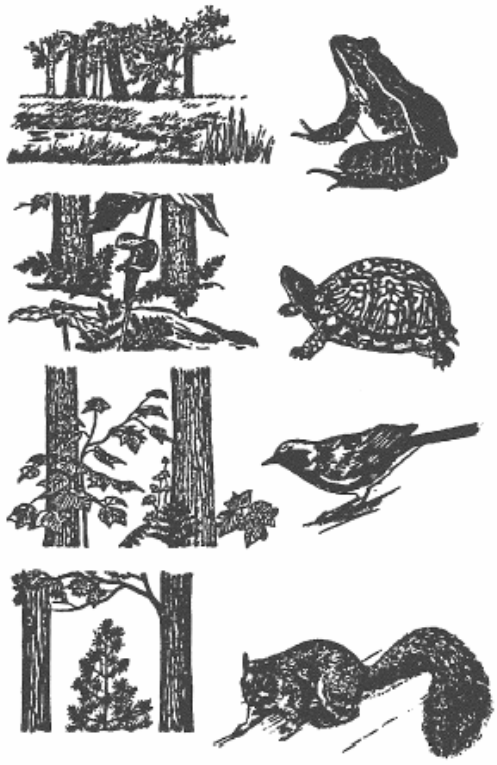
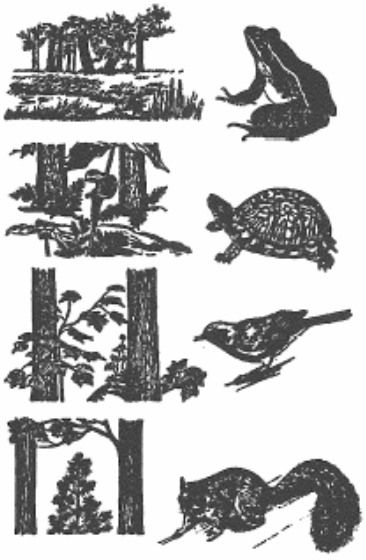
MARY HOOKER ELEMENTARY SCHOOL OUTDOOR CLASSROOM

HARTFORD, CONNECTICUT



EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.
February 1996



MARY HOOKER ELEMENTARY SCHOOL OUTDOOR CLASSROOM

Environmental Review Team Report

Prepared by the Eastern Connecticut Environmental Review Team
of the Eastern Connecticut Resource Conservation & Development Area,Inc.
Haddam, Connecticut

for the

Mary Hooker Elementary School
Hartford, Connecticut

February 1996

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Acknowledgments

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.

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I would also like to thank Mary Hooker Elementary School Principle Richard Montañez and Vice Principle Angela Thomas for their cooperation and assistance during this environmental review.

Contents

List of Figures

INTRODUCTION

An environmental review was requested by the Mary M. Hooker Elementary School in the city of Hartford. The request was made by the school principle and the Hartford Superintendent of Schools granted permission for the Environmental Review Team (ERT) to enter school property.

The inner city school is located on Sherbrook Avenue in southwestern Hartford. The 11.5 acre site consists of the school building, several temporary classroom buildings, surrounding lawn and garden areas, blacktop parking lots, a large mown field and in the rear of property a large area of undeveloped land that is bisected by Cemetery Brook.

The ERT was asked to review the undeveloped open space at the rear of the school for the purpose of developing an outdoor nature classroom that would be used by the school children and the community at large.

The Environmental Review Team Process

Through the efforts of the Mary Hooker School administration and the Eastern Connecticut ERT, this environmental review and report was prepared for the School. This report primarily provides a description of certain on-site natural resources and presents planning, management, land use guidelines and curriculum ideas. The review process consisted of 4 phases:

1) Inventory of the site's natural resources (collection of data);
2) Assessment of these resources (analysis of data);
3) Identification of resource problem areas, and
4) Presentation of planning, management, land use guidelines and curriculum ideas.

The data collection phase involved both literature and field research. The ERT field review took place on November 8, 1995. Mapped data or technical reports were also perused, and specific information concerning the property was collected. Being on-site allowed some Team members to verify information and identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Results of this analysis enabled Team members to arrive at an informed assessment of the property's natural resource opportunities and limitations. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Figure 1

Location Map

N

Scale 1" = 2000'

Mary Hooker Elementary School

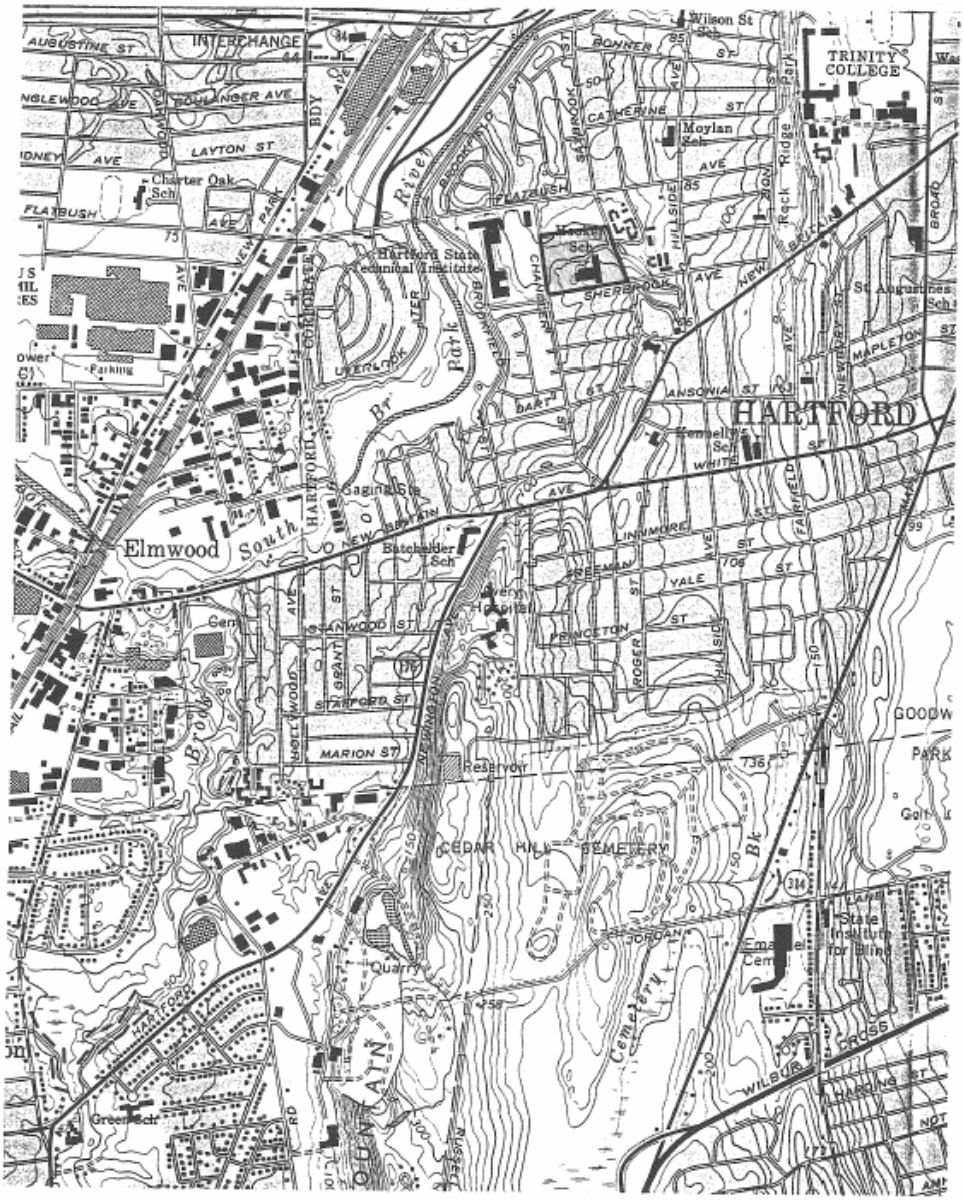

Figure 2

Site Map

N

Scale 1″ = 200′

DEVELOPMENT OF AN OUTDOOR CLASSROOM

The Mary Hooker Elementary School property provides an excellent opportunity for development of an Outdoor Classroom. The school grounds, which cover 11.5 acres, include a variety of surface covers including pavement, lawns, gardens, woodlands and a watercourse. All of these areas can be used by educators and should be incorporated into site design. The large area of open space is unique in such an urban setting.

