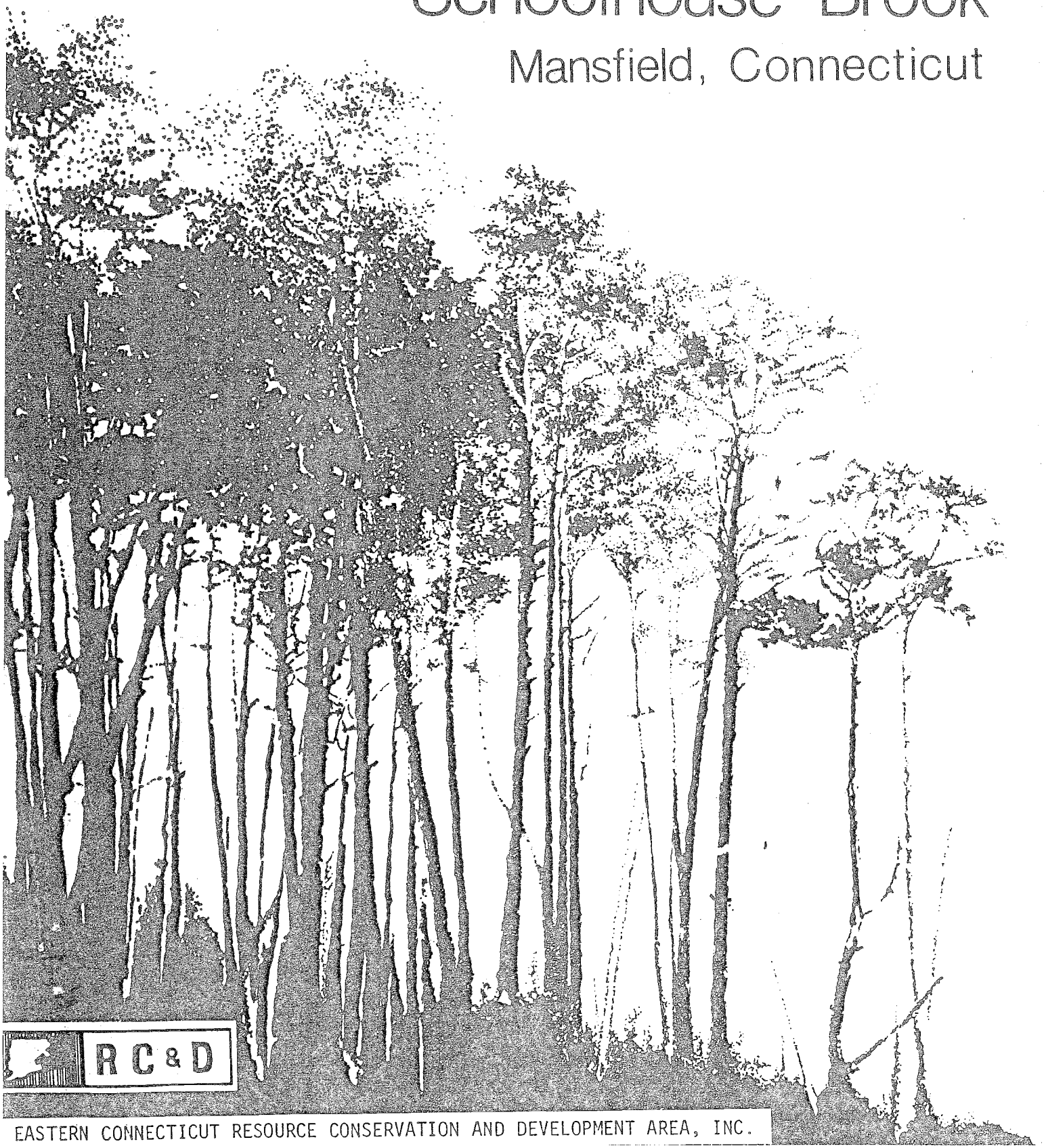
Environmental Review Team Report

Schoolhouse Brook

Mansfield, Connecticut



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EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

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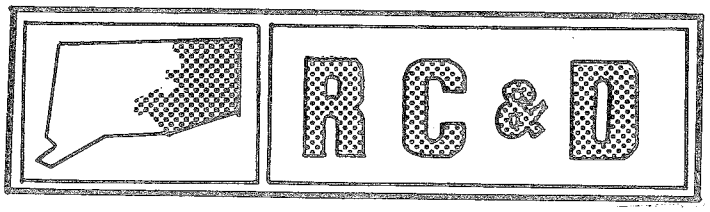
March 1982



eastern connecticut resource conservation & development area

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TOPOGRAPHY

The topography of the Bicentennial Pond watershed consists of a single central valley surrounded by generally moderately sloping hillsides. The eastern boundary of the watershed runs along the crest of an elliptical hill (Spring Hill). The watershed's maximum elevation, approximately 682 feet above mean sea level, is reached at the top of Spring Hill. The western boundary of the watershed follows the crests of several smaller hills. The lowest elevation in the watershed is represented by the surface of Bicentennial Pond, which is normally about 490 feet above mean sea level. A roughly circular basin, about 1,000 feet in diameter, is located in the central stretch of the valley.

