Webb Mountain Park Extension

Monroe, Connecticut

King's Mark Environmental Review Team Report

King's Mark Resource Conservation & Development Area, Inc.

Webb Mountain Park Extension
Monroe, Connecticut

Prepared by the
King's Mark Environmental Review Team
of the
King's Mark
Resource Conservation and Development Area, Inc.

for the

Conservation and Water Resources Commission
Monroe, Connecticut

October 2005

Report #330

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ACKNOWLEDGMENTS

This report is an outgrowth of a request from the Monroe Conservation and Water Resources Commission to the Southwest Conservation District (SWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Council for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark 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 Wednesday, April 20, 2005.

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I would also like to thank John Brooks, chair, conservation commission, Andy Nunn, first selectman, Dan Tuba, town planner and Dina Franceschi, conservation commission member, and Tom Ellbogen, concerned citizen, 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 information. Some Team members conducted a map review only and others made additional site visits. 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 the proposed use, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the review and management of these newly acquired additions to Webb Mountain Park.

If you require additional information please contact:

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Maps, Figures and Tables

INTRODUCTION

Introduction

The Monroe Conservation and Water Resources Commission have requested Environmental Review Team (ERT) assistance in conducting a natural resource inventory for property purchased by the town to extend Webb Mountain Park.

Recently the town, with the help of The Trust for Public Land, was able to purchase two properties and an easement for a total of 171 acres of open space adjacent to existing Webb Mountain Park and Aquarion Water Company Land. One parcel of 106.6 acres had been previously approved for a residential housing development and the second parcel, directly adjacent to Webb Mountain Park, is 60.66 acres. The town also received a conservation easement on 4.46 acres.

The ERT conducted a study in 1979 for the135 acre Webb Mountain Park to evaluate it for passive recreation and to assist in management planning.

Objectives of the ERT Study

The town has requested the ERT to assist them in a natural resource inventory for the new parcels and to provide planning information consistent with the use of Webb Mountain. Specific concerns included vernal pools and waterbodies, use of the area for trails and environmental education.

The ERT Process

Through the efforts of the Monroe Conservation and Water Resources Commission this environmental review and report was prepared for the Town of Monroe.

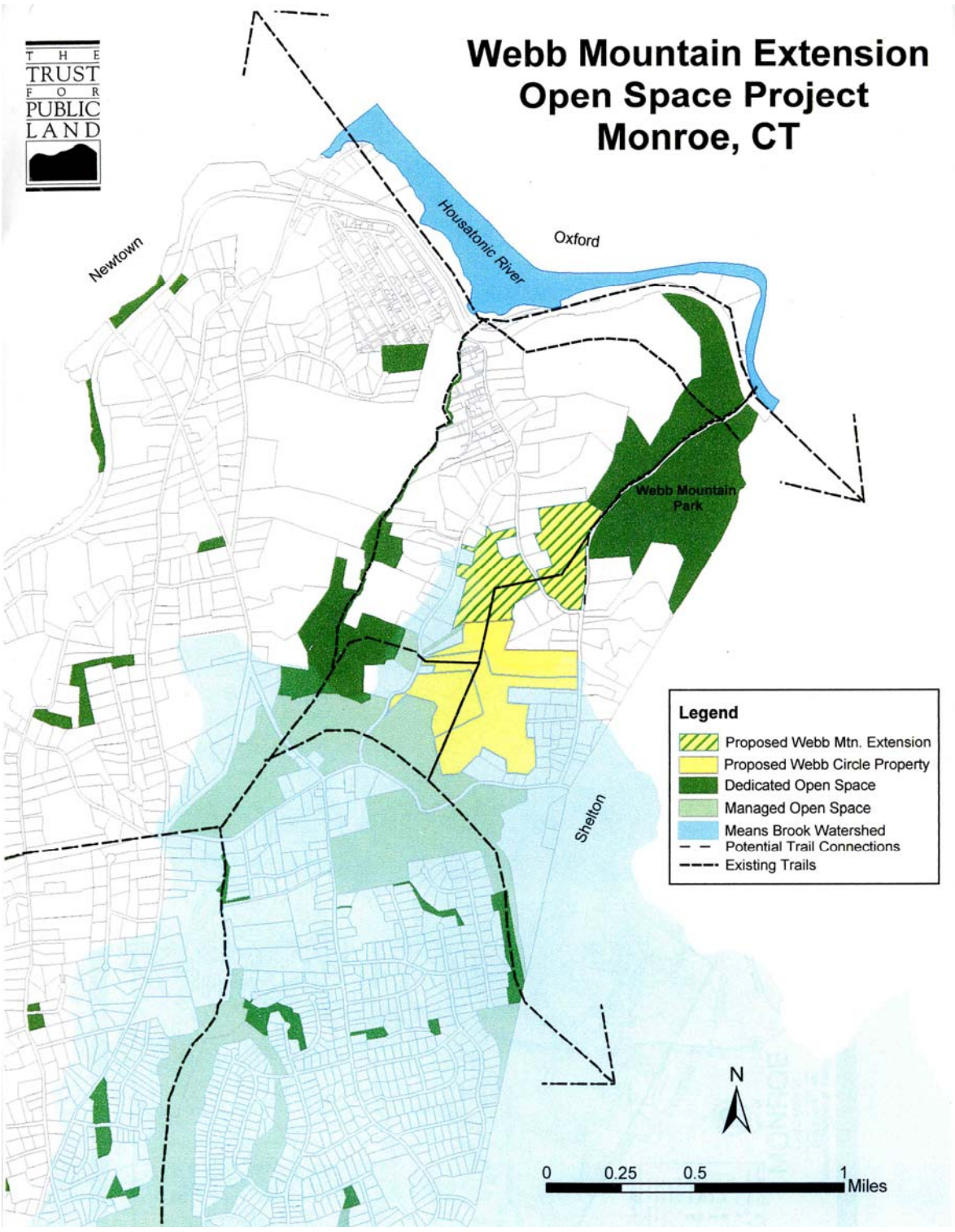
This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the applicant.

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 Wednesday, April 20, 2005. 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.

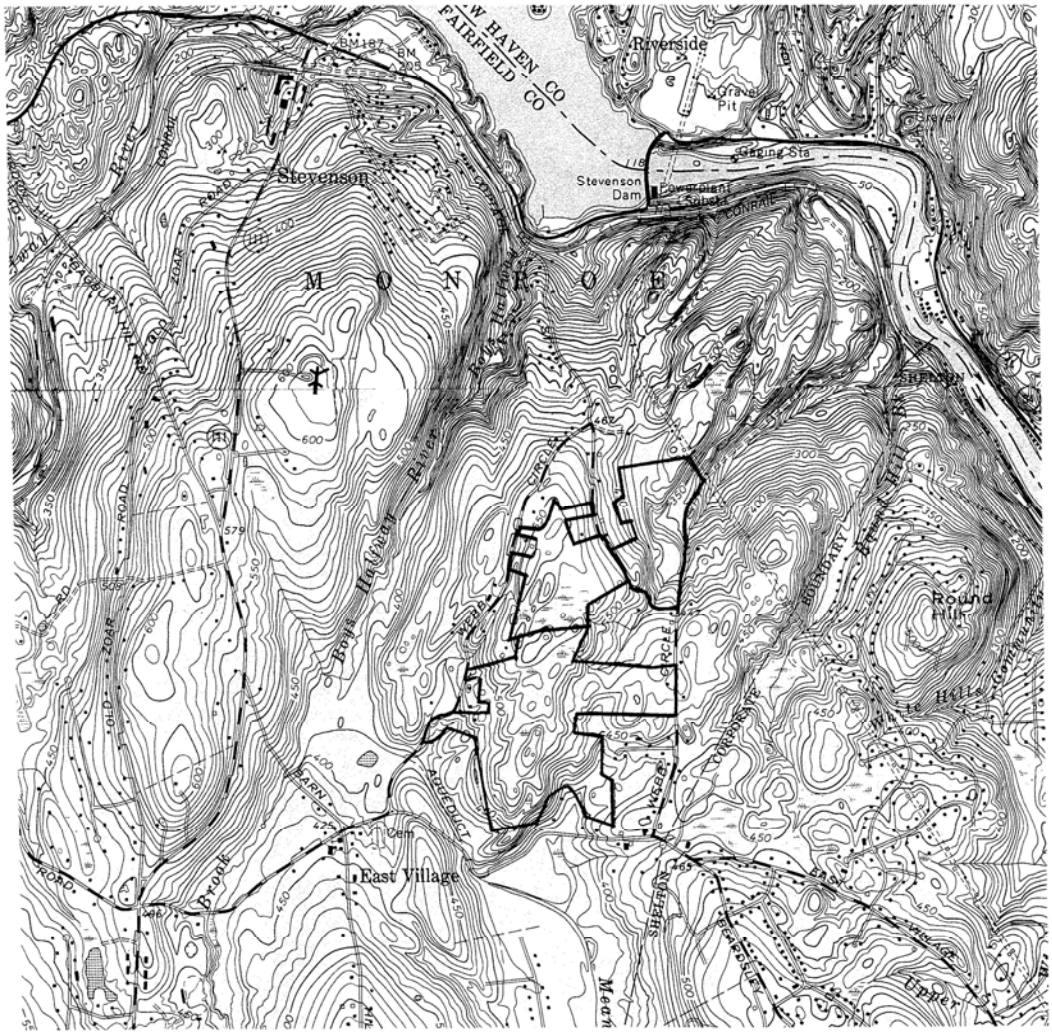
Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.


THE TRUST FOR PUBLIC LAND
Webb Mountain Extension
Open Space Project
Monroe, CT
Housatonic River
Oxford
Newtown
Webb Mountain Park
Shelton
Legend
Proposed Webb Mtn. Extension
Proposed Webb Circle Property
Dedicated Open Space
Managed Open Space
Means Brook Watershed
Potential Trail Connections
Existing Trails
N
0
0.25
0.5
1
Miles

Location

Scale 1” = 2000’

Approximate Site



Southwest
Conservation District Review

All information provided by the Southwest Conservation District is advisory in nature and is intended to assist the town in managing their natural resources.

Inventory of Property Natural Resources

a) Soils

Note: Soil descriptions may be found in the appendix of this report. Soils descriptions are from the Fairfield County Soil Survey. Onsite soils surveys should be completed to determine soil characteristics as necessary for individual projects on the park lands.

List of Soil Types Found on this Site

From USDA NRCS Connecticut Soils *Datamart* and the Fairfield County Soil Survey

Map Unit 2 - Ridgebury Fine Sandy Loam

Map Unit 3 - Ridgebury, Leicester, and Whitman Soils, Extremely Stony

Map Unit 4 - Leicester Fine Sandy Loam

Map Unit 17 - Timakwa and Natchaug Soils

Map Unit 18 - Catden and Freetown Soils

Map Unit 46C -Woodbridge Fine Sandy Loam, 8 to 15 Percent Slopes, Very Stony
45B - Woodbridge Fine Sandy Loam, 3 to 8 Percent

Map Unit 50B - Sutton Fine Sandy Loam, 3 to 8 Percent Slopes

Map Unit 73E - Charlton - Chatfield Complex, 15 to 45 percent slopes, very rocky
73C - Charlton - Chatfield Complex, 3 to 15 Percent slopes, very rocky

Map Unit 79E - Rock Outcrop - Holyoke Complex, 3 to 45 Percent slopes

Map Unit 84B - Paxton and Montauk Fine Sandy Loams, 3 to 8 percent slopes
86D - Paxton and Montauk Fine Sandy Loams, 15 to 35 percent, extremely stony.