Presently, the school population is approximately 650. This is expected to remain constant. The school includes children in pre-school through grade 5. The population is comprised of 70% Hispanic, 39% Afro-American and 1% West Indian. One-third of the population is bilingual, mostly Spanish-speaking.

School officials shared their vision for the school. It is intended that Mary Hooker become a learning center which encompasses four magnet schools. Major program areas would include; 1) Environmental Studies, 2) Science, Health and Technology, 3) Arts and 4) General Education. They indicated that the development of an outdoor classroom would need to meet the following criteria: 1) safety, 2) easy access for classrooms including access for the disabled, 3) appropriately maintains basic character of open space, and 4) fits into program/curriculum needs.

The development of the outdoor classroom at this site would work well with all the program areas proposed. Environmental education is an interdisciplinary subject that is easily incorporated to enhance planned curriculum objectives. Additionally, it is expected that other Hartford schools and community groups would also use the area, extending the educational value beyond the normal school day.

Discussion of the physical characteristics and proposed development of them is presented elsewhere in this report by resource professionals and focuses on the parameters of their discipline (i.e.: forestry, wildlife, etc.). As important as the development of the facility, however, is a plan for the use of the site to its fullest extent. This should include an overall commitment or "buy-in" from the school community including teachers, administrators, parents and students. It may be prudent to initiate

teacher training programs and have support teams for teachers prior to or during the site development.

There are numerous environmental education programs that have been developed and can be utilized by the school. *Project Learning Tree, Project Wild/Wild Aquatic, Project Wet,* and *Agriculture in the Classroom* are excellent programs that provide activities for educators to easily incorporate into all subject areas. Environmental education at Mary Hooker should include such areas as lead contamination and asbestos use. The Hartford County Soil and Water Conservation District, working with the Connecticut Department of Environmental Protection, is available to conduct workshops and assist with program development.

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TRAIL RECOMMENDATIONS AND CONSTRUCTION

The mapping information available precludes getting into some of the detail that the school would like. It really isn't possible to definitively show where a trail will go on a map drawn to 200 scale (1" = 200'). The best approximation is shown on the Metropolitan District Commission (MDC) map (Figure 3) and Figure 8 with input from Team members Pete Picone, Fred Borman and Linda Levine. One main loop is recommended that would be accessible for individuals with disabilities; the other trails could be partially accessible, but would pose more of a challenge. The terrain lends itself to a trail connection in the western portion of the area over the existing headwall (avoiding construction of a bridge and necessary permits!). Slopes next to the brook are not steep. Slopes on the accessible portion should be less than 1 foot rise in 20 feet of run to avoid handrails. Slopes on the rest of the trail would not matter. The accessible portion also requires a firm surface, the DEP Parks Division has successfully used stone dust (4" depth, filter fabric on subgrade if soils are wet), it requires a well drained base and needs to be properly compacted. It would be the least intrusive solution, the next step up would be a mixture of one part portland cement to 7 parts of stone dust, it is mixed dry, applied to the surface, watered and then rolled. After the stone dust, a bituminous concrete walk could be considered, however, it requires heavier equipment, a greater expenditure and would be more intrusive on the environment.

Handicapped trails must be a minimum of 36" wide and the slope can not exceed 1:20 (1' rise in 20'). If the route is less than 60" clear width, then passing spaces at least 60" x 60" should be located at reasonable intervals (not to exceed 200'). The surface of the path should be stable, firm and slip resistant. Rest areas should be provided at intervals of 200-300', out of the travel way and have benches.

To accommodate individuals with visual impairments, a guide system with wood posts and a rope running through would be adequate. A disk could mark where there is something of interest and signs with braille or raised letters could be placed.

Considerable erosion has occurred along the brook banks and enhancing the riparian community would help ease the situation. Recommended plants would include herbaceous materials such as Redtop, Sedge (Fringed, Fox, Broom), Rush, Cardinal

Flower, Marsh Fern and Joe Pye Weed. Shrubs could include Shadblow, Gray or Redosier Dogwood, Winterberry, Meadowsweet and Arrowwood. Most are native species.

The easiest way to prevent through traffic (pedestrian) would be to fence either end of the property (along Chandler Street and Broadview Terrace). An alternative would be earth berms that would be heavily planted with evergreens (pines) and barberry in front to discourage foot traffic.

Activities that could be added would be an interpretive sign system along the trail or some viewing decks/blinds along the stream.

At several parks, wood posts with a routed letter or number serve as "points of interest"; a leaflet at the trail head has the correlating interpretive pieces. The system has worked well and a good portion of the leaflets find there way back to the box. If the activity is confined to school groups the markers could still be installed with a master copy and discussions or activities provided for the teacher.

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Figure 3

Trail Location

N

Scale 1" = 200'

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files have been reviewed for the Mary Hooker Elementary School project area. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species that occur at the site in question.

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.

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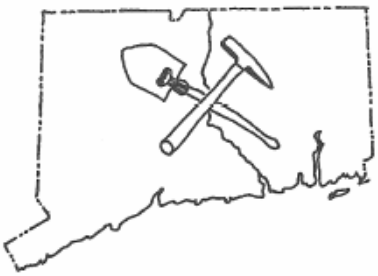
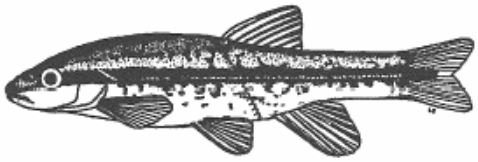
THE RESOURCES

THE WATERSHED



GEOLOGY



AQUATICS

VEGETATION AND FORESTRY

WILDLIFE

ARCHAEOLOGY

THE WATERSHED

Cemetery Brook is a heavily urbanized stream originating about 1.5 miles south of the school at Cedar Hill Cemetery in Wethersfield. It is fed by a large wooded swamp south of the cemetery. The brook enters an underground conduit after flowing out of a pond located on the Wethersfield/Hartford border west of Maple Street. From that point, it flows underground for about a mile where it "resurfaces" at the intersection of Hillside and New Britain Avenues. The brook flows above ground for a short distance of about 400 feet then flows back underground at Chandler Street after flowing through school property. The brook joins with the South Branch of the Park River.

The portion of the brook on school property shows signs of negative impacts associated with urbanization of its watershed. However, the brook also appears to have a certain level of unexpected "environmental health". The accompanying map (Figure 4) shows the location of the school in relation to the watershed of the brook. A watershed is that area of land which drains to the stream at any given point along its length. Chances are, if a rainfall drops within the dotted line, it will eventually end up flowing past the school (if it doesn't evaporate).

One of the benefits of delineating a watershed for a watercourse is that it defines the area wherein certain land use practices would have an effect on the quality of the water flowing in the stream. For instance, if there is a car accident on New Britain Avenue inside the watershed limits and the accident causes oil from the cars to leak onto the road and into a storm water drain, it is likely that this oil will end up in Cemetery Brook, reducing its water quality.

