

# **ANNIE FISHER SCHOOL OUTDOOR CLASSROOM PROJECT**

**HARTFORD  
CONNECTICUT**

Annie Fisher School



Ladder of Success

# **EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT**

**EASTERN CONNECTICUT  
RESOURCE CONSERVATION  
AND DEVELOPMENT AREA, INC.**

**ANNIE FISHER SCHOOL  
OUTDOOR CLASSROOM PROJECT  
Hartford, Connecticut**

Annie Fisher School



Ladder of Success

**Environmental Review Team Report**

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

for the  
Annie Fisher School  
Hartford, Connecticut

April 1998

CT Environmental Review Teams  
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# Acknowledgments

This report is an outgrowth of a request from the Annie Fisher Elementary School to the Eastern Connecticut Resource Conservation and Development Area, Inc. (RC&D). The RC&D Executive Council granted their approval and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

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

The field review took place on Tuesday, November 18, 1997.

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I would also like to thank Percalee Morris, vice-principal of the Annie Fisher School, Robin Kancizor and Sonia Walker from the Annie Fisher School, Susan VanKleef, the Watkinson School Science Chair, Virginia Pertillar from the University of Hartford, Moses Taylor, coordinator for the Eastern CT RC&D and Doris Johnson of the CT DEP/RC&D council member 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 able to view additional maps and discuss the project with the applicants. 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 schools and the City. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the applicants. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in reviewing the proposed outdoor classroom.

If you require additional information please contact:

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# Introduction

## Introduction and Objectives

The Annie Fisher Elementary School had requested assistance from the Eastern Connecticut Environmental Review Team (ERT) in conducting an environmental review for a proposed multi-age, multi-use outdoor classroom.

The outdoor classroom would consist of a series of nature trails with learning stations that would utilize the various habitats found on site. Consideration was also given to suitable sites for aquatic studies, bridge crossings, classroom sites and ideas to enhance the existing Annie Fisher courtyard and athletic fields. The ERT was requested to provide basic natural resource information about the area and provide information and discussion on enhancement of existing features, outdoor classroom/trail creation, connecting the three properties through trails and bridges, management guidelines, ideas for a trail guide and curriculum development.

At the request of the school, in cooperation with the University of Hartford, the Watkinson School and Weaver High School, the ERT conducted a natural resource inventory and feasibility study for the construction of the outdoor classroom. The sites reviewed included property of the Annie Fisher School, the University of Hartford and the Watkinson School for a total of approximately 130 acres. Neighboring Weaver High School and the entire community will have access to the site.

included a school courtyard, athletic fields, forest, forested wetland/floodplain and a few fields in the early successional stage.

The outdoor classroom project offers the unique opportunity to utilize the properties of all three schools and to involve all age and learning levels (elementary, middle, high school, college, and the community) in the planning, construction, use and management of the site. It is envisioned that Annie Fisher, the University of Hartford, the Watkinson School and adjacent Weaver High School will all work collaboratively on the project to involve the wider community in the stewardship of natural resources.

The ERT was requested to provide basic natural resource information about the area and to discuss the feasibility of creating a multi-age, multi-use outdoor classroom and trail. Information and discussion focused on enhancement of existing features, outdoor classroom/trail creation, connecting the three properties through trails and bridges, management guidelines, ideas for trail guide and curriculum development.

## **The ERT Process**

Through the efforts of the Annie Fisher Elementary School, the University of Hartford, and the Watkinson School this environmental review and report was prepared for the these schools.

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



The review process consisted of four phases:

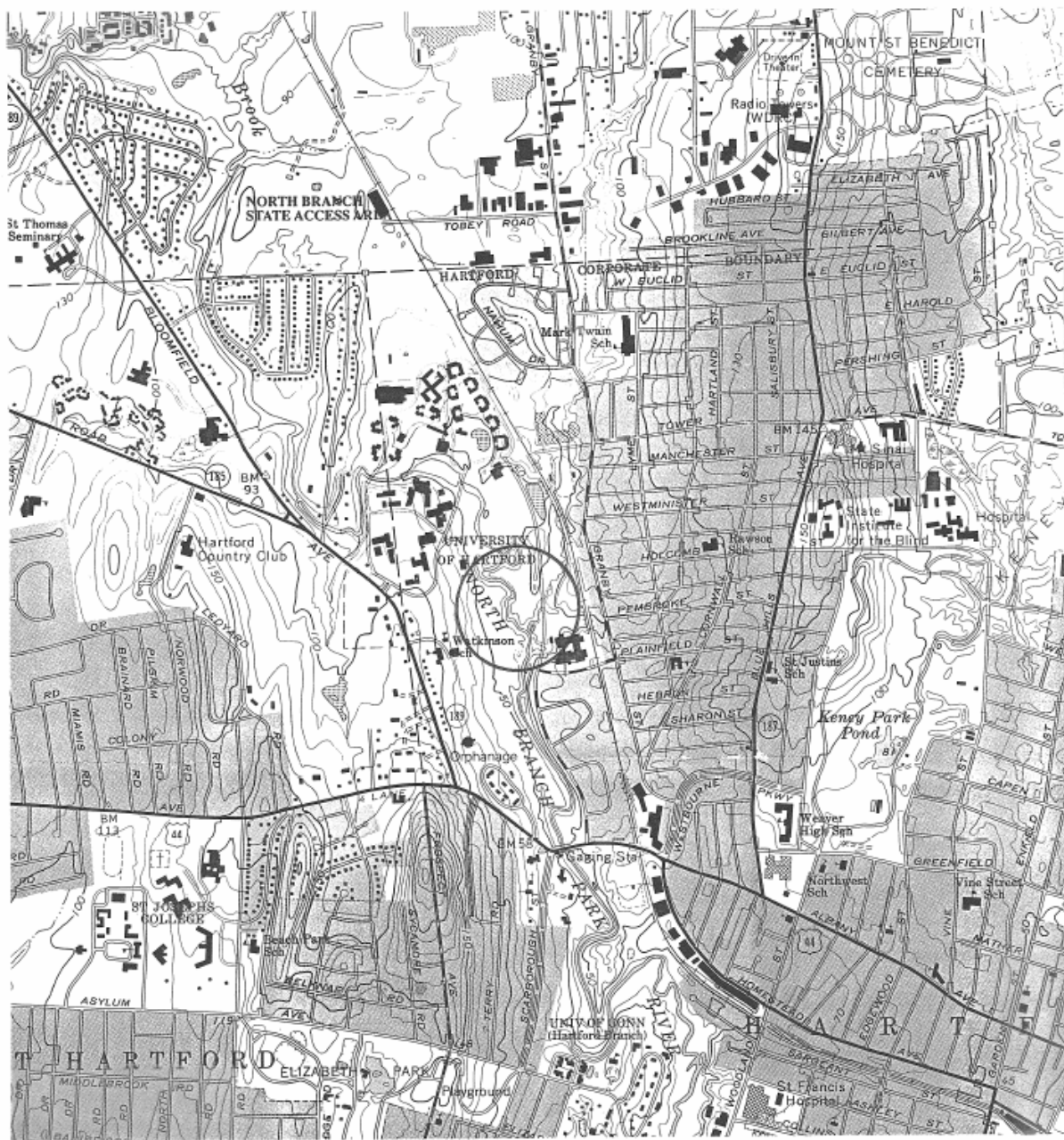
1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on November 18, 1997, and various Team members also made separate and/or additional field visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

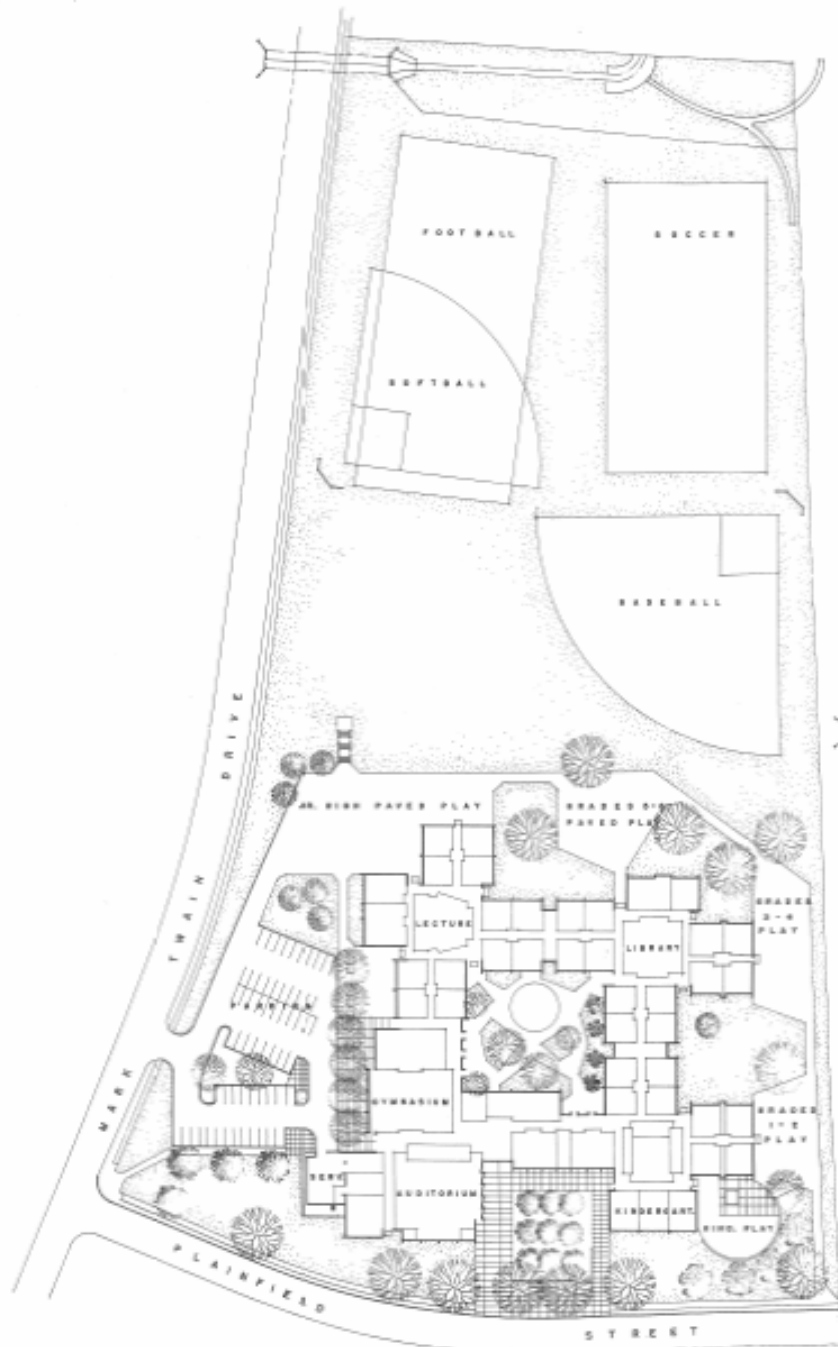
Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Figure 1  
General Location Map

Scale 1" = 2000'







**ANNIE FISHER ELEMENTARY SCHOOL**

RUSSELL, GIBSON & DONLON ARCHITECTS A.I.A.

SCALE: 1/8" = 1'-0"

Figure 3

# Topography and Geology

## Topography

The site proposed for use as a outdoor classroom and nature Trail straddles the floodplain of the North Branch of the Park River. It is a typical urban site as it has been significantly disturbed by the activities of "man." The eastern half of the site adjacent to the Annie Fisher School and the area along Mark Twain Drive is underlain by at least 10 feet of artificial fill (construction debris, broken concrete slabs, etc.). The course of the North Branch Park River and its tributaries bears the scars of human interference. It has been artificially straightened, channeled and deepened in several locations. The western side of the property is less severely impacted. Except for the areas obviously regraded for playing fields and building foundations the topography of much of the area is still close to its original pre-man state.

