upper soil layers and slow to very slow in the substratum. The water table is perched, and can seasonal be found at a depth of about 18 inches. This soil is poorly suited to cropping (3-15% of the soil surface is covered with stones and boulders), suited for trees, and has a fair potential for community development. Wetness and stoniness are the main limiting factors, and steep slopes of excavations can slump when saturated. Unlimed areas are strongly to medium acid.

AREAS OF CONCERN

The main management concerns of the Chapman Mill Pond property include the protection and preservation of steep areas where soils tend to be shallow; low-lying areas wet areas that may easily become compacted or rutted; and vernal

pool amphibian breeding habitats. Select soil properties are provided in Table 1 and woodland management information is provided in Table 2.

Charlton-Hollis and Hollis-Rock complexes, which range in slope from 3% to 40%, are prevalent on site. In particular, the ridgeline along the southeastern shore of Chapman Mill Pond is shown as Hollis-Rock outcrop with slopes approaching 30%. It is in this area that a number of dead hemlocks were observed and active management to minimize safety risks from falling trees may need to be considered. In addition, the right-of-way from Route 145 crosses an area of Charlton Hollis complex with slopes approaching 20%. This soil complex poses a severe erosion hazard and adequate stormwater and erosion controls should be implemented depending on whether the right of-way remains a foot path, is used for intermittent equipment access to the site, or is upgraded to allow vehicle access to a boat launch site.

RECOMMENDATIONS

- A forestry specialist should supervise woodland management activities. Dead hemlocks or other trees should be left in place wherever possible. Selective trimming may be advantageous if trees are near the foot trail. If trees must be removed proper erosion and sedimentation controls should be used (consider using geotextile silt fence in combination with either hay bales or wood chips) and stumps should be left in place. Disturbed areas should be immediately stabilized with a combination of living and non-living soil protection (e.g., seeding, hay mulch, wood chips, erosion control blankets or mats, etc.). All woody material should be left on site and if possible placed perpendicular to the slope to help impede erosive surface runoff. If additional trees are planted species that successfully grow in shallow soils should be selected.

- Concentrated stormwater flows should be controlled on steep sections of foot trail or vehicle accessways. Water bars or diversions should be used to direct excess runoff from the trail or accessway to a stable vegetated area on the side slope. In very steep areas flows may need to be directed to a stable velocity dissipater such as a small riprap splash pad or stone check dam.

Slowly infiltrative C hydrologic group soils, e.g., Woodbridge, Paxton, and Montauk soils, can be seasonally wet with areas of ponded water. Woodbridge soils, which have a perched water table, are shown to the east of the large central wetland (wetland flags #55-119). Paxton and Montauk soils, which can have a dense, low permeability substratum, are shown in the northeast corner of the property and along the right-of-way. During the site visit old road ruts in the existing accessway near wetland flag #62 were observed to be ponding water. Management practices should be used to minimize impacts of future foot, bicycle, or vehicle traffic in these sensitive wet areas.

RECOMMENDATIONS

- Motorized vehicles, heavy equipment, bicycles, and excessive foot traffic can cause rutting and compaction in wet, low permeability soils. Avoid vehicular traffic in these areas unless soils are frozen or completely dry. Relocate recreational trails to drier, more well drained areas and consider barriers to discourage use of already impacted areas.

The large central wetland complex drains through a narrow intermittent watercourse to a wider drainageway and then to the Chapman Mill Pond. Any proposed recreational or management activities in this area should be carefully considered in order to minimize potential impacts.

RECOMMENDATIONS

- Shoreline access should be avoided at this location. Measures to discourage boaters (if access is provided) from stopping or hauling out in this area should be considered, e.g., signs with "sensitive natural area - do not disturb" or other information could be posted.

- If traversing this area with a foot trail cannot be avoided a stable crossing should be provided at the narrowest point of the wetland as possible. The feasibility of a small bridge or boardwalk to cross this area should be evaluated.

- Motorized vehicles or heavy machinery should be prohibited from this area.

Vernal pool habitats have been documented in three of the on site wetlands (Connecticut Ecosystems LLC report dated 4/22/02). A relatively small vernal pools was observed adjacent to an abandoned logging road, while two other were located in seasonally flooded wooded swamps. These latter two pools contained extensive shallow water and were noted to have particularly high amphibian productivity. The extent of seasonally ponded water, therefore the size and hydroperiod of the pools, can vary year-to-year and may continue beyond the surveyed wetland boundaries. Management or site improvement activities occurring near the vernal pool should be carefully evaluated with regard to protection and preservation of the pool's physical structure, water quality, and adjacent upland habitat (e.g., shading, moisture, amount of leaf litter and coarse woody debris).

RECOMMENDATIONS

In addition to the pool itself there are two important vernal pool protection zones: the vernal pool envelope extending 100 feet from edge of the pool and the critical terrestrial habitat (or amphibian life zone) extending at least 400 to 750 feet from the vernal pool envelope. The following suggestions address protection and preservation of both the pool and the surrounding upland habitat essential for amphibian success.[3][4]

- In the vernal pool envelope maintain a closed canopy with at least 75% tree cover (uniform distribution of 20-30 foot trees), deep leaf litter layer, and coarse woody debris.

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[3] Best Development Practices: Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United states, A.J.K. Calhoun and M.W. Klemens. Metropolitan Conservation

[4] Forestry Habitat Management Guidelines for Vernal Pool Wildlife in Maine, A.J.K. Calhoun and P. deMaynadier. U.S. Environmental Protection Agency, Boston, MA 2003.

- In the critical terrestrial habitat minimize disturbances to the forest floor, encourage a partially closed canopy with at least 50% tree cover, and leave coarse woody debris, fallen logs, old and dying trees whenever possible.

- Avoid management activities that will cause dramatic shifts in forest cover types.

- Plan work outside of the active amphibian breeding and migration seasons (spring and late summer/early fall).

- Do not use vehicles or heavy machinery in the vernal pool envelope, and only in the critical terrestrial habitat when the ground is frozen or completely dry to avoid rutting and compaction.

- Avoid constructing roads in the vernal pool envelope and implement stormwater best management practices on existing roads or accessway to minimize impacts to vernal pool water quantity and quality (see the new Connecticut Stormwater Quality Manual, IWRD/CT DEP for recommended BMPs).

Table 1. Select properties of the predominant upland and wetlands soils at the Chapman Mill Pond property in Westbrook, Connecticut (from the Soil Survey Maps for Middlesex County (USDA/Soil Conservation Service)

							Habitat & Wildlife Potential			
Drainage	**Soil Description**		**Slope (%)**	**Hydrologic Group**	**Erosion Hazard**	**Limitation for Paths & Trails**	Wild Herbaceous Plants	Wetlands Plants & Wildlife	Woodland Wildlife	Openland Wildlife
Very Poorly	Aa	Adrian muck	0-2	D	NA	Severe[1]	VP	G	P	VP
Very Poorly and Poorly	LG	Leicester, Ridgebury, and Whitman extremely stony fine sandy loam	0-5	C/D	NA	Severe[1, 3]	F	VP	G	P
Well	CcC	Canton and Charlton very stony fine sandy loam	8-15	B	Severe	Moderate[3]	G	VP	G	P
Well to Somewhat Excessively Well	CrC	Charlton very stony fine sandy loam	3-15	B	Moderate to severe	Moderate[3]	G	VP	G	P
		Hollis very stony fine sandy loam		C/D*		Moderate[3]	F	VP	P	P
Moderately Well	PdB	Paxton and Montauk very stony fine sandy loams	3-8	C**	Moderate	Moderate[1, 3]	G	P/VP	G	F
	SgA	Sudbury sandy loam	0-5	B	Moderate[4]	Slight[1]	G	P	G	G
	WzC	Woodbridge extremely stony fine sandy loam	3-15	C**	Moderate[4]	Severe[3]	G	VP	F	P
Somewhat Excessively	HpE	Hollis-Charlton extremely stony fine sandy loams	15-40	C/D*	Severe	Severe[2, 3]	F/G	VP	P	P
	HrC	Hollis-Rock outcrop complex	3-15	C/D*	Severe	Severe[2, 3]	F	VP	P	P
	HSE	Hollis-Rock outcrop complex	15-40	C/D*	Severe	Severe[2, 3]	F	VP	P	P
	MyA	Merrimac sandy loam	0-3	A	Slight	Slight	F	VP	F	F
Excessively	HkC	Hinckley gravelly sandy loam	3-15	A	Slight	Moderate	F	VP	P	P

**shallow depth to bedrock, **slow to very slowly permeable substratum (confining layer) impedes the downward movement of water*
[1]wet, [2]steep, [3]stony, [4]excavations unstable
VP=very poor, P=poor, F=fair, G=good

Table 2. Woodland management information for the predominant upland soils at the Chapman Mill Pond property in Westbrook, Connecticut (from the Soil Survey Maps for Middlesex County (USDA/Soil Conservation Service)

Soil Description		Slope (%)	Common Trees	Management Concerns			
				Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow Hazard
CcC	Canton and Charlton very stony fine sandy loams	8-15	Eastern white pine, northern red oak, shagbark hickory	Slight	Slight	Slight	Slight
CrC	Charlton very stony fine sandy loam	3-15	Northern red oak, eastern white pine, sugar maple, white spruce, shagbark hickory	Slight	Slight	Slight	Slight
	Hollis very stony fine sandy loam			Slight	Severe	Severe	Moderate
PdB	Paxton and Montauk very stony fine sandy loams	3-8	Northern red oak, eastern white pine, sugar maple	Slight	Slight	Slight	Slight
SgA	Sudbury sandy loam	0-5	Eastern white pine, northern red oak	Slight	Slight	Slight	Slight
WzC	Woodbridge extremely stony fine sandy loam	3-15	Eastern white pine, northern red oak, sugar maple	Moderate	Moderate	Slight	Slight
HpE	Hollis-Charlton extremely stony fine sandy loams	15-40	Northern red oak, eastern white pine, sugar maple, white spruce	Slight	Moderate	Severe	Moderate
HrC	Hollis-Rock outcrop complex	3-15	Northern red oak, eastern white pine, sugar maple, white spruce	Slight	Slight	Severe	Moderate
HSE	Hollis-Rock outcrop complex	15-40	Northern red oak, eastern white pine, sugar maple, white spruce	Slight	Moderate	Severe	Moderate
MyA	Merrimac sandy loam	0-3	Northern red oak, eastern white pine, sugar maple	Slight	Slight	Moderate	Slight
HkC	Hinckley gravelly sandy loam	3-15	Northern red oak, eastern white pine, sugar maple	Slight	Moderate	Severe	Slight

WETLAND RESOURCES

Most of the nature of the on-site wetlands (water quality, vernal pools and fisheries) is discussed elsewhere in this document. This section as a result will concentrate on the lay of the wetland systems on the landscape.

The wetlands lie primarily in two locations. They can be divided east and west of the drainage break depicted on the attached aerial photograph. The system that flows west from the break ultimately turns south and outlets into the pond. Integral to these two wetland systems are large vernal breeding pools. Sheet one of two of the Waldo Inland Wetland Boundary Clarification Map shows both wetland systems outlined with wetland flag numbers. Mr. Edward Pawlak of Connecticut Ecosystems, LLC includes pictures of these wetlands.

The most productive of these wetland vernal pool systems is the wet area west of the break. Here Mr. Pawlak located in excess of eleven hundred egg masses, (combined count of both spotted salamander and wood frog). This is a prolific amount. In the vernal areas to the east of the break, Mr. Pawlak recorded more than three hundred egg masses. Both of these wet systems are forested, predominantly deciduous, wetlands which are seasonally flooded. To the east of the drainage break the period of seasonal inundation must be extensive, at least in some years, to support the buttressing seen on Red maples *(Acer rubrum)* in the vicinity of wetland flag 24.

At one point in the west side wetland flowpath (between the last two white arrows on the photograph) there is a small ponded area which takes on water from the rocks above it. A Green frog *(Rana clamitans)* was located in the proximity of wetland flag 81. The diet of the Green frog includes insects, spiders,

and tadpoles which puts it in a perfect down stream feeding position from the vernal pools.

One of the integral parts of the breeding pool habitat is the proximity of the pools to uplands. Vernal pool breeders spend only a short period of their lives in the water. After hatching they move upslope where it is drier to spend the balance of their life cycles, returning to the pond briefly to breed in spring. The west-of-the-break wetlands are situated in an east-west valley bordered to the north and south by ridges. It is interesting to note that these west breeding pool areas are closely bounded north and south by ridges whereas the breeding pools to the east of the break have hills/slopes located only on the north side and the egg mass count was substantially less.

PRECAUTIONS

- Much of the site is slopey. Where the Team entered the site from the road we proceeded down hill to what was likely an old woods road that forked east and west. As we came downslope we veered left to the east along the road.

  Present here were many tire ruts in the dirt roadway. These ruts form a kind of "decoy" vernal/breeding pool when they fill with water in the springtime. Rainwater and snowmelt collect in the tire ruts, amphibian eggs get deposited, and egg masses grow. Ultimately however there is insufficient water depth and mass to last through the breeding season. The result is that the water in the ruts dries out before the egg masses are able to hatch their young. Elimination of the ruts on this part of the site will concentrate the amphibian breeding activity into areas where it can be sustained through the critical wet springtime months.

- Because of the slopiness, any work that will be implemented will need to employ the most up-to-date and appropriate sediment and erosion control measures. This should insure that sedimentation is not a problem. Sediment loading into the sensitive areas of the breeding pools, and in general the sedimentation of the stream, and ultimately the pond, must be avoided.

- If the area will be open to the public some of the nuisance plants such as Greenbrier *(Smilax sp.)* located near the pathway entrance and along some interior trails or roadway might need to be thinned for ease of public transit. While a native species, its thorny vines can none-the-less be an irritating nuisance.


Green Frog located

A WATERSHED PERSPECTIVE

INTRODUCTION

These comments are given from the perspective of improving and maintaining water quality and supporting designated uses of the State's waters in accordance with Connecticut's Water Quality Standards.[1] This information also reflects upon the Connecticut Department of Environmental Protection's (CTDEP) growing commitment to address water resource concerns from a watershed perspective, taking into account the cumulative impact that various land use policies and activities within a given watershed may have upon water resources.

The following remarks may overlap with those of other ERT members who are dealing with more specialized aspects of the review (i.e. fish and wildlife habitat, historic/archaeological significance, wetlands, stormwater erosion and sedimentation control, etc.). In such cases, these comments are meant to support or supplement their specialized reviews.