The recreational potential of the soils found onsite are given in **Figure One. Figure One A** is USDA NRCS criteria for determining recreational potential of soils.

Figure Two indicates the potential of the soils for woodland management and productivity. In sensitive areas adjacent to vernal pools, restricted woodlot management criteria should be applied (see below **section d**) to Wetlands/Vernal Pool areas.

Figure Three indicates the soils potential for specific crops and trees and for wildlife.

Other Soils Data

b) Soils – Wetland soils, natural drainageways, where water is near or at the surface seasonally (these can be included within upland soils delineations), and prime farmland soils are priorities for conservation.

c) Prime farmland would include the areas of Woodbridge Fine Sandy Loam (WxB) and Paxton Fine Sandy Loam (PbB). Farmland soil of statewide importance would include Leicester Fine Sandy Loam (Lc). **Farmland Soils map** indicates the approximate location of these soils.

Prime and Farmland of Statewide Importance areas should be left open as potential future agricultural areas and not be disturbed by permanent or semi-permanent alterations such as road or parking lots or by any activity which involves removing or disturbing top soil.

d) Wetlands/Vernal Pools

The vernal pool complex on this property is an important natural resource. One or more pools appear to have two important qualities “microtopographic complexity” and “vertical stratification” (Calhoun & Klemens, 2002). For a thorough review of vernal pools and their management, refer to “Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States”, Kalhoun and Klemens, 2002.

Vernal pools and associated upland habitat require a significant and well-defined protection in order to maintain their integrity. Given this, other resource use and protection should be oriented from first protecting these vernal pool areas.

The first recommended step is to engage in a thorough inventory of the vernal pools and dependant resources in order to establish a baseline on the size, location and quality of the pools. This is essential information for determining relationships between pools and to upland areas, so that important habitat areas can remain undisturbed and public access can be designed for areas of least impact.

Two models for effective inventory of wetlands/vernal pools include the Connecticut River Coastal Conservation District's "Vernal Pool Management Plan for the Chapman Mill Pond Open Space Property Westbrook, CT. (December 2004) and the Southwest Conservation District's "Town of Wallingford Vernal Pool Study" (September 2002).
Sample survey criteria are included in the appendix of this report.

Once a detailed inventory of vernal pools/wetlands is completed, important planning decisions can be made for protecting these valuable resources. Mapping at 1" = 100 feet at a minimum (1" = 40 feet even better) allows examination of topographic and other factors useful for determining minimum vernal pool buffers. Arbitrary boundaries at set distances, even if the distances seem large, are not necessarily useful criteria for determining buffer boundaries. Soils, vegetation, geology, ground and surface water and relative position of vernal pools, wetlands and other natural features to each other need to be considered when drawing buffer boundaries. In particular, surface and subsurface drainage areas supporting pool hydrology must be considered. Depending on geologic and soil characteristics, these drainage areas can be beyond typically accepted wetland buffer boundaries. When mapping vernal pool locations it is helpful to map the estimated surface and subsurface drainage areas that directly support the pools hydrology.

Vernal pools are particularly useful educational resources (Kalhoun & Klemens, 2002, page 3). When accessing sensitive vernal pool areas by trail, care should be given to minimize "fragmentation" of upland areas around pools. For example, a trail could lead to the edge of vernal pool at a single point instead of circling the entire pool.

Egg masses in pool One (large pool). The first pool observed on the site walk had a very regular, straight definition to the open water area, little emergent vegetation.

e) Watercourses

All areas of human activity –hiking, camping, roads, outhouses, and parking lots should consider buffers between such activity and the watercourse. Furthermore stream buffers should maintain a minimum of 10 feet of natural vegetation (25 feet preferred), except in well defined and properly stabilized access areas. Riparian buffers should maintain a natural mix of ground cover, understory and overstory vegetation.

The initial inventory and subsequent monitoring of vernal pools and their associative wetland and upland areas can be an extremely useful educational tool. Not only to those directly involved with the assessment process, but as a valuable source of information on these resources in general.

Until a thorough science based assessment of wetland and vernal areas is completed it is recommended that no human activity take place within 750 feet of these areas, including trail-building activities.

Support Data for Management Plan Development.

1)
Provide base mapping for entire parcel and include area to 1000 feet beyond property boundary.

Activities adjacent to the managed parcel can have significant direct and indirect impacts. Assessing the resources and land use activities adjacent to the town parcel is essential for proper planning. Adjacent property owners should be given as many opportunities as practicable to participate in the stewardship of nearby public lands.

2)
Use buffers and other pollution prevention techniques to minimize use impacts and use these BMP's as educational opportunities. A few quick examples are given below. A park is an excellent location to utilize conservation measures and to have them designed as educational projects.

Existing higher use areas can be used to demonstrate conservation measures for potential future uses on newly purchased parcels. See below

3)
General conservation planning principles that would apply to development/ use of park open space:

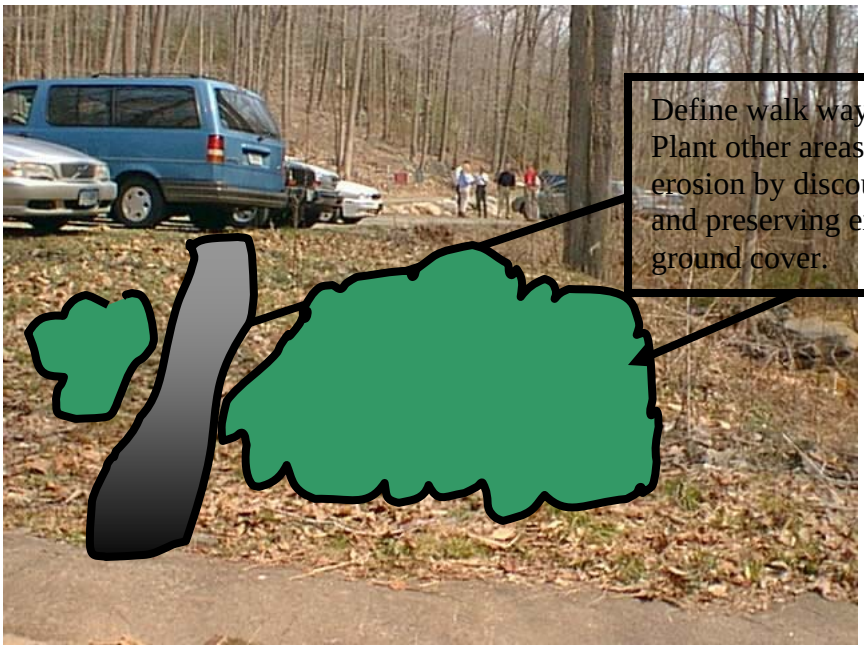
a) Concentrate activities in use areas so as to minimize impact on sensitive resource areas such as wet soils and steep slopes.
b) Concentrate activities so as to minimize fragmentation of natural areas.

c) Define land use intent – preservation areas versus use areas. i.e. – ball fields are not natural areas, while a field mowed once a year might be considered one.

Sites from lower parking area of Webb Mountain Park

Water Quality and Wildlife Habitat Enhancement

Use native vegetation as a buffer between parking area and stream. If visibility of stream is desired, use native groundcover or low shrubs. Define the edge of the parking area to protect buffer plants and to avoid encroachment into buffer area over time. Group vegetation (instead of planting in a straight line) within entire width of delineated area in order to maximize effectiveness of vegetation for preventing sand and other contaminants from entering stream. Parking lot runoff will be filtered, shrubs and trees provide habitat and can be used to control stream pedestrian access points. Larger shrubs and trees provide shade which helps keep water temperatures lower for cold water fish species. Installed buffers should be explained on site as much as possible (signage). Two simultaneous purposes will be served the stream will be buffered and visitors will observe a stream buffer applicable to other locations. Undisturbed natural areas should be maintained wherever possible. Landscaped plantings can then be a buffer between actual use areas and the natural riparian area.



In heavier use areas (foreground is drainage swale from hand pump well to stream), defining the walkway and vegetating other areas discourages de-vegetation through excessive foot traffic and enhances stream buffer for wildlife and stream pollution prevention.
Defining the walkway with a suitable permeable structure prevents foot traffic erosion and can enhance the definition of the pump access route.

Upper park entry road. To protect water quality, a buffer of native plants should be installed between the stream and the paved surface areas. Shrubs and ground cover will minimize direct runoff into stream and prevent erosion. Tall shrub and canopy trees will shade stream and keep water temperature lower.

4)
Limit fragmentation especially in the vernal pool areas where there is currently little or no disturbance.

a) Limit access to vernal pools both in number of pools accessed and by running single trails to a single point of vernal pool edge (no loop trails around or in between pools).
b) Within 750 feet of vernal pools: maintain at least 75 % natural forest and ground cover. Avoid continuous fences, walls or other structures that may impede wildlife migration.

5) Concentrate use in defined limited areas within areas of least habitat value.

6) Follow standards and recommendations in previous ERT and Webb Circle development review.

7) Consider use in terms of site and adjoining sites/linkages.

8) Agriculture land –use agricultural conservation methods including timing field cutting to minimize impact on nesting birds.

9) Develop communication and educational opportunities with adjoining property owners

10) Develop programs that enhance the existing park and newly acquired land that simultaneously address environmental issues on the ground and provide opportunities for participatory educational programs as suggested in below examples. Invite adjoining property owners, as well as other appropriate segments of the public to view and participate in demonstration projects.

Haying should be timed to minimize impact on ground nesting birds.