GEOLOGY

Most of the watershed is covered by till, a sediment that was deposited directly from glacier ice. The till, which is locally called "hardpan," contains rock particles ranging in size from clay to huge boulders. In general, the till is neither sorted nor stratified; the rock particles were indiscriminately mixed by the ice. Deep excavations in the till may show a sandy, stony, friable type overlying a slightly siltier, less stony, tightly compact and crudely fissile type. Shallow excavations usually encounter only the sandier till. The overall thickness of the till in the watershed is variable. Thicknesses may exceed forty feet in the northern portion of the watershed, but the till is probably less than twenty-five feet thick in most areas.

The only other surficial deposits worthy of note in the watershed are the swamp sediments occupying the central basin-like area. These deposits consist of sand, silt, and partly decomposed organic materials. The thickness of the sediments is probably less than five feet in most places. Till generally underlies the swamp sediments.

Bedrock (locally called "ledge") underlying and cropping out within the watershed consists mostly of granitic gneisses. Gneisses are metamorphic (geologically altered) rocks in which layers of granular minerals alternate with thin bands of elongate, platy, or flaky minerals. The local gneisses are composed largely of quartz, different members of the feldspar group (principally microcline and oligoclase), and biotite. Some garnet, hornblende, and other minerals may also be found in the rocks. Other rock types found in the watershed include schist and pegmatite. Schists are metamorphic rocks in which elongate or flaky minerals are predominant and are arranged into parallel layers or sheets. Schists commonly can be split into slabs quite easily. Pegmatites are very coarse-grained, quartz- and feldspar-rich rocks that appear as either concordant or cross-cutting masses among the metamorphic rocks. The bedrock in the watershed is not believed to have any significant commercial value.

HYDROLOGY

Bicentennial Pond receives drainage from a watershed of approximately 468 acres. Schoolhouse Brook is the only inlet and outlet stream. Since the watershed

is covered largely by till, it would be expected that Schoolhouse Brook experiences very low flow rates during dry periods. Stratified drift deposits, which are better able to absorb rainfall and release it to streams in dry weather, are not found in the drainage area. Nevertheless, local residents have reported that Schoolhouse Brook, to their knowledge, has never completely dried up. This may be due to groundwater discharges occurring in the swampy areas along the streamcourse.

The Department of Health Services (DHS) uses the following formula to estimate the number of daily swimmers that a pond may safely accommodate: $N = [(V/180) + F/1,000]$, where N is the number of swimmers per day, V is the volume of the pond in gallons, and F is the surface inflow rate in gallons per day. Assuming that surface inflow is negligible during extended dry periods, the formula reduces to $N = V/180,000$. The normal volume of the pond is approximately 8,439,000 gallons; hence, the minimum allowable number of swimmers per day is 8,439,000/180,000 = 47 swimmers per day. Certainly, more than 47 swimmers may utilize the pond on a given summer day. It is important, therefore, that the town closely monitor the pond during dry summer periods. The water should be tested regularly when stream inflow appears minimal.

The DHS formula used above is based upon an assumption that the initial quality of the water is acceptable for swimming. At present, the natural quality appears to be adequate. However, the watershed is presently only lightly developed. More intensive development may lead to deterioration of the quality of Schoolhouse Brook and Bicentennial Pond.

Major causes of water-quality changes after development include erosion and wastewater discharges. Erosion may result from increases in runoff, another common aspect of development; from clear-cutting of vegetation; from improperly monitored excavation or filling; or from concentrated surface discharges. Erosion causes surface waters to become turbid and allows ponds and lakes to fill with sediment more rapidly than otherwise would be the case. Any development within the watershed should, therefore, be accompanied by appropriate sediment-and-erosion control measures. Runoff reduction measures should also be considered, particularly where development will be intensive.