ENVIRONMENTAL REVIEW TEAM (ERT) OBJECTIVES

The ERT has been requested to provide assistance in reviewing the newly acquired Chapman Mill Pond Open Space, purchased by the Westbrook Conservation Commission with the help of the Trust for Public Land, and to help develop a management plan that meets the town's objectives.

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[1] State of Connecticut, Department of Environmental Protection. Effective 1996 & 2002. Water Quality Standards, Bureau of Water Management, Planning and Standards Division. Hartford, CT.

SITE DESCRIPTION

The site is an 83 acre parcel located on the Clinton-Westbrook Town line, approximately 1/2 mile north of Interstate 95, and west of State Route 145 (a.k.a. Horse Hill Road). The parcel contains a 24.3-acre impoundment, Chapman Mill Pond (a.k.a. Lake Laconia), located on the Menunketesuck River, which eventually flows into Long Island Sound. The lake stretches across the property from north to south, straddling the town line. The land surrounding the lake is mostly undeveloped forest and is bordered to the east and south by a long ridge which separates two fingers of open water. Much of the open water area is shallow. Access to the parcel is through a 50' wide right-of-way, although there is no formal entrance or parking area at this time. Reportedly, the acquisition of this parcel will tie into a burgeoning Menunketesuck Greenway Trail that will stretch from Cockaponsett State Forest near the northern border of Westbrook to the Stewart B. McKinney Salt Meadow National Wildlife Refuge on Long Island Sound, located along the tidal reaches of the Menunketesuck River in Westbrook.

SOILS

The soils associated with the parcel are generally a complex of sandy loams. The particular soil series are depicted on a map in the Soil Survey of Middlesex County Connecticut, where further information is provided. For the purposes of this report, assuming that the site will remain substantially undeveloped, these soils generally pose a low to average risk for erosion. Since no extensive excavation is proposed, minor clearing and grading should not cause excessive sedimentation and erosion provided that best management practices are properly

installed and maintained in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control[2], revised, especially for the steeper slopes.

EROSION & SEDIMENT CONTROL

Regarding the dying stand of hemlocks located on the steep slopes on the east side of the lake experienced staff such as the Connecticut River Coastal Conservation District or the USDA Natural Resources Conservation Service (NRCS) should be consulted for recommendations on stabilizing the soils. The roots of the afflicted trees still provide bank stabilization and should not be stumped unless part of a stabilization plan.

Connecticut River Coastal Conservation District (formerly Middlesex County Soil & Water Conservation District) deKoven House—27 Washington Street Middletown, CT 06457 phone: (860) 346-3282 fax (860) 346-3284, e-mail: ctrivercoastal@ct.nacdnet.org

NRCS Service Center Office, Windsor Service Center, 100 Northfield Drive, 4th floor, Windsor, CT 06095-4729 phone: (860) 688-7725 fax: (860) 688-0083, e-mail Jewel.McKenzie@ct.usda.gov

WATER QUALITY/WETLANDS

The Water Quality Classification Maps show the Class assigned to each surface and ground water resource throughout the State. The Connecticut Water Quality Standards[3] establish a goal of restoring and maintaining the chemical, physical, and biological integrity of Connecticut's surface waters, and wherever attainable, providing for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water. The Water Quality Classifications,

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[2] The Connecticut Council on Soil and Water Conservation. May, 2002. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. Connecticut Department of Environmental Protection, Bureau of Water Management, Inland Water Resources Division. Hartford, CT.

based on the Adopted Water Quality Standards, establish designated uses for surface and ground waters and identify the criteria necessary to support those uses. The Standards and Classifications are designated to manage water quality to protect health, the environment, and legitimate uses of water resources. The complete State of Connecticut Water Quality Standards and Criteria document is available on the CT DEP web site at: http //www.dep.state.ct.us/wtr/wq/wqs.pdf.

Chapman Mill Pond is located within the Menunketesuck River Subregional Drainage Basin, #5103, which covers a 17.4-square mile area. Approximately 90% of the watershed drains to the outlet of Chapman Mill Pond. The lake's water quality is classified as Class A; suitable for potential public drinking water supply in the future. The upper reaches of the Menunketesuck River are also Class A, and there is an existing public drinking water supply reservoir on the Clinton-Killingworth border. Class A surface waters have the following designated uses: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture.

Below Chapman Mill Pond, within the tidal reaches of the Menunketesuck River, the water quality is classified as Class SB/SA. The letter "S" refers to coastal waters, and the double symbol means that the waters presently may not be meeting Criteria for one or more designated uses, which are: habitat for marine fish, other aquatic life and wildlife; shellfish harvesting for direct human consumption; recreation; industrial water supply; and navigation. The water quality goal is achievement of Class SA Criteria and attainment of Class SA designated uses.

The groundwater designation is Class GA which has the following designated uses: existing private and potential public or private supplies of water suitable for

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[3] State of Connecticut, Environmental Protection. Effective 1996 & 2002. Water Quality Standards. Bureau of Water Management - Planning and Standards Division. Hartford, CT.

drinking without treatment; baseflow for hydraulically connected surface waterbodies.

To determine whether the State's surface water resources are meeting designated uses, CTDEP monitors or collects samples from selected water bodies throughout the state. Generally, water quality is assessed based on the following three uses: fish consumption, aquatic life support, and primary contact (i.e. direct exposure) for recreation. The degree to which the water body is suitable for that use is assigned one of the following use support descriptors: fully supporting, threatened (fully supporting but threatened by impairment), partially supporting, not supporting, not attainable or not assessed. The degree to which these different uses are supported by the water body determines the "overall use support."[4]

The following table identifies the water quality assessment for three sections of the Menunketesuck River, including Chapman Mill Pond, in addition to the estuary portion. From Chapman Mill Pond upstream to Bushy Pond, water quality is very good. From Bushy Pond upstream to Kelseytown Reservoir, water quality does not always support the designated use due to flow diversions. From Kelseytown Reservoir upstream to the North Roast Meat Hill Road crossing, water quality is excellent. For further explanation, see the table.

Due to the water quality assessment for below Kelseytown Reservoir, River Segment CT5103-00_02, the river is listed on the CTDEP Draft 2004 List of Connecticut Waterbodies Not Meeting Water Quality Standards (303(d) list), February 27, 2004, for only partially meeting Aquatic Life Support due to flow alteration upstream (dry flows observed below Kelseytown Reservoir Dam) caused by the operation of the Kelseytown Reservoir public water supply system which serves the Connecticut Water Company's Shoreline Region. This

[4] State of Connecticut, Department of Environmental Protection. October, 2002. 2002 Water Quality Report to Congress. Bureau of Water Management, Planning and Standards Division. Hartford, CT.

impairment is not caused by a pollutant, but by a stressor not direct y related to water quality (e.g., hydraulic modification, habitat modification, diversions). These waters will be monitored in the future, in accordance with the ambient monitoring strategy adopted by the CTDEP.

River Segment CT5102-E_01, Patchogue River/Menunketesuck River Estuary (3.52 square mile area) is also 303(d) listed for not supporting shellfishing in the tidal portions of the Patchogue and Menunketesuck rivers, and the Westbrook Offshore area due to indicator bacteria with possible sources from marinas, onsite wastewater systems (septic tanks), recreation and tourism activities other than boating, urban runoff/storm sewers, and/or waterfowl. These potential sources are listed in relation to their occurrence near the impaired water body segment and may or may not be contributing to the impairment. This impairment is caused by the a surrogate indicator (e.g., indicator bacteria) such that implementing a Total Maximum Daily Load (TMDL) analyses for one or more pollutants can reasonably be expected to result in attainment of uses.

A TMDL is a watershed plan that focuses resources on reducing loads of known pollutants. TMDLs provide the framework to restore impaired waters by establishing the maximum amount of a pollutant that a waterbody can assimilate without adverse impact to aquatic life, recreation, or other public uses. The TMDL is then divided up between all potential sources of that pollutant. TMDLs are often expressed by the mathematical equation:

TMDL = Point Sources + Nonpoint Sources + Background + Margin of Safety

The end result of the TMDL process is a Water Quality Management Plan with quantitative goals to reduce pollutant loadings to the impaired waterbody. TMDLs are implemented under the existing authorities of CTDEP and may include both regulatory and voluntary actions as part of a larger Water Quality Management Plan.

Development of a TMDL for River Segment CT5102-E_01 is considered to be a low priority because other programs are likely to remedy the water quality impairment. This includes Phase II of the National Pollutant Discharge Elimination System (NPDES) Storm Water Program for Regulated Small MS4s, the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems, that was issued by the CTDEP on January 9, 2004. This general permit requires that all municipalities with municipal separate storm sewer systems (MS4s) located within urban areas, as defined by the Census Bureau based on the 2000 census data, obtain stormwater permit coverage. All municipalities are required to develop a program aimed at reducing the discharge of pollutants as well as the protection of water quality. It includes a provision for towns to focus their stormwater plans on waterbodies for which TMDLs have been developed. Such a program must include the following six control measures: public education and outreach; public participation; illicit discharge detection and elimination; construction stormwater management (greater than 1 acre); post-construction stormwater management; and pollution prevention and good housekeeping. Specific requirements have been developed within each of these control measures. It is anticipated that this general permit will be utilized as a broad-based pollution control measure for impaired waterbodies located within regulated MS4 communities.

Establishing TMDLs for stormwater-impaired waters will help ensure that a municipality's comprehensive stormwater management program will specifically address achieving and maintaining acceptable water quality conditions in these impaired waters. Where more than one pollutant is associated with the impairment, the waterbody or waterbody segment will remain in this category until TMDLs for all pollutants have been completed and approved by the U.S. Environmental Protection Agency. Further investigative monitoring, if necessary will be scheduled to confirm causes. Follow-up

monitoring will be scheduled to determine if the standard is attained following TMDL implementation.

As development increases in a watershed and the percent cover of imperviousness surpasses 10% water quality will show signs of degradation. Within the Menunketesuck River Watershed, development and imperviousness is low, but there is moderate to intense development in the surrounding areas which is likely to sprawl into the watershed. The holistic watershed approach to landuse planning can help minimize potential impacts.

The CTDEP supports and recommends the use of buffers to protect wetlands and watercourses from environmental impacts. Leaving a vegetated strip around surface water resources, including wetlands helps protect surface and groundwater quality, and fish and wildlife habitats from nonpoint source pollution. Buffers trap road sands, contaminants and other pollutants contained in stormwater runoff generated from roadways, parking lots, roof tops, and other impervious surfaces, as well as eroded sediments occurring from natural scour or land moving activities such as site development and other soil disturbances, including farming activities. A 50 foot vegetated buffer is typical, but widths can vary depending on such factors as topography, the erosivity of the soil, and the

value or sensitivity of the water resource. The CTDEP Fisheries Division[5] recommends a 100-foot buffer along perennial streams and a 50-foot buffer along intermittent streams; measured from the upland boundary of the regulated area, including any riparian wetlands. CTDEP Fisheries further recommends that the buffer remain in a naturally vegetated and undisturbed condition.

The "riparian corridor" is the area adjacent to a watercourse that typically contains wetlands and acts as a buffer to the watercourse. In addition to the benefits described above, riparian buffers help moderate the temperature of stormwater runoff before it enters the watercourse, thereby reducing thermal impacts on aquatic wildlife. Riparian wetlands may additionally provide valuable wildlife habitat, flood attenuation, water quality renovation, and groundwater recharge, so it is important to protect these areas from degradation.

FISHERIES

According to the CTDEP 2002 Water Quality Report to Congress,[6] from Chapman Mill Pond upstream along the Menunketesuck River to Bushy Pond in Clinton, there exists a threatened level of support for Aquatic Life. This means that the waters are suitable for the protection, maintenance and propagation of a viable community of aquatic life and associated wildlife, but the benthic macroinvertebrate (e.g. aquatic insects) community may be lightly impaired and show some loss of pollution-intolerant forms, or there may be a condition(s) that exists that may impact the community in the future. The benthic community structure is used as the primary indicator of biological integrity.

Management to enhance and protect the aquatic habitat for fisheries would depend on what the targeted fish species is to maintain or support. For example,

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[5] Brian D. Murphy, Technical Assistance Biologist, Inland Fisheries Division. December 13, 1991. Position Statement - Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut. Connecticut Department of Environmental Protection, Bureau of Natural Resources, Inland Fisheries Division, Hartford, CT.

if recreational fishing is the desired goal, then there may be additional measures that could be taken to enhance these opportunities at Chapman Mill Pond, such as dredging, placement of fish habitat structures, re-contouring of the lake bathymetry and fish stocking. Other methods of providing fish habitat may be appropriate for lower or upper reaches along the Menunketesuck River. On the other hand, if the goal is to maintain and protect the natural native fish community, the ultimate goal may be to protect the water quality of the stream by controlling impacts from land development within the watershed, such as sedimentation and erosion from construction and farming activities, and nonpoint source pollution including stormwater runoff, pesticides and fertilizers; as well as water diversions for public, industrial or agricultural supply.

Additionally, dams and other obstructions to fish passage along the river can impede this management effort. The dam at Chapman Mill Pond denies alewife and sea-run brown trout access to abundant, high quality upstream habitat and should be considered for a fishway to restore migration.[7] Upstream, there have been observations of a dry streambed during seasonal low flow conditions below the Kelseytown Reservoir Dam in Clinton. The Connecticut Water Company diverts large quantities of water from the upstream reservoirs and has proposed to divert even more. CTDEP Fisheries has suggested that if such water removals are to be allowed, that fish passage at Chapman Mill Pond be considered as mitigation.

For specific recommendations on fisheries management, this Team member defers to the Team's fisheries biologist.

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[6] State of Connecticut, Department of Environmental Protection. October 2002. 2002 Water Quality Report to Congress. Bureau of Water Management, Planning and Standards Division. Hartford, CT.

[7] State of Connecticut, Department of Environmental Protection, December 2002. South Central Coast Major Basin Overview. Bureau of Water Management, Planning and Standards Division. Hartford, CT.

WILDLIFE

A wildlife biologist should be consulted as to the management necessary to enhance, improve, and protect wildlife habitat. However, as it pertains to designing a trail system, it is worth noting that the less intrusive a trail design is, the less disturbance there will be to wildlife. Wide, paved trails pose greater disturbances during construction and could permanently impact wildlife habitat by virtue of the cleared swathe and opportunity for extensive public use. Whereas, a narrower, less obtrusive design may minimize these adverse effects.