See:
http://www.massaudubon.org/Birds_&_Beyond/grassland/agricultural.php

Resources

Buffer references:
http://www.candlewoodlakeauthority.org/root.aspx?sess=OWE15QIZ2B3M35RHZCE5

http://www.umass.edu/nrec/onlinedocs.html

Reference for trail construction: http://www.trailbuilders.org/resources/books1.html and

http://gatorsport.phhp.ufl.edu/travel_nature.html

Reference for park management in environmentally sensitive areas (This is from Oregon, but still has applicable data)

http://www.cityofsalem.net/~parks/sensitive_area.htm

Vernal Pool Information:

The Vernal Pool Association: http://www.vernalpool.org/vernal_1.htm

Rhode Island Department of Natural Resources Vernal Pool Site:
http://www.uri.edu/cels/nrs/paton/

Here Today, Gone Tomorrow?
Connecticut's Vernal Pools
A Policy Guide to Ephemeral Wetlands Protection:

http://www.yale.edu/ccws/VPPolicyGuide.pdf

Town of Wallingford Vernal Pool Study
New Haven County Soil & Water Conservation District
K. Casella, M. Kitterridge, A. Cadman
September 2002

Vernal Pool Management Plan for the Chapman Mill Open Space Property, Westbrook, Ct.
December 2004

Connecticut River Coastal Conservation District

Other References

Environmental Review Team Report
Webb Mountain Park
Monroe, Connecticut
November, 1979
Kings Mark Resource Conservation and Development Area

Fairfield County Soil Survey

Soils Map


LAKE
ZOAR
CONRAIL
34
River
Halfway
Brook
Pond
N
R
O
E
Hill
Round
White
Hills
ROUND
HILL
East
Village

Figure 1 - Recreational Potential Impacts for Onsite Soils

Map Unit	Camp areas	Picnic areas	Playgrounds	Paths & Trails
2- Ridgebury fine sandy loam	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness
3- Ridgebury, Leicester & Whitman soils, extremely stony	Severe: wetness, large stones	Severe: wetness	Severe:wetness	Severe:wetness
4- Leicester fins sandy loam	Severe: Wetness	Severe: Wetness	Severe: Wetness	Severe: Wetness
17 –Timakwa & Natchaug (Adrian Muck)	Severe: Wetness, floods, excess humus	Severe: Wetness, excess humus	Severe: Wetness, floods, excess humus	Severe: Wetness, excess humus
18 – Catden & Freetown (Carlisle Muck)	Severe: floods, ponding, excess humus	Severe: ponding, excess humus	Severe: excess humus, ponding , floods	Severe: ponding , excess humus
45B Woodbridge fine sandy Loam 3to 8 percent slopes	Moderate: percs slowly ,large stones	Slight	Moderate: slope, percs slowly, wetness	Slight
46C Woodbridge fine sandy loam , 8 to 15 %	Moderate: percs slowly	Moderate: slope	Severe: slope	Slight
50B Sutton fine sandy loam, 3 to 8 %	Slight	Slight	Moderate: slope, wetness	Slight
73C Charlton –Chatfield complex, 3 to 15 %, very rocky	Moderate: Slope, large stones	Moderate: slope	Severe: slope	Moderate: large stones
73ECharlton –Chatfield complex 15 to 45% slope	Severe: Slope	Severe: slope	Severe: slope	Severe: slope
79E Rock outcrop –Holyoke complex, 3 to 45% slopes	Severe: slope. Large stones	Severe: slope	Severe: slope. Depth to rock, large stones	Severe: slope, large stones
84B Paxton & Montauck fine sandy loams, 3 to 8 % slopes	Moderate: percs slowly	Slight	Moderate: slope, percs slowly	slight
86D Paxton and Montauk fine sandy loams, 15 to 35%slopes, extremely stony	Severe: slope, large stones	Severe: slope	Severe: Slope. Large stones	Severe: large stones

Figure 1A

Camp Areas, Picnic Areas, and Playgrounds

The soils of the survey area are rated in this table according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Somewhat limited indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. Very limited indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in this table can be supplemented by other information, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, saturated hydraulic conductivity (Ksat), and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, Ksat, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, Ksat, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, Ksat, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, Ksat, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, Ksat, and toxic substances in the soil.

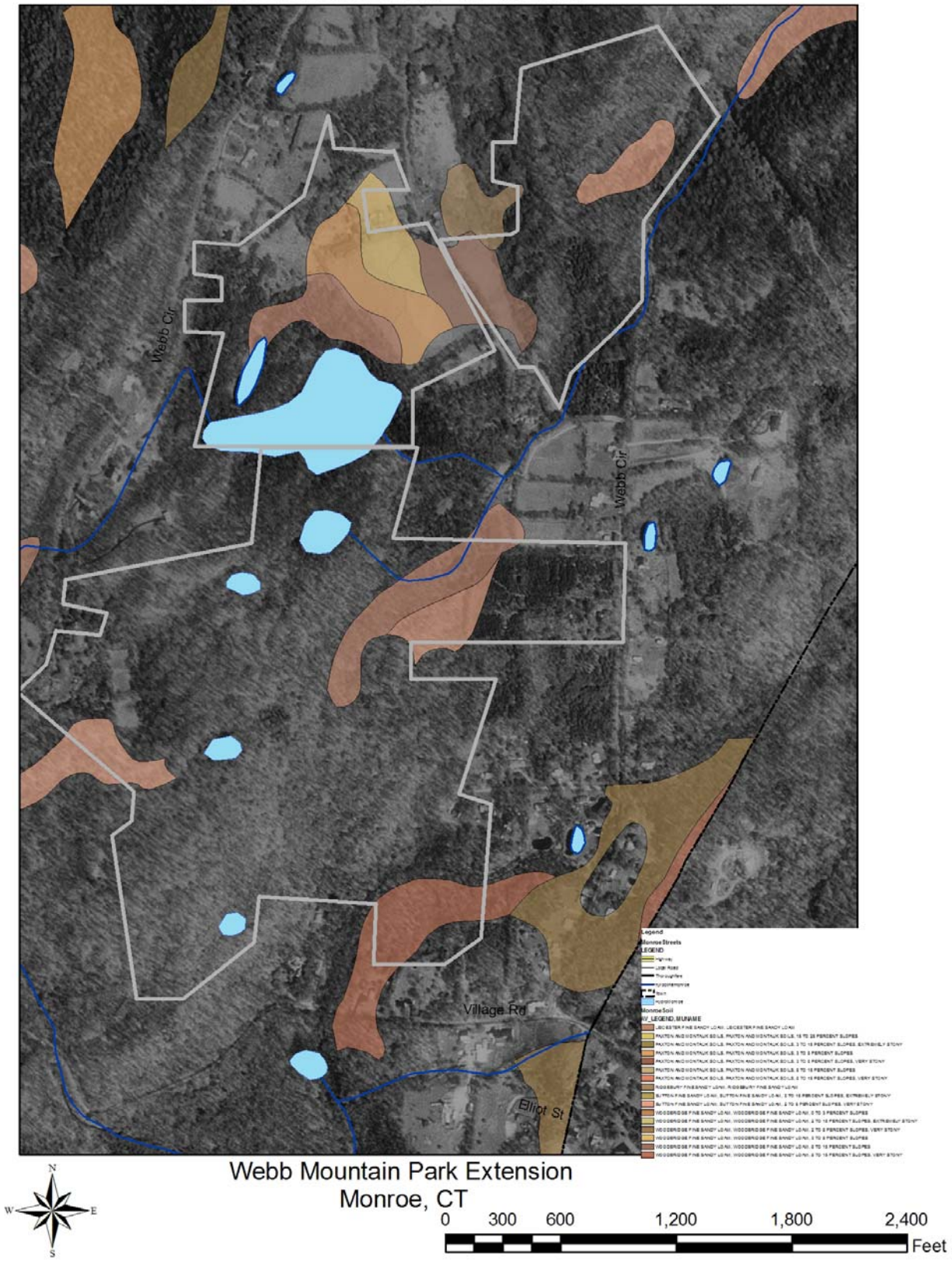
Figure 2 -Woodland Management and Productivity

Map Unit	**Management Concerns**				
	Ordination symbol	Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow hazard
2- Ridgebury fine sandy loam	4W	slight	Severe	Severe	Severe
3- Ridgebury, Leicester & Whitman soils, extremely stony	4X	Slight	severe	severe	severe
4- Leicester fins sandy loam	4W	Slight	Severe	Severe	
17 –Timakwa & Natchaug (Adrian Muck)	5W	Slight	Severe	Severe	severe
18 – Catden & Freetown (Carlisle Muck)	5W	Slight	Severe	Severe	Severe
45B Woodbridge fine sandy Loam 3to 8 percent slopes	3O	slight	slight	slight	Slight
46C Woodbridge fine sandy loam , 8 to 15 %	3O	slight	slight	slight	slight
50B Sutton fine sandy loam, 3 to 8 %	4O	slight	slight	slight	slight
73C Charlton –Chatfield complex, 3 to 15 %, very rocky	4O	slight	slight	slight	slight
73ECharlton –Chatfield complex 15 to 45% slope	4R	slight	Slight	Slight	slight
79E Rock outcrop –Holyoke complex, 3 to 45% slopes	5D	Slight	Moderate	Severe	moderate
84B Paxton & Montauck fine sandy loams, 3 to 8 % slopes	3O	Slight	Slight	Slight	slight
86D Paxton and Montauk fine sandy loams, 15 to 35%slopes, extremely stony	3X	Slight	Moderate	Slight	slight

Soil	Grain & Seed Crops	Grasses & Legumes	Wild Herbaceous plants	Hardwood Trees	Coniferous Plants	Wetland Plants	Shallow Water Areas	Openland Wildlife	Woodland Wildlife	Wetland Wildlife
2	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair
3	Very poor	Very poor	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair
4	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
17	Very poor	Very poor	Very poor	Poor	Poor	Good	Good	Very poor	Poor	Good
18	Very poor	Very poor	Very poor	Poor	Poor	Good	Good	Very poor	Poor	Good
45	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
46	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
50	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
73 c	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
73 e	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
79 e	Very poor	Very poor	Fair	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor
84 b	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
86 d	Very poor	Very poor	Good	Good	Good	Very poor	Very poor	Poor	Fair	Very poor

Figure 3 – Suitable vegetation for the various soil types on site.

Farmland Soils



AQUATIC RESOURCES

Site Description

There is one pond on the 171-acre parcels recently acquired by the Town of Monroe as an extension of Webb Mountain Park. The unnamed pond is approximately 1.25-acres in surface area. Dredge spoils around the pond perimeter indicate that it is artificial in nature, likely being constructed to provide a water supply source for a farm that previously occupied the site. A narrow "shelf" of shallow water (less than 3 feet deep) is found around the pond perimeter; maximum depths could not be estimated, as the water is "tea-stained", that is being stained a translucent brown color from tannins leached from the surrounding oak watershed.

Aquatic vegetation is completely absent on the shallow water shelf around the pond. Such shallow water areas in small ponds, referred to as littoral zones, are colonized by emergent and submergent aquatic vegetation. The vegetation develops on organic material that accumulates over time and is supported by sunlight that penetrates from the water surface to the pond bottom. In review of a time series of historic topographic maps for the Long Hill, Connecticut Quadrangle made available by the University of New Hampshire Library - Government Documents Department [(1)]1, the pond does not appear on a map produced in 1947 but is depicted on a map from 1953. Over the 52^{+}-year time period since its creation, aquatic vegetation should have taken hold around the pond. One possible explanation for the lack of vegetation lies in the fact that watershed of the pond is dominated by oak forest growing on a fairly shallow layer or organic soil. In addition to imparting a brown color to the pond water, the decomposition of oak leaves produces tannic acids. With limited buffering of the shallow soil, the water flowing into the pond can be moderately acidic; the acidity can inhibit aquatic plant growth.