## Bedrock Geology

Although no bedrock is exposed on the site the area is known to be underlain by the same red-colored sedimentary rocks that outcrop in the bed of the North Branch Park River upstream of the University of Hartford (see USGS Geologic Quadrangle map 223). Students at the Annie Fisher School would probably be more familiar with similar rocks exposed in the large road cuts along I-84 in the vicinity of the Buckland Hills Mall and Dinosaur State Park in Rocky Hill. These rocks accumulated as sediments in elongated depressions 200 million years ago during the initial stages of the last opening of the Atlantic Ocean. Connecticut at the time was situated near the equator in the center of the large continent of "Pangea" and its climate was much more

arid and desert-like. A good readable account of the geologic history and environment of deposition of these redbeds can be found in Bell's *The Face of Connecticut*.

## Surficial Geology

The loose unconsolidated sediments which conceal the 200 million year old sedimentary bedrock were all deposited less than 30,000 years ago. The oldest material forming the gentle slopes along the western edge of the site were deposited at the base of flowing ice, 20-30,000 years ago during the height of the last major ice age to cover Connecticut. The sediment, commonly referred to as glacial till, is abraded and groundup underlying bedrock. It may well be several tens of feet thick and is characteristically very compact as it accumulated under the weight of several thousand feet of overlying ice.

14,000 years ago, the ice retreated north of the area. A thick deposit of sand and gravel in the vicinity of Rocky Hill dammed the Connecticut River forming Glacial Lake Hitchcock which flooded much of the present Connecticut River Valley. In the vicinity of Hartford the lake level reached an elevation of 150 feet. During the thousand or so years of the lakes existence the Annie Fisher School site was under 60 feet of water. Fine clay and silts settling out of the muddy glacial water accumulated locally to a depth of roughly 25 feet. The lake bottom sediment is very fine grained, gray to brown in color, thinly bedded and in places varved on a centimeter scale. [*varve: distinct layers of sediment indicating seasonal deposits*]

When, 12,000 years ago the debris dam at Rocky Hill was breached, Glacial Lake Hitchcock drained rapidly. The streams and rivers which had previously flowed into the lake now had to cut new channels across the exposed lake bottom sediments. The North Branch Park River established its present valley at that time and has since meandered back and forth across its floodplain depositing a thin (3-5 feet) blanket of

fine grain sands and gravel alluvium atop finer grained lake bottom sediments. [*alluvium: sedimentary material deposited by flowing water*]

The most recent sediment in the area was deposited by “man” sometime between 1960 and 1972 as fill to reclaim some wetlands along the east bank of the North Branch Park River. The fill is extremely inhomogeneous, consisting of concrete slabs and construction debris several feet across. In areas which have not since been landscaped and regraded, the last dump truck loads are recognizable as mounds ten feet or so in diameter. The deposit is at least 10 or more feet in thickness. The weight of this material has significantly increased the fluid pressures within the underlying fine grained lake sediments and at least one small “mud volcano” has appeared at the base of the steep cliff along the western edge of the fill.

## Geology Related Teaching Resources

A very readable account of the general geologic history of Connecticut can be found in Bell's *The Face of Connecticut: The People, Geology and the Land* published as Bulletin #110 of the Connecticut Geologic and Natural History Survey. This book describes the origin and history of Mesozoic bedrock, the glacial till and the Glacial Lake Hitchcock sediments that underlie the general area of the site.

More detailed site specific information can be extracted from the USGS's folio I-784 of the Hartford North Quadrangle. This folio is an exceptional resource for anyone planning environmental science activities focused on the site. The included maps show the distribution of:

- A. Unconsolidated Materials
- B. Bedrock Geology
- C. Contour Map of the Bedrock Surface
- D. Depth to Bedrock

- E. Thickness of Principal Clay Unit
- F. Thickness of Materials Overlying Principal Clay Unit
- G. Resources of Coarse Aggregate
- H. Landforms
- I. Natural Land Slopes
- J. Drainage Areas
- K. Availability of Groundwater
- L. Depth to Water Table
- M. Flood Prone Areas
- N. Low Flow of Streams
- O. Maximum Concentration of Dissolved Solids in Surface Water
- P. Location of Wells and Test Holes
- Q. Sites of Solid-Waste Storage and Liquid-Waste Discharge
- R. Sanitary and Water Related Facilities, Services and Use

A permanent trail along the edge of the North Branch Park River could allow students to see first hand the power of running water. Every year there is at least one flood that approaches a bank-full stage. It is at that time a river accomplishes most of its work. Perhaps students could take photos of some section of the river both before and after such an event. With this information they could answer such questions as: What size sediment moved? (paint or number a few rocks for easier identification). How fast was the water going at the peak of the flood? ( a video timing floating debris between two known points can be rather accurate). Did the size and position of sandbars change? Interesting map reading activities could be coupled with these activities. Where does the water passing the school come from (i.e. what is the drainage basin?) and where does it go?

In addition, students could also be exposed to the interrelationships of ecology and hydrology. The river will cause change. Erosion and deposition accompany every flood. Some banks may collapse, perhaps destroying a favorite tree or nesting site, but at the same time new sites for vegetation will be created. If students could document



such changes with photos and video over a period of several years (remember stream processes work on a time scale of several tens to hundreds of years) they may well develop a true appreciation for the value of change in natural processes.

# Soil Resources

This section provides general soils information for use in the creation of an outdoor classroom and/or trail system on property joining the three schools; the University of Hartford, The Annie Fisher School and the Watkinson School. While on-site, officials from the Annie Fisher School requested recommendations for improvements to the athletic field.

## Educational Trail System

### Soil Resources

The general mapping unit descriptions from the USDA Hartford County Soil Survey, 1962, shows soil types ranging from excessively drained to very poorly drained. The site consists of well drained Agawam, Bermudian (also known as Hadley), Broadbrook, and Enfield soils. Broadbrook mapping units steeper than 15% can be somewhat excessively well drained and the Alluvial soils found in the floodplain can range from well drained to very poorly drained. Other poorly drained soils are Limerick and Saco which is considered very poorly drained. Also present on the site are Made Land mapping units which are soils that have been disturbed due to excavating and filling.

Appendix A contains a soil map legend, a nontechnical soils description report, tables showing soil suitability for recreational development (including paths and trails), wildlife habitat, water and soil features, a hydric soils list and list of prime farmland soils. In addition are tables on woodland management and productivity, building site development and sanitary facilities. The information found in these reports can be used for the actual trail design as well as for educational material.

### **Current Soil Conditions**

There seems to be no apparent serious erosion concerns within the site evaluated for the proposed trail system, though there were some areas of streambank instability. Maintenance of existing vegetation and locating the trail away from the top of the streambank will help to avoid further erosion.

The existing trail system at the University of Hartford had only very minor soil condition concerns. There were two wet areas, located on the section of the trail west of the Park River and neither seemed to be in need of immediate attention. If the condition worsens where the trail approaches the river, a log crossing can be placed over the wet area. A wetlands permit may be required for certain activities within this floodplain area. The local wetlands commission and the State Department of Environmental Protection should be contacted before any construction begins. The second wet area is located in the middle of the slope where runoff crosses the trail. Potential erosion could be reduced by installing a small rock trail crossing to divert water across the trail and outlet it into existing stable vegetation.

If a bridge is to be installed to connect the trail systems on either side of the North Branch Park River, an erosion control plan should be included in the design plans necessary for permit applications. During construction, maintained haybale barriers can be used to help keep sediment from entering the river. All disturbed areas should be established to vegetation once construction is complete. A vegetated buffer zone established on either side of the bridge footings and along the top of the river bank will help to keep hikers on the trail and bridge only and reduce future erosion potential.

### **Trail Design**

By running the proposed trail parallel to Mark Twain Drive on the fill (Made Land), the floodplain and river can be observed and not disturbed by excess foot traffic. Avoidance of long steep sections of trail will help to reduce erosion. Creating a

“switchback” trail configuration on slopes and using water bars to divert water off the trail to a stable outlet are erosion control practices that can be effective.

Occasional side trails can be constructed to the river for closer observation. To reduce erosion and excessive impact to wetland areas, trails should be kept in the upland soils when possible. Trails within wetland areas should be located along the periphery, where there is less soil saturation. In addition, there may be areas within the floodplain that contain vernal pools. Such areas should not be disturbed, however they can offer excellent educational opportunities. Limiting access by using well-defined side trails will help protect these fragile ecosystems.

### **Comments on Athletic Field**

The main concern expressed was safety, due to the depressions forming in the field. In addition, the school would like recommendations for aesthetic improvements to the field.

The athletic field appears to have been filled to its current grade. There is a gully forming at the northern edge of the field where it abuts the existing woodland. There is a stream located within the woodland. The existing, long narrow low spot that splits the field in half and runs northerly into the woods, is currently acting as a swale. It appears that most of the surface water entering the field that does not enter the storm sewer system, travels through this existing swale into the adjacent woodland. The outlet for the swale is currently unstable and is contributing to sediment loading in the adjoining wetland system. The gully that has formed at the outlet is progressing into the athletic field and may become a safety concern as well.

The erosion seems to be caused by both subsurface water flow through assorted fill material and overland flow down the swale into an unstable outlet. (Fill containing bulky materials, such as asphalt, leaves space for soil to fall into through the years,

causing depressions at the ground's surface.) The sedimentation to the nearby wetland system poses a water quality concern.

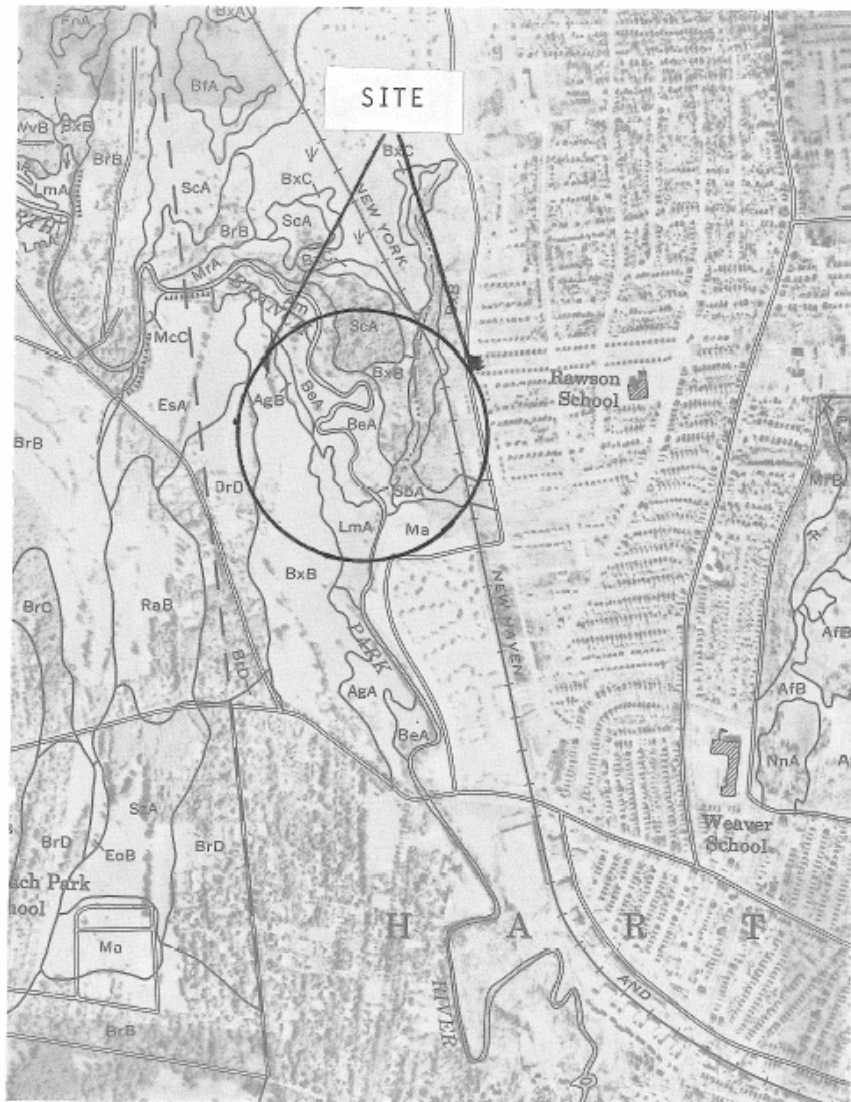
### **Athletic Field**

- ◆ Stabilizing the existing outlet is recommended to reduce sediment deposition in the wetland system and to decrease the potential for safety hazards within the athletic field.
  - A licensed professional engineer should be contacted to determine the type of outlet protection required.
  - Erosion control practices, such as haybale barriers should be installed before construction begins and maintained until permanent vegetation has been established. Temporary and permanent seedings should be established where appropriate. See the enclosed information about these practices in Appendix A.
  - A soil test should be taken before fertilizing and seeding to determine the necessary fertilizers. Appropriate seeding dates are either between May 15th and June 15th or August 15th and September 15th.
  