Wastewater discharges may cause serious degradation of water quality, depending upon the nature of the discharge and the means used (if any) to mitigate the detrimental effects. Subsurface sewage disposal systems are likely to remain the most common sources of wastewater discharges in the watershed. In general, the soils in the watershed are limited in terms of suitability for septic systems. Compact soil zones (hardpan), high water tables, extreme stoniness, and shallowness to bedrock are the predominant limitations. In many cases, these limitations can be overcome by engineering techniques, but the techniques must be carefully designed and implemented. In areas where the local health director deems it necessary to engineer septic systems, the entire installation process should be carefully monitored.

Assuming that all new subsurface sewage disposal systems are properly installed, the systems should pose no serious water-quality problems unless the density of systems is too high. Thomas Holzer, a hydrogeologist formerly affiliated with the University of Connecticut, estimated the maximum safe density

for septic systems in till-covered areas served by on-site wells.* He used the Town of Mansfield, Connecticut, as a basis for his evaluation, and derived a figure of one septic system per acre of land. However, Holzer based his evaluation primarily on presumed nitrogen loading; other factors not addressed by Holzer (e.f. phosphorus, pathogens) may, upon further study, dictate a lower density. In addition, the one-system-per-acre figure presumes that the soil conditions are otherwise suitable for septic system installation. Physical constraints, such as high water tables, may also necessitate decreased densities in some areas. It should be noted, however, that in some limited areas where "good" soils adjoin "poor" soils, it may be desirable to allow higher-density residential clusters on the good soils as long as the overall density (poor soils included) does not exceed the desired figure. Although Holzer's study was related specifically to the quality of groundwater for drinking purposes, and not to surface-water quality, the study should be carefully weighed by the town for both reasons. Surface water and groundwater are hydrologically connected within the watershed; deterioration of groundwater may lead to deterioration of surface water.

The discussion above has focused on septic system discharges, but other types of contaminants may have an adverse effect on the quality of Schoolhouse Brook and Bicentennial Pond. Present potential sources of contamination include street drainage and fertilizer. Since there are no intensive agricultural uses at present in the watershed, fertilizer is probably not a problem. Street drainage, however, may carry salt, oil, and sand into Schoolhouse Brook and Bicentennial Pond. The town should consider minimizing the use of salt and sand during winter. Minimizing sand applications, or at least making an attempt to recover sand as soon after application as possible, would be especially important on the section of Spring Hill Road that lies within the watershed: no extensive wetlands that could serve as sediment traps lie between Spring Hill Road and Bicentennial Pond.

The town should be interested in preserving as much of the watershed's central wetland as possible. In addition to its function of trapping sediment, the wetland also serves to reduce peak storm flows in Schoolhouse Brook, and it is probably a useful buffer for some dissolved pollutants, removing them from inflowing waters. The wetland may also provide a valuable habitat for wildlife. During the pre-review discussion, the possibility of digging a pond in the smaller wetland, approximately 1,250 feet north of the central wetland, was discussed. This activity would have little effect on the flood-storage and sediment-trapping functions of the wetland, but it would reduce the potential for biochemical buffering of surface-water pollutants. On the other hand, creating the pond could increase the flows in Schoolhouse Brook during dry periods, an advantage for Bicentennial Pond. In view of the small drainge area that feeds the smaller wetland, and the existence of the larger, central wetland, the Team foresees no significant hydrologic disadvantage, but rather a possible benefit, from creating the pond.

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* Holzer, "Limits to Growth and Septic Tanks," in Water Pollution Control in Low-Density Areas: Proceedings of a Rural Environmental Engineering Conference, W. J. Jewell and R. Swan, eds., University Press of New England, 1975.

SOILS

A detailed Soils Map of the Watershed is included in the Appendix to this report, accompanied by a chart indicating soil limitations for various urban uses. Limitation ratings are as follows:

(1) Slight: The few limitations are easily overcome by engineering design. The expense of correction is usually below the average cost of preparing the site for the intended use.

(2) Moderate: The limitations require more intensive on-site observation and testing to determine proper design. Moderate limitations can be corrected at average to above average cost of preparing the site for the intended use.

(3) Severe: This rating indicates that the use of the soil is seriously limited by one or more factors. Intensive testing of the site is necessary to develop design features to overcome the limitations. Preparing the site for the intended use would be costly and in some cases prohibitive. Severe limitations do not, however, preclude the use of land for development. If economics permit and the intended use is consistent with the objectives of local and regional development, many soils and sites with serious problems can be used.

The Schoolhouse Brook Watershed can be divided into three areas. The western slope consisting mostly of Charlton and Sutton soils, the eastern slope consisting mainly of Paxton and Woodbridge soils, and the central wetlands made up of Peat-Muck and Leicester soils, which border the stream itself. Small inclusions of wetland soils (Leicester) are also present on the slopes.