Also, change in land cover patterns may have an effect on the condition of the brook. In areas of more natural land cover such as open fields and forests most of the rainwater that falls immediately soaks into the ground and slowly makes its way to the stream as groundwater. With a more urbanized land cover such as roads, parking lots and buildings rainfall can not penetrate to groundwater but runs off more quickly and more directly to the stream as surface water or through storm drain pipes, along with the many pollutants which can be found on these "impervious" surfaces. This change in the landscape, referred to as "urbanization" can result in lower water quality and higher surface water quantities, both of which do no good for the stream which receives

this flow.

A brief inspection of the brook on school property revealed the eroding stream banks, bad odors and discolored water which are signs of a heavily urbanized stream. On the other hand, surprising signs of a healthy watercourse were observed including six mallard ducks, thirteen other bird species (not too bad for a quick winter count), a relatively healthy looking stream bottom, and the unexpected call of a kingfisher (a fish eating bird).

There appear to be no true "wetlands" (swamps or marshes) on the school property. An open drainage swale runs perpendicular to the brook on its north side.

Recommendations

The value of this wooded parcel to provide environmental education opportunities for the children of the Mary Hooker School are obvious and are focused on in other sections of this ERT report. However, the opportunity to broaden the experience of learning about this area also exists. The concept of the watershed, land use practices within this watershed and its effect on the brook as it flows past the school should be emphasized. This exercise will serve to demonstrate the inter-connectiveness of our environment and how human actions at one location may have an unforeseen result at another location.

For instance, familiarizing the children with the watershed of Cemetery Brook in the class room and then leading small groups out of the classroom to observe conditions in the actual watershed of the brook should be an effective way of instilling in them a sense of the interconnected "web of nature".

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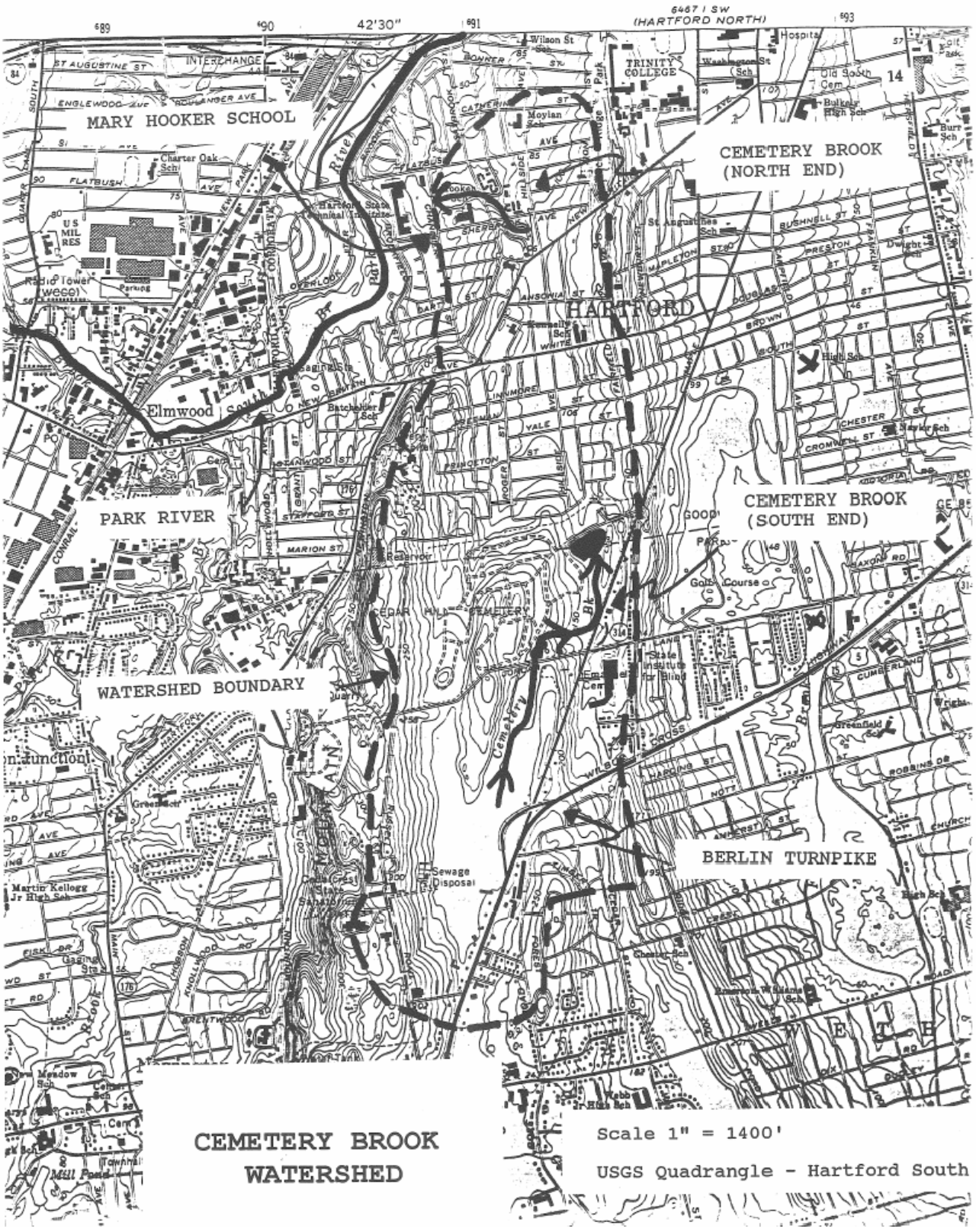

6467 I SW
(HARTFORD NORTH)
42'30"
MARY HOOKER SCHOOL
CEMETERY BROOK
(NORTH END)
HARTFORD
Elmwood
PARK RIVER
CEMETERY BROOK
(SOUTH END)
WATERSHED BOUNDARY
BERLIN TURNPIKE
CEMETERY BROOK
WATERSHED
Scale 1" = 1400'
USGS Quadrangle - Hartford South

GEOLOGY

Observations on Site

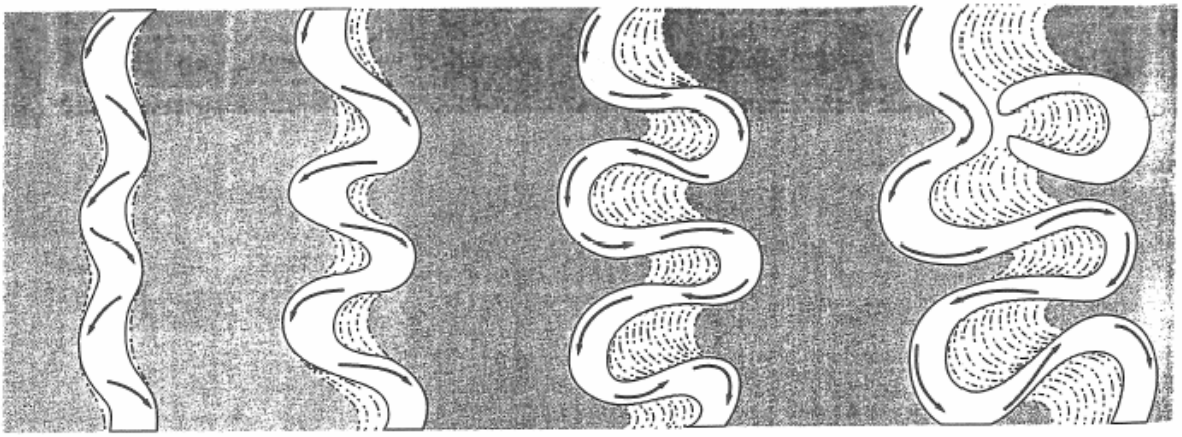
The most prominent geological feature on the site is Cemetery Brook, a stream which flows through the wooded areas of the school grounds. The stream passes through a culvert under Broadview Terrace in a westerly-by-northwesterly direction, then turns and flows west-by southwest until it enters another culvert under Chandler Street. From there it turns to the northwest for about 300 feet, and then almost due north, all underground, until it flows into the Park River. Where it is exposed at the school grounds, there is an opportunity to observe behavior in an urban setting.