- ◆ Addressing the depressions within the field will require filling and grading.
  - One alternative is to remove all the bulky fill material and replace with soil, grade the area, spread topsoil, then fertilize and seed with the proper grass mixture. This method may be costly.
  - Another alternative is to fill in the depressions as they occur and seed to grass. When filling in these areas, directing surface waters to a stable outlet is important to avoid causing wet areas in the field.
  - For source of topsoil for the school, check with the City of Hartford and surrounding towns that may have leaf composting facilities. Grading should direct surface water to a stable outlet. When determining the appropriate

outlet protection for the existing swale, surface water for the entire field should be considered.

- ◆ Currently, the field consists of only grass and is mowed all the way from the edge of the road, to the fence line and to the edge of the parking lot.
  - Apple trees planted alongside the road could provide shade and an opportunity for school children to pick apples. When planting trees, do not plant under power lines unless they are a dwarf variety and also be sure to leave some space between the trees and the road for snow piles. By taking a soil sample and sending it to the University of Connecticut Soil Testing Lab, the proper amounts of fertilizer can be applied before planting the trees. The lab can be reached by calling (860)486-4274.
  - If wetland vegetation, such as cattails and sedge grasses grow in the swale, only mow once per year. This type of vegetation may help to clean stormwater runoff.
  - The fenceline on the eastern edge of the field could be planted with species to attract birds and other wildlife. Grapes are fall-bearing and may be one alternative to plant. Check with DEP Team wildlife biologist to determine the appropriate plantings. Also refer to the Wildlife Resources section and the Park Planner section for additional information.

**Figure 4**  
**Soils Map**



# Aquatic Resources

## Site Description

The outdoor classroom and nature trail is proposed for development along an approximate 4000 foot reach of the North Branch Park River within the properties of the Annie Fisher School, the University of Hartford, and the Watkinson School, Hartford. Through this reach, the river is contained in a channel nearly 40 feet in top of bank width and normal flow depths averaging 1.5 feet. The low to moderate gradient channel creates surface flow predominated by moving pool interspersed by shallow riffle. Stream substrate is composed of cobble, gravel, coarse sand, and sand-silt fines.

An unnamed tributary stream enters easterly to the North Branch Park River beneath Mark Twain Drive. The stream is similar in character to the North Branch Park River although it is significantly smaller being some 15 feet in top of bank width and normal flow depths averaging one foot or less.

Despite extensive development in the watershed, dense growths of hardwoods and woody shrubs predominate as riparian vegetation and provide the North Branch Park River and the unnamed tributary stream with a nearly complete canopy. Physical in-stream habitat is provided by the water depth in pools, undercut banks, and fallen or overhanging riparian vegetation. The extensive watershed development (as exemplified in several stormwater drainage discharges) has however, impacted water quality. The Department of Environmental Protection classifies the North Branch Park River and the unnamed tributary stream as *Class C/A* surface waters. Designated uses for surface water of this classification are certain fish and wildlife habitat, certain recreational activities, agricultural, industrial and other legitimate uses including navigation; swimming may be precluded. Although not currently meeting water quality



criteria, the goal for *Class C/A* waters is an improvement in water quality to *Class AA*, *A*, or *Class B* depending upon uses designated for the watercourse.

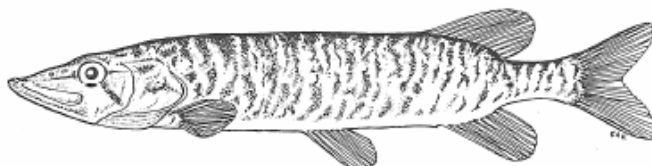
## Aquatic Resources

Based upon channel grade, morphology, and substrate composition, the North Branch Park River is classified as a cool water resource. The Fisheries Division has formally surveyed the river's finfish population with the most recent survey conducted August 23, 1988. The river reach surveyed was in the vicinity of the Annie Fisher School and Watkinson School. Species collected included redbfin pickerel (*Esox americanus*), common shiner (*Luxilus cornutus*), spottail shiner (*Notropis hudsonius*), tessellated darter (*Etheostoma olmstedii*), common carp (*Cyprinus carpio*), white sucker (*Catostomus commersoni*), and American eel (*Anguilla rostrata*). These species are native to cool water rivers and streams in Connecticut. In addition, the following warmwater lake and pond species were observed: largemouth bass (*Micropterus salmoides*), pumpkinseed sunfish (*Lepomis gibbosus*), redbreast sunfish (*Lepomis auritus*), and rock bass (*Ambloplites rupestris*). These species are likely to have emigrated from lakes or ponds within the immediate watershed. A copy of the survey results may be found in Appendix B.

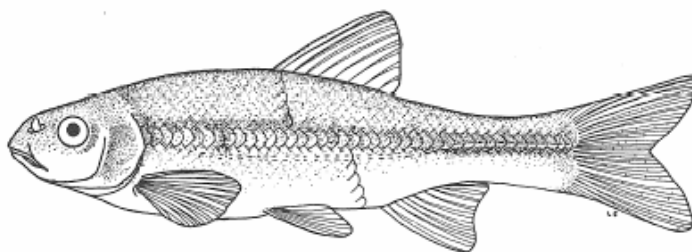
The unnamed tributary stream has never been surveyed by the Division but is anticipated to contain a finfish population similar to that of the North Branch Park River.

**Redfin Pickerel**

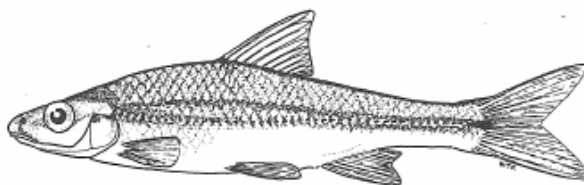
The redfin pickerel is a native fish that is most common in small streams in the lowland areas of the state. It is dark green dorsally, grass green laterally, and lighter ventrally; the sides commonly have dark vertical markings; the fins are almost orange in color. The species reaches lengths of 1 foot.

**Common Shiner**

The common shiner is a native fish and its preferred habitat is over sand and rock or gravel bottoms of streams. Spawning takes place in spring. Their food consists of invertebrates and algae. They are olivaceous dorsally with a dark mid-dorsal stripe, silver laterally, white ventrally; the sides commonly have scattered dark scales. Lengths of 8 inches are reached.

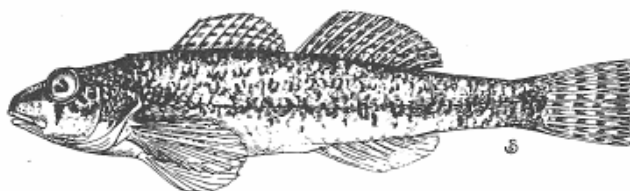
**Spottail Shiner**

The spottail shiner is a native fish that prefers large rivers and impoundments. This species spawns in the early spring. It feeds on small invertebrates and plant materials. The color pattern is greenish dorsally, silver laterally, white ventrally; a black caudal spot is commonly present; many preserved specimens have a dark lateral band. Lengths up to 3 inches are reached.



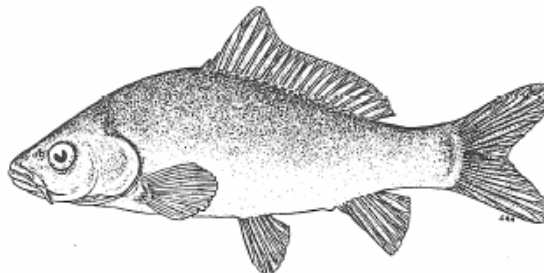
### **Tessellated Darter**

The tessellated darter is a native fish that is found in quiet waters and riffles of streams and occasionally in lakes and ponds. They spawn in late spring; eggs are laid on the under surfaces of rocks and guarded by the males until they hatch. Food consists of a variety of small invertebrates. This darter is olivaceous dorsally, lighter laterally, yellowish ventrally, and on its sides is row of dark blotches that commonly appear W-shaped. Lengths of 4 inches are reached.



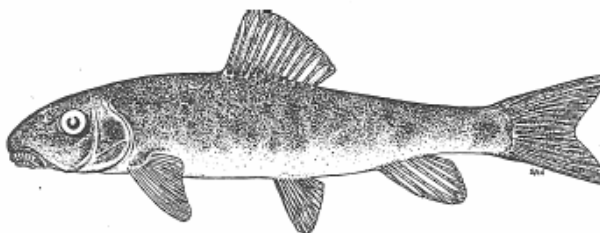
### **Carp**

The carp is an introduced Asiatic species and waters with low gradient are the preferred habitat. Spawning occurs in spring and eggs are broadcast over vegetation in shallow water. Carp consume a wide variety of plant and animal materials. They are grayish bronze dorsally, lighter laterally and ventrally. The mouth has two pairs of barbels. Carp are generally completely scaled. Lengths of up to 4 feet are reached.



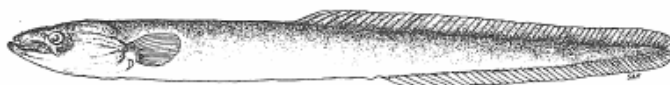
### **White Sucker**

The white sucker is a native fish. They spawn in the early spring and move upstream in large numbers to spawn throughout the day and night in riffles. There is no nest preparation or care of eggs and young. After spawning adults now move back into deeper waters of lakes and rivers, while young prefer muddy shallows. The food of this species consists of a wide variety of plant and animal materials. This sucker is olive bronze dorsally and laterally, and light ventrally; young often have a series of 3 dark blotches on the sides. Adults reach lengths of up to 18 inches.

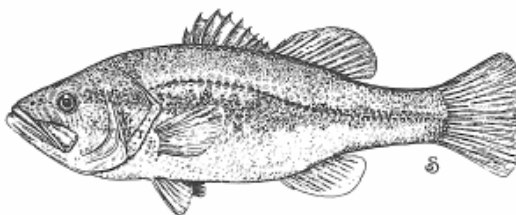


**American Eel**

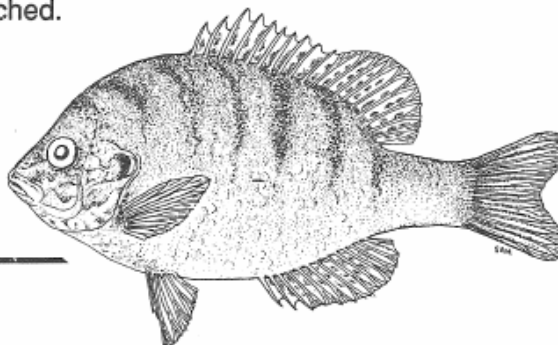
The American eel is catadromous which means that they spawn in the sea and spend most of their lives in brackish and freshwaters. This eel spawns in the South Atlantic (Sargasso Sea) in spring. The young males migrate into estuaries and the lower ends of rivers, while the females move far up rivers. They are nocturnal in habit and feed mainly on invertebrates and fish. After several years in freshwater, the mature fish return to the Sargasso Sea, spawn, and die. The American eel is brownish dorsally and laterally, yellow ventrally; pelvic fins are absent. Lengths up to 6 feet are reached.