Paxton and Woodbridge soils have an impermeable layer at a depth of 24-36" which prevents downward percolation of water. This condition can result in lateral movement of pollutants down slope. Severe limitations to development result from this condition. Establishment of a buffer strip utilizing the "Streambelt System" of ensuring water quality is one alternative which the town might consider.

Soil Descriptions:

Charlton Series: These soils are deep, well drained and have formed in friable glacial till on nearly level to steep uplands. The texture ranges from fine sandy loam on the surface to gravelly sandy loam in the substratum. Charlton soils are moderately permeable and have a high moisture holding capacity. Stony phases are common on the watershed. Non-stony phases with slope less than 5% are considered prime farmlands. Principal limiting factors for development are stoniness and slope exceeding 8%.

Hollis Series: The Hollis Series consists of moderately coarse to medium textured soils that are somewhat excessively drained and shallow to bedrock with common bedrock exposure. Depth ranges from a few inches to about twenty, with isolated pockets to about ten feet. Only the deep areas, if large enough, are suitable for septic and other development activities.

Leicester-Ridgebury-Whitman Complex: This mapping unit consists of poorly drained Leicester and Ridgebury and very poorly drained Whitman soils. All of these soils are wet and stony with severe limitations for development. They are also regulated under Public Act 155 as amended which protects inland wetlands.

Paxton Series: These soils are deep and well drained. They formed in compact glacial till on uplands, till plains, and drumloidal land forms. They are very similar in color, texture, and minerology to the Charlton Series except for the presence of a firm hardpan at a depth of approximately 24-36 inches. This results in seasonal wetness and presents problems for on-site sewage disposal. Areas of extreme slope and stoniness also present limitations for development. Non-stony areas with a slope less than 8% are considered prime agricultural areas.

Peat and Muck: These soils consist of organic deposits in various stages of decomposition. They are found in low, very poorly drained positions where the water table is at or very near the surface most of the time. They are regulated wetlands under Public Act 155 as amended.

Sutton Series: These soils are moderately well drained and have formed on level to moderately steep slopes of till covered uplands, usually on lower slopes or in slight depressions. The substrata is firm in some areas causing a seasonally high water table and resulting limitations for on-site septic systems or dwellings with basements. Very stony phases are common on the watershed causing additional limitations. Areas with less than 8% slope are considered prime agricultural areas.

Woodbridge Series: These soils are moderately well drained and have formed on compact glacial till. There is a firm hardpan present approximately 20-30 inches from the surface. The resulting seasonal water table presents severe limitations. Steepness of slope and areas where the stony phase are found also present limitations for development. Areas with slope less than 8% and few stones are considered prime agricultural areas.

STREAMBELT DELINEATION

The objective of a streambelt system is the identification, development and management of a network of environmental corridors. This is based on standards that will reduce pollution, siltation, and potential losses from floods. In addition, the streambelt system promotes conservation and management of important wildlife habitat, provides quality recreation areas, retains scenic quality and protects other important ecological systems. Streambelts are intended to provide features that promote a high quality environment and serve the need for open space. A streambelt map for the Schoolhouse Brook Watershed and the criteria used in the delineation of this streambelt, are included in the Appendix. The various Natural Soils Groups are keyed within the streambelt boundary.

Given the Mansfield Conservation Commission's objective of maintaining the water quality of Schoolhouse Brook and Bicentennial Pond, establishment and management of the streambelt should be a prime consideration.

In addition to the streambelt, the entire watershed could be treated as a special conservation area considering the following:

1. Construction of all future on-site septic facilities in the watershed.

2. Ensuring proper function of existing facilities. Possibly through a program of inspection and matenance implemented by the town.

3. Controlling erosion and sedimentation on all new construction sites.

4. Frequent cleaning of roadside catch basins.

Existing flora and fauna in and around Schoolhouse Brook indicated high water quality at the time of the review. Some silt deposits were observed on the surface of stones in the stream. The erosion and deposition of fine particles from the stream itself, rather than some outside source, is the probable cause of this condition. Only one area shows evidence of deposition from storm drain runoff which originates from a roadside drain on Route 195 near the intersection of East Road. Construction of a simple sediment basin would improve this condition and prevent future sedimentation from this source.

On request, the Tolland County Soil and Water Conservation District can provide technical assistance in reviewing erosion and sediment control plans and on-site soil interpretations.