The natural behavior of streams is to meander. Once meandering begins, it tends to become enhanced, because the stream flows faster on the outside of the meander and erodes its banks, but flows slower on the inside of the meander and deposits sediment. As a result, the meander shape becomes exaggerated, and the loops become wider (see figure 5).

This behavior can be seen in Cemetery Brook. When cemetery Brook merges from the culvert under Broadview Terrace, it has been constricted and the water is flowing rapidly. After it has flowed a hundred feet or so, it must turn to the west, because its channel has been modified to flow along the backs of the building lots that were planned along Dorset Street. Where the brook must turn, a small set of meander loops is developing (see figure 6). Since the water is flowing rapidly, it will erode its stream banks more, and the curve where the stream must turn (Loop 1 in figure 6) will become more exaggerated. Downstream from the curve, another small meander (Loop 2) is developing, and will also become exaggerated with time. On-site, an overhanging tree with roots exposed at Loop 2 is a vivid demonstration of the erosion taking place. If nature is allowed to take its course, both of these loops will widen, and more loops will develop downstream, converting the man-made straight channel into a natural, meandering channel.

Since the outside of the meander loop is where the most erosion is taking place, that is often the best place to observe the geological materials the stream is flowing through. At Loop 1, three different layers of deposits can be observed. Starting from the top, these

were a 1-2 foot thick grayish black deposit, 1-2 foot thick brownish-red deposit, and a light gray clay deposit. The upper two deposits are bulldozed material from apparently two different bulldozing episodes. The fact that bulldozing has occurred is evident from the artificial nature of the stream channel mentioned above. The rocks in the bulldozed material are, for the most part, either traprock (grayish-black) or brownstone (reddish-brown). (The geologic term for traprock is *basalt*, and the geological term for brownstone is *arkose* or *arkosic sandstone*.) It pays to be be cautious, however, because much of the rock-like material that has been bulldozed is manmade. Materials to watch out for include asphalt, concrete, and brick.



(A) Stream flow is deflected by an irregularity and moves to the opposite bank, where erosion begins.

(B) Once the bend begins to form, the flow of water continues to impinge on its outside curve, so that a meander loop develops. At the same time, deposition occurs on the inside of the bend as a result of the lower stream velocities in that area.

(C) The meander is enlarged and migrates laterally, with the contemporaneous growth of a point bar.

(D) There is a general downslope migration of meanders as they grow larger and ultimately cut themselves c to form oxbow lakes.

The evolution of stream meanders results because erosion occurs on the outside of a curve in the stream channel, where velocity is greatest, and deposition occurs on the inside of the curve, where velocity is low.

From Hamblin and Christiansen, 1995, p. 280.

Figure 5

The clay deposit found at the bottom of Loop 1 is natural. Since it was under water at the time of the site visit, it is not possible to give a detailed description. It may be possible to visit the site and look at the clay more closely when the water is lower. There appeared to be thin layering present in the clay deposit. This clay deposit was formed during glacial times (at least 10-20,000 years ago) as a deposit at the bottom of Glacial Lake Hitchcock. Since the lake waters are very quiet, very fine clay-size sediments are allowed to settle to the bottom of the lake. A very thin layer of clay is deposited every year. Each layer is about 1 mm in thickness, and is called a *varve*. In principle it is possible to count the varves and determine how many years of sediment were deposited, but in practice it is not practical to do that in this location, because the bottom cannot be seen, or the oldest part, of the deposit.

Figure 6

From MDC Map, scale 1 inch = 200 feet; contour interval is 2 feet.

It is possible to see sediments deposited on the inside of both meander loops, in the low energy environment. These deposits are low, about the same level as the water surface, and usually just look like mud. These sediments are being built up towards the center of the river as the river is eroding its channel outward, helping to exaggerate the meander shape.

The stream bank north of Cemetery Brook is not in its natural condition, because of the bulldozing mentioned above. The presence of mounds of dirt along side of the stream is a result of human activity, and is not the normal topography one would expect to see by a stream. At the time of the site visit, there were also several areas north of the stream that had standing water from recent rainfall. These are a result of poor drainage from human activity, probably an attempt to produce level building lots. It would be useful to find out how long the system has been operating in its present state.

The MDC map reproduced in Figure 6 shows a small depression on Chandler Street where the river enters the culvert to go under the street. This indicates that there may be erosion under the street by stream water that does not enter the culvert, but erodes around the outside of the culvert under the street when the water is high. Observation of the street revealed cracks in the same area, confirming this possibility.

Geology Observable Near the Study Area

The bedrock geology is not observable on-site, but there are several locations nearby which are outstanding areas for study. The rocks in the area are Triassic in age, about 210 million years old, and date from the time of the dinosaurs. At that time, North America was joined to North Africa, about where Morocco is now. The large continent thus formed is called Pangaea. The valley where Hartford is located, called the Connecticut River Valley, was formed as a result of the break-up of Pangaea starting about 210 million years ago. An area in Pangaea began to dome up and crack, a depression formed in the top of the dome, and the earth slipped down along faults and formed a basin. Basaltic magma from under the surface and sediments from the surrounding hills were deposited into the basin. The Connecticut River valley is part of Pangaea that began to crack apart and form an ocean, but did not go all the way. Needless to say, the Atlantic Ocean is the place where the complete split formed. The rocks in the Hartford area, therefore, are basalt and sandstone or arkose.

Both rock types can be observed in Rock Ridge Park, near the Trinity college campus. This locale has been studied many times over the years by various geologists, and is a regular field trip site for Geology 102 students at the University of Connecticut in Storrs. Included as supplemental material to this report are several field trip guides prepared for either 102 students or Connecticut earth science teachers. These guides contain diagrams and bibliography material for further study, written by various geology faculty members at Storrs (see Appendices A-C). They will be happy to act as a resource if additional explanation or material is required. In addition, a copy of a professional field trip led for geologists is included (Appendix D). This may be a bit technical, but it provides a resource for other geologists that may be of assistance. An additional resource that is highly recommended is a book call ed *The Face of Connecticut*, which provides an excellent overview of Connecticut geology and geography in layman's terms.

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AQUATICS

Site Description

The 11.5 acre school parcel contains approximately 850 feet of Cemetery Brook. Through the site Cemetery Brook has a channel approximately 15 feet in width having normal flow depths averaging 1.5 feet. A moderate to steep gradient produces surface stream flow predominated by shallow riffle interspersed with moving pool. Stream substrate is composed of ledge, cobble, gravel, coarse sand, and sand-silt fines. Dense growths of hardwoods and woody shrubs predominate as riparian vegetation and provide Cemetery Brook with a nearly complete canopy. Physical in-stream habitat is provided by undercut banks and fallen woody debris.

Approximately 250 feet of stream immediately upstream of the Chandler Street crossing exhibits signs of previous modification. This may have been intended to minimize back-flooding of the Chandler Street culvert.

Aquatic Resources

Based upon it's physical characteristics, Cemetery Brook can be classified as a cold-water resource. Extensive development within the watershed has compromised water quality with the Department of Environmental Protection classifying this reach of Cemetery Brook as "Class B" surface waters. Although the stream possesses some exceptional physical habitat, diminished water quality is anticipated to limit aquatic species diversity. The stream is anticipated to contain a fishery assemblage of blacknose dace, longnose dace, tessellated darter, and white sucker. (Coordinator's Note: See Appendix E for fish descriptions)

Impacts

The remaining wooded open space and section of Cemetery Brook channel on the school property offer an ideal opportunity for use as an outdoor classroom. There is ample area for incorporation of a trail into the open space area in a manner not impacting the stream's aquatic resources.