**Largemouth Bass**

The largemouth bass is an introduced species that is found in weedy, mud-bottomed lakes and in sluggish streams. They favor warmer water than the smallmouth bass. Their food consists of invertebrates and fishes. This species is dark brown dorsally, lighter laterally, and whitish ventrally; a solid or broken lateral band is usually present. Lengths of 2 feet are reached.

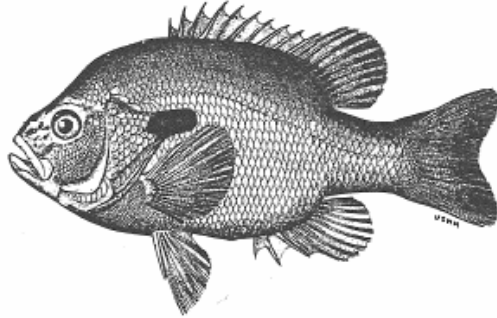
**Pumpkinseed**

The pumpkinseed is a native fish that is found in a variety of habitats including both standing and flowing bodies of water. Their food consists of invertebrates and small fishes. The pumpkinseed is olive green dorsally, lighter laterally, and orangish yellow ventrally. Its sides have small spots of orange, yellow, blue, and green. Lengths of about 1 foot can be reached.



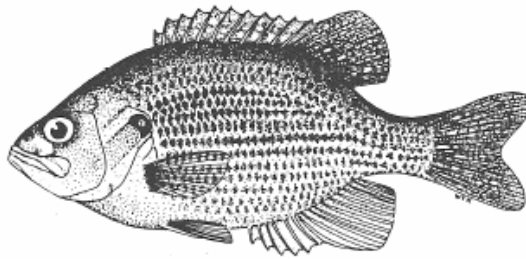
### Redbreast Sunfish

Redbreast sunfish prefer rivers and streams but are found in lakes and ponds. They are a native fish. They eat invertebrates and small fish. This sunfish is dark olivaceous dorsally, lighter laterally, and yellowish white ventrally; the sides of some individuals have vertical bars. Lengths of about 1 foot are reached by this species.



### Rock Bass

The rock bass is an introduced fish that prefers clear streams with rock bottoms and they tend to stay near pools and the shore. Their diet consists of invertebrates and fish. This species is dark brown to black dorsally, lighter laterally, and whitish ventrally; 4-6 dark saddles extend across the head and back and the sides have scattered dark spots on most of the scales. Lengths of up to 1 foot are reached by this species.



This information and these illustrations are taken from *Freshwater Fishes of Connecticut* by Walter R. Whitworth, Peter Berrier, and Walter T. Keller, Bulletin #101, DEP, State Geological and Natural History Survey of CT, 1968, reprinted in 1988.

### Glossary

dorsal - upper surface

lateral - to the sides

ventral - pertaining to the lower surface

barbel - fleshy protuberance in the form of a thread, flap or cone found around the mouth or chin.

## Impacts

As previously mentioned, dense growths of hardwoods and woody shrubs predominate as riparian vegetation along the reach of the North Branch Park River proposed for the outdoor classroom and nature trail serving both to protect riverine habitats and resources and offering an ideal educational setting. There is ample area adjacent to the river for incorporation of the trail in a manner not impacting the river's habitats or resources.

## Recommendations

The topography of the land adjacent to the North Branch Park River, especially along Mark Twain Drive, lends itself well to a trail which can provide a "birds-eye" view of the river and controlled access points to the channel. It should be a relatively simple undertaking to connect the proposed trail to one existing along Mark Twain Drive on property of the University of Hartford.

The suggestion of spanning the North Branch Park River with a pedestrian bridge for access to a trail westerly along the river is a more complex issue. It is likely that such a structure would require extensive engineering design to satisfy safety and regulatory concerns which, coupled with construction, may become cost prohibitive. Trails along either bound of the river are best maintained as separate entities.

Signage should be erected along the trail(s) at select locations to describe the function of key features of the river such as pools, riffles, riparian area, and the consequence of stormwater discharges. An initial scheme 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 a 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 finfish. During low flows pools can become isolated pockets of water which allow survival of finfish and other aquatic organisms.
3. **Riffles.** Areas of shallower, faster moving water with coarser bed materials. Riffles are most often associated with "white water," a turbulence which adds oxygen to water. Riffles tend to support higher densities of aquatic insects and are thus important areas of finfish food production. Riffles also serve as a spawning site for most stream finfish. Due to competition and predation, juvenile and small sized finfish tend to inhabit riffles.
4. **Riparian area.** The riparian area is that section of land which adjoins the river channel. A well vegetated riparian area is critical to the health of the river ecosystem. Roots of trees, shrubs, and grasses bind the river bank soils and provide a resistance to the erosive forces of flowing water. Stems and leaves of river bank vegetation provide shade which prevents high water temperatures. Leaves, stems, and other plant parts that fall into the river provide food for aquatic insects. Large woody debris that fall into the river enhance physical habitat. Abundant riparian vegetation softens rainfall and enables the riparian area to serve as a reservoir storing surplus runoff for a gradual release to the river during low flow periods of summer and early fall. The riparian area is a natural filter which removes nutrients, sediments, and other non-point source pollutants from overland runoff.
5. **Stormwater discharge.** Urban development typically results in large impervious areas such as roadways, sidewalks, parking lots, and rooftops that shed water during rainstorms. Unlike vegetated areas, where water can soak into the ground

after storms, runoff from impervious areas of urban areas increase the amount and velocity of water runoff causing dramatic fluctuations of river flow resulting in bank erosion, damage to riparian vegetation, and widening of the river channel. This will result in lower water depths during non-storm periods, higher than normal water levels during wet weather periods, and higher water temperatures. The quality of river water can be significantly affected by stormwater discharge. Motor oil, grease, gasoline, and sediment are commonly found in stormwater drainage. In addition, a variety of fertilizers and pesticides are used to maintain lawns and gardens; these substances often find their way into stormwater. Native finfish and other aquatic life cannot survive in rivers severely impacted by stormwater runoff.



# Vegetation

The review site proposed for the potential development of an interpretive nature trail and outdoor classroom to be used by students of Annie Fisher School, The University of Hartford, Watkinson School and Weaver High School totals approximately 130 acres. The unmaintained open space adjacent to these schools has high vegetative diversity which is reflected by its high level of species richness. The development of an interpretive nature trail and stations along the trail which incorporate appropriate Project Learning Tree (PLT) material would be especially valuable for students learning about the local ecosystems. The sensitive nature of the flood plain environments which are present and the proposed Park River crossing pose special problems which must be addressed in the design and construction of the trail system. The utilization of boardwalks, bridges, wood chips and crushed stone for the foot pathways will define the trail and reduce the negative impact of use. Due to the fragile nature of this site and the vegetation which is present, large scale forest management is not appropriate. Limited light thinnings which focus on releasing selected trees to full sunlight could be implemented for demonstration purposes.

The vegetation present on the review site falls into several broad categories. These include Flood Plain/Wetland vegetation, Old Field vegetation, Conifer Plantation, Mixed Hardwoods, Open Swamp, Mowed Grass, Athletic Field and Maintained Right-of-Way. Below are brief descriptions of each of the vegetation categories. The location and acreage of these areas were obtained from 1995 aerial photographs and are only approximate. They are depicted on Figure 5 (the Vegetation Map). A more comprehensive inventory of the herbaceous vegetation which is present in each of these categories should be made at different times throughout the year by a botanist.

## Flood Plain/Wetland

Approximately 64 acres of the site falls into the flood plain/wetland category which is associated with the North Branch Park River. These flood plain areas are somewhat variable with all size classes and age classes of trees represented. Each forested flood plain area is unique, however they are characterized by the presence of red maple with any or all of the following tree species intermixed: eastern cottonwood, silver maple, box elder, sugar maple, Norway maple\*, basswood, sycamore, black willow, hawthorn, red mulberry, white pine, black gum, white ash, American elm, yellow birch, black birch, black locust, pin cherry, shagbark hickory, swamp white oak, red oak, black oak and pin oak. A few of the larger trees in these wetland areas have cavities which make excellent den sites for many species of wildlife. The standing dead trees and the dead trees on the ground which are present are also valuable to wildlife. Understory vegetation includes buckthorn\*, crab apple, pussy willow, spice bush, winterberry, hawthorne, shadbush, speckled alder, American hornbeam, highbush blueberry, red osier dogwood, flowering dogwood, choke cherry, gray birch, winged euonymous\*, swamp azalea, tartarian honeysuckle\*, arrowwood, witch-hazel, winterberry, multiflora rose\*, swamp rose, staghorn sumac, smooth sumac, and Japanese barberry\*. Vines and ground cover vegetation include poison ivy, Virginia creeper, Asiatic bittersweet\*, grape, Japanese honeysuckle\*, green briar, bull briar, raspberry, Japanese knotweed\*, stinging nettle, steplebush, meadowsweet, skunk cabbage, tussock sedge, clubmoss, horsetail, sphagnum moss, Christmas fern, cinnamon fern, sensitive fern, evergreen wood fern, Canada mayflower, spotted wintergreen, sedge spp., aster spp. and other wild flower and weed species. Portions of this flood plain ecosystem were filled and built up during the development of the surrounding properties. Some areas along Mark Twain Drive were filled but never developed. These areas have been revegetated naturally with many of the above species.

## Old Field

The old field vegetation type occupies about 21 acres of this site and may be found in several locations to the west of the Park River. The vegetation which is present in these areas is variable. This is primarily due to soil moisture differences and the timing of the establishment and spread of hardwood shrubs and trees. Buckthorn\*, flowering dogwood, gray-stemmed dogwood, silky dogwood, alternate-leaved dogwood, red maple, quaking aspen, speckled alder, highbush blueberry, multiflora rose\*, autumn olive\*, arrowwood, choke cherry, crab apple, Tartarian honeysuckle\* and staghorn sumac are scattered throughout this vegetation type. White pine, white spruce and larch have been planted in several of the fields. Ground cover vegetation is comprised of grasses, sedges, poison ivy, goldenrod, ragweed, raspberry, cinquefoil, Queen Anne's lace, milkweed, Joe-Pye-weed, thistle, daisy fleabane, Japanese knotweed\*, elderberry, spirea, meadowsweet and other wildflower and weed species. Purple loosestrife\* and cattails have become established in the wetter sections of these fields.

## Plantation

Pole and sawtimber size (trees 6" and larger in diameter at breast height) white pine and larch are present in two plantations which total approximately 3.5 acres. These trees were probably planted in the early 1900's. Many are in a reasonably healthy condition. Red maple, pin oak, black cherry, crab apple and buckthorn\* have become established where openings in the overstory were present in the past. Today understory and ground cover vegetation is sparse due to the limited sunlight which reaches the forest floor. The white pine in this stand would respond well to a demonstration thinning. Healthy "Crop Trees" could be chosen and released to full sunlight on several sides by removing competing trees. Trees that are removed could be used to create brush piles for wildlife cover. Some of the competing trees could

also be deadened in place and left standing for wildlife. It is important, however, that the standing dead trees do not become a risk to users of the area. Crab apple trees can provide quality food for many species of wildlife. Releasing these trees to full sunlight will improve their health and vigor and result in increased flowering and fruit production. Once again the trees that are removed may be used to create brush piles.