VEGETATION

Management for the protection from invasive species is a valid concern. Disturbed sites are often more easily colonized by such species, such as Common Reed grass *(sp. Phragmites australis)* and Purple Loosestrife *(sp. Lythrum salicaria)*. Existing stands of Common Reed can be eradicated by repeated mowings, mulching, and timely applications of an herbicide. Any new outbreaks may be hand-removed and/or treated with an herbicide. For more information, contact the Connecticut Invasive Plant Working Group at UCONN, e-mail: donna.ellis@uconn.edu.

One of the greatest threats to Connecticut's waterbodies today is aquatic non-native, invasive plants. This is a growing, pervasive problem across the state. Boat launches often precipitate the introduction of these disastrous species from an infested waterbody through the transfer of plant fragments either attached to the trailer, boat, or in the boat's ballasts. It may be prudent to have a limnologist perform an abbreviated water quality study on Chapman Mill Pond to assess the presence or potential for aquatic non-native, invasive plants. This may include collecting baseline samples in the spring and summer for eutrophic parameters; i.e. phosphorus, nitrogen, secchi disk. An annual rooted aquatic plan survey should also be performed.

If boating, canoeing or kayaking is intended to be permitted on Chapman Mill Pond, only hand-carry, car-top boats should be allowed to be launched in order to minimize the risk of the introduction of aquatic non-native, invasive plants.

OPEN SPACE/LAND USE

Open space acquisition may be used to protect natural resources, preserve scenic landscape and historical resources or offer opportunities for recreation or nonmotorized transportation. Open space may connect existing protected areas and provide access to the outdoors. For the protection of water quality in the watershed, riparian corridors are an important feature. Often existing beyond riparian corridors are wildlife corridors. These are typically wide, linear tracts of land which allow wildlife to move freely between natural habitats containing both wetlands and uplands. Urban and suburban development and roadways often segment these corridors resulting in wildlife habitat fragmentation. Efforts to preserve open space help maintain these corridors and can provide valuable "edge" habitat for wildlife.

RECREATION

There is strong scientific evidence that providing access to places for physical activity increases the level of physical activity in a community, which is good for one's health (see the attached flier in the Appendix).

A trail may be constructed simply for pedestrian access or multiple uses, such as equestrians, bicyclists, roller bladers, baby strollers, joggers/runners, etc., but the trail design and route should be conducive to the natural terrain. Trail designs vary from at-grade stone dust paths to pavement of various widths and raised boardwalk crossings over wetlands and watercourses or as viewing platforms. With regard to promoting public access, it may be appropriate to construct a trail system that provides for scenic vistas, lakeside access, and wildlife viewing,

besides merely pedestrian/bicyclist/equestrian use, provided that the terrain and habitat are suitable. Complementing nature trails with educational kiosks for animal tracks and sign, bird watching, and valuable/grand trees and shrubs, and natural geologic features offer additional attractions that may increase usage by individuals and educational groups. If the own is limited in its resources to construct the trail system, it is suggested to establish a main loop initially off which future spurs could later be constructed. Additionally, the concern for public safety and illegal dumping may be reduced by limiting access to isolated areas until such time as popular use of the trai l system would provide enough traffic and visibility to discourage prospective law-breakers. Future trail expansion off-site is encouraged, but this may require lengthy and costly negotiations with adjacent property owners.

The next level of corridor protection is the establishment of a greenway. In 1995, State legislation was adopted which allows municipalities to adopt plans for greenways protection and development into their "plans of conservation and development" (CGS Sec. 8-23). As defined by the State statute, "greenway" means:

> a corridor of open space that (1) may protect natural resources, preserve scenic landscape and historical resources or offer opportunities for recreation or nonmotorized transportation, (2) may connect existing protected areas and provide access to the outdoors, (3) may be located along a defining natural feature, such as a waterway, along a man-made corridor, including an unused right-of-way, traditional trail routes or historic barge canals or (4) may be greenspace along a highway or around a village (CGS Sec. 23-100).

This same legislation also established the Connecticut Greenways Council, that among other things, serves "to advise and assist in the coordination of state

agencies, municipalities, regional planning organizations and private citizens in voluntarily planning and implementing a system of green ways" (CGS Sec. 23-102).

If the Westbrook Conservation Commission choose to pursue designation of a greenway, the Commission needs to carefully consider the types of uses that would be allowed in this area. CTDEP would suggest that opportunities to protect and conserve natural resources values such as water quality, fisheries, wildlife habitat and unique plant communities be considered first.

Adoption of a greenway in this region may provide additional opportunities for public access to "satellite" treks; however, these uses may necessarily be limited to minimize impacts on natural resources. For further guidance on establishing a greenway, contact the Connecticut Greenways Council, DEP Greenways Assistance Center, Leslie Lewis at telephone (860) 424-3578, e-mail: leslie.lewis@po.state.ct.us.

Water Quality Assessment for the Menunketesuck River

Reference: 2002 Water Quality Report to Congress (305(b) list), CTDEP, October 2002

River Segment	Segment Size	Segment Location	Assessment Method	Overall Use Support	Aquatic Life Support	Fish Consumption	Primary Contact (Recreation)	Drinking Water Supply	Causes of Impairment	Sources of Impairment
CT5103-00_01	2.0 miles	From Chapman Pond upstream to Bushy Pond, Clinton.	Evaluated	Threatened	Threatened	Fully	Threatened		Flow Alteration	Hydromodification, Upstream Impoundment, Flow Regulation/Modification
CT5103-00_02	2.0 miles	From Bushy Pond, Clinton, upstream to Kelseytown Reservoir, Clinton - Killingworth border.	Monitored	Partial	Partial	Fully	Threatened		Flow Alteration	Hydromodification, Upstream Impoundment, Flow Regulation/Modification
CT5103-00_03	5.0 miles	From Kelseytown Reservoir upstream to North Roast Meat Hill Road crossing.	Monitored	Not Assessed	Fully	Fully	Not Assessed	Fully		
CT5102-E_01	3.52 square miles	Tidal portions of Patchogue & Menunketesuck Rivers, Westbrook Offshore area from Kelsey Point, Clinton, east to Old Kelsey Point, Westbrook.	Monitored	Partial	Fully	Fully	Fully		Pathogens, Indicator Bacteria *Not Supporting Shellfish*	Marinas, Onsite wastewater Systems (Septic Tanks), Urban Runoff/Storm sewers, Waterfowl, Land Disposal

Assessment: **Evaluated** - If the data are more than five years old, not considered high quality, reflect limited sampling events, or if the assessment is made using other types of information, such as knowledge of a pollution source, the waterbody or waterbody segment is considered evaluated.

Monitored - A waterbody or waterbody segment is considered monitored if reliable ambient water quality data exist that are less than five years old.

General Definitions of Levels of Support:

Fully Supporting - *the waterbody or waterbody segment is suitable for a designated use and will presumably continue to be suitable for that use in the future.*

Threatened - *the waterbody currently supports the designated use, but may not in the future due to degrading water quality or the existence of pollution threats that may impair water quality. This category is a subset of Full Support.*

Partial Support - *the waterbody or waterbody segment does not support the designated use at all times or under certain conditions, or the criteria used to assess support are only partially met*

Not Supporting - *the waterbody or waterbody segment does not support the designated use.*

Not Attainable - *the waterbody or waterbody segment has been altered to the point where there is no expectation that the use can be met (e.g., a section of river that is piped underground). Note: The Not Attainable designation does not imply that there has been a Use Attainability Analysis. This designation has been retained for 305(b) reporting because it provides information regarding river segments that are completely enclosed in conduits or that are documented to run dry due to diversions (i.e., for all practical purposes are not attainable). For 303(d) listing however, these waters are grouped with Not Supporting so as not to be construed to have a Use Attainability Analysis.*

Not Assessed - *insufficient or no information exists to adequately assess use support.*

DEFINITIONS

OVERALL USE SUPPORT: Waters supporting all of their designated uses. (Overall use support is an integrated assessment that considers all designated uses in aggregate: aquatic life, primary contact, fish consumption and shellfishing (estuaries only). Secondary contact and aesthetics are generally not considered for this integrated use.)

Fully Supporting - All designated uses fully supported.

Threatened - All designated uses met, but data may show a decline in integrity. One or more uses threatened.

Partially Supporting - One designated use not supported (Estuaries); one or more uses partially supported (Rivers and Lakes)*

*CT DEP estuary assessment staff considers overall use support to be partially supported if one use is not supported or partially supported. Rivers and Lakes staff considers overall use to be not supported if one use is not supported.

Not Supporting - One or more designated uses not supported (Rivers and Lakes); more than one use not supported (Estuaries).

Not Attainable - Streams that are completely dewatered due to a diversion, or enclosed in a conduit or concrete trough.

Not Assessed - Some or none of the designated uses were assessed.

AQUATIC LIFE SUPPORT: Waters suitable for the protection, maintenance and propagation of a viable community of aquatic life and associated wildlife.

Fully Supporting - Benthic community: bioassessment indicates community is non-impaired or slightly impaired*, and meets narrative criteria in CT WQS; RBP III Community Score (Plafkin *et al.* 1989) > 54 % of Reference Condition. Fish community: species composition, trophic structure, and age class distribution as expected for a non-impacted stream of similar size. Conventional physical/chemical criteria not exceeded. Measured toxicants do not exceed chronic toxicity criteria. No record of catastrophic events (*e.g.*, chemical spills, fish kills). No evidence of flow diversion.

* slightly impaired is a bioassessment category from Plafkin et al.1989. It refers to a benthic macroinvertebrate community that may show some loss of pollution-intolerant forms. In Connecticut, a slightly impaired assessment may still meet water quality standards given habitat restrictions.

Threatened - Benthic community: non-impaired or lightly impaired, but still meets narrative criteria in CT WQS; RBP III Community Score (Plafkin *et al.* 1989) > 54 % of Reference Condition, and conditions exist that may impact the community in the future. Fish community as above, but documented trend is downward or conditions exist that may impact the community in the future. Slight exceedences of either conventional or toxicant criteria in < 10% of samples; exceedences difficult to discern from expected analytical variability or error. Discharge effluent constitutes >20% of stream flow. Land use conditions exist that may cause impairment. Flow reductions due to diversions have been observed.

Partially Supporting - Benthic community: bioassessment indicates community is moderately impaired; RBP III Community Score (Plafkin *et al.* 1989) 21 - 50% of Reference Condition. Fish community: species composition, trophic structure and age class distribution significantly less than expected for a non-impacted stream of similar size; diversity and abundance of intolerant species reduced; top carnivores rare; trophic structure skewed toward omnivory. Either fish or benthic communities meet above conditions, and

the other community is fully supporting. Conventional physical/chemical criteria exceeded in > 10% but < 25% of samples. Measured toxicants exceed chronic criteria < 10% of samples. Flow is reduced significantly during drought conditions.

Not Supporting - Benthic community: bioassessment indicates community is severely impaired; RBP III Community Score (Plafkin *et al.* 1989) < 17% of Reference Condition. Fish community: species composition, age class distribution and trophic structure greatly impaired in comparison to a non or minimally impacted stream of similar size; community dominated by highly tolerant species, omnivores and habitat generalists; in extreme cases, few species present and/or diseased fish common. Conventional physical/chemical criteria exceeded in > 25% of samples. Measured toxicants exceed chronic criteria >10% of samples. Stream known to dry completely for significant periods. Documented catastrophic event (*e.g.*, chemical spill, fish kill).

Not Attainable - Stream completely enclosed in conduit or cleared concrete trough. Stream is dewatered most of the time due to and upstream impoundment or diversion.

FISH CONSUMPTION: Waters supporting fish that do not contain concentrations of contaminants that would limit consumption to protect human health.

Fully Supporting - No consumption advisory for any fish species or any consumer group, other than the statewide advisory for Mercury in freshwater fish or PCBs in migratory saltwater fish.

Threatened - No consumption advisory for any fish species or any consumer group, other than the statewide advisory for Mercury in freshwater fish or PCBs in migratory saltwater fish, but sediments contain detectable levels of contaminants known to bioaccumulate in fish.

Partially Supporting - A consumption advisory exists for some fish species or for certain risk consumer groups, in addition to the statewide advisory for Mercury in freshwater fish or PCBs in migratory saltwater fish.

Not Supporting - A fish consumption advisory exists for all fish species for all consumer groups.

PRIMARY CONTACT (RECREATION): Swimming, water skiing, surfing or other full body contact activities.

Criteria / Indicators for designated public bathing areas:

Fully Supporting - Designated bathing area closed 5% of swimming season or less; and Sanitary survey indicates no significant source* of human fecal contamination.

* a significant source of human fecal contamination is one that originates from a fixed location and is transported to or within the water body (*e.g.*, a CSO or a community with failing septic systems).

Threatened - Designated bathing area closed between 6% and 10% of swimming season; and Sanitary survey indicates no significant source of human fecal contamination. Land use or environmental conditions exist that may cause impairment. This may include excessive growth of aquatic weeds that threaten swimming use.

Partially Supporting - Designated bathing area closed between 10% and 25% of swimming season; or Sanitary survey indicates minor potential for significant source of human fecal contamination.

Not Supporting - Designated bathing area closed more than 25% of swimming season; or Sanitary survey indicates potential for significant source of human fecal contamination.

Criteria/Indicators for areas not designated as public bathing areas:

Fully Supporting - Sanitary survey indicates no significant source of human fecal contamination; and CT DEP and /or USGS ambient monitoring data show no exceedences of indicator bacteria.

Threatened Support - Sanitary survey indicates no significant source of human fecal contamination; and CT DEP quarterly monitoring data show a single sample exceedence of indicator bacteria; or Limited data from another source show exceedences; or Land use or environmental conditions exist that may cause impairment. (This may include excessive growth of aquatic weeds that threaten swimming use.); or Stream flow comprises >20% treated sewage effluent.)

Partially Supporting - Sanitary survey indicates minor potential for significant source of human fecal contamination; or Monthly or frequent ambient monitoring data from USGS or another reliable source show a single sample exceedence or an exceedence of the geometric mean for indicator bacteria; or CT DEP quarterly ambient monitoring data show two extremely high or three moderate single sample exceedences of indicator bacteria. Land use or environmental conditions exist that may cause impairment. This may include excessive growth of aquatic weeds that preclude swimming.