Recommendations

Topography of land adjacent to the stream lends itself well to a trail which can provide both a "birds-eye" view of the stream and controlled access points to the channel. Signage should be erected along the trail at select locations to describe the function of key physical features of the stream such as pools, riffles, riparian area, and the consequence of the altered reach of channel.

Some initial suggestions for such signage include:

1. Stream habitat overview. A key characteristic of any productive in-stream habitat is diversity. It is imperative that the proper blend of water depths, water velocities, and substrate types be present together to form the necessary food production, spawning-incubation, and cover areas that combine to form complete stream habitat.

2. Pools. Loosely defined, a pool is a region of deeper, slower moving water with fine bed materials. With overhanging banks and vegetation, pools provide cover, shelter, and resting areas primarily for larger fish. During low flows pools can become isolated pockets of water which allow survival of fish and other aquatic organisms.

3. Riffle. Areas of shallower, faster moving water, with coarser bed materials. Riffles are most often associated with "whitewater" a turbulence which adds oxygen to water. Riffles tend to support higher densities of aquatic insects and are thus important food producing areas for fish. Riffles are also serve as a spawning area for most stream fish. Due to competition and predation, young fish and small fish tend to inhabit riffles.

4. Altered channel. The goal of most types of channel alteration is to increase the amount of flow carried within the channel banks. Greatest impacts to aquatic insects are caused by the change in substrate from gravel to sand/silt fines and the removal of riffle habitat. Channel alterations influence the fishery population by eliminating spawning and nursery habitat found in riffles, changing substrate from gravel to sand/silt fines, and eliminating in-stream and streamside cover. The fishery population associated with altered channels is composed primarily of only the most tolerant species.

5. Riparian area. The riparian area is the area of land that adjoins the stream. A well-vegetated riparian area is critical to the health of the stream ecosystem. Roots of trees, shrubs, and grasses bind stream bank soils and provide a resistance to the erosive forces of flowing water. Stems and leaves of stream bank vegetation provide shade which prevents

high water temperatures. Leaves, stems, and other plant parts that fall into the stream provide food for aquatic insects. Large woody debris that falls into the stream enhances in-stream habitat. Abundant riparian vegetation softens rainfall and serves as a reservoir storing surplus runoff for gradual release during low stream flow periods of summer and early fall. The riparian area serves also as a natural filter removing nutrients, sediments, and other non-point source pollutants from overland runoff.

The Team fisheries biologist is available to provide additional assistance with the outdoor classroom project as needed.

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VEGETATION AND FORESTRY

Vegetative Analysis

The open space site adjacent to the school is a typical flood plain ecosystem. Cemetery Brook divides the subject parcel almost in half. The surrounding topography is gently sloping with the greatest degree of slope adjacent to the brook itself. The vegetation found is also typical of what might be expected in this type of ecosystem.

The predominant tree species found is eastern cottonwood, with a major component of willow, silver maple, red mulberry, and American elm. Other tree species found, which are a minor component of the stand are pin oak, pin cherry, ailanthus and an occasional apple tree. The cottonwoods, elms, silver maples and elms appear to be native. The Norway maple and ailanthus are definitely invasive species, and the remainder may have seeded in from the surrounding area.

Understory vegetation, sparse in some places, includes honeysuckle, multi-flora rose, silky dogwood, staghorn sumac, blackberry, golden rod, milkweed and rag weed. An occasional grapevine can be found but they are few in number, and serve as an important source of wildlife food. Adjacent to Broadview Terrace, between the road and the stand of cottonwood is a patch of Japanese bamboo. This is a noxious weed that should be eliminated.

Management Recommendations

For the purposes of this ERT, the parcel is divided into three distinct stands. The Forest Resource Map (Figure 7) indicates the location of the three stands.

Stand 1: This is the largest stand and the oldest. Most of the overstory cottonwoods and willows are probably 60-80 years of age. Neither of these species is particularly long-lived, and it is evident that this is a declining stand, due to the number of dead or dying trees and the preponderance of large woody debris on the forest floor. This is a stand in transition. Invasive species such as Norway maple and ailanthus are very much in evidence in the understory. The Team forester cautions against opening up the overstory, and allowing increased sunlight on the forest floor. This would only

aggravate the situation of invasive species, both tree and shrub, taking over. The recommended practices here would be to control vines and invasive (non-native) tree and shrub species by mechanically removing them. Smaller trees that have been cut down, and large woody debris already down, could be utilized to construct brush piles. These brush piles could then be utilized by small mammals as cover. This in turn would draw hawks and owls to act as predators of the small mammals. It is also recommended that tree species such as white pine and Norway spruce be planted. These would provide year round cover, particularly in the winter when there is very little coniferous cover for animals to utilize to protect them from the snow. The conifers could be planted randomly throughout the stand but perhaps a quarter to half an acre could be planted at a 5X6 or 6X6 foot spacing to provide a thick grove for winter cover. Additional plantings of hardwood seedlings should also be considered to try and maintain an assortment of native species which would do well in a flood plain situation. All construction and road paving materials should be removed in a general clean up of the area (please refer to Wildlife section for another perspective on the need to remove these materials).

The DEP Divisions of Parks and Wildlife are recommending a trail system for this parcel. For the safety of anyone using the trail system, any species of shrub or tree, such as hawthorne or multi-flora rose should be cut back from the pathway to avoid anyone being injured by thorns. The treadway should be free of any stumps, vines or roots which may impede pedestrian or wheel chair access. Access to Cemetery Brook should be limited to one or two locations to avoid excessive erosion of stream banks and to maintain the natural setting of the brook.

Stand 2: This is the open area adjacent to Chandler Street. The recommendation here is to remove all the construction materials presently found here and convert this one acre sized parcel to a meadow. If possible, the existing vegetation should be removed, the ground regraded to remove the berms around the edge, and wildflowers planted to create a meadow which could be used as an outdoor classroom, and which would create an entirely different habitat. At present, just to the northeast of this area is a vernal pool which was artificially created when the soil was pushed up into the berm. If it is at all possible to save this seasonal wetland, it would be desirable as this may be a breeding ground for salamanders, frogs and other small amphibians. It is desirable to maintain vernal pools as they support forms of life not found in perennial bodies of water. This is due to the lack of fish, as the pool dries up in the summer.

Stand 3: This area is similar in structure to Stand 1, although the stocking of tree species is less than in Stand 1. This area should be left to develop in its natural course of succession. Presently, there are a number of shrub species which provide excellent food and cover for many forms of migratory song birds. Two suggestions for this stand would be to route any trail toward Chandler Street to avoid crossing the brook at its steepest points, and to mow the field closest to Chandler Street once a year to maintain the low herbaceous growth there. Any apple trees found here, and in Stand 1, should be protected, and if need be, released from competition from other tree or shrub species to enhance their ability to produce fruit for wildlife. Again, if a trail is routed through this stand, any vegetation with thorns or spines should be removed to permit safe passage along the trail.