### **Mixed Hardwoods**

This vegetation category totals approximately 2 acres and is located adjacent to mowed grass, gardens and an old field. The trees which are present range in size from small seedlings to moderately sized sawtimber (trees 11.1" and larger in diameter at breast height). The larger trees range between 60 and 100+ years of age, are reasonably healthy and make good specimen trees. Scarlet oak, red oak, pin oak, shagbark hickory, red maple, black cherry and flowering dogwood are the most common tree species present. Understory vegetation includes hardwood tree seedlings, buckthorn\*, barberry\* and highbush blueberry. Vine and ground cover vegetation includes grasses, poison ivy, Virginia creeper, green briar, Asiatic bittersweet\*, raspberry, wood aster and several species of clubmoss.

### **Open Swamp**

A ±2 acre open swamp is located in the northeastern section of this site. It is drained by a small tributary of the North Branch Park River. Flood plain vegetation, which is dominated by red maple surrounds this area. Red maple seedlings, button bush, common reed\*, purple loosestrife\* and tussock sedge are present around the edges of the open water.

### **Mowed Grass**

There are approximately 25 acres of maintained lawn within the review site. Numerous urban trees have been established. These trees are providing shade and improving the aesthetics of the area.

### **Athletic Field**

±12 acres of maintained athletic fields are present within the review site. These areas are mowed regularly.

### **Right-of-way**

The vegetation which is present on the maintained right-of-way is dominated by grasses, sedges, wild flowers and weed species along with shrub and tree seedlings. Some wild flower and weed species which were observed include daisy fleabane, ox-eye daisy, black-eyed Susan, milkweed, goldenrod spp., ragweed spp., poison ivy, bittersweet\* and raspberry. The shrub and tree seedlings which have become established include staghorn sumac, buckthorn\*, flowering dogwood, crab apple, choke cherry and red maple. Periodic mowing keeps the shrub and tree species from taking over.

\*Invasive exotic vegetation has become established on much of the review site. Of special concern are several invasive plant species which have the potential to become major components of the ecosystem by out competing with native species. These include Norway maple, buckthorn, winged euonymous, Asiatic bittersweet, autumn olive, Japanese honeysuckle, tartarian honeysuckle, purple loosestrife, common reed, Japanese knotweed, barberry and multiflora rose. Although many of these species provide wildlife with food and cover, they are aggressive competitors with native plant species. Mechanical removal of these plants may be difficult, but it is effective. In some areas the presence of one or more of these species has precluded the establishment of other more desirable native species.

## **Hazards**

Potential hazards on this property relating to the vegetation include poison ivy, stinging nettle and trees that have a high risk of injuring people that are utilizing the property. New trails should be located to avoid areas of poison ivy and stinging nettle. Poison ivy and stinging nettle which is present along existing trails should be eradicated or well labeled so that it can be avoided. Trees with a major portion of their roots exposed, dead trees, dead tree parts and those trees which have a high probability of falling due to excessive decay or lean would be considered hazardous. These high risk trees should be located, evaluated and perhaps removed if they are located near areas of high use such as the proposed interpretive nature trail or the outdoor classroom.

### **More In-depth Information**

Forests are dynamic, living systems that are ever changing through time. Planning, development and maintenance of the interpretive nature trail, outdoor classroom and demonstration stations will be an on going project. In-depth information regarding Project Learning Tree is available from the Department of Environmental's Division of Communication and Education. Foresters are available from the Connecticut DEP Division of Forestry to assist with this project on a more in-depth technical level. A listing of Certified Consulting Foresters that charge a fee for services not provided by the DEP Foresters is available from the Division of Forestry.

**Figure 5**  
**Vegetation Map**

**NORTH**



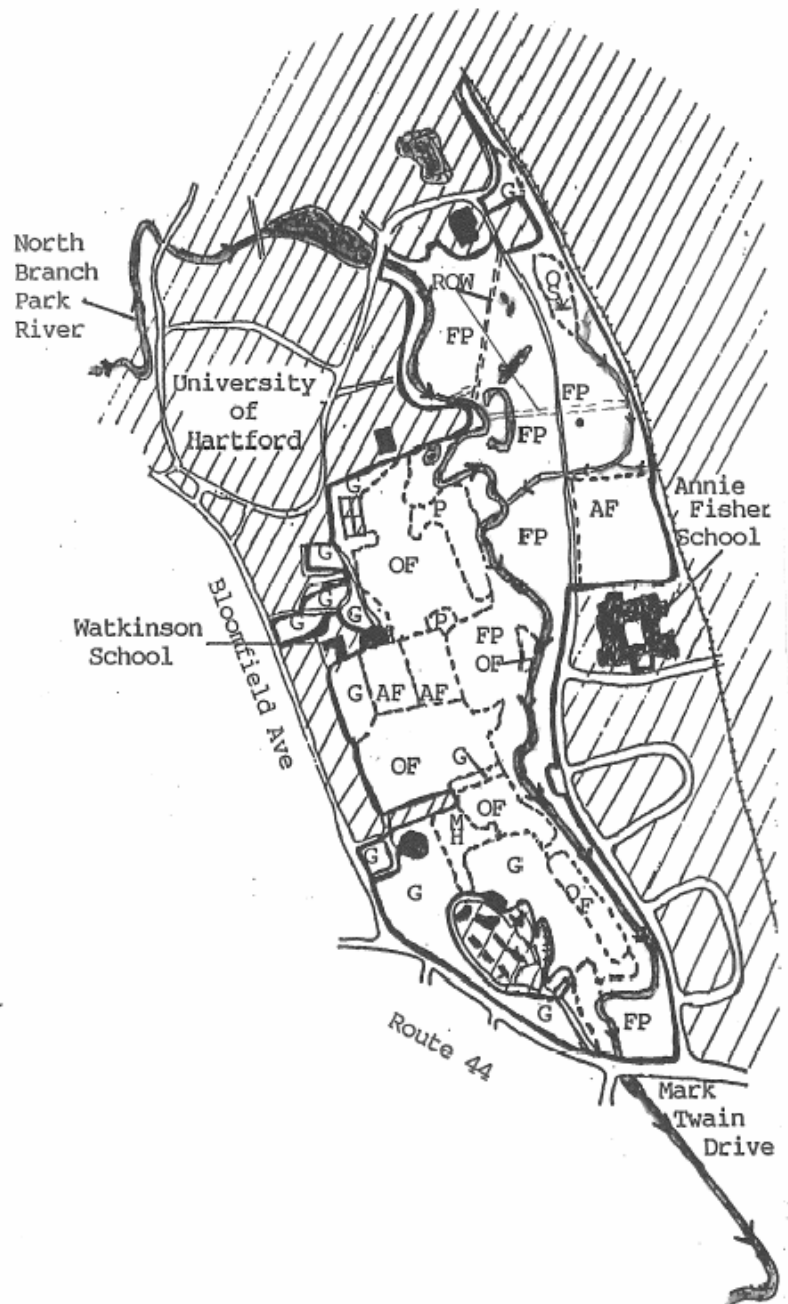
**SCALE 1"=1000'**

**VEGETATION TYPES**

- FP- Flood Plain/Wetland...64+- ACRES**
- OF- Old Field.....21+- ACRES**
- P- Plantation.....3.5+- ACRES**
- MH- Mixed Hardwoods.....2+- ACRES**
- OS- Open Swamp.....2+- ACRES**
- G- Mowed Grass.....25+- ACRES**
- AF- Athletic Field.....12+- ACRES**
- ROW- Right-Of-Way.....0.5+- ACRES**

**LEGEND**

- SITE BOUNDARY**
- VEGETATION BOUNDARY**
- ROAD**
- RAILROAD**
- RIVER**
- STREAM**
- POND**
- STRUCTURES**
- DEVELOPED**





# Wildlife Resources

## Current conditions

The following wildlife were observed during the site inspection either directly or indirectly and evidence of their presence was confirmed by identifying tracks, scat, calls, or other sign: European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), white-throated sparrow (*Zonotrichia albicollis*), mourning dove (*Zenaidura macroura*), Northern cardinal (*Cardinalis cardinalis*), bluejay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), black-capped chickadee (*Parus atricapillus*), downy woodpecker (*Picoides pubescens*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), meadow vole (*Microtus pennsylvanicus*), Eastern chipmunk (*Tamias striatus*), gray squirrel (*Sciurus carolinensis*), cottontail (*Sylvilagus spp.*), white-tailed deer (*Odocoileus virginianus*), and eastern coyote (*Canis latrans*). One can expect these natural areas to be frequented by a variety of common adaptable wildlife as well as some of the less known forest interior wildlife during seasonal migrations. The area contains a variety of forest succession conditions. Notable is the early successional habitat (old fields) along the west side which is in decline in most of Connecticut. Evidence of white-tailed deer is found throughout the properties included in this review. Deer tracks, browsed twigs, droppings, and antler rubs were found throughout the floodplain area. Although there is a sizeable conifer stand (white pine and tamarack (a.k.a. larch)), there is a general lack of evergreen cover in the lower forest canopy. Invasive non-native vegetation occurs throughout the area, displacing more valuable native vegetation. The properties included in this review, collectively form a significant wildlife corridor and natural area.

## **Effects of Urbanization on Wildlife**

As time passes, land use patterns fragment natural areas of the landscape into smaller more isolated pieces. The long term effect of typical urbanization on wildlife is that some species adapt to the changed conditions and may actually increase whereas many decline. Habitat quantity and quality diminishes for those species which tend to require larger patches of forest, especially interior forest. Bird life can expect to be comprised of generalists which are highly adaptable to small patches. Seasonal occurrences of birds of prey and interior forest songbirds may occur during stopovers for resting and feeding as they move south during the fall and north during the spring. Mammalian wildlife are typically comprised of generalists which tend to have smaller home ranges and/or are highly adaptable, however occasional visitation of wildlife such as a transient black bear may occur. Reptiles and amphibians can expect to be impacted by various things such as isolation from other herptile populations, loss of or diminished special breeding habitat (vernal pools), and lack of migratory pathways between breeding and foraging areas.

## **Planning for Wildlife**

Land that is public ownership can be managed for wildlife habitat for the long term. In contrast, private land, which consists of 88 percent of the land in Connecticut, usually changes ownership and is mostly not managed for wildlife for the long term. Properly managed public land, in conjunction with private land, can conserve its natural features and benefit the region's biodiversity. Wildlife habitat near suburban and urban areas can be places for citizens to enjoy wildlife in close proximity to where they live. Properties of educational institutions can be managed with an eye for providing habitat for wildlife and environmental education. It can also be a place for students, teachers

and the general public to learn more about nature. In a survey of urban residents from 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 were interested in wildlife in the backyard or neighborhood area (Brown et al. 1979).

Wildlife habitat is represented by the collective summation of all the environmental factors that occur at a given location such as food, water, cover and their spatial arrangement. As Hartford's natural areas become smaller and more isolated, the value of remaining natural areas will collectively increase in value for wildlife. The school properties collectively provide diverse habitat conditions which are utilized by wildlife. These natural areas will provide habitat for wildlife and be places to observe natural vegetation and the associated wildlife. The properties can be useful in teaching the students and adults of the community how to recognize the various components of habitat and help them understand the **function of habitat** and the **importance of habitat for the existence of wildlife**.

The natural areas included in this report are uniquely positioned to create a large educational outdoor nature classroom.

## Outdoor Classroom Nature Trail

An outdoor classroom trail system can revolve around the theme that wildlife need food, water, cover and space to survive. For basic learning, habitat can be broken down into components such as:

- 1- Spring and early summer seeds
- 2- Summer berries
- 3- Fall berries
- 4- Winter persistent foods
- 5- Conifers and evergreens
- 6- Nuts and acorns
- 7- Grasses and forbs
- 8- Nectar plants
- 9- Dead or decaying trees
- 10- Artificial nest boxes
- 11- Brush and/or rock piles
- 12- Water sources / vernal pools

Each component of habitat has representative examples that can be located on the properties along the trail. The plants which supply the seasonal foods and cover for wildlife can be identified using trail signs or markers. Select areas can have seating arrangements (ranging from horizontally placed logs to wooden benches) for a small group to sit and discuss the ecological significance of a particular spot along the trail.