Aquatic Resources

The unnamed pond has the physical characteristics commonly associated with warm-water ponds in Connecticut. Although there were no fish observed during the field review, the species associated with warm-water ponds include bluegill *(Lepomis macrochirus)*, largemouth bass *(Micropterus salmoides)* and golden shiner *(Notemigonus crysoleucas)*. The notable lack of fish can be attributed to tannic acids discharging to the pond from the surrounding forested watershed. Ideally the pH of pond water should range between 6 and 9. Warmwater fish cannot tolerate a pH level below 6 for extended periods. Acidity will increase following rain events or snowmelt.

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1 University of New Hampshire Library – Government Documents Department, Historic USGS Maps of New England and New York, *http://docs.unh.edu/nhtopos/nhtopos.htm*

Mitigative Recommendations

Maintaining the site as an open space addition to Webb Mountain Park will best preserve the physical characteristics of the unnamed pond. Should there be future land use change on the parcel, it is imperative that vegetated buffers be maintained around the pond. The buffer should have a minimum width of 100 feet. Buffers absorb surface runoff, and the pollutants they may carry, before they enter wetlands or surface waters.

An assessment of the unnamed pond's living resources (i.e. fish, macroinvertebrates, amphibians) and water quality (pH being of immediate concern) should be conducted as an initial step in determining future management of the waterbody. Such an assessment could be incorporated into the biological science based curriculum of the local school system or be completed by an intern(s) as an independent educational project. Based on the findings of such an assessment, and if desired by the Town of Monroe, the Inland Fisheries Division can then assist in developing fish management guidelines.

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data base maps and files concerning the project area have been reviewed. According to our information, there are known extant populations of *Terrapene carolina carolina* (eastern box turtle) a state species of special concern that occur in the vicinity of the project site.

Eastern box turtles require old field and deciduous forest habitats, which can include power lines and logged woodlands. They are often found near small streams and ponds, the adults are completely terrestrial but the young may be semi aquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year.

If Eastern box turtle habitat exists on the proposed site, the Wildlife Division recommends that a herpetologist familiar with the habitat requirements of this species conduct surveys between April and September to see if they are present. A report summarizing the results of such surveys should include habitat descriptions, reptile species list and a statement/resume giving the herpetologist's qualifications. The DEP doesn't maintain a list of qualified herpetologists. A DEP Wildlife Division permit may be required by the herpetologist to conduct survey work; you should ask if your herpetologist has one. The results of this investigation can be forwarded to the Wildlife Division and, after evaluation, recommendations for additional surveys, if any, will be made.

Please be advised that the Wildlife Division has not made a field inspection of the project nor have we seen detailed timetables for any work to be done. Should state permits be required or state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested.

Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments.

Natural Diversity 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 Environmental & Geographic Information 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.

FOREST RESOURCES

The study area totals 171 acres of which 163 acres are forested. Open fields and a one-acre pond take up the remaining eight acres.

A forest reconnaissance was made on the area. This process entails laying out the boundaries of the area on a recent aerial photo, dividing the forest cover into stands, visiting each stand and noting the forest vegetation that occurs there. Along with the vegetation, other physical characteristics of the property such as aspect, slope, terrain, drainage, accessibility from roads, limits to the operability of equipment, and the evidence of past management activity is noted. The reconnaissance is the prelude to conducting a forest inventory. A certified forester would use the data from that inventory to develop a forest management plan.

It is recommended that the Town of Monroe enlist the services of a certified forester to conduct a forest inventory and develop a forest management plan for the portions of the study area that lend themselves to active forest management. The locating and marking of the boundaries of the property would be the minimum level of forest management.

Forest Cover Type Descriptions

The forested portion of the study area can be broken down into five forest cover types: red cedar/white pine, old plantation, mixed hardwood dry site, mixed hardwood wet site, and old field (see Forest Cover Map).

1. **Red Cedar/ White Pine:** This type occupies a total of five acre of scattered stand of pole-sized red cedar and white pine growing in former pastures. Also present are mixed hardwood saplings and poles of black birch, red maple, and white ash. The understory is comprised of Japanese barberry and multiflora rose. The red cedar and white pine should be maintained for the benefit of having conifer cover in a property that is predominately mixed hardwood.

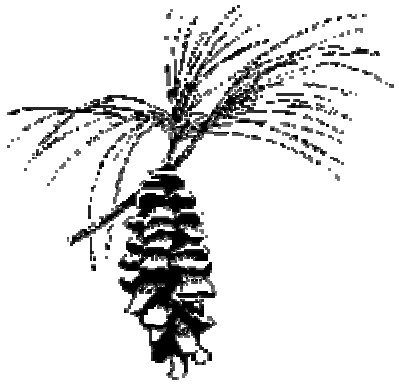
2. **Old Plantation:** This type is located west of Webb Circle and north of Blakeman Drive. The seven acres occupied by this type appear to be an abandoned tree nursery. Tree species planted are yews, white pine, Scotch pine, black walnut, Chinese chestnut, and flowering dogwood. Tree species that have seeded in amongst the plantations are aspen, white ash, black birch, and red maple. Trees range in size from saplings to small sawtimber. Shrub species present are multiflora rose and Japanese barberry. Vine growth in the stand is comprised of grape and poison ivy. As in Type One, the conifer plantations should be maintained for the diversity they add to the forest cover.

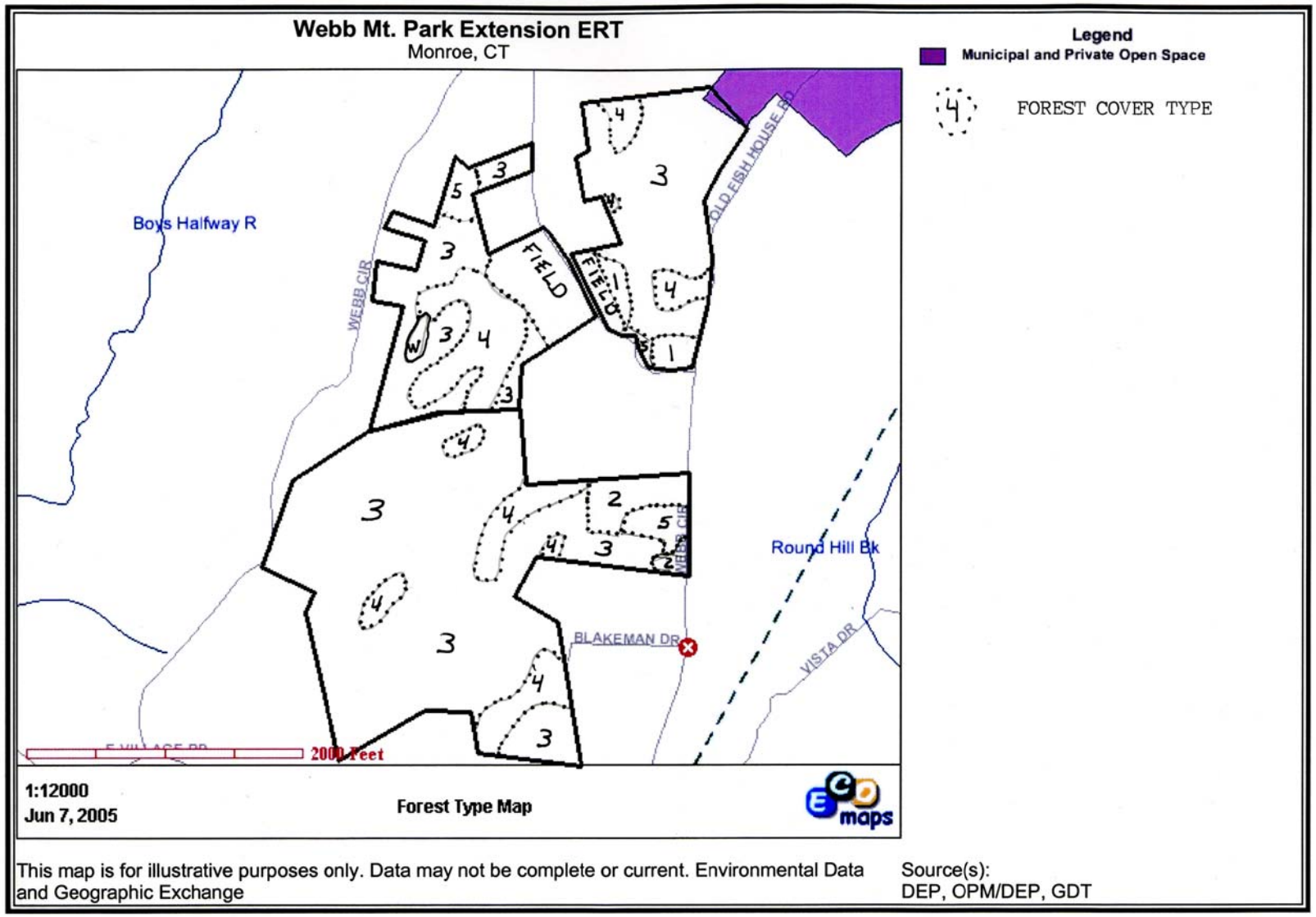
3. **Mixed Hardwood Dry Site:** This type covers approximately 137 acres and is the predominant cover type on the study area. The pole and sawtimber sized mixed

hardwood trees present are white ash, beech, black birch, black cherry, hickory, red maple, sugar maple, yellow poplar, black oak, red oak, chestnut oak, scarlet oak, and white oak. Softwood trees present are scattered hemlock poles. Hemlock saplings, and shrub species such as mountain laurel, spicebush, winterberry, and witch hazel occupy the lower canopy. The extent and occurrence of certain groups of hardwood species are influenced by the soils' moisture availability and it's depth to bedrock. On shallow, dry soils, species such as black oak, chestnut oak, scarlet oak and hickories will dominate along with a mountain laurel understory. On soils that are deeper and have more moisture, species such as white ash, beech, black birch, black cherry, sugar maple, red maple, yellow poplar, red oak, and white oak will dominate. The understory will contain shrub species such as spicebush, winterberry, and witch hazel. There is evidence of timber harvest activity within the last 10 years in the southern portion of the study area. It appears that the forest stand was "hi-graded", that is the most valuable sawtimber trees were removed. This type is suitable for active forest management due to its established access, the forest cover type, and its operable soils.

4. **Mixed Hardwood Wet Site:** This type occupies approximately 14 acres of the study area in patches scattered throughout. This type occurs on soils that are poorly drained or have seasonally high water tables. Tree species found in this type are white ash, black gum, red maple, scarlet oak, and swamp white oak. Shrubs found in this type are buttonbush, highbush blueberry, clammy azalea, and spicebush. The soils' poor drainage and high water table restricts active forest management activities.

5. **Old Field:** This type occurs in three patches totaling five acres of the study area. These stands are former agricultural lands that have been abandoned within the last 10 years. Tree species found in this type are red cedar, white pine, and apple. The tree sizes range from pole to sawtimber and have a scattered occurrence. Tree seedlings of white ash, red maple, black birch, sugar maple, and aspen are invading the open areas of the field. Shrubs species present are Japanese barberry, autumn olive, multiflora rose, and gray-stemmed dogwood. These shrubs form scattered thickets. Vine species present are grape, poison ivy, and oriental bittersweet. This type should be maintained for the beneficial wildlife cover it provides.