Contact: Fred Borman
Program Specialist/Urban Forestry
DEP - Division of Forestry
79 Elm Street
Hartford, CT 06106
(860) 424-3630

Possible Sources for Tree Planting Assistance

Linda Kehoe
Project Director
Hartford Trees, Inc.
(860) 623-8994
A School Planting Project Application is currently being mailed to your school. (2/14/96)

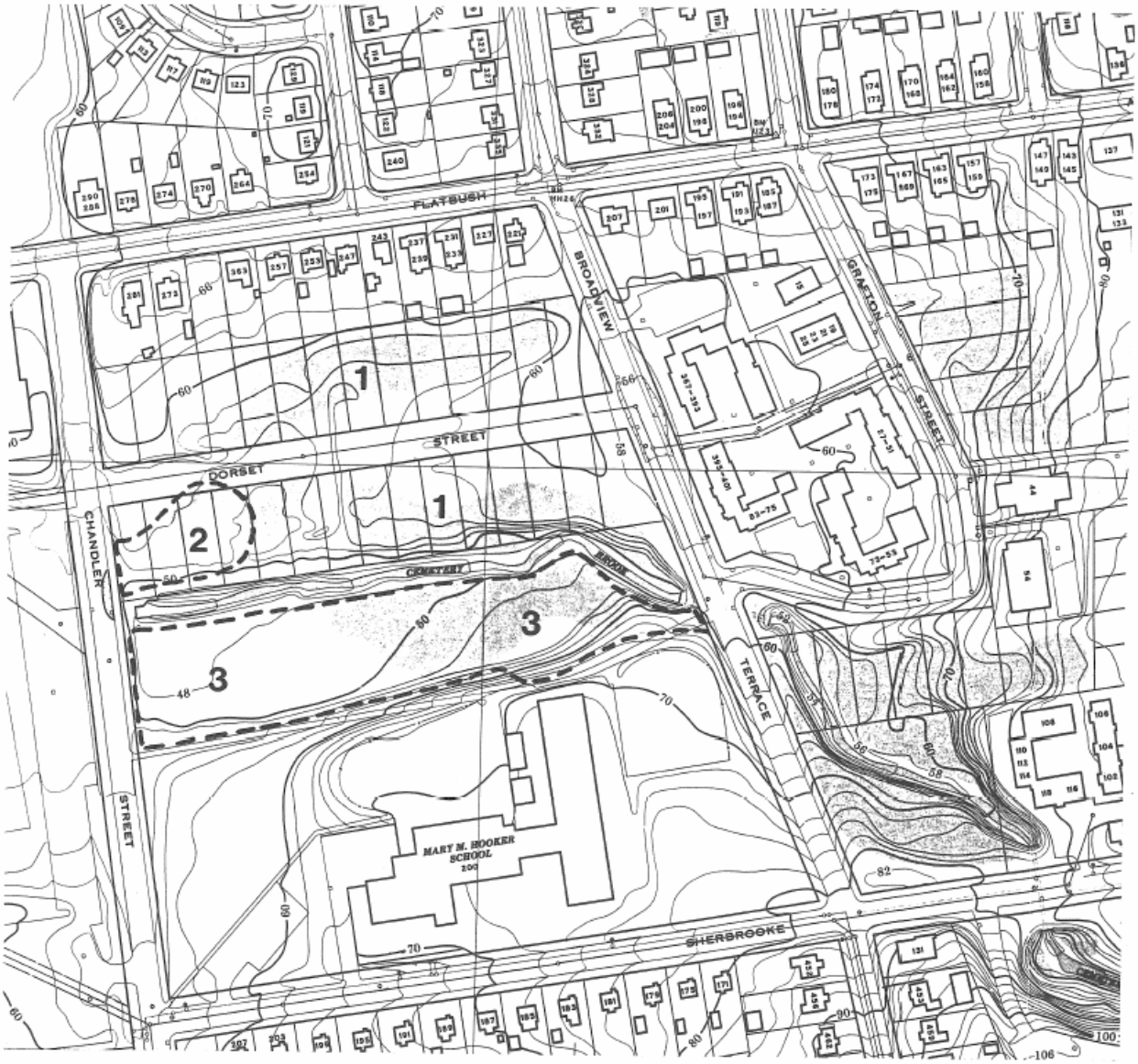
Garden Club of Hartford
Barbara David
(860) 678-9131

Figure 7

Forest Resource Map

N

Scale 1″ = 200′



WILDLIFE

Introduction

The 11.5 acre school property is surrounded by urbanization. It is virtually an island of green vegetation surrounded by tar, buildings and concrete. (see Figure 9). It has been subject to numerous human-related disturbances such as filling, dumping and clearing. Despite a rather destructive past, the vegetation growing on it is in various stages of succession and providing a marginal, yet functional habitat for a variety of adaptable wildlife. It has good potential for establishing an outdoor classroom and can be improved for wildlife, as well as, showing urban school children the basic components of wildlife habitat and basic techniques of habitat management.

Field Observations and Notes

Three site visits (Fall-'94, Spring-'95, and Fall-'95) to the property were made. The following wildlife sign were observed: Black-capped chickadees feeding on goldenrod pods, mourning doves feeding along Cemetery Brook, a pair of mallards in the brook, cardinal feeding on wild rose berries, a flock of crows chasing a barred owl, common grackles perched in trees, a cottontail rabbit in brush, a downy woodpecker pecking away at a dead willow branch, a muskrat swimming in the brook, a carcass of a young skunk, a non-poisonous northern brown snake collected from under a rock being held in a jar by a neighborhood boy, small flocks of European starlings feeding in lawn areas, house sparrows perched along a fence, a mockingbird perched in a multiflora rose bush and a flock of about 20 cedar waxwings feeding on the wild crabapple fruits.

Site Evaluation

Although the site is a small island of vegetation, it does provide habitat for some wildlife. With the exception of the observation of a barred owl, the observed wildlife noted in this review are considered generalists and this property provides them some or all of their seasonal habitat requirements. Wildlife studies have shown that as forest sizes get smaller and fragmented, there is a shift in the types of wildlife that will occur in the changed conditions. Some wildlife (generalists) do not require large expanses of habitat and will adapt to the smaller, marginal habitats. The wildlife (here-to-fore referred to as specialists) that require larger areas of habitat usually leave the marginal sites, especially for breeding. Specialists may, however, utilize smaller sites during

migration for food, shelter or roosting. This property has important value as a stopover for migratory songbirds especially those using the Connecticut River migratory corridor.

Most of the property has experienced dumping, filling and bulldozing which is evident while walking the site. Particularly evident, are the concrete slabs scattered about. Although aesthetically displeasing to the eye, they actually make good cover for reptiles, amphibians and small mammals. This was particularly evident during a site visit when the Team wildlife biologist witnessed a cottontail taking refuge under a concrete slab and also a youngster playing there that had collected a northern brown snake by overturning some of the lighter debris laying on the ground, There are some spots where the concrete slabs may need to be moved or altered to accommodate the hiking trail but most of them can stay from a wildlife habitat perspective.

Like most abandoned property in heavily urbanized areas, there is a preponderance of non-native invasive woody plants (see Vegetation and Forestry section) that occur on the property which should be managed against in favor of the native plants. Managing or controlling non-native woody plants can be a very tedious and long term job, but with proper planning, can be done successfully. The by-products of controlling non-natives can be used to make brushpiles which provide additional cover for wildlife. Controlling invasive non-native plants allows for more growing space for the more valuable native species. The Team wildlife biologist is available to provide additional technical assistance as to which plants should be removed and the types of native plant replacements.

Area 2 (see Figure 8), needs a thorough clean up. This area includes a created pool which appears to have some similar attributes of a vernal pool. Vernal pools are important water sources and can be breeding places for amphibians which require water without fish present to lay their eggs and live for part of their life cycle. This wet area should be looked at more closely in the early spring for signs of wildlife use.

Area 3 (see Figure 8), is heavily sloped and has a dense understory. Because the area has dense vegetation and has poor accessibility, it should be maintained as refugia with no disturbance from human traffic. Wildlife need places where they can escape from disturbance. On a small property such as this one, whose surroundings are heavily urbanized, consideration of leaving refuge space should be a priority. Historically, the

property has had white-tailed deer on it (*Mary Hooker School Principal, personal communication, 1995*) which probably were able to find minimum habitat requirements. Maintaining **Area 3** as refugia with minimal disturbance can allow creatures such as the deer and other more secretive wildlife to inhabit the property. The surrounding urbanization (see Figure 9) is quite inhospitable to the majority of common wildlife and there isn't much in the way of travel corridors for terrestrial animals to disperse or get to the property. Any wildlife that can't fly in or out are less likely to occupy the habitats on the property.