## **How Many Trails and Where?**

Given the size of the property, location of the schools, and the floodplain conditions, it may be best to configure two separate trails (see Figure 6). Each trail will have its own uniqueness and allow teachers to plan their lessons accordingly. Field trips can include one of the trails or both, depending on time and teaching objectives. Also a trail guide can be developed which corresponds to numbered stops along the trail. This can reduce the maintenance of signs and requires the trail user to pick up a guide from the school or centralized trail head. The trail system, however, should not criss-cross the entire area because wildlife need places where they can avoid constant disturbance from hikers. This is especially important during the nesting season. Hikers should be encouraged to stay on well marked trails and avoid blazing additional unauthorized trails. A bridge could be built to connect the trail over the Park River, however this may be costly.

## **Hartford's Landuse / Cover Statistics**

Review of the DEP's geographic information systems landuse /land cover data for the city of Hartford shows that Hartford is approximately 7 percent forested, compared to about 59 percent statewide (see Table 1). Of Hartford's 11,554 acres, only about 797 acres are forested. It is important to note that the properties included in this report are not only suitable for outdoor nature classrooms, but also form a significant portion of the forested wetland area ( 117.02 acres) remaining in Hartford. Proper care and management of the properties included in this report will become increasingly important as Hartford becomes further developed.

The properties need to have a long term plan which contains goals and objectives for maintaining the trails and the habitat. Also, in concert, with the habitat management, a plan is needed for utilizing the property for educational purposes. It may be helpful to have the outdoor classroom project have several phases which establish priorities and timelines. A yearly budget and schedule should be prepared to ensure the maintenance and longevity of such a project.

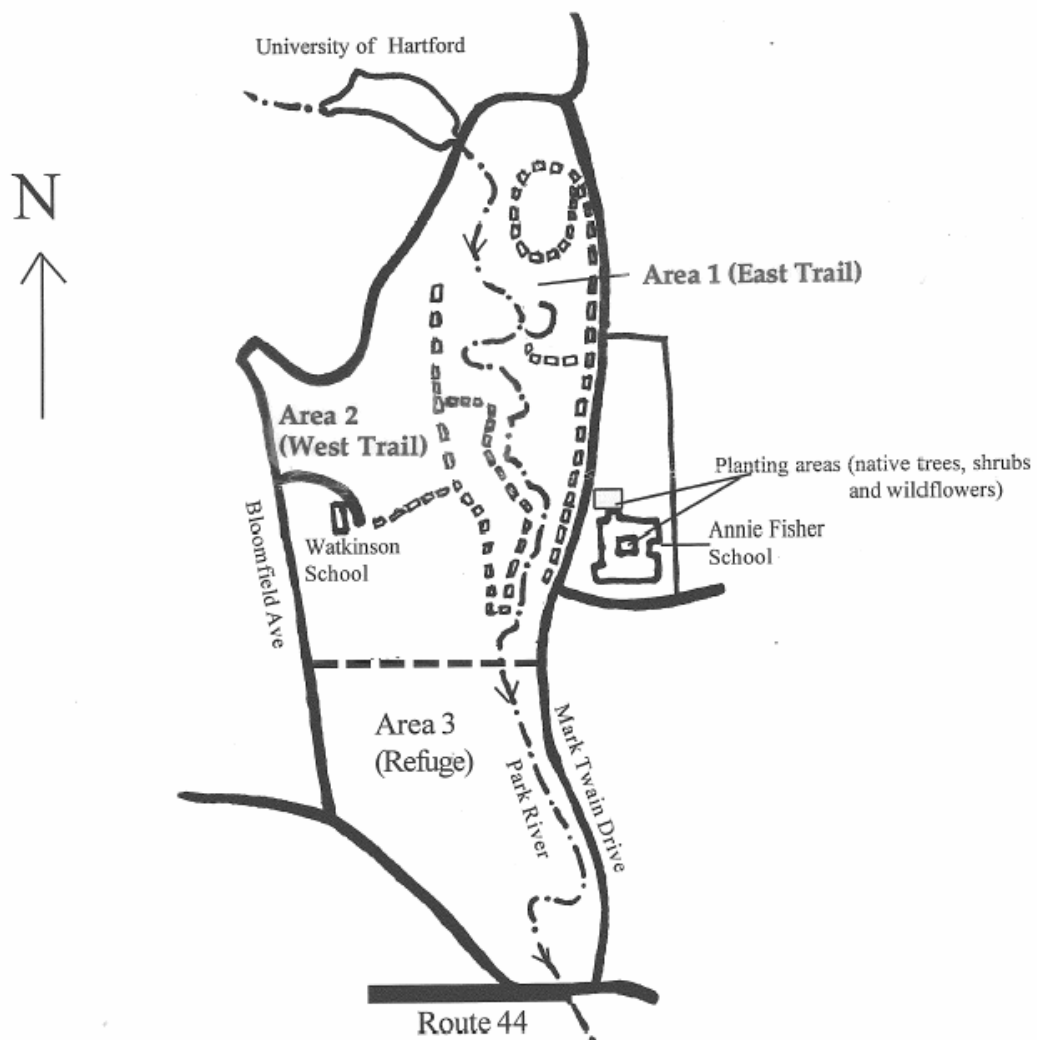
**Table 1.** Landuse/cover statistics are from DEP-Natural Resources Center/ Geographic Information Systems, 79 Elm Street, Hartford; updated August 30, 1996. The landuse/cover categories listed are only those found within the town.

### Hartford Land-Use Data

Total area size: 11,553.6 acres = 18.05 square miles

<b>Land-use/Cover Category</b>	<b>Acres</b>	<b>Percent of Total Area</b>
Impervious Surface	2,438.72	21.11
Residential High Density	2,708.84	23.45
Residential Medium Density	2,346.14	20.31
Surface - Roof	84.27	0.73
Pavement	23.79	0.21
Grass (turf)	275.78	2.39
Soil (hay/pasture)	260.37	2.25
Grass (hay/pasture)	643.75	5.57
Soil (corn)	8.98	0.08
Grass (corn)	15.66	0.14
Forest (deciduous)	635.06	5.57
Forest (coniferous)	44.99	0.39
Forest (wetland)	117.02	1.01
Water (deep)	369.10	3.19
Water (shallow)	165.49	1.43
Land (barren)	226.55	1.96
Soil (bare)	303.64	2.63
Road (major)	885.44	7.66

Figure 6



Hypothetical layout of nature trails for Annie Fisher Elementary School, Watkinson School and University of Hartford properties. Trails go through many of the habitat features and points of interest on the properties.

### Legend

- Area 1 - East side trails stay on the east side of the Park River and includes the abandoned fitness trail.
- Area 2 - West side trails stay on the west side of Park River.
- Area 3 - Should remain without foot trails and be a refuge for wildlife.

□□□□□ = nature trails

## **Habitat Management**

The area, although diverse with natural vegetation, contains many invasive non-natives. Controlling invasive non-native plants will require a diligent application of mechanical removal by hand, pick and shovel, and tractor (back-hoe). Also, application of herbicides may be necessary for some invasives to prevent resprouting of cut stumps (if herbicide use is a major concern - least environmentally sensitive compounds can be used). The need for controlling invasive non-natives outweighs the risks of utilizing herbicides. Managing invasive non-natives along the trail and on adjacent open space land should be planned and strategies should be implemented to reduce their impacts to the natural habitats. Limited herbicide use should not be ruled out as an option to control some of the particularly aggressive invasive plants. It is advised to consult with the Connecticut Agricultural Experiment Station (Dr. Todd Mervosh) at 860-683-4984 for advice on herbicides.



## Plantings

Plantings for improving seasonal food sources and cover can be accomplished along the trail and especially on the school grounds. School's can enhance areas with a variety of native trees, shrubs and wildflowers. Technical assistance is available from the Team wildlife biologist. Plantings should not be of invasive non-natives. The following plants should not be planted and, if present, removed:

### Invasive Non-native Trees

Norway Maple (*Acer platanoides*)

Privet (*Ligustrum spp.*)

Tree of Heaven (*Ailanthus altissima*)

Catalpa (*Catalpa spp.*)

Common buckthorn (*Rhamnus cathartica*)

Glossy Buckthorn (*Rhamnus frangula*)

### Invasive Non-native Shrubs

Autumn Olive (*Elaeagnus umbellata*)

Multiflora Rose (*Rosa multiflora*)

Russian Olive (*Elaeagnus angustifolia*)

Winged Euonymus (*Euonymus alatus*)

Burning Bush (*Euonymus atropurpureus*)

### Invasive Non-native Vines

Asiatic Bittersweet (*Celastrus orbiculatus*)

Tartarian Honeysuckle (*Lonicera tatarica*)

Japanese Honeysuckle (*Lonicera japonica*)

Some habitat improvements can be established by planting native trees, shrubs or wild flowers to enhance or diversify food or cover. For example: if it is determined that there is a lack of persistent winter foods on the property - then a planting of winter persistent shrubs such as winterberry (*Ilex verticillata*), high bush cranberry viburnum (*Viburnum trilobum*) or bayberry (*Myrica pensylvanica*) can benefit wildlife in the winter months. Another example of an enhancement might be to plant some early summer food sources such as: red mulberry (*Morus rubra*) or high bush blueberry (*Vaccinium corymbosum*). Planting of wild flowers or maintenance of unmowed lawn areas can help attract butterflies and/or hummingbirds.

Creation of evergreen cover will provide valuable wildlife cover and shelter especially during harsh winter weather. This component can be added by planting clusters (5 feet by 5 feet spacing, a quarter acre or more in size) of mixed evergreens such as white pine (*Pinus strobus*), white spruce (*Picea glauca*), and norway spruce (*Picea abies*) in appropriate areas (contact the Team wildlife biologist).

Plant materials should be of native sources as much as possible. Plantings should strive to be complimentary to the existing habitat and species which occur in the particular habitat area should be utilized. Careful observation of plant communities and plant succession of a particular area will help formulate species lists for enhancement or restoration. Plant species which restore and enhance natural habitat conditions should be utilized and invasive non-native species avoided. Plantings of native trees, shrubs and wildflowers can enhance conditions for wildlife in the area. Planting should strive to diversify the seasonal availability of food sources such as planting spring, summer, fall, or winter persistent food sources. Enhancement of seasonal food sources benefits resident wildlife as well as migratory species which may come through in spring and fall periods. The following is a select list of native plants which can be used to enhance the property (some species are currently found on the property):

**Native Trees**

Flowering dogwood (*Cornus florida*)  
 Black Cherry (*Prunus serotina*)  
 White Pine (*pinus strobus*)  
 Eastern Red Cedar (*Juniperus virginiana*)

**Native Shrubs**

Gray dogwood (*Cornus racemosa*)  
 Silky dogwood (*Cornus amomum*)  
 Arrowwood viburnum (*Viburnum recognitum*)  
 Nannyberry viburnum (*Viburnum lentago*)  
 Common Elderberry (*Sambucus canadensis*)  
 Winterberry (*Ilex verticillata*)

**Additional Native Plants (not currently found on property)**

American Holly (*Ilex opaca*)  
 Bayberry (*Myrica pensylvanica*)  
 American Cranberry Bush (*Viburnum trilobum*)  
 Sweet pepperbush (*Clethra alnifolia*)  
 Hackberry (*Celtis occidentalis*)

**Meadow Environment Plantings**

Encourage native wildflowers through selective mowing. Maintain herbaceous environment by mowing fields at least once a year to prevent woody plant invasion. Plant / seed native wildflowers throughout the open meadow areas.