Not Supporting - Sanitary survey indicates potential for significant source of human fecal contamination; or Ambient monitoring data from USGS or another reliable source show one or more single sample exceedences and an exceedence of the geometric mean for indicator bacteria; or Land use conditions exist known to cause impairment.

Not Attainable - Full body contact not possible; river enclosed in conduit.

PUBLIC DRINKING WATER SUPPLY (Existing or proposed* drinking water supplies – AA): Waters presently used for public drinking water supply or officially designated as potential public water supply.

*Potential drinking water supplies identified in the Long Range Plan for Management of Water Resources prepared and adopted pursuant to Section 22a-352 Section 25-32d of the Connecticut General Statutes (CT WQS, CT DEP 1997).

PUBLIC WATER SUPPLY (Potential drinking water supplies - A): Waters that have not been identified, officially, but may be considered for public drinking water supply in the future.

SHELLFISHING (Shellfish harvesting for direct human consumption - SA): Waters from which shellfish can be harvested and consumed directly without depuration or relay. Waters may be conditionally approved.

Fully Supporting - SA waters approved for direct harvest.

Partially Supporting - SA waters conditionally approved for direct harvest.

Not Supporting - SA waters prohibited to shellfishing, seed oyster harvesting or certain aquaculture operations; or approved only for relay operations.

SHELLFISHING (Commercial shellfish harvesting - SB): Waters supporting commercial shellfish harvesting for transfer to a depuration plant or relay (transplant) to approved areas for purification prior to human consumption (may be conditionally approved); also support seed oyster harvesting

Fully Supporting - SB waters approved for direct harvest, conditional harvest, or restricted to relay or depuration operations.

Not Supporting - SB waters prohibited to shellfishing, seed oyster harvesting or certain aquaculture operations.

FISHERIES RESOURCES

CHAPMAN MILL POND

Chapman Mill Pond, also known as Lake Laconia, is an approximate 31 acre artificial impoundment of the Menunketesuck River. The pond has been treated with herbicides (Diquat and Rodeo) in the past to help control floating leaf plants such as water lilies. Excessive amounts of water lilies were not observed in the pond the day of the field review. Diquat treatments have not been allowed in recent years due to concerns of a threatened aquatic plant species in the Menunketesuck River in areas below the dam(please refer to the Natural Diversity Data Base section). No information is available relative to pond bathymetry and water quality.

Chapman Mill Pond contains suitable habitat necessary for the survival of warmwater pond fishes. Warmwater fisheries are resident freshwater finfish populations, which can reproduce and survive in an aquatic environment where water temperatures exceed 75°F for extended periods. Warmwater species that may be expected to inhabit the pond would be: large mouth bass, pumpkinseed bluegill, chain pickerel, yellow perch and brown bullhead. The pond most likely is not deep enough to provide extensive amounts of suitable coldwater habitat for trout to survive throughout the summer. For trout to survive, water temperatures in deeper portions of the pond should be 70 °F or less with dissolved oxygen levels 5 mg/l or greater.

Anadromous fish runs in the Lower Menunketesuck River are currently blocked by the Chapman Mill Pond Dam, a 12 foot high, privately owned concrete structure. Inland Fisheries Division staff have documented river herrings (mainly alewife, some blueback herring), sea-run brown trout, and white perch,

all of which are anadromous species, below the base of the dam. The alewife population in particular could be expanded greatly if fish had access to Chapman Mill Pond, which is considered an ideal spawning area and nursery habitat for alewife.

RECOMMENDATIONS

1. Given the very steep topography within the property, any permanent roadway that would be constructed to gain access to the pond should be carefully planned and constructed to minimize soil erosion into the pond. A gravel base road and terminus gravel parking lot is recommended. Roadway and parking lot design needs to consider the effective management of stormwaters to reduce direct runoff to the pond. Stormwaters should be only be outletted into non-wetland habitat; thus, avoiding initial and direct contact with the pond or wetlands. Install and maintain proper erosion and sedimentation controls during road and parking lot construction to reduce runoff into the pond This includes such mitigative measures as silt fences and staked hay bales. Only small areas of soil should be exposed at one time and these areas should be reseeded as soon as possible.

2. Boating access to Chapman Mill Pond should be limited to small car-top boats, kayaks and canoes to protect and maintain existing water quality conditions. To improve shoreline fishing access, the town should consider some minimal clearing of vegetation in a few areas of the shoreline. Currently there is fairly dense tree and shrub growth along the edge of the pond which prevents fishing access. The town may also want to consider providing fishing access in the form of a fishing pier for handicapped anglers. The DEP can provide the town with appropriate design examples of fishing piers constructed on State property.

3. The town should consider working with the DEP Inland Fisheries Division and the private owner of the dam to help fund and construct a fishway at

Chapman Mill Pond. Construction of a fishway will provide anadromous fish access to Chapman Mill Pond and upstream to the base of Bushy Pond Dam, a stream length of approximately 2.1 miles.

4. The town may want to consider stocking coldwater species such as trout into the pond during early spring utilizing a "put-and-take" strategy in which most fish would be harvested from the pond before environmental conditions became unsuitable for summer survival. It is possible that some trout will survive the summer and "holdover" within the pond. This management strategy will limit the number of fish living in the pond during the summer; hence, minimizing possible fish mortalities due to warm water temperatures. An initial total stocking of adult rainbow and brown trout is recommended. Brown trout are better able to temporarily withstand warmwater pond habitats whereas rainbow trout are more easily caught by shoreline angling. Harvesting of fish can be enhanced by holding a children's fishing derby in the spring.

5. The town should consider the installation of in-pond habitat improvement structures to provide cover for fish forage species seeking shelter and predators seeking prey. These structures are relatively simple and inexpensive to construct and usually involve anchored brush piles and trees. CTDEP Inland Fisheries staff are willing to work with the town to determine the appropriate number, type and location of structures.

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files regarding the project area have been reviewed. According to our information, several State-Listed species plants occur in the lower intertidal area immediately below the outfall of the Chapman Mill Pond dam. These include Parker's pipewort *(Eriocaulon parkeri,* State Threatened) and Mudwort *(Limosella subulata,* State Special Concern).

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

USDA Natural Resources Conservation Service

PLANTS Profile

Eriocaulon parkeri B.L. Robins.

estuary pipewort

Symbol:	ERPA4
Group:	Monocot
Family:	Eriocaulaceae
Growth Habit:	Forb/herb
Duration:	Perennial
U.S. Nativity:	Native

Plant Synonyms:

ERPA4 *Eriocaulon parkeri* B.L. Robins.

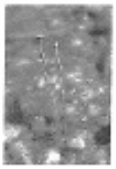
ERRO11 *Eriocaulon rollandii* Rouss.

ERSEP *Eriocaulon septangulare* Withering var. *parkeri* (B.L. Robins.) Boivin & Cayouette

Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 1: 454. Courtesy of Kentucky Native Plant Society. Scanned by Omnitek Inc.

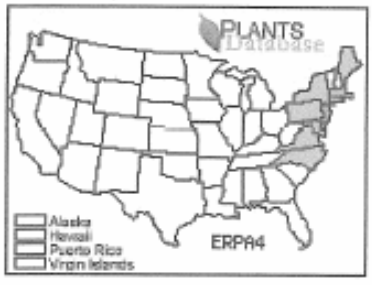
Plant Photographs

Eriocaulon parkeri B.L. Robins.More than one image is available in the PLANTS Image Gallery. Click on the thumbnail(s) below to view other versions of this printer-friendly plant profile with a full-sized image and a high resolution publication image (when available).



Plant Distribution by State

Eriocaulon parkeri B.L. Robins.



County distributions for the following states are available in the PLANTS database:

Connecticut Maine Massachusetts Virginia

© Image generated using gd 1.8

Threatened and Endangered Plant Information:

Eriocaulon parkeri B.L. Robins.

This plant is protected by the U. S. federal government or a state. Common names are from state and federal lists.

Connecticut:

Parker's pipewort	Threatened
Maine:	
Parker's pipewort	Special Concern
Maryland:	
Parker's pipewort	Threatened
Massachusetts:	
Parker's pipewort	Endangered
Pennsylvania:	
Parker's pipewort	Extirpated

Wetlands Indicator Status:

Eriocaulon parkeri B.L. Robins.

Nat. Ind.	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	Reg. 0	Reg. A	Reg. C	Reg. H
OBL	OBL	NI	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Taxonomic Hierarchy for:

Eriocaulon parkeri B.L. Robins.

Kingdom	Plantae– Plants
Subkingdom	Tracheobionta– Vascular plants
Superdivision	Spermatophyta– Seed plants
Division	Magnoliophyta– Flowering plants
Class	Liliopsida– Monocotyledons
Subclass	Commelinidae–
Order	Eriocaulales–
Family	Eriocaulaceae– Pipewort family
Genus	*Eriocaulon* L.– pipewort
Species	*Eriocaulon parkeri* B.L. Robins.– estuary pipewort

Integrated Taxonomic Information System (ITIS)

Taxonomic Serial Number for *Eriocaulon parkeri* B.L. Robins.:
39196

Time Generated: Mon 11:11 AM - 01/19/2004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next white flower
next in figwort family ▶
next rare plant ▶

Mudwort

Limosella australis (Limosella subulata)

Mudwort is rare in Connecticut; it is classified by the state as a species of special concern.

- Family: Figwort (Scrophulariaceae)
- Habitat: tidal mudflats, muddy or sandy shores
- Height: 1-2 inches
- Flower size: 1/8 inch across
- Flower color: white
- Flowering time: July to October
- Origin: native

VEGETATION

The Chapman Mill Pond Open Space was recently acquired by the town of Westbrook for public education, passive recreation and natural resource conservation. This property may be divided into several broad vegetation categories. These include several mixed hardwood stands, several hardwood swamp areas, a declining hemlock/hardwood stand and a small area dominated by white pine. Below are brief descriptions of each of these vegetation categories. The location and acreage of these areas were obtained from 1995 aerial photographs and are only approximate. They are depicted on the Vegetation Type Map. The field inventory of vegetation types was conducted in September and December of 2003. A more comprehensive inventory of the herbaceous vegetation that is present in each of these categories should be made at different times throughout the year by a botanist.

Approximately twenty years ago several areas of this tract were harvested leaving large openings in many sections of the forest. At that time the majority of the merchantable red, black and white oaks were removed leaving the smaller less vigorous and poor quality trees to grow in the residual forest. Some larger trees were left scattered throughout the harvested areas of the property, however most were either very poor quality or non-oak species. Fortunately, many of these larger trees, especially the hickories and occasional white oak provide excellent mast for wildlife. Some of the larger trees that are present have cavities that are being utilized by wildlife as nesting sites. In areas where the timber harvest was heaviest, specifically along the road that was constructed at or about the same time, a dense growth of seedling and sapling size hardwoods originating from both seed and stump sprouts have become established.

An infestation of Hemlock Woolly Adelgid over the last ten or so years has caused widespread hemlock mortality on sections of this property. The Hemlock Woolly Adelgid is a small aphid-like insect that feeds on young Eastern Hemlock twigs during all seasons of the year with the greatest damage occurring during the spring. The loss of new shoots and needles seriously impairs the hemlock's health and vigor. The Adelgid is dispersed by wind, birds and mammals and is at the present time almost impossible to control in a forested environment. Cultural and chemical control methods have proven to work well in ornamental landscapes. Biological control agents such as the Asian ladybird coccinellid beetles show promise, but widespread availability and use are probably several years off. Defoliation and the resulting mortality can occur within several years after infestation. Infested hemlock die at different rates and deteriorate quickly after death. Although standing dead hemlock provide excellent foraging and cavity-nesting habitat for many species of birds they do create problems. Dead hemlock trees not only pose a direct threat to people and property; they may also pose a long-term wild fire hazard and are generally not aesthetically pleasing.

The hemlock mortality that has occurred is causing an extremely hazardous condition of falling trees and falling dead branches in the Hemlock vegetation type. (The location of this area is depicted on the Vegetation Type Map.) Hardwood tree seedlings, especially black birch have become densely established by taking advantage of the increased light that is reaching the forest floor as the hemlock continue to lose needles and die. Erosion, even on the steep slopes down to Chapman Mill Pond should not be much of a problem unless new trails are constructed or activity in this area increases.

The forested portions of this property are well suited to environmental education, conservation and passive recreation. However, due to the high and unpredictable risk of falling dead hemlock trees and falling dead branches, use of the trails in the high-risk hemlock area should be restricted until a safe condition

exists. This high-risk condition may exist for several years if the trees are left alone to fall on their own. However, if dead and dying trees that are within striking distance of the trails were felled, the high risk condition would be eliminated.

Several non native invasive plant species have become established in some locations of the review site especially in the openings that were cleared when the road was put in. Of special concern are several species that have the potential to become major components of the ecosystem by out competing native species. These invasive species include Asiatic bittersweet, autumn olive, wineberry, Japanese honeysuckle, and several species of bush honeysuckle. Although some of these species provide wildlife with food and cover, they are aggressive competitors with native plants and should be controlled when possible. At the present time, mechanical removal of these plants should be effective especially where limited numbers of individuals are present. However, if no effort is made at this time, they will become more widespread and control will become much more difficult. In areas where these species are well established a combination of cultural, chemical and biological methods may be needed for complete control.

Forest management aimed at removing the unhealthy and poor quality trees that are interfering with the growth of healthy trees could improve the overall health, stability and diversity of this forest. Although the majority of the high quality, valuable oaks were removed during the previous harvest, another harvest that would generate a modest amount of revenue and improve the condition of this forest would be feasible at this time. The effect of the proposed intermediate harvest and regeneration harvest if properly administered could be used for the purpose of educational demonstration especially if non-managed control areas are set aside for comparison.

It is important that the property boundaries are located and clearly marked before any trail development or management activities are implemented.

VEGETATION TYPE DESCRIPTIONS

A. Mixed Hardwoods:

This Mixed Hardwood vegetation type totals approximately 18 acres and is generally restricted to areas that have well drained soils. Pole and small sawtimber size trees that were left after the last harvest dominate this type. They range from 60 to about 110 years of age. Larger trees are present but they are few in numbers and scattered. The larger black oak that are present have damaged crowns and are declining rapidly in health and vigor. The overstory in this vegetation type is becoming crowded and is dominated by red oak, black oak, white oak, scarlet oak, American beech, black birch, red maple, shagbark hickory, pignut hickory, mockernut hickory and sassafras. Several groves of American beech are present on the slopes along the shore of Chapman Mill Pond. The understory vegetation that is present includes hardwood tree seedlings, flowering dogwood, hophornbeam, American hornbeam, maple leaved virburnum, American chestnut sprouts, witch-hazel, highbush blueberry, lowbush blueberry, huckleberry and scattered mountain laurel. Declining eastern red cedar are also present in the understory as remnants of when this area was abandoned as pasture. Several patches of Tatarian Honeysuckle, a non-native invasive bush honeysuckle have become established. This species should be eradicated before it becomes more widespread. Ground cover vegetation includes poison ivy, Virginia creeper, green briar, rattlesnake plantain, wild sarsaparilla, wood aster, club moss, evergreen wood fern, hayscented fern, Christmas fern and many other species of grasses, sedges and wild flowers.