Webb Mt. Park Extension ERT
Monroe, CT
Legend
Municipal and Private Open Space
FOREST COVER TYPE
Boys Halfway R
WEBB CIR
FIELD
FIELD
OLD FISH HOUSE RD
Round Hill Bk
BLAKEMAN DR
VISTA DR
2000 Feet
1:12000
Jun 7, 2005
Forest Type Map
This map is for illustrative purposes only. Data may not be complete or current. Environmental Data and Geographic Exchange
Source(s):
DEP, OPM/DEP, GDT

ARCHAEOLOGICAL AND HISTORICAL REVIEW

A review of the state of Connecticut's archaeological site files and maps show no known archaeological resources in the proposed park extension area, however, topographic and environmental characteristics of the land suggest a high sensitivity for undiscovered cultural resources. These potential sites would be associated with the terraces adjacent to the wetland areas and represent the seasonal camps of Native American hunters-gatherers utilizing the natural resources of the area.

Passive trail development may allow for interpretive landscapes of potential cultural use including the town's farming history. An archaeological reconnaissance survey for the project area may identify, evaluate and manage all cultural resources for educational and research purposes. The Office of State Archaeology would recommend a survey if any land use activities at the park should affect below-ground resources. In lieu of ground disturbances, no action need be taken except to develop possible educational opportunities.

RECREATION PLANNER REVIEW

This review addresses two properties (Webb Mountain Extension and Webb Circle Property) which both expand the existing Webb Mountain Park and serve to link this park with Aquarion Water Company holdings. The original park property basically consists of a very scenic, deep valley along an unnamed brook tributary to Round Hill Brook. Its main features include a number of campsites, rare in this part of Connecticut, and a number of hiking trails including a stretch of the Paugusset Blue Trail.

The adjoining Webb Mountain Extension is split by Webb Circle (road) and can be described as follows:

a. An eastern segment which is a southerly extension of the Rocky Ridge bordering on the west the brook flowing through Webb Mountain Park.

b. A western section including a maintained hayfield along the road plus wooded rear acreage containing conservable wetland, vernal pools, and a small pond.

The other property considered is the Webb Circle property which provides the linkage between the Webb Mountain extension above & the Aquarion Holdings. It is a hummocky wooded area containing a mix of ledge and wetland offering opportunity for access off Webb Circle.

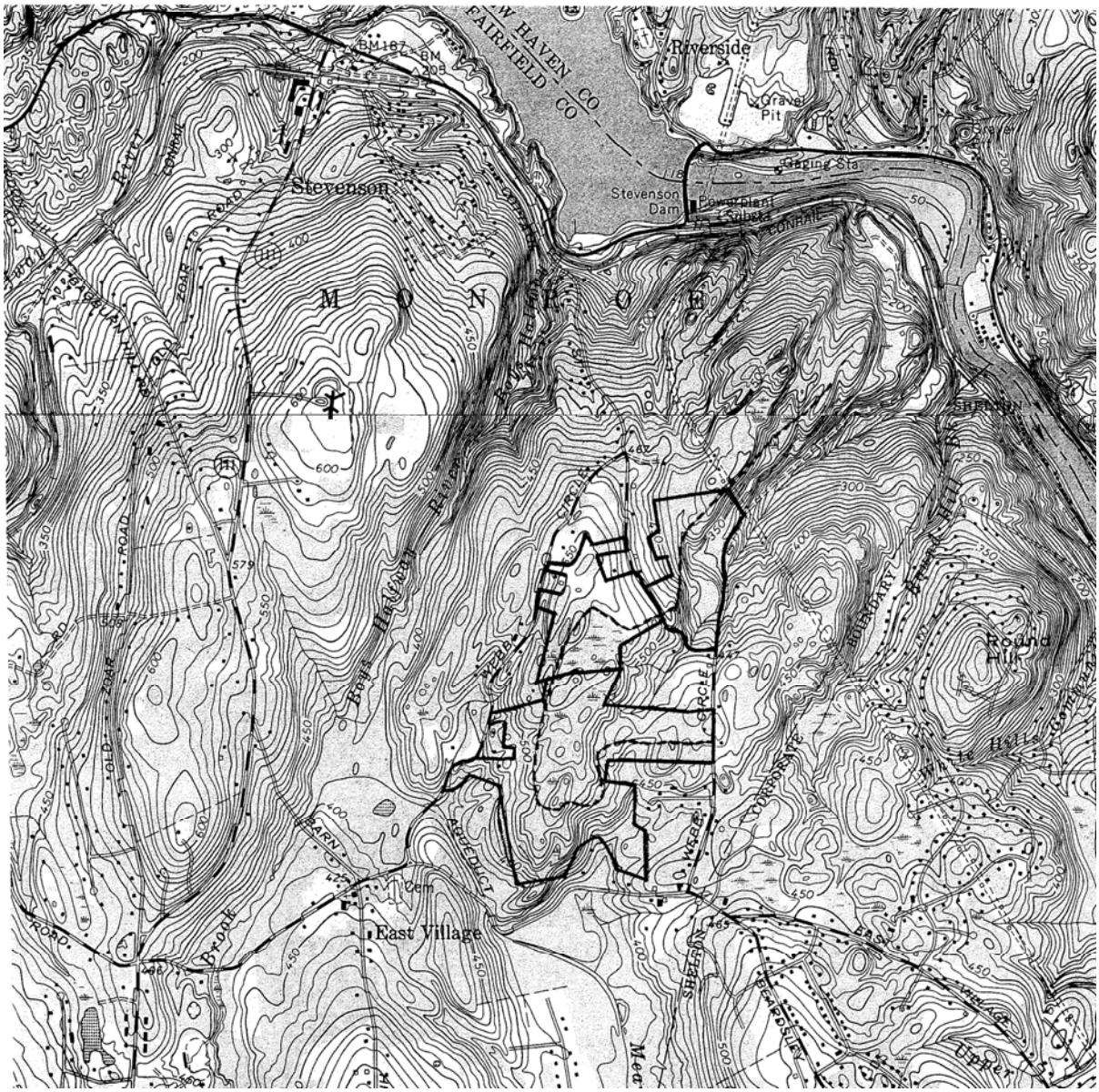
Based upon the physical character of these properties and the reported town management goals, the overall management philosophy should be focused on preservation combined with low intensity public use such as hiking and environmental education. Specific management recommendations include development of additional hiking opportunity as indicated schematically on the following map, including a ridge walk leading from Webb Mountain Park to Webb Circle, skirting the hayfield on its southern edge, following a bony ridge south and around the Webb Circle property, ending at a suggested small parking lot on Webb Circle.

A second management recommendation is to maintain the existing hayfield as an attractive visual counterpoint to the surrounding woodland. This can be accomplished either through continued lease through a local farmer or if necessary through contracted mowing.

A final recommendation is to determine appropriate uses and to provide signage and enforcement as needed. Both hunting and motorized off road usage have occurred in this area and are likely to continue unless the existing management vacuum is filled effectively.

Schematic of Additional Hiking Trail

- - - - - Possible Trail Route



ENVIRONMENTAL EDUCATION

Webb Mountain Park Extension has great potential for use by environmental, middle and high school classes, environmental clubs and youth groups (scouts, 4H, etc.). Education specialists for decades have realized that the experience of nature is necessary for children's physical, cognitive and emotional development. Education specialists, environmental psychologists and child psychologists have recognized the need for children to have "direct contact" with their natural world. Stephen R. Kellert (2002) suggests that although there are positive aspects to organized programs and mass communications exposure to the natural world, these are not adequate substitutes for diminished direct encounters with nearby and familiar natural environments.

In 2005, Richard Louv writes in his book *Last Child in the Woods, Saving Our Children from Nature Deficit Disorder* that our children today are the first generation to be raised without meaningful contact with the natural world. In one study, only 40 percent of rural children reported they had ever spent more than half an hour in a wild place, and less than 20 percent of urban children have seen wildlife in a natural setting (Nabhan and Trimble 1998). Between 1981 and 1997, the amount of time children ages 6 to 8 in the U.S. played decreased 25%, by almost four hours per week, from 15 hours a week to 11 hours and 10 minutes. During the same period, the time they spent in school increased by almost 5 hours (Hofferth & Sandberg 2000). With children's access to the natural world becoming increasingly limited, **schools, where children spend 40 to 50 hours per week, may be our last opportunity to reconnect children with the natural world** and create a future generation that values and preserves nature (Herrington & Studtmann 1998, Malone & Tranter 2003).

Webb Mountain Park can serve as the area where our children can have a meaningful experience in a natural setting. The forest, fields, streams, and vernal pools are habitats that can be studied. Long-term research plots can be established to investigate the gradual succession that is occurring.

If you are going to work with the schools you should be aware of where the use of Webb Mountain fits into the school curriculum and then programs can be developed accordingly. The Department of Education web site www.state.ct.us/sde/dtl/curriculum/ has all the curriculum frameworks.

At the end of this section, after reviewing the Core Science Curriculum Framework, this Team member has copied those that best apply to the use of a natural area. The "**Core Science Curriculum Framework** articulates the main conceptual themes and content standards that **all** students are expected to learn in their elementary, middle and high school science classes. Further, the framework describes the specific performances that will be assessed on the statewide science assessments."

Although this Team member has highlighted science this site could also be utilized as an extension to the classroom for hands-on learning in math, art, music, language arts and social studies as well.

Steps that need to be taken to insure success:

1. Provide an orientation for children, teachers, scout leaders, administrators, parents and the community on the present site and possible future plans. This will enable you to know what resources are available to assist you and realize any potential roadblocks.

- **Develop a plan and invite people to a Saturday morning gathering to review and comment. Be sure to have food available and large sheets of paper around the room inviting people to comment or provide resources on various topics. Example of topics: Sources of Funding (Grants, In-Kind Donations).**

2. Encourage other organization to become involved. The more people involved – the less potential for vandalism. The visitors will become the eyes and ears for security.

- **If vandalism does occur be prepared to clean-up, as soon as possible.**

3. Offer hands-on workshops highlighting how to use the site to teach what is already in the curriculum or scout manual. Do not expect the teachers to embrace the idea if it adds to their already overloaded schedule. Also, you do not need to take the time to develop new activities many can be tailored to the site that have already been written.

- **The Department of Environmental Protection's Kellogg Environmental Center is available to conduct hands-on, interdisciplinary workshops. Workshops can be offered focusing on the national curricula** Project Learning Tree, Project WILD**,** Aquatic WILD, Project Food, Land & People**,** Project WET **(Water Education for Teachers), and** Classroom FeederWatch **or a combination of the above. To obtain any of the** national **curricula individuals must attend a workshop; other materials can be purchased directly e.g. WOW The Wonders of Wetlands.**

Project WILD is one of the most widely used conservation and environmental education programs among educators of students in kindergarten through high school. Project WILD is based on the premise that young people and educators have a vital interest in learning about our natural world.