**Native Plant Sources**

New England Wildflower Society, Inc.  
 Garden in the Woods  
 Hemenway Road  
 Framingham, MA 01701 -2699

Tel. (617) 237-4924 or 877-7630

DEP Forestry Division  
Seedling Program  
Pachaug State Nursery  
Box 23A, 190 Sheldon Road  
Voluntown, CT 06384

Tel. (860) 376-2513

## **Other Schoolyard Habitat Enhancements**

Students can create cover by constructing brushpiles using cut brush (invasive exotics) from cleared areas or by gathering fallen tree limbs. They may also collect used real Christmas trees and pile them up in appropriate areas. This helps them learn about the importance of wildlife cover and how to provide it.

Cavity nesters can be aided through the placement of artificial nest boxes. The students can build nest boxes for House wrens, Black-capped chickadees, Gray squirrels, and Screech owls, to mention a few. They should be built to specifications and then placed into appropriate habitats. The students should be able to recognize the need for some wildlife to find dead or decaying trees (snags) for part of their habitat requirements and that artificial nest boxes are mimicking the natural cavities found on the landscape. Snags can be artificially created through the girdling of unwanted (invasive exotics) trees which will eventually develop cavities. Three to five snags and one den tree per acre is recommended. Technical specifications are available upon request from the Team wildlife biologist.

### **Annie Fisher School Courtyard**

The courtyard can be enhanced by planting a diversity of native wildflowers and shrubs. Plants which serve as nectar sources for butterflies and hummingbirds should be planted. Larval food plants of butterflies can be planted to educate children about insect life cycles. Specific technical assistance is available from the Team wildlife biologist.

### **Athletic Field Area**

This large mowed field can be creatively enhanced through plantings of appropriate trees, shrubs and wildflowers. Planting materials should be of indigenous species that complement the surrounding natural area. The Team wildlife biologist is available for further consultation.

## **Practical Wildlife Censusing Techniques**

Counting or documenting the presence or absence of wildlife along the nature trail can be both fun and educational for the students. It also teaches the importance of record keeping and identification of wildlife (directly and indirectly).

- Locate nests and other important wildlife occurrences
  - seasonally locate nests and plot locations on maps
  - find den trees and natural cavities in trees and find out what animal is using it
  - place artificial nest boxes out and monitor use
  
- Owl hooting survey
  - play an owl hooting tape and listen for response
  
- Bird Count
  - learn to identify birds by sound and vision and document their presence in the spring, summer, fall and winter.
  
- Snow tracking
  - following a light snow (2-3 inches), animal tracks can be identified and followed to see where they are travelling to and from. Also, students may detect and document what the animal had been eating or doing.

- Field stations can be set up along the nature trails in the various habitats (Team wildlife biologist is available to field mark these).

## Conclusions

The nature trails need to be carefully planned so that it allows many of the important habitat features to be included, however they should be kept to a minimum size so that not all the area is being traversed. A portion of the property should be reserved as refugia and not have any trails through it. Too many trails and excessive pedestrian traffic through a small natural area can have a negative impact on the wildlife especially the ones nesting on the property and larger mammals such as whitetailed deer. The south side of the floodplain forest (see figure 6) should remain undeveloped and be considered as a refuge area. Also, trails through wet areas need to be carefully designed to not cause excessive erosion in the streams. A specially designed trail can bring hikers along various habitats and point out the habitat components using visual trail signs and/or a printed trail guide. A printed trail guide or signs should seek to point out valuable wildlife food plants and habitat improvements which students and /or residents can gain an appreciation for.

The Team wildlife biologist is available for further consultation for the nature trail, habitat enhancement and trail guide information. The Department of Environmental Protection's wildlife division has developed a habitat demonstration area at it's Sessions Woods property in Burlington. This area can be visited to view various habitat demonstrations and get ideas about the trail signage and how it was implemented.

The natural areas included in this review can collectively provide a unique opportunity to enjoy nature and bring its students and citizens closer to nature and, at the same

time, show them practical habitat management techniques that are "take home" messages. This report provides only a handful of ideas for the property. For more information and further technical help please contact the Team Wildlife Biologist at DEP Wildlife Division, Sessions Woods Wildlife Management Area, Route 69, Burlington, CT 06013, Tel. (860) 675-8130.

### **Literature Cited**

Brown, T. L ., C . P . Dawson, and R. L 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 M. Picone  
Urban Wildlife Biologist  
DEP Wildlife Division  
Sessions Woods Wildlife Management Area  
P.O. Box 1550  
Burlington, CT 06013  
(860) 675-8130

# The Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding the project area have been reviewed. 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.

It is now possible for you to conduct an initial endangered species review using the "State and Federal Listed Species and Significant Natural Communities" maps available for viewing through each town's Town Hall. The Town Planner should have a copy of the map. This map shows the generalized locations for listed species and communities as gray-shaded areas on a 1:24,000 scale map of the town. See the attached sheet for instructions on how to use the map to conduct an endangered species review.



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.

# Archaeological and Historic Sensitivity

## National Register of Historic Places

The Watkinson School and associated lands (55.76 acres) are listed on the National Register of Historic Places. The Nomination Inventory Form can be found in Appendix D.

The proposed outdoor classroom provides an excellent opportunity to combine the natural and historic aspects of the property. The National Register information provides concise historical and architectural information that can be used for interpretive and outdoor-based curricula.

## Use of Historic Bridges

The proposed crossing of the Park River offers another excellent opportunity for adaptive use of a historic bridge. The state Historic Preservation Office often requires that ConnDOT market historic bridges proposed for replacement in order to assess the potential for relocation and off-site use. The tentative cost for demolition can be applied by ConnDOT towards the expense of relocation. Relocation of a historic bridge would provide further educational and interpretive opportunities related to the state's significant engineering heritage. The school could develop hands on student involvement with respect to repainting and other minor maintenance activities. A relocated historic bridge might also enhance the esthetics of the proposed river crossing. (Contact: Moses Taylor, Eastern CT RC&D Area, 860-870-4942.)

## Archaeological Sites

Most of the acreage at the Watkinson School was farmland throughout the 18th and 19th centuries. Although there are no Native American sites reported from the property specifically, the Office of State Archaeology does have two archaeological sites along the North Branch Park River northwest of the University of Hartford campus. As a result, the Watkinson School area certainly would have a moderate to high sensitivity for undiscovered archaeological sites dating to the precontact period of Native American usage. Should any below-ground activities adjacent to the wetlands on well-drained soils be proposed for the outdoor classroom, then the Office of State Archaeology (OSA) should be contacted to review that area prior to construction. If there are no ground disturbances, then it would not be necessary to contact the OSA unless the planners of the outdoor classroom activity would like to have the area tested to locate archaeological sites for educational purposes.

## Conclusion

The Annie Fisher School Outdoor Classroom property offers a number of historic and archaeological teaching experiences. The Office of State Archaeology encourages the developers of the outdoor classroom to consider the historic aspects of the property in their educational commitments.

# Outdoor and Environmental Education

## Educational Perspective

The Annie Fisher School would serve as an excellent site for development of an outdoor classroom and improvement of the schoolyard for wildlife habitat. The courtyard, due to its close proximity to the school, could be used to attract birds and butterflies in order for students to have an opportunity to see wildlife up-close. The nature trail, because of the fact that it can link together an elementary school, high school, private school and a university, allows some educational opportunities that aren't available in other areas - e.g. internships, student exchange programs, and mentoring. This is also an excellent opportunity to teach a variety of subjects (math, science, language arts, art, etc.) in the outdoors utilizing many of the national curricula that have been developed and are sponsored locally by the CT Department of Environmental Protection (DEP) including: Project WILD, Project Learning Tree, Aquatic WILD and Project WET.

The educational opportunities should be explored at all levels. The students could map the schoolyard; conduct the site inventory; develop the management plan; and choose and implement the projects (see *Homes for Wildlife: A Planning Guide for Habitat Enhancement on School Grounds* - available from Diane Joy, DEP Education Coordinator, 860-424-3599). Although this may sound overwhelming, one of the most important aspects of a project like this is to involve the students every step of the way. Students will then understand that what they are learning in the classroom has a practical application.

## **The Courtyard**

The teachers seem to be very willing to commit time and effort into beautifying the courtyard area. Some bird feeders already exist there, but the area has great potential for a butterfly garden and to set up bird feeding stations. With little effort the school can have an area that can be used immediately and the students and teachers will become accustomed to learning and teaching in the outdoors.

The courtyard is a mini-ecosystem that could be used to acquaint the students with the various basic requirements wildlife need in order to survive. It can also provide an area for teaching about data collection and monitoring techniques. For example, after conducting a site inventory of native and non-native species, students can observe the types of butterflies that use the various plants. After conducting research and careful observation students can determine which plants to add or remove from the "butterfly garden." Because there is no standing water in this area, it would be beneficial to provide a source of water. Bird feeding data can be sent to a national database: Project FeederWatch run by Cornell Laboratory of Ornithology, call (607) 254-2414 or write Project FeederWatch, Cornell Lab of Ornithology, Dept. HSC, 159 Sapsucker Woods Road, Ithaca, NY 14850.

## **The Field**

The field adjacent to Annie Fisher School can provide a "gathering area" for the classes, as well as an area for recreational activities and environmental simulations. Picnic tables or some type of low maintenance seating should be placed in the southwest corner of the field. This would allow teachers to make assignments prior to the students entering the trail.

## **The Trail Head**

The trail head should be easily accessible to the students at Annie Fisher School. The three adjoining schools (Weaver High, University of Hartford and Watkinson School) will benefit from the establishment of a nature trail, and although the other schools presently have limited access Watkinson and the University of Hartford are utilizing the site. In order to access the river directly across from the school due to the slope of the land, there would have to be considerable construction. At this time it does not appear feasible to establish a bridge to cross the river. It is this Team member's opinion that before consideration is given to putting a bridge across the river we must assure that the trail on the Annie Fisher side of the river is handicap accessible. The quickest access to the area should be established because teachers cannot spend all day hiking down to the water or even to an area along the trail that is large enough for a class gathering to talk and/or make assignments.

## **Park River**

Access to the North Branch Park River will allow the students to monitor the river assessing its relative environmental quality based on indicators of pH, water temperature and the presence of a diversity of macro and micro organisms. In order to gather this data the school will need a variety of supplies since monitoring equipment is not on-site at the school presently.

## **Teacher Training and Equipment**

Access is an important issue, but teacher training and equipment must be considered when determining how often the trail will be used and how valuable this site will be to the school. The teachers will need to have assistance in learning about materials and

techniques that can be applied to teaching in the outdoors. Throughout Connecticut, North America and in fact all over the world there is a movement to establish creative and beneficial school ground projects involving teachers, students and whole communities. In celebration of this, May 1, 1998 (**International School Grounds Day**) is a day that has been set aside to celebrate the schoolyard as an exciting and often untapped alternative classroom. Because of this many guides for the process, planning, design and management of school grounds, curriculum resources, and videos are available. Throughout the State of Connecticut educators and resource professionals (Connecticut recently established a Schoolyard Habitat Network - contact Diane Joy (424-3599) or Peter Picone (675-8130)) are available to assist the teachers and community groups. Teacher training is available through the CT DEP and many other environmental organizations.

## Equipment

In speaking to the Annie Fisher teachers and administrators it is evident that they will need to acquire equipment that can be used in conducting studies on the school grounds. Although this is not to be viewed as comprehensive, listed below are some basic equipment that would be useful by teachers. (Diane Joy, DEP - Education, is very willing to provide a more detailed list of materials and resources after speaking with the teachers.)