Although many of the larger oaks were removed during the last harvest, the remaining forest is reasonably healthy, but becoming crowded. Many of the larger black oaks that remain are in poor to fair condition and could be removed to provide space for trees with more potential for long-term health to expand

their crowns and grow. A sawtimber thinning which removes the poorest one third of the sawtimber size trees along with the poorest quality one third of the pole size trees would improve the overall condition of this part of the forest. If this thinning is implemented, the healthy, high quality trees that remain in the forest will have the space needed to expand their crowns and become healthier, larger and more stable over time.

B. Hardwood Swamp:

There are five Hardwood Swamp areas that total approximately 13 acres located within this tract. Three of these wetlands are considered to be vernal pools. The vegetation that is present in all of these wetlands is somewhat variable but generally dominated by red maple. Other tree species that are present may include yellow birch, black gum, white ash, hemlock and American elm depending on which wetland is being considered. All size classes are represented in these wetlands. Shrub species that are present include mountain laurel, spicebush, sweet pepperbush, speckled alder, highbush blueberry, swamp azalea, swamp rose, winterberry, hophornbeam. American hornbeam and witch-hazel. Skunk cabbage, tussock sedge, club moss, sphagnum moss, poison ivy, green briar, Virginia creeper, cinnamon fern, sensitive fern, evergreen wood fern, royal fern, sedges and many wild flower species are present throughout as ground cover. Many of the large red maples that are present have cavities that make excellent den sites for many species of wildlife including wood ducks. There are also many standing dead trees called snags that are being utilized by a variety of birds.

C. Hemlock/Hardwoods:

Approximately 12 acres of the Hemlock/Hardwoods vegetation type are present within this parcel. Over 60% of this vegetation type is made up of dead and dying seedling to sawtimber size eastern hemlock that are infested with Hemlock

Woolly Adelgid and Elongate Hemlock Scale. Fortunately black birch, red maple, tuliptree, sugar maple, white ash, sassafras, American beech, shagbark hickory, mockernut hickory, pignut hickory, red oak, black oak, white oak and white pine are also intermixed. These trees will expand their crowns to take up the space made available by the dying hemlock. In some areas the understory vegetation is taking advantage of the increased light levels caused by the dying hemlock. Included are hardwood tree seedlings (especially black birch), hemlock seedlings, white pine seedlings, mountain laurel, highbush blueberry, witch-hazel, maple-leaved viburnum, hophornbeam and American hornbeam. Poison ivy, club moss, Christmas fern, spotted wintergreen, grasses and sedges were observed as ground cover where sunlight reaches the forest floor.

Unfortunately as the hemlock die and fall apart they create a hazardous situation. The trail that passes through this area should be temporally closed to avoid potential risk of in jury to users.

One management option is to let the hemlock die and fall at its own pace. This option is excellent for all the wildlife that utilizes dead and dying trees. However, it leaves this area unsafe for recreational uses for the longest period of time. It also creates the longest period of potential high wildfire danger. Another option is to remove only the hemlock that are within striking distance of the trail. This would effectively eliminate the hazard to users. Unfortunately, most of the hemlock that is present has been dead for too long to be salvaged as sawtimber.

D. Mixed Hardwoods:

This two aged Mixed Hardwood stand totals approximately 11 acres and has developed from the removal of the merchantable timber during the last harvest, which occurred approximately 20 years ago. Many of the larger trees that are present are well spaced but are declining in health and vigor, while the smaller trees and those that have become established since the last harvest are becoming

crowded. Included are American beech, white oak, red oak, black oak, tuliptree, red maple, sugar maple, sassafras, black cherry, mockernut hickory and pignut hickory. Understory vegetation includes hardwood tree seedlings, spicebush, hophornbeam, American hornbeam, maple-leaved viburnum and American chestnut sprouts. Grape, Asiatic bittersweet and Japanese honeysuckle are damaging many trees in the overstory. These vines should be removed from trees that are otherwise healthy. Ground cover vegetation includes poison ivy, green briar, raspberry, wineberry, Christmas fern, hayscented fern and club moss.

As a result of the previous harvest, there are not enough healthy trees present at this time for this area to develop into a healthy and productive forest on its own. An option to improve the condition of this forest would be to implement a shelterwood harvest, which removes about half of the sawtimber size trees and most of the pole size trees. In a shelterwood harvest, the healthiest and highest quality trees are left in the residual stand to produce the seed that will eventually become the future forest. These residual trees also shelter or protect the new seedlings until they are well established. Once the new forest has become established (this usually takes between five and fifteen years) another harvest that removes some or all of the remaining large trees may be implemented. This final harvest actually allows the new seedlings to receive full sunlight so that they develop properly and grow quickly creating early successional habitat for wildlife. If another harvest is not implemented during this time period the seedlings that were established as a result of the shelterwood harvest will be shaded by the larger trees and die. The most important goal of the regeneration process is to re-establish a healthy forest.

E. Mixed Hardwoods/Road:

A dense growth of seedling and sapling size trees has become established in the 8.5-acre area that was cleared when the access road was developed. Included are black birch, red maple and tuliptree along with scattered black oak, red oak, sugar

maple, black cherry, American beech, gray birch, hophornbeam, American hornbeam, flowering dogwood and sassafras. Several non-native invasive plant species have also become established in this area along with grapevines and witch hazel. The non-native invasive species include Asiatic bittersweet, Japanese honeysuckle, bush honeysuckle, wineberry and autumn olive.

F. Mixed Hardwoods:

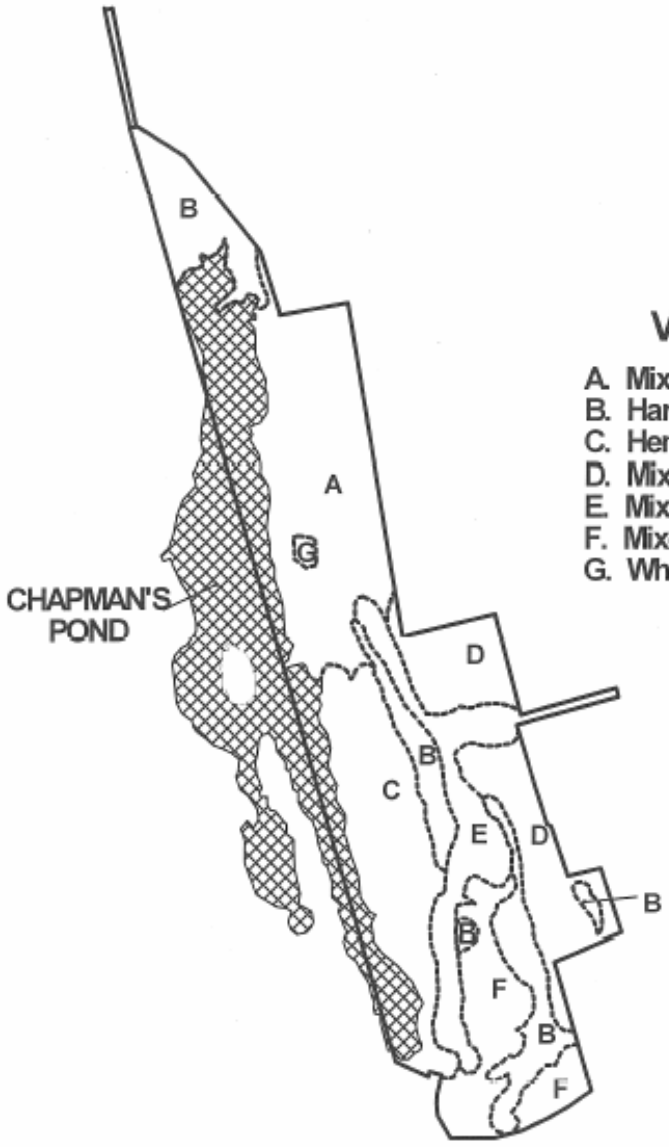
There are approximately 8 acres of Mixed Hardwoods that have a dense understory of mountain laurel present. Pole and sawtimber size scarlet oak, black oak, red oak, white oak, cankered black birch, red maple, American beech and sassafras form the overstory. Red maple, black gum, white ash, and tuliptree dominate where this mixed hardwood type makes a transition to the Hardwood Swamp vegetation type. The understory vegetation, which is dominated by mountain laurel also includes hardwood tree seedlings, maple-leaved viburnum, witch-hazel, sweet pepperbush, and highbush blueberry. Ground cover vegetation is limited by the dense shade that the mountain laurel casts. Where breaks in the mountain laurel exist, groundcover vegetation includes poison ivy, club moss, evergreen wood fern, hayscented fern, Christmas fern and many other species of grasses, sedges and wild flowers.

Many of the larger trees that are present are in fair to good condition and still have space to expand their crowns and grow. The majority of the smaller trees in this stand are in poor condition and are declining in health and vigor. The unhealthy trees that are competing with larger healthy trees could be removed and utilized as fuelwood, however this is not critical for the health of this stand at this time.

G. White Pine:

A small stand of pole size eastern white pine is present within this tract. This stand totals approximately 0.5 acres and also includes white oak, black oak, hickory, black birch and red maple. Understory vegetation in this stand includes hardwood tree seedlings, highbush blueberry, maple-leaved viburnum and witch-hazel. Ground cover is made up of club moss, hayscented fern, grasses and sedges. Releasing the white pine by removing competing hardwoods should help to ensure the long-term survival and health of this stand of white pine.

CHAPMAN MILL POND OPEN SPACE
WESTBROOK, CONNECTICUT
VEGETATION TYPE MAP



VEGETATION TYPES

A.	Mixed Hardwoods	18+- Acres
B.	Hardwood Swamp	13+- Acres
C.	Hemlock/Hardwoods	12+- Acres
D.	Mixed Hardwoods	11+- Acres
E.	Mixed Hardwoods/Road	8.5+- Acres
F.	Mixed Hardwoods	8+- Acres
G.	White Pine	0.5+- Acres

0 250 500 7501000 Feet

LEGEND

PROPERTY BOUNDARY

VEGETATION TYPE BOUNDARY

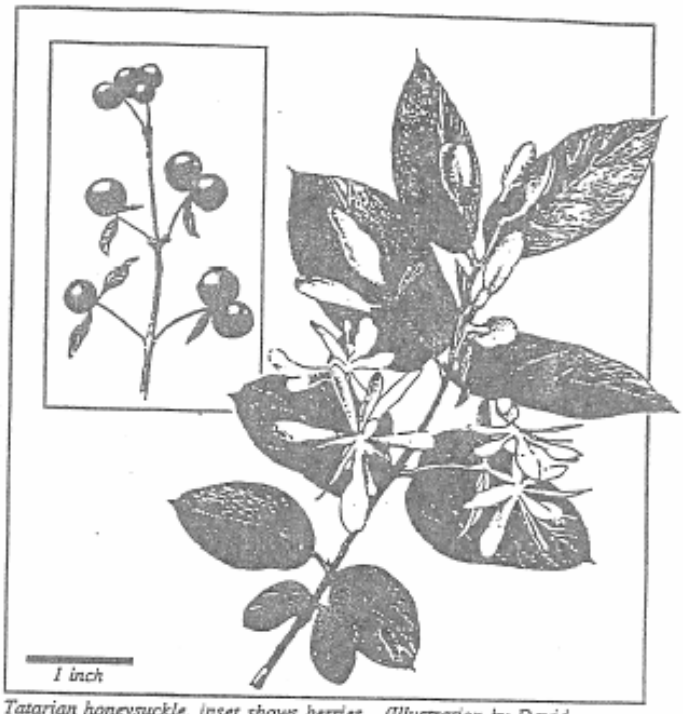
Invasive Plant Information Sheet

Bush Honeysuckles

Lonicera tatarica L., *L. morrowii* A. Gray, *L. mackii* (Rupr.) Maxim, *L. xylosteum* L., *L. x bella* Zabel
Honeysuckle Family (*Caprifoliaceae*)

Status: Common and invasive in Connecticut.

Description: Bush honeysuckles are upright, generally deciduous shrubs that range from six to sixteen feet in height. Tatarian honeysuckle (*L. tatarica* L.) has smooth, hairless, bluish-green leaves and pink or white flowers that do not turn yellow as they age. Morrow honeysuckle (*L. morrowii* A. Gray) has downy leaves and white flowers that turn pale yellow as they age. Bella honeysuckle (*L. x bella* Zabel) is a hybrid between tatarian and Morrow honeysuckle. Amur honeysuckle (*L. mackii* [Rupr.] Maxim) has dark green leaves that are hairy on the veins and white flowers that yellow with age. European Fly honeysuckle (*L. xylosteum* L.) has yellow flowers and leaves that are hairy underneath.



Tatarian honeysuckle, inset shows berries. (Illustration by David [Randy] Kleinman, courtesy of the US Army Corps of Engineers)

Preferred habitat: Abandoned fields, roadsides, woodlands, and edges of marshes are all places to find bush honeysuckles. They tolerate varying moisture levels and moderate shade, but prefer open areas and achieve the greatest fruit production when in full sun.

Seasonal cycle: Bush honeysuckles leaf out early in the spring before many native species and hold their leaves until November. They flower in May and June and fruit in July and August. The flowers are fragrant, tubular, and borne in pairs. The fruit is a many-seeded, red, orange, to yellow berry.

Distribution: In North America, bush honeysuckles have naturalized from New England south to North Carolina and as far west as Iowa. All the bush honeysuckles are found in the central portion of this area, yet each has a slightly different, overlapping range.

Other points of interest: Bush honeysuckles are native to Europe, eastern Asia, and Japan. Most species were introduced as ornamentals in the 1800s; tatarian honeysuckle is a popular ornamental shrub that was introduced from southern Russia in 1752. Amur honeysuckle is a problem in the midwestern United States, where it forms dense stands and shades out native herbaceous groundcover. The spread of bush honeysuckles is generally accomplished by birds, which consume the ripened fruit in the summer.