Area 4 (see Figure 8) is a reverting meadow that was once mowed grass. This area should be maintained in an early successional stage with annual mowing with a brush hog or its equivalent. This area can illustrate the dynamics of plant succession to the students and also be a wildflower and butterfly area.

Urban Wildlife Habitat and Planning

As urban areas become developed, natural areas are divided into smaller and smaller, isolated pieces (see Land Use/Cover Type Map - Figure 9). Land that is in public ownership can be managed for wildlife habitat with a long term view point. In contrast, private land, which makes up 88 percent of Connecticut's land, usually changes ownership and isn't managed for wildlife for the long term. Wildlife habitat in urbanized areas can be places where citizens can enjoy wildlife within the city limits. In a survey of urban residents in five metropolitan areas of New York State, 96 percent of the respondents indicated that it was important for their children to learn about nature and 73 percent of the respondents were interested in wildlife in their backyard or neighborhood area (Brown et. al. 1979). The Mary Hooker School property offers an opportunity to not only improve and conserve wildlife habitat, but also be a place to enjoy wildlife and learn about wildlife habitat.

Learning About Habitat

Wildlife habitat is made up of basically all the living and non-living components of a site. Habitat, in its basic form, provides food, water, shelter and space arranged in a suitable manner that meets the needs of an animal or group of animals. There are many components of habitat that can be identified for purposes of educating students. By learning to identify the habitat components and their wildlife value, students can piece together the intricate parts of wildlife habitat almost like a jig-saw puzzle. This

will help students understand the function of habitat and the importance of habitat for the existence of wildlife. In addition, what they learn may be applied to their own backyards or neighborhoods.

The Team wildlife biologist is available to assist the school in developing a trail guide that points out the various wildlife habitat components and provide technical assistance pertaining to habitat improvements that can be made through plantings, habitat alterations/manipulation, artificial nest box placement, and also offer training sessions for the school teachers to help them become familiar with interpreting the various habitat components and ecological concepts pertaining to the property.

Habitat Management and Improvement Recommendations

- Because of the past land use practices on the site, the pre-existing conditions will never be able to be restored. However, improvements can be made to benefit wildlife habitat. With urbanization and development, many non-native plants have been introduced to the landscape which are invasive and displace naturally occurring vegetation and alters natural plant communities which ultimately affects the wildlife. An effort to remove some of the invasive non-native plants and encourage that native plants can be helpful in improving habitat conditions. More detailed information on this is available upon request.

- The majority of the forest on the property is deciduous. An effort to increase the evergreen cover through plantings would benefit winter cover and nesting cover. The types of plant species and where to plant them can be determined at a later date.

- As mentioned earlier in this report, the annual mowing of **Area 4** (see Figure 8) will maintain the meadow condition which helps diversify the habitat types.

- Creation of snag trees (dead or dying trees) by girdling the base of some of the trees can help provide habitat for woodpeckers and other wildlife that need dead wood as part of their habitat. Which trees should be targeted for alteration and how to do it can be provided at a later date.

- Several different types of nest boxes can be placed throughout the property to improve conditions for cavity nesters such as black-capped chickadees, house wrens, screech owls or gray squirrels. Nest box placement and dimensions can be provided

at a later date.

- Plantings of fruiting native woody shrubs along Cemetery Brook in **Area 2** can help improve wildlife habitat and assist in soil stabilization. The type of plants and locations for planting can be provided at a later date.

Long Range Technical Assistance

A project, such as this, requires a long term commitment from the local school administrators, board of education, and select municipal staff. Also, state level long term assistance from natural resource professionals, is necessary. The Team wildlife biologist works as an Urban Wildlife Biologist and is available to provide technical assistance throughout the phases of developing this urban outdoor classroom. It is hoped that this outdoor classroom can be a blueprint for others of its kind for urban areas of Connecticut.

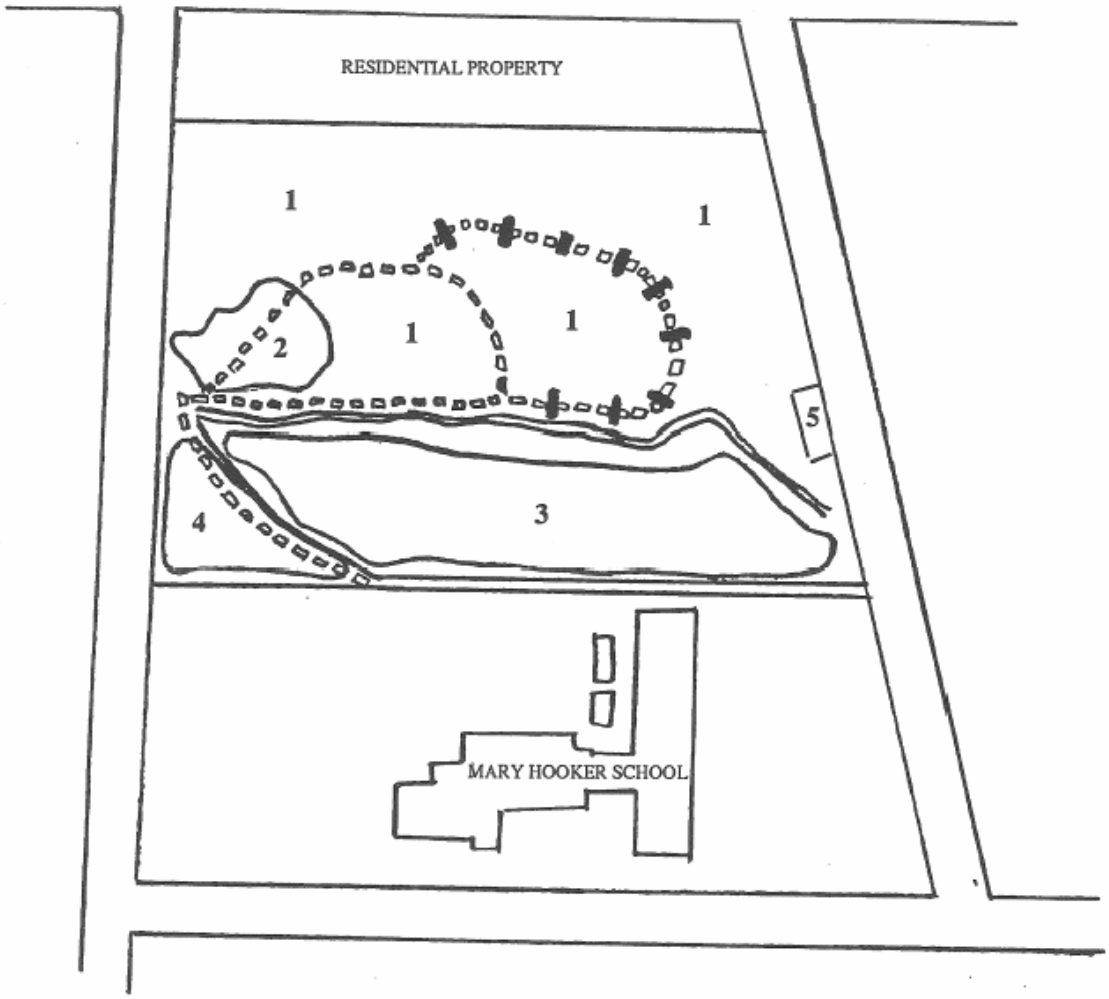
Literature Cited

Brown, T.L., C. P. Dawson, and R. Miller. 1979. Interests and attitudes of metropolitan New York residents about wildlife. Transactions of North American Wildlife and Natural Resource Conference, 44: 289-297.

Contact: Peter Picone
Urban Wildlife Biologist
DEP - Wildlife Division
Sessions Woods Wildlife Management Area
P.O. Box 1550
Burlington, CT 06013
(860) 675-8136

Figure 8

Habitat Types and Proposed Trail Location



LEGEND

1 = Cottonwood/willow overstory mixed with red mulberry, norway maple, american elm, silver maple,pin oak,ailianthus ,wild apple, and crab apple.