The program emphasizes wildlife because of its intrinsic and ecological values, as well as its importance as a basis for teaching how ecosystems function. In the face of competing needs and pressures affecting the quality and sustainability of life on earth, Project WILD addresses the need for human beings to develop as responsible citizens of our planet.
Contact DEP's Kellogg Environmental Center, (203) 734-2513
www.dep.state.ct.us/educ/kellogg
www.projectwild.org

Project Learning Tree® (PLT) is an award winning, broad-based environmental education program for educators and students in PreK - grade 12. PLT helps students learn HOW to think, not WHAT to think, about the environment. PLT, a program of the American Forest

Foundation, is one of the most widely used environmental education programs in the United States and abroad.

> PLT materials bring the environment into the classroom and students into the environment. The program covers topics ranging from forests, wildlife, and water, to community planning, waste-management and energy.

Contact DEP's Kellogg Environmental Center, (203) 734-2513.
www.dep.state.ct.us/educ/kellogg
www.plt.org

Food, Land & People's science- and social sciences-based curriculum, *Resources for Learning*, currently serves Pre-K to 12th grade students throughout the United States. The curriculum consists of 55 hands-on lessons, developed and tested by more than a thousand educators. The subjects range from environmental science and stewardship ("Don't Use It All Up!") to human populations and land use issues ("What Will the Land Support?")
Contact DEP's Kellogg Environmental Center, (203) 734-2513.
www.dep.state.ct.us/educ/kellogg
www.foodlandpeople.org

Project WET **(Water Education for Teachers)** explores people's relationships to water. The 516-page curriculum guide is full of activities that are hands-on, easy to use and fun! Activities incorporate a variety of learning formats, such as large and small group learning, whole body activities and laboratory investigations. The WET curriculum itself covers the full spectrum of water-related topics and concepts, from water's role in the social and cultural contexts of our lives to its existence as a managed resource and an essential ingredient of life throughout all Earth systems. These activities promote critical thinking and problem solving skills.

Contact DEP's Kellogg Environmental Center, (203) 734-2513.
www.dep.state.ct.us/educ/kellogg

Classroom FeederWatch has students across the country watching and counting winter feeder birds such as Northern Cardinals, Black-capped Chickadees and Downy Woodpeckers and reporting their results to the Cornell Lab. of Ornithology. Some classes even write their own scientific article about their own results and get published in Cornell's newsletter "Classroom Birdscope." The Kellogg Environmental Center provides teacher training for this integrated science project and curriculum.
Contact DEP's Kellogg Environmental Center, (203) 734-2513.
www.dep.state.ct.us/educ/kellogg
http://birds.cornell.edu/cfw

PROJECT SEARCH
Project SEARCH is a water quality monitoring and aquatic studies program for high schools. It was designed to encourage systemic change in the teaching of science and mathematics. The project is administered by Science Center of Connecticut and the Connecticut

Department of Environmental Protection. The data that SEARCH students collect from local rivers and streams are submitted to the Department of Environmental Protection and municipal officials. While generating useful information, students learn important lessons in Earth Science, Environmental Science, Biology, Chemistry, Geography and Mathematics. They also gain an opportunity to use state of the art field techniques in the collection and interpretation of scientific data.

- **DEP's Environmental Education Staff and other environmental organizations can present many other environmental workshops. It is recommended having at least part of the workshop held on-site for a variety of reasons. It will increase their familiarity and confidence and if they aren't able to bring their students to the site, they might bring their families at a later date. To find out more about workshops or to arrange a workshop contact DEP's Kellogg Environmental Center, (203) 734-2513. www.dep.state.ct.us/educ**

- **Also there are many** school **programs that are available that can be conducted at Webb Mountain.**

School Programs:

Testing the Waters
What factors affect the quality of one of our most precious resources?
Students identify the environmental stresses on a pond habitat. Through macroinvertebrate identification and analysis, the students classify the health of a pond ecosystem.

Understanding Watersheds
While waterways have shaped civilization, what impacts do people have on water and watersheds?
Investigate local watersheds to see how water use and health issues changed from the 1800's to today. Hands-on and critical thinking activities allow students to track water as it moves through the environment, our homes and living systems.

Habitat Investigations
Why do we need to preserve so much open space?
How are habitats defined and what are the limiting factors for wildlife in occupying them? Students investigate and map habitats; classify habitats based on soil, plant and animal surveys; and then identify land use options and preservation issues.

Connecticut Wildlife: Past, Present and Future
What challenges do wildlife managers face?
A wildlife biologist must have knowledge of animals and their needs and be able to balance these with human growth. Using maps, simulations and population surveys, students apply basic principles of wildlife management to current issues facing Connecticut.

Mapping our Landscape
How can we learn about Connecticut's landscape through maps?

Students will gain map skills and be introduced to the basics of compass reading. By investigating maps students will determine how historical land use has shaped Connecticut's present landscape and their communities.

Connecticut Treasures
What are Connecticut's special natural resources?
Select one natural history topic for your field study experience. Learn methods of identification and explore current issues within the state.

Endangered Species
Animal Tracks
Birds
Mammals
Insects
Wildlife Taxonomy
Food Chains
Forestry
Forest Ecology
Plant Life
Seasonal Nature Explorations
Geology

Amphibian Monitoring Project
Students learn the life histories of Connecticut's amphibians and apply that knowledge to surveying amphibians in a wetland within or near the school. Amphibian species diversity, density and species frequency are determined and the results are shared with the DEP and the local Conservation and Inland Wetland Commissions. Grades 7-12.

Vernal Pools
Students locate and study a local vernal pool throughout the fall and spring. Evidence is collected to document the area as a vernal pool and a report is submitted to the DEP and the local Inland Wetland and Conservation Commissions. Grades 7-12.

Scouts:

You can offer "Badge Days" for Girl Scouts. Girl Scouts, CT Trails Council, Inc., 20 Washington Ave., North Haven, CT 06473-2343 1-800-922-2770

Boy Scouts of America also have Soil & Water Conservation, Fishing and Environmental Science Merit Badges that they can work on. To receive a copy of the merit badge pamphlets contact: Direct Mail Center, P.O. Box 900, Pineville, NC 28134-0909, and-1-800-323-0732. 1-800-323-0732

4. Encourage the teachers to develop lesson plans using the site after providing them with suggested activities that have already been developed and tested.

5. Visit local nature centers and environmental organizations to see what they have incorporated into their trails.

- **CT Forest & Park Association, 16 Meriden Rd., Middlefield, CT**
- **DEP's Sessions Woods Wildlife Management Area, Route 69, Burlington, CT**
- **CT Audubon Society maintains the following sites:**

Edward Steichen Memorial Wildlife Preserve (54-acres)
Chestnut Woods Road, Redding
Huckleberry Swamp, as those who frequent it fondly call this preserve, consists of 54-acres. A boardwalk crosses over the swamp and a trail meanders through the upland. An ecological survey made in cooperation with the Yale School of Forestry and Environmental Studies was completed in 1976. A copy can be obtained by calling the CAS Office in Hartford, 860-527-8737.

Roy and Margot Larsen Wildlife Sanctuary (154-acres)
(Adjoining the CAS Center at Fairfield)
2325 Burr Street, Fairfield
One of the most actively used sanctuaries; the property features streams, ponds, forest and fields which are managed for their diverse plant and animal communities. Seven miles of excellent trails and boardwalks with interpretive signage crisscross the sanctuary. A trail with wheelchair access is being constructed for disabled visitors. A self-guiding brochure is available at the Center. There is a nominal admission fee for non-members and non-residents of Fairfield.

6.Establish a resource library at the school so all teachers have access to the information. If you have the technology available to you set-up an e-group for exchange of information among the teachers. (See below)

Recommended Resources

WOW! THE WONDERS OF WETLANDS, an Educator's Guide. Watercourse, Environmental Concern. Comprehensive guide for anyone teaching about wetlands. Features 330 pages of information and activities for grades K-12. The first 70 pages feature discussions on how people have historically interacted with wetlands; how wetlands are defined; their global distribution; physical/hydrological, chemical, biological and socioeconomic benefits of wetlands; wetland plants, animals, and general ecology. Modern management options, including restoration, enhancement, and acquisition are covered along with a special section to help teachers organize field trips, prepare student checklists, and compile a basic wetlands sampling kit. The next 250 pages consist of dozens of clearly written activities for the field and classroom. Over 50 activities are organized into sections covering wetland definitions, wetland plant and animal communities, water quality and supply issues, soil factors, human factors, and suggestions for getting involved in wetland stewardship. Each activity features clear headings detailing grade levels, subject areas covered, duration, student skills, materials needed, field or lab procedures, and appropriate assessment techniques. Building your own wetland? This book offers a special appendix on creating a schoolyard wetland habitat. A goldmine of information and new activities at a very reasonable price! #WATER-4108. $16.95.

SIGNS, TRAILS AND WAYSIDE EXHIBITS, Connecting People and Places. Trapp, Gross, Zimmerman. Are you developing interpretive panels or trail kiosks for your facility? If so, then this guide will show you the way! “How-to” suggestions for building signs and exhibits that effectively translate both the content and the spirit of a location to visitors. Chapters on design basics, wayside exhibits, the message, sign fabrication, trails - corridors to adventure, trail construction and maintenance, trail interpretation, and resources. Glossy color photographs and fine black-and-white line drawings demonstrate creative techniques that will give your facility high visibility! #IN-1102. $19.95.

THE BUTTERFLY BOOK, an Easy Guide to Butterfly Gardening, Identification and Behavior. Stokes & Williams. Complete reference includes sample butterfly garden plans, lists of plants that attract butterflies, "how-to" section on raising butterflies, descriptions of 63 species supplemented by over 140 color photographs. Useful resource section lists butterfly societies, books, public displays, etc.
#INV-494. $12.95.

EVERYTHING YOU NEVER LEARNED ABOUT BIRDS: Lore & Legends, Science & Nature Hands-on Projects. Rupp. Children ages 9 and up will be fascinated by the lore and activities in this unusual book. Regardless of how many bird books you have, this one will not duplicate anything else on your bookshelf! #BIRD-4226. $14.95.