Control: Light infestations may be cleared by hand with a shovel or hoe. For control to be effective, the entire root must be removed. Severe infestations may be controlled by repeated treatments of cutting, burning or applying herbicide. Cutting should be conducted during the early spring and again in the late summer or early fall. A glyphosate herbicide (20% solution) may be applied to the leaves or freshly cut stumps late in the growing season. If prescribed burning is chosen, it should be conducted during the growing season. Control methods must be repeated for a period of three to five years to inhibit growth of

new shoots and eradicate target plants. To prevent re-invasion, "underplanting" disturbed woods with tolerant native woody species may be effective.

Additional information sources:

Invasive Plant Species of Virginia. Bush Honeysuckles. C. Williams. 1994. Virginia Department of Conservation and Recreation and Virginia Plant Society.

Plants Invasive in Rhode Island L. Gould and I. Stuckey. The Rhode Island Wild Plant Society *Newsletter*, Vol. 6, No. 2: September 1992.

Vegetation Management Guideline: Bush Honeysuckles. R. Nyboer. Natural Areas Journal Vol. 12 (4) 1992.

Element Stewardship Abstract for *Lonerica tatarica, L. morrowii, and L. X bella*. C. K. Converse. 1985. The Nature Conservancy. Unpublished document.

Diagnostic information: Tall shrub (6 to 16 feet tall). *Leaves:* Opposite, simple. Ovate to oblong, 1 to 2-1/2" long, rounded at base. *Flowers:* Small, fragrant, axillary; lips equalling or longer than the tube; upper four-lobed to its base. Style hirsute. *Fruit:* Berries many-seeded; red or yellow; 1/4" in diameter; borne in pairs usually on axillary peduncles. *Stems and branches:* Wide spreading stems; slightly drooping branches. Older branches hollow.

Heather J. Brunelle / Revised March 5, 1996

The Nature Conservancy

This fact sheet has been prepared by The Nature Conservancy Connecticut Chapter, in cooperation with The Natural Diversity Data Base of the Connecticut Department of Environmental Protection.

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Natural Diversity Data Base
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Japanese Honeysuckle

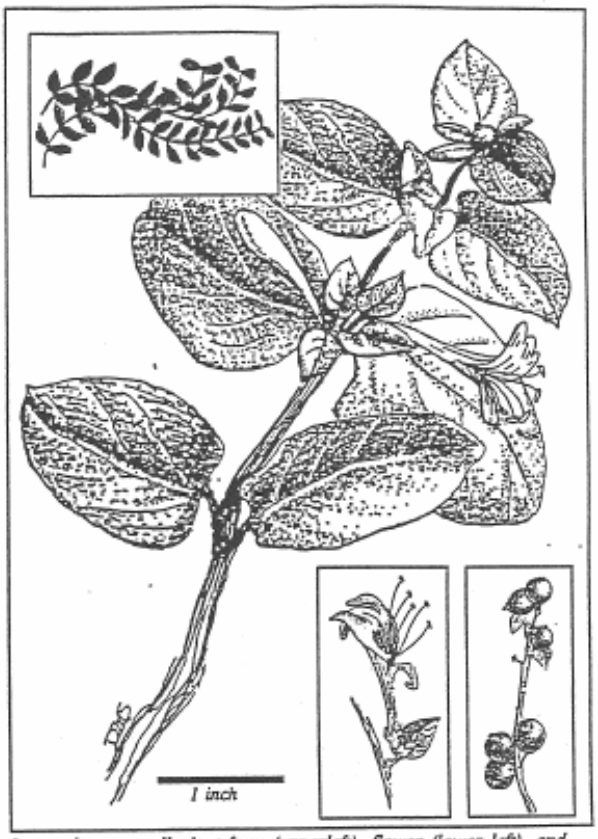
Lonerica japonica Thunberg
Honeysuckle Family (*Caprifoliaceae*)

Status: Common and invasive in Connecticut.

Description: Japanese honeysuckle is a woody perennial trailing or twining vine. Its individual runners can grow more than 30 feet in length; it roots at the nodes of the pubescent runners. Leaves are simple, opposite and oval to oblong in shape. Occasionally, young leaves are lobed. Japanese honeysuckle's flowers are fragrant, two-lipped, one to two inches in length, and white, changing to yellow with age. Fruit is a many-seeded, purple-black, pulpy berry.

Preferred habitat: Japanese honeysuckle is found in thickets, borders of woods and roadsides, and meadows. It occurs primarily in areas where natural or human disturbances have provided a light gap in the canopy. It can also be found in shaded areas, but most rapid growth occurs in areas exposed to sun.

Seasonal cycle: Japanese honeysuckle flowers from late May through the summer, and fruits from July through the fall. Late in the season, it continues photosynthesis after most associated native plants have become dormant. The stem and some of the leaves persist through the winter, resulting in an evergreen or semi-evergreen plant.



Insets show overall plant form (upperleft), flower (lower left), and berries (lower right). (Illustration by Donna Smith, courtesy of the Virginia Department of Conservation and Recreation)

Distribution: In North America, Japanese honeysuckle is naturalized from Maine, Massachusetts, and New York, south to Texas and Florida and west to Missouri and Indiana.

Other points of interest: Not native to this area, Japanese honeysuckle was introduced to North America from Japan in the 1800s as an ornamental shrub and vine. It has also been used for soil erosion control along railroads and highways. The berries of Japanese honeysuckle are a source of food for wildlife, especially mockingbirds, and other birds that disperse seeds. It is a serious threat to native plant species because of its capacity to strangle and destroy supporting trees and shrubs.

Japanese honeysuckle is distinct from two other trailing honeysuckles, the trumpet honeysuckle (*L. sempervirens*) and wild honeysuckle (*L. dioica*), found in Connecticut. The fruits of the other honeysuckles are red to orange-red berries, and their uppermost pair of leaves are joined together.

Control: Being semi-evergreen, Japanese honeysuckle is easier to detect during the fall when most native species have dropped their leaves. Control methods for Japanese honeysuckle in areas of heavy and light

infestations include mowing, grazing, prescribed burning, and the application of herbicides. Mowing and grazing reduces the spread of vegetative stems but does not completely remove the vegetation; instead, vigorous resprouting increases stem density. Small populations may be controlled by careful hand pulling, grubbing with a hoe or shovel, and removing trailing vines. Glyphosate herbicide (1.5-2% solution, applied during the fall before a hard freeze) is recommended to control Japanese honeysuckle. Care must be taken not to harm native species as the glyphosate herbicide is non-selective.

Additional information sources:

Gray's Manual of Botany. Eighth edition, corrected printing. M. Fernald. D. Van Nostrand Company, New York 1970.

Japanese Honeysuckle (Lonicera japonica): A Literature Review of Management Practices. J. Evans. Natural Areas Journal Vol.4 (2) 1982.

Invasive Alien Plant Species of Virginia, Japanese Honeysuckle (Lonicera japonica Thunberg). C. Williams. 1994. The Department of Conservation and Recreation and the Virginia Native Plant Society.

Vegetation Management Guideline: Japanese Honeysuckle (Lonicera japonica Thunb.). R. Nyboer. Natural Area Journal Vol.12 (4) 1992.

Diagnostic information: *Leaves:* ovate or oblong (1-1/2" to 3" long); roundish or broadly cuneate at base; glabrescent or hairy; short petioled, green. Young leaves may be pinnately lobed. *Flowers:* two-lipped flowers (1"-2" in length); borne in pairs in axils of young branches; the tube about equaling the limb; extremely fragrant; opposite, white, changing to yellow with age. *Fruit:* a many-seeded, purple-black berry (1/4" diameter). *Stems and branches:* trailing or twining woody vine. Stems are pubescent.

Heather J. Brunelle / Revised February 26, 1996

The Nature Conservancy

This fact sheet has been prepared by The Nature Conservancy Connecticut Chapter, in cooperation with The Natural Diversity Data Base of the Connecticut Department of Environmental Protection.

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Asiatic Bittersweet, Oriental Bittersweet

Celastrus orbiculatus

Staff Tree Family (Celastraceae)

Ecological Impact: Asiatic bittersweet is a rapidly spreading deciduous vine that threatens all vegetation in open and forested areas. It overtops other species and forms dense stands that shade out native vegetation. Trees and shrubs can be strangled by twining stems that twist around and eventually constrict the flow of plant fluids. Trees can be girdled and weighed down by vines in the canopies, making them more susceptible to damage by wind, snow, and ice storms. There is evidence that Asiatic bittersweet can hybridize with American bittersweet (*Celastrus scandens*), which occurs in similar habitats. Hybridization will destroy the genetic integrity of the native species.

Control Methods: The most effective control method for Asiatic Bittersweet is to prevent establishment by annually monitoring for and removing small plants. Eradication of established plants is difficult due to the persistent seed bank in the soil. Larger plants are best controlled by cutting combined with herbicide treatment.

Mechanical Control: Light infestations of a few small plants can be controlled by mowing or cutting vines and hand pulling roots. Weekly mowing can eradicate plants, but less frequent mowing (2-3 times per year) will only stimulate root suckering. Cutting and uprooting plants is best done before fruiting. Vines with fruits should be bagged and disposed of in the trash to prevent seed dispersal. Heavy infestations can be controlled by cutting vines and immediately treating cut stems with herbicide. Cutting vines without removing or killing the roots will stimulate vigorous re-growth resulting in large patches.

Chemical Control: Herbicides can be applied broad scale as a foliar spray, or to select individuals as cut stump treatments.

1) Foliar Spray: This method is most effective for low, dense patches. Early in the growing season, cut all vegetation to ground level and allow to regrow. One month later, spray the area with a 1-2% solution of water-soluble triclopyr (Garlon 3A™) using a backpack sprayer. Triclopyr is suggested over glyphosate since it does not kill monocots (*e.g.*, grasses, sedges, lilies) which remain and keep the soil from being exposed. Triclopyr is the active ingredient, in relatively dilute form, in Ortho's Brush-B-Gone, which is not a restricted chemical and can be used as an alternative to Garlon 3A™.

2) Cut Stump Treatment: This method is most effective for tall patches. Care should be taken to cut and treat only bittersweet vines and not native plants, since these will be needed to revegetate the area. In late summer, cut vines and apply a systemic herbicide like triclopyr (Garlon 3A™) or glyphosate (Roundup™) to the cut. To ensure uptake of the herbicide before the plant seals off the cut, apply immediately after cutting, within 5-15 minutes.

Apply with a sponge or paint brush. Any vines left hanging in the trees will decompose and fall within two to three years.

Biological Control: Currently, there are no known biological control methods.

Autumn Olive

Eleagnus umbellata

Oleaster Family (Eleagnaceae)

Ecological Impact: Autumn Olive grows rapidly and is a prolific seed producer. It establishes in disturbed sites adjacent to ornamental plantings where it shades out other plants that require direct sunlight. It is widely disseminated by birds and can easily adapt to many sites including areas with infertile soil. Its ability to fix nitrogen can adversely affect the nitrogen cycle of native plant communities that depend on low soil fertility.

Control Methods: The most effective control method for Autumn Olive is to prevent establishment by annually monitoring for and hand pulling small plants. Cutting and burning stimulate sprouting. Repeated cuttings over several consecutive years will reduce plant vigor and may prevent spread. However, herbicide use in combination with cutting may be more effective.

Mechanical Control: Seedlings and small plants should be hand pulled when the soil is moist. Be sure to remove the entire plant including all roots, since new plants can sprout from root fragments. Root sprouts resemble seedlings, but are attached to a lateral root and are nearly impossible to pull up. Larger plants can be cut off at the main stem and treated with herbicide.

Chemical Control: Herbicides can be applied broad scale as a foliar spray, or to select individuals as injection or cut stump treatments. Foliar sprays are highly effective, but should be used only where contact with nearby native vegetation can be prevented. Injection treatment can inhibit or prevent sprouting if done at the right time of year.

1) Foliar Spray: This method is most effective on small stands. Spraying should be done in late August or September when plants are actively translocating nutrients to the roots. Use a 1-2% solution of glyphosate (*e.g.*, Roundup™ or Rodeo™) and water. If plants are in or near wetlands, only Rodeo™ should be used. Glyphosate is a non-selective herbicide that will kill all vegetation. Managers should be cautious not to spray so heavily that herbicide drips off the leaves. Other herbicides that have proven effective, but remain in the soil for longer, are specific for broadleaf and woody species. These include dicamba (Banvel™), picloram (Tordon™), silvex, and 2,4,5-T applied in late June in a 90% water/10% diesel oil carrier. Dicamba applied in late June at 4 lbs./gal. (2 qts./100 gal./acre) with a surfactant is also effective.

2) Cut Stump Treatment: This method is most effective if done in late August or September. To ensure uptake of the herbicide before the plant seals off the cut, apply immediately after cutting, within 5-15 minutes. Use a 10-20% solution of glyphosate (*e.g.*, Roundup™ or Rodeo™) and water. Apply with a sponge or paint brush or spray with a spray bottle or backpack sprayer. Follow-up with a foliar spray or cut stump treatment the next year if sprouts appear.

3) Injection Treatment: This treatment is most effective if done during the dormant season, in March. Using a hand axe, make downward-angled cuts into the sapwood around the tree trunk. Make one cut for each inch of diameter, plus one extra (e.g., for a 10 inch diameter tree, make 11 cuts). Space the cuts so that 1-2 inches of uncut living tissue remains between them. Apply a low concentration (down to 1% in diesel oil) of oil-soluble triclopyr (Garlon 4™) into each cut so that the bottom of the cut is covered, but not running over. A trigger spray bottle works well as an applicator. This method is relatively easy for one person to do, but working with a partner is recommended in case of accident. Follow-up with a foliar spray or cut stump treatment the next year to control any sprouts.

Biological Control: Currently, there are no known biological control methods.