2 = Debris, soil piles, moist spots,young sapling growth interspersed with herbaceous vegetation

3 = Dense vegetative cover on a steep slope,similar overstory as area 1 with dense understory

4 = Reverting field habitat with mixture of herbaceous and woody plants.

5 = Mowed grass area

Trail - handicap accessible

Trail - non-handicap accessible

AREA OF DETAIL

TOWN

QUADRANGLE

52

HARTFORD

HARTFORD SOUTH

500

FEET

0 1000 2000

1:24000 Scale or 1" = 2000'

DEP-GIS *Connecticut Land Use and Land Cover (Satellite Imagery)*

LEGEND

Mary Hooker School

33

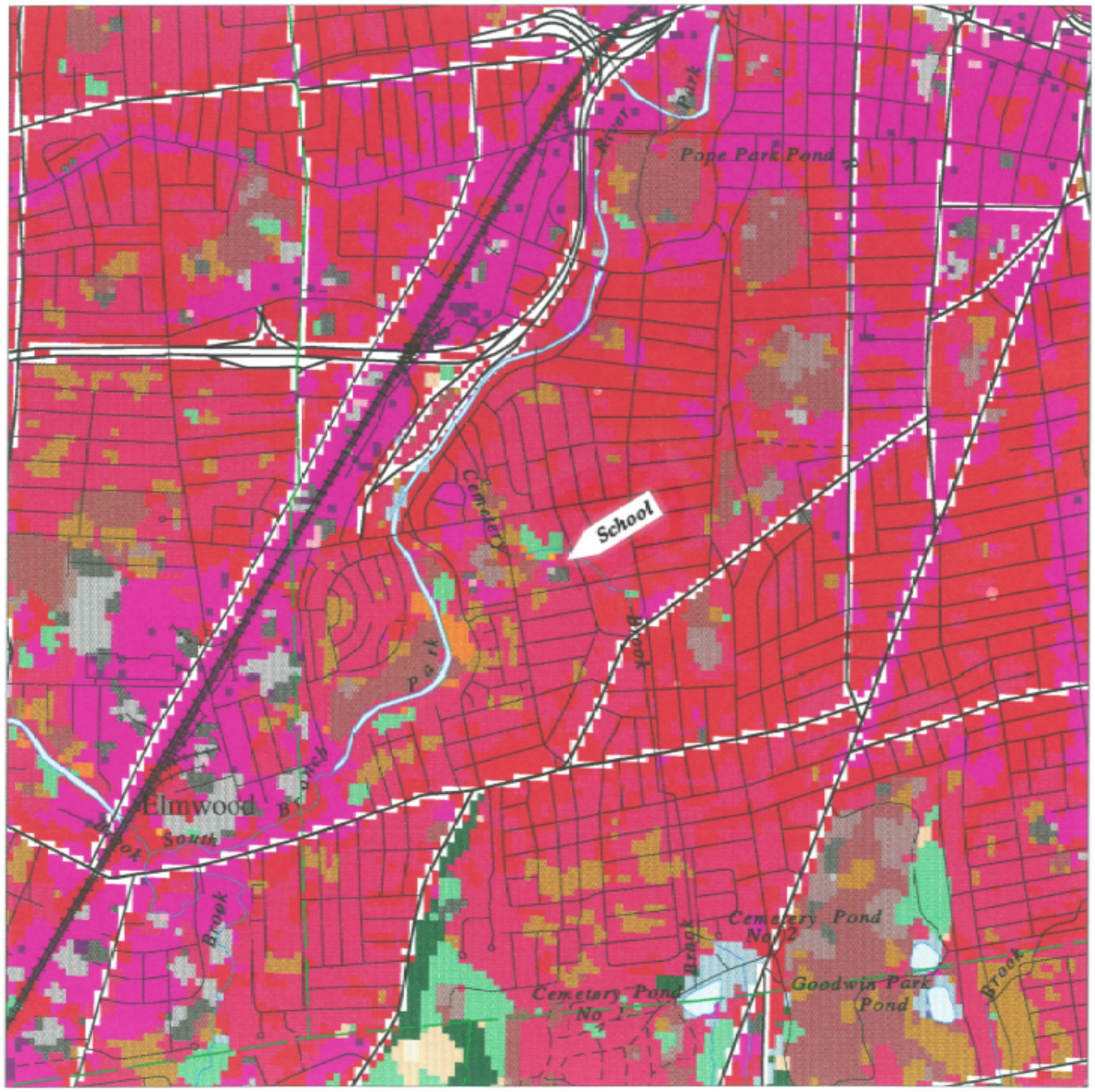
IMPERV SURFACE	GRASS/TOBACCO	MAJOR ROADS	
H DEN RES/COM	DECID FOREST		
MED DEN RES	CONIF FOREST		
ROOF	DEEP WATER		
PAVEMENT	SHALLOW WATER		
TURF/GRASS	NON-FOR WETLAND		
SOIL/GRASS/HAY	FOREST WETLAND		
GRASS/HAY/PAST	BARREN LAND		
SOIL/CORN	BARE SOIL		
GRASS/CORN	LOW COAST MARSH		
SOIL/TOBACCO	HI COAST MARSH		

Figure 9

Land Use and Cover Type Map

PLOTTED: 01/02/96 08.22.56 GIS

Natural Resources Center, Connecticut DEP



ARCHAEOLOGY

A review of the State of Connecticut Archaeological Site files and maps show no known archaeological sites listed for the school property. A review of the project area suggests a low-to-moderate sensitivity for undiscovered archaeological remains. This evaluation is primarily the result of urban development. Proximity to the South Branch of the Park River would have given the school property a high potential for prehistoric archaeological sites, however, any site locations would probably have been destroyed with the urban development.

The Office of State Archaeology has been designated state coordinator for the Society of American Archeology to facilitate communication about public and school educational opportunities. The Office maintains a file on elementary school archaeology curriculums from around the country. In addition, they have developed teacher workshops, given presentations at schools, and maintain listings of teachers that have incorporated archaeological projects within their school programs. The Connecticut State Museum of Natural History offers exhibit tours and outreach materials that travel to schools. They have met with numerous teacher groups to coordinate and advise on the teaching of archaeology. The Office of State Archaeology would be more than pleased to offer these services to interested teachers at the Mary Hooker School.

While archaeological integrity may be lost to the property, the proposed outdoor nature classroom has the potential to develop an area for a simulated archaeological excavation. The Office can provide expertise on setting up the excavation units and artifacts for burial. Students can "dig" in a scientific controlled manner, recovering, cataloguing and interpreting their finds. The Office can bring them through the scientific process in an interesting and exciting way. An archaeological project can also involve many academic departments within the school system. For example, the "dig" can include artifacts demonstrating history and technology (i.e. social sciences), animal bones and plant remains indicating diet and environmental adaptations (i.e. life sciences), and soil level changes (i.e. earth sciences). Laboratory analysis can include instruction on computer inventories, microscopic examinations, and illustrations. Completion of a site report can assist in writing skills. An archaeology project can incorporate a multi-disciplinary approach and provide the students with the ability to handle primary data that they excavate from their sites.

Once again, the Office of State Archaeology and the State Museum of Natural History would be pleased to meet with interested teachers from the Mary Hooker School to share ideas in developing such a curriculum.

Contact: Nicholas Bellantoni
State Archaeologist
CT Museum of Natural History
UCONN
U-Box 23
Storrs, CT 06268
(860) 486-5248

APPENDICES

A. Geology Field Trip to Trinity College
B. The Rocks on Trinity Ridge
C. Rocks in the Connecticut Valley
D. Guidebook for Fieldtrips in Connecticut ...
E. Fish Descriptions

For Appendix Information please contact the ERT Office at 860-345-3977

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.