### Suggested Equipment

- Identification books (taxonomic keys) examples include:
  - *The Golden Guide to Pond Life*
  - *Peterson's Field Guide to Butterflies and Birds*
  - *Symonds Tree Identification*
  - *Newcombs Wildflower Guide*
- Sampling Equipment
  - seine nets
  - sieves
  - trays
  - assorted containers

- white trays
- magnifying lenses
- eye droppers
- forceps
- water quality test kit (to test both pH and dissolved oxygen)
- thermometer
- meter sticks or tape measure
- microscopes
- aerial nets
- bug boxes
- leaf, seed and bud samples.



# Park Planner Comments

While the ERT request focused on construction of an outdoor classroom and a nature trail built on portions of three schools' properties this analysis is based upon the field review and will also cover the courtyard at Annie Fisher School and the athletic field to the north used jointly by Annie Fisher and the University of Hartford. Design and operational issues will be discussed.

## The Courtyard

The courtyard lies within Annie Fisher Elementary School so development of this area would be beneficial solely to Annie Fisher. Comments from the school staff ranged from a request for plant materials which would attract butterflies to the unuseability (trash catchers) of the planting beds that have yews and junipers and to the fact that they are always full of weeds. The courtyard has a sunken stage circled with seating which can be used as an outdoor classroom. Operationally having students in the space could be disturbing to the students in the surrounding rooms plus, because you can't physically see out of the courtyard, it may be more challenging to focus a student's attention on a site feature they can't physically see. The raised stage, however, would be ideal for large puzzles made of cut up maps, showing the school and surrounding property, laminated on to plywood. One suggestion would be two identical map puzzles, one cut along property lines and the other along soil boundaries, illustrating the difference (and conflicts) between manmade legal/political boundaries and natural boundaries. Additionally the map puzzles could be used to discuss and point out the locations that the students would subsequently go to on the nature trail.

The following lists are for some nectar plants for adult butterflies and food plants for the caterpillar and pupa stages:

## Nectar Plants

### Shrubs

*Buddleia davidii* 'Black Night', Butterfly Bush  
6' ht., blooms from July to frost, flowers: dark purple  
should be pruned back hard in early spring

### Perennials

*Asclepias tuberosa* 'Hello Yellow', Butterfly Weed  
2' ht., blooms mid-late summer, has ornamental flowers and pods

*Echinacea purpurea* 'Bright Star', Cone Flower  
3-4' ht., blooms all summer, flowers: rose-pink

*Liatris spicata* 'Floristan White', Gayfeather  
2-3' ht., blooms July-August, flowers: white

*Monarda* 'Aquarius', Beebalm  
32" ht., blooms June-July, flowers: rose-pink

*Phlox stolonifera* 'Bruce's White', Creeping Phlox  
8" ht., blooms April-May, flowers: white, semi-evergreen

*Phlox Astolonifera* 'Dirigo Arbutus', Mountain Pinks  
4-6" ht., blooms late spring, flowers: lavender

*Salvia verticillata* 'Purple Rain', Meadow Sage  
14-20" ht., blooms all summer, flowers: purple

## Food Plants

### Trees

Birch  
Cherry  
Plum  
Shadblow

### Flowers

Artemesia  
Asters  
Snapdragon  
Violets

### Shrubs

Cottoneaster      Viburnum  
Lilac

It should be noted that planting of these material does not guarantee a butterfly garden and that the period of most activity in the garden (summer) is when school is out. If the butterfly garden is not maintained (cultivating, watering, fertilizing, pruning, and mulching) then it will be indistinguishable from the current weeds (in fact, the current weeds will crowd out these plants). [Enclosed in Appendix C is additional butterfly gardening information, plans to build a butterfly house, as well as a butterfly house available from a catalogue.]

It was noted that the birds using the courtyard were not using the plant material but using the stems of weeds that had grown up through the yews and junipers. Presumably the seeds on the weeds were either preferable food and perches or the surrounding shrubs gave them a physical barrier from humans. The only criticism of the current shrub plantings in the courtyard is not the choice of or care but the fact that they were planted too close to the concrete walks meaning they overhang them or have to be trimmed creating a wall effect. The issue of plants being trash collectors and weeds is operational, and could just as easily be in a butterfly garden.

### **Athletic Field**

It was noted that the attached soils map in the ERT packet was taken from the Soil Survey of Hartford County (sheet 31). My interpretation of the map is that Annie Fisher School is on "man made" soil and that the athletic field is built upon a filled feeder stream of the North Branch Park River. Saco silt loam 0-3% .... a wetlands soil comprises most of this area. The Team park planner's experience is that while one may divert water away from a wetlands soil it will always function as a wetland soil, meaning options are severely limited for improving the site as a sports field. The cost of regrading, drainage controls and reseeding would be approximately \$20,000/acre (the field is approximately 7 acres given a total budget of \$140,000) but, because you are on a wetlands soil, the field will eventually revert back to existing conditions (an

operational issue). Excavation of the top three feet and the importing of new soil is out of the question, but the only permanent solution. In fact, today, wetland regulations would probably prevent the creation of the field. If a pavilion with seating and tables is contemplated it should be located on higher ground.

At the field review meeting someone asked for vine suggestions for the fence along the railroad tracks. The recommendation is Virginia Creeper (Woodbine) (*Parthenocissus quinquefolia*). It is a deciduous vigorous woody vine, suitable for a fence, turns bright red in fall, and the berries are eaten by 37 species of birds.

## Nature Trail

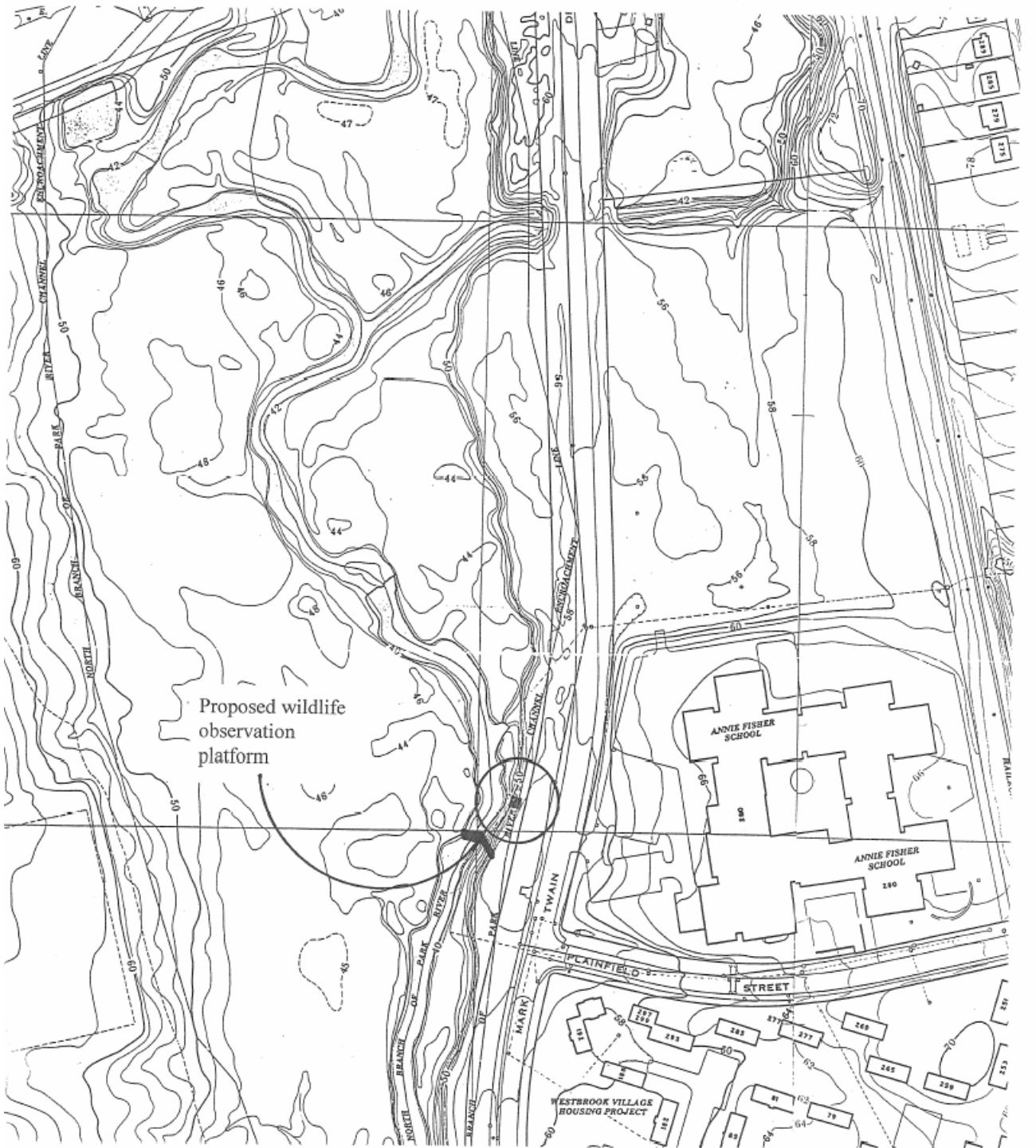
Let us first look at the existing trails. There is one from the Watkinson School to the "Pine Grove," one from the University of Hartford (via a parking lot) to the Watkinson School and an exercise par course along the river (a sign at the bridge designates the river area as a wildlife refuge) at the University of Hartford. None of these trails are near Annie Fisher School. There is developed access on the western side (Watkinson School) and northern crossing (University of Hartford) but none on the east. Initially an elevated boardwalk/bridge/trail link between Annie Fisher and the Watkinson School pine grove is what most people contemplated, creating a southern link across the North Branch Park River. If the link were made all parties (Annie Fisher, Watkinson, University of Hartford) should determine responsibility for maintenance and security (operational issues) since the link would effectively breach the separation currently provided by the river. Additionally, permit requirements (these should be verified) for an elevated trail and river crossing could make the cost prohibitive.

An alternative to a trail would be a 16'x24' wildlife observation platform. A suggested location and plans are included with this report (See Figure 7). (This is the platform used for wildlife observation along shore locations funded by the Long Island Sound license plates and the platform DEP uses for handicapped fishing access at ponds.)

The budget estimate for construction would be \$7,000-\$8,000. Advantages of the platform would be: easy access, handicapped accessible, useable year round, and, because it is elevated, would be advantageous for bird watching. Disadvantage is that Annie Fisher School would probably be the sole user. Operational issues are the clean up of trash, broken glass and vandalism repair (yes, someone will try to burn the platform and will carve their initials and obscene words in the wood railing).

Figure 7

Wildlife Observation Platform Location



## Brief Summary of Proposed Actions

All the Environmental Review Team members agreed that the review site is a unique area that can offer many educational and environmental opportunities to a wide audience. It was generally agreed that the project should be phased with Annie Fisher School receiving priority.

Below is a brief outline of three general phases and issues that can be used as a guideline in developing an action plan. Please remember that Team members and the Schoolyard Habitat Network are available to assist with the various phases as you develop your plans, construct the actual trail/classroom and they are also able to provide training to staff in the use of the site, curriculum materials and equipment.

### **Phase 1 - Annie Fisher School**

- Trail/Outdoor classroom on the east side of the North Branch of the Park River including the abandoned fitness trail.
  - easy trailhead access for teachers and students
  - handicap accessible
  - observation platform along river
- Schoolyard Courtyard
  - planting a diversity of native wildflowers and shrubs to attract butterflies and birds
- Athletic Field Improvements and Enhancements
  - stabilizing existing outlet to wetland system
  - addressing depressions in fields
  - enhancing plantings along road, fence and swale

### **Phase 2 - West Side Trail**

- Along the North Branch Park River on the west side of the river.

### **Phase 3 - Pedestrian Bridge**

- Explore technical feasibility and funding for a pedestrian bridge across the North Branch Park River to connect the two trails.
  - CT DOT Historic Bridge Program

## Appendix A-E

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 variety 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.