KEY

LIFEFORMS

T = tree
S = shrub
V = vine
H = herbaceous plant
G = grass
A = aquatic

HABITATS

U = uplands (all upland habitats including closed-canopy forests, second-growth woods, fields, grasslands, ridge tops, sand barrens, pitch pine scrublands etc.)
O = open areas (fields, grasslands, sand barrens, dry meadows etc.)
W = wetlands (swamps, marshes, wet meadows, fens, bogs, flood plains, flood plain forests, pond and stream shores)
L = lakes (ponds, in impounded water)
R = rivers (streams, in running water)
C = coast (sand dunes, rocky headlands, upper edges of salt water tidal marshes)

This list and the criteria for listing were ceveloped by the George Safford Torrey Herbarium, University of Connecticut, in conjunction with the State Geological and Natural History Survey of Connecticut and the Connecticut Invasive Plant Working Group. For a copy of the Criteria, please visit the Invasive Plant Working Group web page **http://www.eeb.uconn.edu/invasives.**

For more information on these species visit the New England Invasive Plant Atlas web page **http:/www.eeb.uconn.edu/invasives/neipa.htm.**

This list should be cited: Mehrhoff, L.J., K.J. Metzler, & E.E. Corrigan. 2001. Non-native and potentially invasive vascular plants in Connecticut. Center for Conservation and Biodiversity, University of Connecticut, Storrs.

CENTER FOR CONSERVATION & BIODIVERSITY • UNIVERSITY OF CONNECTICUT •

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

USDA

Non-native *Invasive* and *Potentially Invasive* Vascular Plants in Connecticut

This is a list of species whose intentional introduction into minimally managed habitats (preserves, sanctuaries, parks, wildlife management areas and other natural areas) should be discouraged. Species on the list are either **potentially invasive** or **invasive.** Invasive species are either **widespread** or have a **restricted** range in Connecticut. These two terms are geographic descriptors and do not imply degree of invasiveness. The list is intended to be an educational tool, is not static and will be reevaluated on an annual basis. A species as listed here includes all subspecies, varieties, forms, cultivars and synonyms. Life forms and broad habitat descriptors for habitats that are primarily threatened are noted.

MARCH 2001

WIDESPREAD AND INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Ailanthus altissima (Mill.) Swingle	Tree-of-heaven	T	U
Alliaria petiolata (Bieb.) Cavara & Grande	Garlic Mustard	H	U
Berberis thunbergii DC.	Japanese Barberry	S	U
Cardamine impatiens L.		H	U
Celastrus orbiculatus Thunb.	Asiatic Bittersweet	V	U
Centaurea maculosa Lam. syn. Centaurea biebersteinii DC.	Spotted Knapweed	H	O
Elaeagnus umbellata Thunb.	Autumn Olive	S	O
Euonymus alatus (Thunb.) Sieb.	Winged Euonymus	S	U
Euphorbia cyparissias L.	Cypress Spurge	H	O
Fallopia japonica (Houtt.) Decraene syn. Polygonum cuspidatum Sieb. & Zucc.	Japanese Knotweed	H	U, W
Frangula alnus Mill. syn. Rhamnus frangula L.	European Buckthorn	S	U
Hesperis matronalis L.	Dame's Rocket	H	U
Lonicera X bella Zabel	Bella Honeysuckle	S	U, W
Lonicera japonica Thunb.	Japanese Honeysuckle	V	U, W
Lonicera morrowii A. Gray	Morrow's Honeysuckle	S	U, W
Lythrum salicaria L.	Purple Loosestrife	H	W
Nasturtium officinale R. Br.	Watercress	H	W
Phragmites australis (Cav.) Trin.	Common Reed	G	U, W
Potamogeton crispus L.	Crispy-leaved Pondweed	A	R, L
Rhamnus cathartica L.	Buckthorn	S	U
Robinia pseudoacacia L.	Black Locust	T	U
Rosa multiflora Thunb.	Multiflora Rose	S	U
Vincetoxicum nigrum (L.) Moench syn. Cynanchum nigrum (L.) Pers. Cynanchum louiseae Kartesz & Gandhi	Black Swallow-wort	H,V	U
Vincetoxicum rossicum (Kleo.) Barb. syn. Cynanchum rossicum (Kleo.) Borhidi	Swallow-wort	H,V	U

RESTRICTED AND INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Ampelopsis brevipedunculata (Maxim.)	Porcelain berry	V	U
Cabomba caroliniana A. Gray	Fanwort	A	L, R
Egeria densa Planchon	Brazilian Water-weed	A	L, R
Froelichia gracilis (Hook.) Moq.	Cottonweed	H	O
Humulus japonicus Sieb. & Zucc.	Japanese Hops	H,V	W, U
Hydrilla verticillata (L. f.) Royle	Hydrilla	A	L, R
Iris pseudacorus L.	Yellow Iris	H	W
Lepidium latifolium L.	Tall Pepperwort	H	C, O
Lysimachia vulgaris L.	Garden Loosestrife	H	W
Microstegium vimineum (Trin.) A. Camus	Japanese Stilt Grass	G	U
Myriophyllum heterophyllum Michx.	Variable Water-milfoil	A	L, R
Myriophyllum spicatum L.	European Water-milfoil	A	L, R
Polygonum perfoliatum L.	Mile-a-minute vine	V, H	U
Ranunculus ficaria L.	Lesser celandine	H	UW
Rubus phoenicolasius Maxim.	Wineberry	S	U
Trapa natans L.	Water Chestnut	A	L, R
Tussilago farfara L.	Coltsfoot	H	U, W

POTENTIALLY INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Acer ginnala L.	Amur Maple	T	U
Acer platanoides L.	Norway Maple	T	U
Acer pseudoplatanus L.	Sycamore Maple	T	U
Aegopodium podagraria L.	Goutweed	H	W
Aira caryophyllea L.	Silver Hairgrass	G	O
Allium vineale L.	Wild Garlic	H	U
Amorpha fruticosa L.	False Indigo	S	W
Arthraxon hispidus (Thunb.) Makino		G	O, W
Berberis vulgaris L.	Barberry	S	U
Bromus tectorum L.	Drooping Brome-grass	G	O
Butomus umbellatus L.	Flowering-rush	H	W
Callitriche stagnalis Scop.		A	R, W
Cirsium arvense (L.) Scop.	Canada Thistle	H	O
Datura stramonium L.	Jimson-weed	H	C
Elaeagnus angustifolia L.	Russian Olive	S	U
Elsholtzia ciliata (Thunb.) Hylander	Elsholtzia	H	U
Euphorbia esula L.	Leafy Spurge	H	O
Geranium nepalense Sweet	Nepalese Crane's-bill	H	U
Glechoma hederacea L.	Gill-over-the-ground	H	W
Glyceria maxima (Hartman) Holmburg	Tall mannagrass	G	W
Impatiens glandulifera Royle	Tall impatiens	H	W
Kochia scoparia (L.) Schrader	Summer Cypress	H	C
Ligustrum obtusifolium Sieb. & Zucc.	Border Privet	S	U
Ligustrum ovalifolium Hassk.	California Privet	S	U
Ligustrum vulgare L.	European Privet	S	U
Lonicera maackii (Rupr.) Maxim.	Amur Honeysuckle	S	U
Lonicera tatarica L.	Tatarian Honeysuckle	S	U
Lonicera xylosteum L.	European Fly-honeysuckle	S	U
Lychnis flos-cuculi L.	Ragged Robin	H	O
Lysimachia nummularia L.	Moneywort	H	W
Marsilea quadrifolia L.	Water Shamrock	H	L
Miscanthus sinensis Anderss.	Eulalia	G	O
Myosotis scorpioides L.	Forget-me-not	H	W
Myriophyllum aquaticum (Vell.) Verdc.	Parrotfeather	A	L
Nelumbo lutea (Willd.) Pers.	American Water Lotus	A	L
Najas minor Allioni	Eutrophic Water-nymph	A	L
Nymphoides peltata (Gmel.) Kuntze	Yellow floating heart	A	L
Onopordum acanthium L.	Scotch thistle	H	C
Ornithogalum umbellatum L.	Star of Bethlehem	H	U
Paulownia tomentosa (Thunb.) Steudel	Empress-tree	T	U, C
Phalaris arundinacea L.	Reed Canary-grass	G	W
Poa compressa L.	Canada Blue-grass	G	U
Polygonum caespitosum Blume		H	U
Populus alba L.	White Poplar	T	U
Pueraria lobata (Willd.) Owhi	Kudzu-vine	V	U
Rosa rugosa Thunb.	Japanese Rose	S	C
Rumex acetosella L.	Sheep Sorrel	H	U
Silphium perfoliatum L.	Cup-plant	H	U
Solanum dulcamara L.	Climbing Nightshade	H, V	U, W
Valeriana officinalis L.	Garden-heliotrope	H	U
Veronica beccabunga L.	Brooklime	H	W

ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site files and maps shows no known archaeological site listed for the project area. However, our files do indicate two prehistoric Native American sites located to the immediate south of Chapman Pond. In addition, the historic remnants of the various mill industries may be reconstructed through archaeological investigations.

Our records suggest that no systematic archaeological survey has ever been conducted at the Chapman Mill Pond Open Space area. As a result, we know little concerning the cultural resources in the project area. However, the potential to discover new archaeological sites, and, to add to the industrial history of Chapman Mill is very high.

The Office of State Archaeology recommends that the open space plan include working toward an archaeological reconnaissance survey for the project area to identify all cultural resources associated with the property. This survey should provide recommendations on the significance of each site and specific preservation strategies that can be implemented in the future. The survey should be conducted in accordance with the Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources*.

The recommended survey can also provide unique educational opportunities, including site visits by school children during fieldwork activities, the development of exhibits in coordination with the Westbrook Historical Society, site walks and presentations for the general public.

The Office of State Archaeology would look forward to working with the Town of Westbrook in providing any technical assistance in the conducting of an archaeological survey and the conservation and preservation of its cultural resources in the open space management area. In addition, they would be pleased to provide local teachers and historians with information on the promotion of the Chapman Mill Pond area to students and the general public.

APPENDIX

Connecticut Ecosystems LLC

• Wetland Delineation • Wetland & Aquatic Evaluation • Natural Resource Inventories
• Mitigation • Project Planning • Permit Assistance • Expert Testimony

April 22, 2002

Mr. Thomas Odell
9 Cherry Street
Westbrook, CT 06498

Re: Lake Laconia Property Vernal Pools
Westbrook, CT

Dear Tom:

At your request I accompanied you, the Westbrook Wetlands Enforcement Officer, and a member of the Westbrook Conservation Commission, on April 11, 2002 on an inspection of three wetlands on the "Lake Laconia" property. The purpose of the inspection was to determine whether these wetlands are vernal pools. We sampled the wetland waters for fairy shrimp and marbled salamander larvae with dip nets, and searched for wood frog and spotted salamander egg masses. Appendix 1 contains the field data sheets.

The first wetland that we inspected is a small (30' diameter) pool adjacent to a logging road (wetland flag 30 is a reference). This pool held a maximum of 12 inches of clear water. It contained 22 spotted salamander egg masses and small invertebrates that appeared to be fairy shrimp.

The second wetland that we inspected is a long and narrow, seasonally flooded deciduous wooded swamp located between two steep ridges (wetland flags 13-35 are references). This wetland contained extensive shallow, dark-colored inundation (average depth: 5 inches). There was no inlet or outlet on the inspection date. We counted approximately 223 spotted salamander and 89 wood frog egg masses, and observed fairy shrimp.

The third wetland that we inspected is a seasonally flooded deciduous/coniferous wooded swamp (wetland flags 99-116 are a reference). This wetland also contained extensive shallow ponded water (5 inches average). The flooded soils are very soft in this swamp, which is bordered to the west by a steep ridgeline. We counted approximately 707 spotted salamander and 416 wood frog egg masses in this swamp.

Based upon the presence of spotted salamander and wood frog egg masses, these three wetlands are classified as vernal pools. The second and third vernal pools we inspected are particularly productive, based upon the large number of observed egg masses.

38 Westland Avenue • West Hartford, CT 06107
Phone (860) 561-8598 • Fax (860) 561-0223 • email ecosys@connico.net

Please do not hesitate to contact me if you have any questions regarding this correspondence.

Very truly yours,

Connecticut Ecosystems LLC

Edward M. Pawlak
Registered Soil Scientist
Certified Professional Wetland Scientist

Photo 1. First vernal pool on Lake Laconia property.

Photo 2. Second vernal pool on Lake Laconia property.

Photo 3. Third vernal pool on Lake Laconia property.


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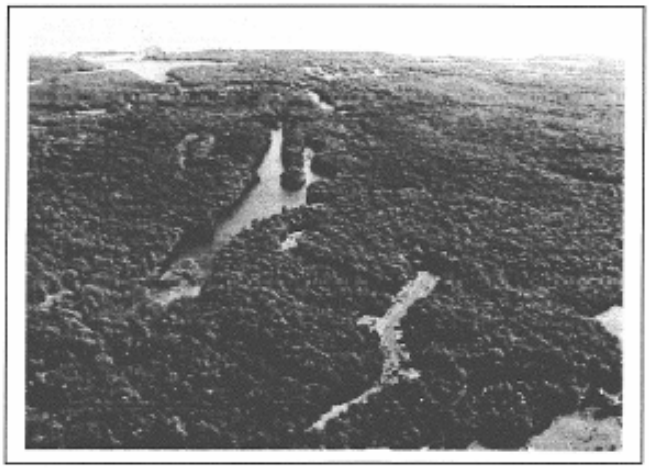
State of Connecticut
52-79
Westbrook Vernal Pool Study
Connecticut Ecosystems LLC
3/21/01

NEWS RELEASE

TOWN MEETING
WESTBROOK HIGH SCHOOL
WEDNESDAY
JULY 31, 2002
7:30 PM

TO VOTE ON OPEN SPACE ACQUISITON OF 83 ACRE CHAPMAN MILL POND/LAKE LACONIA PROPERTY

Land Description
The 83-acre Chapman Mill Pond property, also known as Lake Laconia, is located off of Horse Hill Road (Route 145) and Chapman Mill Pond Road on the western border of Westbrook. The property is located within an emerging, Menunketesuck Greenway Trail that will stretch from the Northern border of Westbrook with the Weber Woods section of Cockaponsett State Forest to the Stewart B. McKinney National Wildlife Refuge on Long Island Sound.



Aerial photo over Chapman Mill Pond looking towards Long Island Sound by Aero-tag, Incorporated.

Support for Acquisition/Protection
The Conservation Commission, charged by ordinance with evaluating land for open space acquisition, has recommended purchase of the Chapman Mill Pond property as a high priority. Subsequently the Planning Commission, Board of Selectmen and Board of Finance voted in support of sending this proposal to Town Meeting. The Connecticut River Estuary Regional Planning Agency, Westbrook Land Conservation Trust, Connecticut Audubon and The Stewart B. McKinney National Wildlife Refuge have all written letters in support of this conservation effort.