HOMES FOR WILDLIFE, A Planning Guide for Habitat Enhancement on School Grounds. Wyzaga. This fine resource from Project H.O.M.E. (Habitat: Opportunities for Management and Education) offers hands-on learning as students design and carry out plans for improving wildlife habitat. Provides step-by-step procedures for assessing and mapping an area, developing and implementing a plan, and following the changes that ensue. Originally developed by the New Hampshire Fish and Game Department, this fine resource extends the superb concepts and activities found in Project Wild curricula. Engaging activities and worksheets are found throughout this exceptional resource. Grades K-6. Three-hole punched, unbound. #B-5668. $18.95

WILD School Sites
A Guide to Preparing for Habitat Improvement Projects on School Grounds

This guide helps students and teachers learn about the importance of biodiversity, understand the basic steps of creating a wildlife habitat, develop a plan for action and gain community support. The purpose of this guide is to assist educators and their students in taking responsible action to improve their communities for people and wildlife, beginning on their school grounds.
To order contact: www.projectwild.org

PROJECT SEASONS, Hands-on Activities for Discovering the Wonders of the World.
Parrella, Smith.
A fine collection of interdisciplinary, hands-on activities and teaching ideas for elementary educators. Using the school year seasons of fall, winter and spring, this book integrates science, agriculture and environmental science themes, showing relationships and interconnections. Each section contains activities and extension projects, background

information and exhibit ideas. Perfect for outdoor educators, teachers, camp leaders and parents. Developed by the staff of Shelbourne Farms, an exemplary environmental education center in Vermont. #EE-6147. $24.95.

THE BUTTERFLY BOOK, A Kid's Guide to Attracting, Raising, and Keeping Butterflies. Hamilton. Color pictures and descriptions of butterfly biology, ecology and behavior. Useful tips on attracting butterflies as well as techniques for observing and raising them from eggs or caterpillars. Perfect introduction to butterflies for children ages 5-9. #INV-5285. $ 8.95

Greening School Grounds: Creating Habitats for Learning, Tim Grant and Gail Littlejohn, (eds), 2001, Toronto: Green Teacher, 144 pages, 8 1/2 " x 11". ISBN 0-86571-436-3. Grades K-12, $16.95
Schoolyard “greening” is an excellent way to promote hands-on, interdisciplinary learning through projects that benefit schools and increase green space and biodiversity in communities. In this new anthology from *Green Teacher* magazine, readers will find step-by-step instructions for numerous schoolyard projects, from tree nurseries to school composting to native-plant gardens, along with ideas for enhancing learning by addressing the diverse needs of students. Among more than a dozen schoolyard habitat options presented, the guide includes detailed articles on rooftop gardens, far-north gardens, desert gardens, butterfly gardens, ponds and prairie restorations. For project planners, there are practical tips on minimizing vandalism, maximizing participation and raising funds. And for teachers, there are dozens of outdoor classroom activities and curriculum links, a bibliography of learning resources, and up-to-date listings of funders and training organizations. *Greening School Grounds* is a compendium of the best schoolyard greening articles and activities from *Green Teacher*.

CT Department of Environmental Protection Wildlife Division
Informational Series Fact Sheets
http://www.dep.state.ct.us/burnatr/wildlife/pdf.htm#HSFact

CT DEP Macroinvertebrate Field Identification Cards
http://www.dep.state.ct.us/wtr/volunmon/rbvcards.pdf
Each organism has distinct shape, structure, color, or behavior and provides key ecological information about the stream environment. Each card lists the common name across the top and the category at the bottom. These bands are color-coded based on the ecology of each organism.

Tracking and the Art of Seeing: How to Read Animal Tracks and Sign, Paul Rezendez ISBN# 0-944475-29-9 $19.95

Amphibians and Reptiles in Connecticut, Klemens, Michael W. A checklist with notes on conservation status, identification and distribution. CT Department of Environmental Protection, Bulletin # 32, $11.95

Stokes Guide to Amphibians and Reptiles, Tyning, Thomas F., What to look for and how to interpret what you see when you observe amphibians and reptiles in their natural habitats.

ISBN # 0-316-81713-9, $14.95

Peterson First Guides **are simplified versions of the famous Peterson Field Guides. Peterson First Guides include:** Astronomy • Birds • Clouds & Weather • Dinosaurs • Fishes • Insects • Mammals • Reptiles and Amphibians • Rocks and Minerals • Seashores • Shells • Solar System •Wildflowers **$4.95**

The Tree Identification Book, Symonds, George W.D., Pictorial Key ISBN 0-688-05039-5 $17.95

A Guide to Common Freshwater Invertebrates of North America
by J. Reese Voshell, Jr., illustrated by Amy Bartlett Wright
This book provides substantive information in non-technical language for about 100 of the most common groups of invertebrates found in the inland waters of North America.

The Geography of Childhood: Why Children Need Wild Places
Gary Paul Nabhan
(Beacon Press)
In this unique collaboration, naturalists Gary Nabhan and Stephen Trimble investigate how children come to care deeply about the natural world. They ask searching questions about what may happen to children denied exposure to wild places - a reality for more children today than at any time in human history. The Geography of Childhood draws insights from fields as various as evolutionary biology, child psychology, education, and ethnography. The book urges adults to rethink our children's contact with nature.

Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations. Kahn, Peter H., Jr. and Kellert, Stephen R. (2002). Cambridge: The MIT Press.

Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder. Louv, Richard (2005). Chapel Hill: Algonquin Books of Chapel Hill.

On-Line Field Guide
www.enature.com

Sources of Supplies and Field Guides
Delta Education
www.delta-education.com

Acorn Naturalists
www.acornnatralists.com

Enhancing Your Backyard Habitat for Wildlife
by Peter Picone
State of Connecticut DEP
Bureau of Natural Resources Wildlife Division
Sessions Woods W.M.A.
PO Box 1550
Burlington, CT 06013
email: peter.picone@po.state.ct.us

Core Science Curriculum

DEVELOPMENTAL ORGANIZATION
OF CORE SCIENCE CURRICULUM FRAMEWORK

PreK-2: Development of *wonder* about the natural world and the ability to observe, describe and apply basic process skills

Grades 3-5: Development of *descriptions* of basic natural phenomena and the ability to perform simple experiments and record accurate data

Grades 6-8: Development of basic *explanations* for natural phenomena, and the ability to ask good questions and apply experimental procedures to collect and analyze data

Grades 9-10: Development of *interest* in global issues and the ability to collect, analyze and use data to explore and explain related science concepts

PreK-Kindergarten Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Heredity and Evolution – What processes are responsible for life's unity and diversity? **K.2 - Many different kinds of living things inhabit the Earth.** ♦ Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli.	**A 1.** Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans). **A 2.** Describe the similarities and differences in the appearance and behaviors of adults and their offspring. **A 3.** Describe characteristics that distinguish living from nonliving things.

Grade 1 Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **K.3 - Weather conditions vary daily and seasonally.** ♦ Daily and seasonal weather conditions affect what we do, what we wear and how we feel.	**A 4.** Describe and record daily weather conditions. **A 5.** Relate seasonal weather patterns to appropriate choices of clothing and activities.
Structure and Function – How are organisms structured to ensure efficiency and survival? **1.2 - Living things have different structures and behaviors that allow them to meet their basic needs.** ♦ Animals need air, water and food to survive. ♦ Plants need air, water and sunlight to survive.	**A 6.** Describe the different ways that animals, including humans, obtain water and food. **A 7.** Describe the different structures plants have for obtaining water and sunlight. **A 8.** Describe the structures that animals, including humans, use to move around.
Structure and Function – How are organisms structured to ensure efficiency and survival? **1.3 - Organisms change in form and behavior as part of their life cycles.** ♦ Some organisms undergo metamorphosis during their life cycles; other organisms grow and change, but their basic form stays essentially the same.	**A 9.** Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis. **A 10.** Describe the life cycles of organisms that grow but do not metamorphose.

Grade 2 Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Structure and Function – How are organisms structured to ensure efficiency and survival? **2.2 - Plants change their forms as part of their life cycles.** ♦ The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal.	**A 11.** Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds. **A 12.** Explore and describe the effects of light and water on seed germination and plant growth.
The Changing Earth – How do materials cycle through the Earth's systems? **2.3 - Earth materials have varied physical properties which make them useful in different ways.** ♦ Soils can be described by their color, texture and capacity to retain water. ♦ Soils support the growth of many kinds of plants, including those in our food supply.	**A 13.** Sort different soils by properties, such as particle size, color and composition. **A 14.** Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.

Grade 3 Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Heredity and Evolution – What processes are responsible for life's unity and diversity? **3.2 - Organisms can survive and reproduce only in environments that meet their basic needs.** ♦ Plants and animals have structures and behaviors that help them survive in different environments.	**B 1.** Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats. **B 2.** Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.

The Changing Earth – How do materials cycle through the Earth's systems? **3.3 - Earth materials have different physical and chemical properties.** ♦ Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used.	**B 3.** Describe the physical properties of rocks and relate them to their potential uses. **B 4.** Relate the properties of rocks to the possible environmental conditions during their formation.

Grade 4 **Core Themes, Content Standards and Expected Performances**	
Content Standards	**Expected Performances**

Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems? **4.2 - All organisms depend on the living and non-living features of the environment for survival.** ♦ When the environment changes, some organisms survive and reproduce and others die or move to new locations.	**B 5.** Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive. **B 6.** Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.
Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **4.3 - Water has a major role in shaping the Earth's surface.** ♦ Water circulates through the Earth's crust, oceans and atmosphere.	**B 7.** Describe how the sun's energy impacts the water cycle. **B 8.** Describe the role of water in erosion and river formation.

Grade 5 Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Structure and Function – How are organisms structured to ensure efficiency and survival? **5.2 - Perceiving and responding to information about the environment is critical to the survival of organisms.** ♦ The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.	**B 9.** Describe how light absorption and reflection allow one to see the shapes and colors of objects. **B 10.** Describe the structure and function of the human senses and the signals they perceive.

Grade 6 Core Themes, Content Standards and Expected Performances	
Content Standards	**Expected Performances**
Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems? **6.2 - An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.** ♦ Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply. ♦ Populations in ecosystems can be categorized as producers, consumers and decomposers of organic matter.	**C 1.** Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis. **C 2.** Explain how populations are affected by predator-prey relationships. **C 3.** Describe common food webs in different Connecticut ecosystems.

Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **6.3 - Variations in the amount of the sun's energy hitting the Earth's surface affect daily and seasonal weather patterns.** ♦ Local and regional weather are affected by the amount of solar energy these areas receive and by their proximity to a large body of water.	**C 4. Describe the effect of heating on the movement of molecules in solids, liquids and gases.** **C 5. Explain how local weather conditions are related to the temperature, pressure and water content of the atmosphere and the proximity to a large body of water.** **C 6. Explain how the uneven heating of the Earth's surface causes winds.**

Science and Technology in Society – How do science and technology affect the quality of our lives? **6.4 - Water moving across and through earth materials carries with it the products of human activities.** ♦ Most precipitation that falls on Connecticut eventually reaches Long Island Sound.	**C 7.** Explain the role of septic and sewage systems on the quality of surface and ground water. **C 8.** Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.