Last year the Inland Wetlands and Planning Commissions approved two phases of a 19-lot subdivision on the property. When the landowner expressed interest in preserving the land the Conservation Commission contacted the Trust for Public Land (TPL), a national nonprofit conservation organization, for help in permanently protecting the property. TPL reached an agreement with the landowners to purchase the property in two phases over two fiscal years.

Funding Open Space Acquisition
Funds for the purchase will come from the $2.2 Million Open Space Authorization that was voted on by referendum in January. Based on appraisal the cost of the land will be $1,700,000. A state grant application to the DEP's Open Space and Watershed Land

Acquisition Grant Program was submitted in April requesting 50% of the purchase price of the first phase of the purchase. A second grant application will be submitted in the fall grant round for 50% of the second phase of the property.

Community Benefits and Opportunities

Water Quality: Protecting this property will protect the ground and surface water in the Menunketesuck River, an important tributary to Long Island Sound. Protecting the watershed, designated by the town as a water resource zone, will also help protect the drinking water quality for wells in the area.

Recreation: As an addition to the Greenway as well as on its own, the acquisition of the Chapman Mill Pond/Lake Laconia property will increase the recreational resources on the Western side of town as it will provide a Southern point of access from Route 145. Currently, trails and walkable areas traverse the property and make it inviting to hikers and birdwatchers. The property abuts a 40-acre lake that will provide a significant recreational resource for nonmotorized boat owners as well as fisherman.

Historical Resource: Chapman Mill Pond has a long history in the Town of Westbrook. The old mill that was once on the property was used as a gristmill belonging to George Chapman, one of the founding families of Westbrook. Later it was converted to a sawmill. Among the products that were produced on the property were wooden buttons, chestnut shingles and sleighs. Another familiar name in Westbrook's history, William J. Neidlinger purchased the property in 1911 and lived there with his family.

Wildlife Habitat Protection: The Chapman Mill Pond property is home to a variety of wildlife and is considered an important flyway for migrating birds. The Lake is known to contain numerous fish such as largemouth and calico bass, perch, catfish and pickerel. Both Audubon Connecticut and The Stewart B. McKinney National Wildlife Refuge support this conservation project because of its importance to migratory birds and upland habitat they require on their migration routes North. This property also includes several vernal pools that contain breeding populations of spotted salamander, fairy shrimp and wood frogs. A vernal pool contains standing water, usually dries out in the summer, lacks a fish population, and contains one or more species that depend on vernal pools for survival.

Help Balance Growth in Westbrook: The landowner for this property has already received approvals for two-thirds of a 19-lot subdivision. If Town Meeting does not approve of this purchase, the landowner will proceed with the subdivision. Development would eliminate recreational opportunities, wildlife habitat, water resource protection and damage wetlands and vernal pools. It would also increase the demand for expensive municipal services, including schools, police and fire protection, and road maintenance, while adding to traffic congestion and detracting from the character of this community.

VOTE YES!

Description of Chapman Mill Pond property, Westbrook, CT

The 86±acre Lake Laconia property lies along on the Western border of Westbrook with access from Route 145. The lake, historically known as Chapman Mill Pond, is a Menunketesuck River impoundment that is fed by small tributaries originating in Haddam, Killingworth, Clinton and Westbrook. The river ultimately flows into Long Island Sound. The eastern half of the 40-acre lake is in Westbrook and is included in the purchase. The land, including over 3000 feet of water frontage, consists of a rolling, irregular terrain with rocky knolls (ledge areas). Except for the ledge areas, unconsolidated materials (sand and gravel) that overlie trap rock control land surface throughout most of the site. The majority of slopes range from flat to gentle. Areas of steep slopes are concentrated along the southwestern limits near the lake.

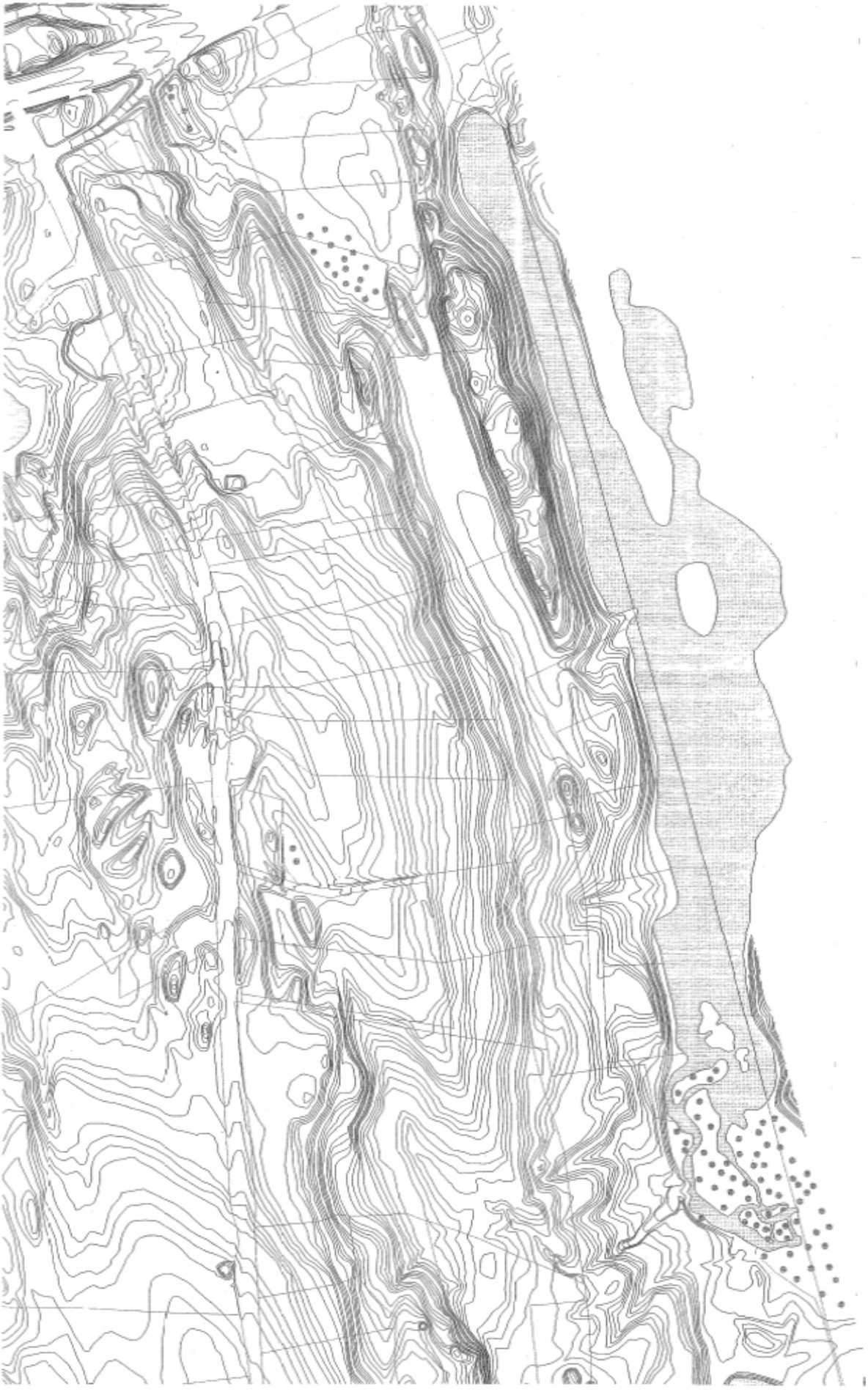
Two small streams in the northern part of the site appear to run continuously indicating a supply of ground water. There is also a small wetland area on eastern side of the rock knoll. Two vernal pools have been identified in this area.

Mixed hardwoods dominate the northern portion of the site while dead and dying Hemlock dominate the steep rocky slopes along the southeastern edge. Black birch seedlings are stabilizing the soils in the openings caused by the dying hemlocks. Red and white spruce saplings, planted some years ago, are also responding to the added sunlight. The over story of mixed hardwoods is predominantly white, red and scarlet oak, with a scattering of beech and hickory. The mixed hardwood area is still maturing. Remnants of open agricultural fields include dead or dying cedar and stone walls with live stock openings. A small stand of white pine, planted 20+ years ago, adds diversity to the landscape. In the middle of the site there is a thriving stand of sapling tulip poplar that has taken over an area previous stripped for a road.

This property is home to a variety of wildlife including fox, coyote, deer, ospreys (two nests), turkeys, wood duck white heron, and, at times horned owls. Because of the properties location just north of the Stewart B. McKinney National Wildlife Refuge and the availability of early emerging aquatic insects and oak forest the area is considered an important flyway for migrating birds. The lake is known to contain numerous fish such as largemouth and calico bass, perch, catfish and pickerel.

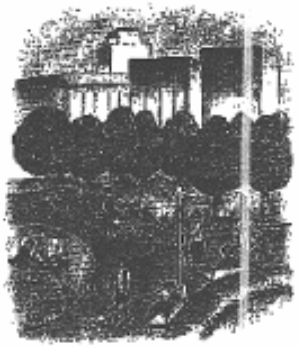
Lake Laconia was formed by a dam built for manufacturing but is now used only to maintain water level in the lake. It is inspected at regular intervals by the CT Department of Environmental Protection. Remnants of a fish ladder are visible next to the dam. The lake and dam have been managed in accordance with Department of Environmental Protection protocols and contains Class A water. No motor boats or personal watercraft are allowed on the 40-acre lake.

Once protected, this property will become part of the greenway being created on the western side of Westbrook stretching from the Stewart B. McKinney National Wildlife Refuge to the Cockaponsett State Forest in northern Westbrook. The most recent addition to the greenway was the 24-acre King property acquired by the Town last year.



Promoting Physical Activity Through Trails

Trails have been built and maintained in this country mainly for reasons related to transportation and recreation. Rarely, however, have people asked how important are trails to our health and whether trails should be a resource accessible to multiple-types of recreation users?



There is strong scientific evidence that regular physical activity promotes health and reduces risk of premature death and many chronic diseases. It is recommended that adults obtain a minimum of 30 minutes of moderate intensity (e.g., brisk walking) on most, if not all, days of the week.

Indeed, there is now scientific evidence that providing access to places for physical activity increases the level of physical activity in a community.[1] The Task Force on Community Preventive Services strongly recommends creating or enhancing access to trails and other places for physical activity. However, just building trails is not enough, the Task Force highlighted that communication strategies and outreach activities that promote using trails and facilities are also recommended. A typical study of an intervention to create or enhance access to places for physical activity reports a 25% increase in physical activity levels.[2]

The health benefits of using trails are significant

- Regular physical activity is a key component of any weight loss effort.[3] Greater access to trails can directly impact our nation's **obesity** epidemic by improving access to places for physical activity and opportunities.
- Participating in aerobic training significantly reduces systolic and diastolic blood pressure.[4] Trails provide the opportunity for individuals to help control their **hypertension** (high blood pressure).
- Moderate physical activity such as walking and cycling on trails can protect against developing **non-insulin dependent diabetes**.[5]
- Through aerobic exercise training, walking and cycling on trails can improve symptoms of **mild-to-moderate depression and anxiety** of a magnitude comparable to that obtained with some pharmacological agent.[6]
- Studies have reported that walking two or more miles a day reduces the chance of **premature death** by 50%.[7]

Trails Reach the Whole Community

Many commonly recognized activities related to physical activity exclude large segments of the community. For example: organized team sports may favor athletically gifted individuals and families with sufficient financial means; fitness centers may favor individuals who have high self-determination and fitness ability; youth recreational programs may favor young children. Trails however, represent a diversity of opportunity from the gifted athlete interested in a convenient place to train to the individuals who are looking for an aesthetically pleasing place to take an after dinner walk to a family walking to spend time together.

Many Users—Many Uses

Trails are a medium that offers many opportunities for physical activity:

- Walking the dog
- Walking as break from work
- Walking to a scenic outlook
- Walking as a break from driving
- Rollerblade/inline skating
- Jogging & Running
- Wheelchair accessible recreation
- Bicycling
- Cross County Skiing and Snowshoeing
- Fishing and hunting
- Horseback riding
- Landscaping and trail maintenance
- Bird watching
- Playing with children
- Strolling with infants and toddlers
- Spending time with friends & relatives
- Your ideas here. . .

Resources

To find out about trails in your area:

American Hiking Society's "Hikers Info Center"*
Trails and Greenways Clearinghouse.*
The National Park Service; Rivers, Trails, and Conservation Assistance Program
Rails-to-Trails Conservancy*

To learn more about what CDC is doing to address these and other health issues through the promotion of physical activity please visit the links below:

State-based Physical Activity Program Directory
Introducing a new on-line, searchable resource to help states develop, share, and monitor physical activity programs at the state and national levels. Search for programs in other states or update your state's information with just a few clicks!

Physical Activity
Information on a variety of physical activity-related topics, from science to intervention.

Public Health Programs
To learn about physical activity-related public health programs and campaigns supported by CDC.

Publications
A listing of publications designed to provide you with more information on nutrition and physical activity.

Recommendations
Comprehensive information and recommendations, in several topic areas, for partners, public health educators, and the public.

- *The Guide to Community Preventive Services (Community Guide)** Provides recommendations on population-based interventions to promote health and to prevent disease, injury, disability, and premature death, appropriate for use by communities and healthcare systems.

Contact

For more information about this contact

Division of Nutrition and Physical Activity,
National Center for Chronic Disease Prevention
and Health Promotion,
Centers for Disease Control and Prevention
4770 Buford Highway, NE, MS/K-24
Atlanta, GA 30341-3717

Telephone (770) 488-5820
Fax (770) 488-5473

References

1. Creating or Improving Access to Places for Physical Activity is Strongly Recommended to Increase Physical Activity. The Task Force on Community Preventive Services. Available: [on-line] http://www.thecommunityguide.org/home_f.html*

2. Ibid

3. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease and Health Promotion. Promoting Physical Activity: A Guide for Community Action.

4. Y.A. Kesaniemi, E. Danforth, M.D. Jensen , P.G. Kopelman, P. Lefebvre, B.R. Reeder. Dose-response issues concerning physical activity and health: an evidence-based symposium. *Med. Sci. Sports Exerc.* 33(6):S352-S358.

5. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, Nathan DM; Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002 Feb 7;346(6):393-403.

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ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area — an 86 town region.

The services of the Team are available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, landfills, commercial and industrial developments, sand and gravel excavations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Soil and Water Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.