Grade 7
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **7.3 - Landforms are the result of the interaction of constructive and destructive forces over time.** ♦ Volcanic activity and the folding and faulting of rock layers during the shifting of the Earth's crust affect the formation of mountains, ridges and valleys. ♦ Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place.	**C 9. Describe how folded and faulted rock layers provide evidence of the gradual up and down motion of the Earth's crust.** **C 10. Explain how glaciation, weathering and erosion create and shape valleys and floodplains.** **C 11. Explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.**

Grade 10 **Core Themes, Content Standards and Expected Performances** **Strand V: Genetics, Evolution and Biodiversity**	
Heredity and Evolution – What processes are responsible for life's unity and diversity? **10.5 - Evolution and biodiversity are the result of genetic changes that occur over time in constantly changing environments.** ♦ Mutations and recombination of genes create genetic variability in populations. ♦ Changes in the environment may result in the selection of organisms that are better able to survive and reproduce.	**D 1.** Explain how the processes of genetic mutation and natural selection are related to the evolution of species. **D 2.** Explain how the current theory of evolution provides a scientific explanation for fossil records of ancient life forms. **D 3.** Describe how structural and behavioral adaptations increase the chances for organisms to survive in their environments.
Science and Technology in Society – How do science and technology affect the quality of our lives? **10.6 - Living organisms have the capability of producing populations of unlimited size, but the environment can support only a limited number of individuals from each species.** 42 ♦ Human populations grow due to advances in agriculture, medicine, construction and the use of energy. ♦ Humans modify ecosystems as a result of rapid population growth, use of technology and consumption of resources.	**D 4.** Describe the factors that affect the carrying capacity of the environment. **D 5.** Explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations. **D 6.** Explain how technological advances have affected the size and growth rate of human populations throughout history.

High School Biology

Ecology Stability in an ecosystem is a balance between competing effects.	▪ Biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats. ▪ Changes in an ecosystem can result from changes in climate, human activity, introduction of nonnative species, or changes in population size. ▪ Fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration and death. ▪ Water, carbon and nitrogen cycle between abiotic resources and organic matter in the ecosystem and oxygen cycles through photosynthesis and respiration. ▪ A vital part of an ecosystem is the stability of its producers and decomposers. ▪ At each link in a food web some energy is stored in newly made structures, but much energy is dissipated into the environment as heat. ▪ The accommodation of an individual organism to its environment is different from the gradual adaptation of a lineage of organisms through genetic change.

APPENDIX

Soils Descriptions

For detailed Appendix info on Soils Descriptions please contact the ERT Office at 860-345-3977

Vernal Pool Sample Survey

Attachment Two
Vernal Pool Sample Survey

Potential Vernal Pool Inventory Field Sheet

Investigators: KLC, MK, AC **Date: 3/21/02** **Time: 11:00 AM** (arrival) (departure)

Town: Wallingford **Site: A (on right before bridge)**

Present Weather Conditions (circle): **sunny** **(partly cloudy)** **cloudy** **rainy**

1. POOL CHARACTERISTICS

Parameters	Current Conditions (to edge of standing water)	Max. Extent of Water (to edge of water stained leaves)
MAX. LENGTH (ft)	40'	
MAX. WIDTH (ft) (perpendicular to lg.)	15'	
MAX. DEPTH (in)	6"	

a) Presence of fish in pool? (circle) Yes or (No)

b) INLET? Yes or (No) WIDTH (ft) xx Flowing? Yes or No

c) OUTLET? Yes or (No) WIDTH (ft) xx Flowing? Yes or No

d) % Canopy Cover above Pool: (circle): 0 - 25% 25 - 50% (50 - 75%) >75%

2. SURROUNDING HABITAT (within 500 ft of pool)

General Description: (i.e. shape of water body, substrate, vegetation type, land use, roads, proximity to wetlands or other vernal pools, other interesting features.

Flora:

Trees: Red Maple, Eastern Red Cedar, White Ash, Elm. Shrub: Multiflora Rose, Nannyberry, Viburnum, Wild Grape.

* Garbage dumped in site.

3. BIOLOGICAL CHARACTERISTICS

A. Evidence of Breeding Obligate Species

(1) Egg Masses of Obligate Species

	Wood Frog	Spotted Salamander	Marbled Salamander	Jefferson - blue spotted	Unidentified
# Single egg masses	-	-	-	-	-
# Egg Mass Clusters (2-10 egg masses)	-	-	-	-	-
# Mass Clusters (11—25 egg masses)	-	-	-	-	-
# Egg Mass Clusters (25—50 egg masses)	-	-	-	-	-
# Egg Mass Clusters (> 50 egg masses)	-	-	-	-	-

(2) Wood Frog Calls (circle one) **0** **1** **2** **3**

- 0 = no calls 1 = individual calls, no overlap 2 = some overlap of calls 3 = continuous chorus

B. Evidence of Development of Obligate Species (Larvae / Tadpoles)

Microhabitats Sampled with Dip Net

Microhabitat Type	Shrubs / Woody Growth	Submerged Plants	Emergents (grasses, sedges, rushes)	Sphagnum hummocks	No Veg.	Other
# Dip Net Sweeps Shallow. 0-3' From shore	11	-	2	-	-	-
# Dip Net Sweeps Deep. 3' - 6' From shore	-	-	-	-	-	-

Larval Abundance of Obligate Species

Species	Larval / Tadpole Abundance - Shallow	Larval / Tadpole Abundance - Deep	Adults Yes or No
Wood Frog	-	-	Yes No
Spotted Salamander	-	-	Yes No
Jefferson - blue spotted	-	-	(Yes) No
Marbled Salamander	-	-	Yes No
Unidentified Salamander Mole Salamander	-	-	Yes No
Invertebrates	Adult Abundance - Shallow	Adult Abundance - Deep	1 / 30 sq ft
Fairy Shrimp	-	-	

C. Presence of Faculative Species / Other Notes

Species 2	Observations (life stage of organism, habitat use, calls, other activities such as mating.
Water Scavenger Beetle	Coleoptera Hydrophillidae (adults)
Fingernail Clam	Mollusca Bivalvia (63 ct.)
Mosquito	Diptera Culicidae (larvae)

2 Includes:
Amphibians - four-toed salamander, spotted newt, spring peeper, Eastern spadefoot toad, Green frog, pickerel frog, gray treefrog, Eastern American toad.
Reptiles - snapping turtle, painted turtle, spotted turtle

Potential Vernal Pool Inventory Photo Log

Investigators: KLC, MK, AC **Date: 3/21/02** **Site: A** (on right before bridge)

Town: Wallingford
Photograph an example of each piece of evidence collected. Include - photos of egg masses, larvae, adults of each species observed.

Photographs # Roll # A1 / R1	Time of Day 11 PM	Description A1 - Pool in late stages, water stains on detritus - drying egg masses
A2 / R1	"	A2 - Photo taken by bridge due south

Potential Vernal Pool GPS Log

Investigators: KLC, MK, AC **Date: 3/21/02** **Town: WLFD** **Site Id. A**

Unit Used: GPS III **GPS 12 - Coord. In decimal s (Conversion to Deg/Min/Sec required)**

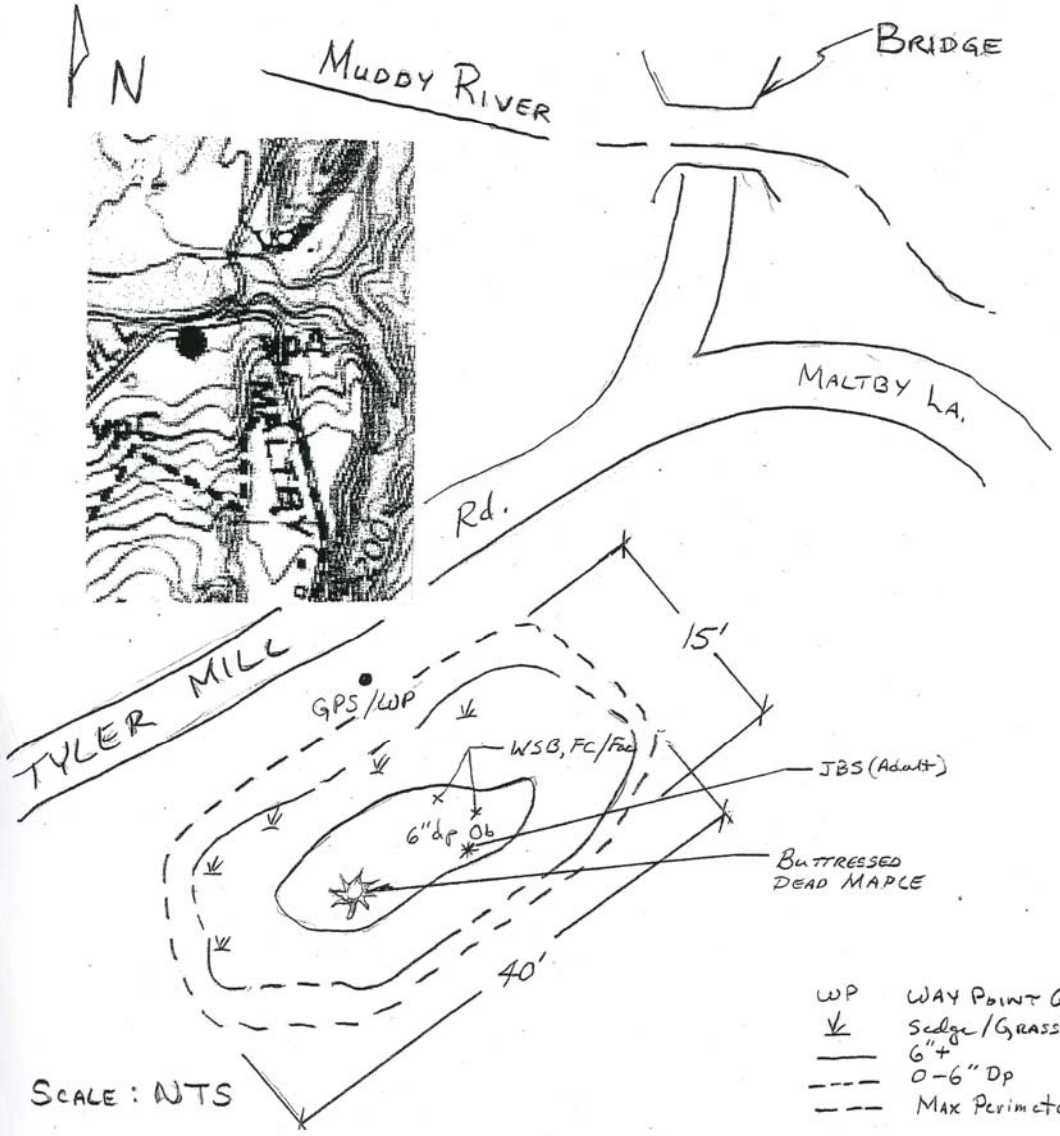
Waypoint Code	Descriptive Location	X Coordinate	Y Coordinate	Elev.	Dev.
#1	South of Tyler Mill Rd.	41 - 25 - 174	072 - 47 - 278	198	9'

Sketch of Site

Investigators: KC, AC, MK **Date:** 3-21-02 (LAST) **Town:** Wfd **Site Number:** A (LETTER)

Sketch path to vernal pool and vernal pool site. Include:

- major roads
- landmarks
- approximate locations of waypoints (GPS readings)
- general sketch of vernal pool, vegetation, locations of obligate species, egg masses, adults



About the Team

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - *free of charge.*

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

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 site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner / developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.