FISH RESOURCES

Schoolhouse Brook flows through woodland and marsh habitats before emptying into Bicentennial Pond. Stream substrate consisted of intermittent stretches of sand, gravel, and small boulders. Habitat for fish was limited in most areas as water flow at the time of observation was very low in the main brook and insignificant in the branches. The main brook did have some small pools in which dace and brook trout were observed. Common shiners and fallfish may also be present in this stream.

The construction of a pond above Bicentennial Pond could be detrimental to fish habitat downstream. While a temporary increase in siltation would occur immediately following construction, the long term effects would be to (1) absorb excess silt, (2) foster a more rapid increase in water temperatures, (3) store nutrients aiding vegetation growth, and (4) reduce stream flow volume and habitat quality for the existing populations of cold water species (specifically trout) while increasing habitat area for warm water species. Additionally, the reduction in flow volume could have an impact on the turnover rate at Bicentennial Pond.

Maintaining the brook at its present condition and controlling the quality of runoff from Route 195 will be the keys in protecting Bicentennial Pond.

WILDLIFE

This study area is basically an upland area which contains a stream and a wetland strip running down through the center of the property from northwest to southeast and ending in Bicentennial Pond. Both the upland and wetland sites are heavily wooded. There are also several old field openings located within the area.

Within the wetland strip, the overstory vegetation consists of red maple, birch, tulip poplar and a few oaks and hickories. The understory contains red maple seedlings, ferns, skunk cabbage and a variety of berry producing shrubs and vines. A shallow stream in the heart of this area contains easily seen aquatic life including fish, frogs and crayfish.

As you move away from the stream site into the drier areas, the overstory contains more oak and hickory along with the red maple and birch trees. The understory contains some shrubby vegetation, but the variety of plant life decreases.

Both the upland and wetland sites contain an adequate understory to attract wildlife - the vegetation provides a food source, cover, and nesting areas. However, this understory growth could be improved by removing some of the crowded overstory with a selective cut. This will allow more sunlight to reach the forest floor thus stimulating understory growth. The remaining trees will have more room to grow and will produce more mast (fruits and nuts), which is an important wildlife food source. Do not cut trees too close to the stream because it will allow the sun to raise the water temperature which could eliminate some life forms.

There is an abundance of cavity trees (trees with holes or hollow sections) which are used by many forms of wildlife for nesting. These trees should not be cut.

Various animal tracks were seen near the stream including deer, raccoon and opossum. Also, squirrels and a variety of songbirds were observed in this area.

There are several old field sites located on the area. These fields help to open up the forested area and add some diversity to an otherwise uniform cover type. Since wildlife usually needs more than one habitat type to live, the more habitat diversity you have, the more an area will be utilized by a variety of wildlife species.

There are two fields located in the northern end of the study area just south of Route 195 that have excellent potential for wildlife use. The more northerly field is extremely diverse. It has a partial spruce border and a large variety of food-producing vegetation including blueberry, cherry, gray-stem dogwood, old field juniper, blackberry, strawberry and various legumes. There is also an aspen patch which is a valuable food source for ruffed grouse.

In addition, there is an underground pipeline right-of-way which crosses Spring Hill Road which provides some valuable open space.

These open areas should be maintained in their present condition by controlling the invading woody vegetation. Mowing these areas every two to three years should be adequate maintenance.

The Bicentennial Pond area provides good waterfowl habitat. There is some low cut grass for feeding and loafing, some high grass for nesting and cover, and a variety of aquatic grasses for food and cover. The pond is also a good water source for not only waterfowl, but other wildlife in the area. A family of mallard ducks were observed on the pond during the field examination. It should

be noted that too many ducks or geese using the pond could become a nuisance problem and create a health hazard.

The total study area has an excellent potential to support a wide variety of wildlife. Destruction of this habitat by development will cause many wildlife species to leave the immediate area. Every effort possible should be made to maintain the quality of the stream.

For further assistance with wildlife management on this study site, contact the Wildlife Unit, Department of Environmental Protection.

PLANT COMMUNITIES

Sugar Maple-White Ash Community

A sugar maple-white ash forest covers about 70% of the watershed. This community occupies lower slopes of the watershed on moderately well-drained soils (i.e., Sutton, Paxton, Woodbridge). The terrain is gently sloping and may be locally stony. Gentle slopes were probably cultivated in the distant past, and wet or steep areas were grazed.

The dominance of white ash (Fraxinus americana) and sugar maple (Acer saccharum) characterize this plant community. Various hardwood tree species, such as hickories (Carya ovata, C. glabra, C. tomentosa), red oak (Quercus rubra), tulip-poplar (Lireodendron tulipifera) and red maple (Acer rubrum), may be associated with this community. The trees form a moderately closed canopy (70%) at a height of around 45 feet.

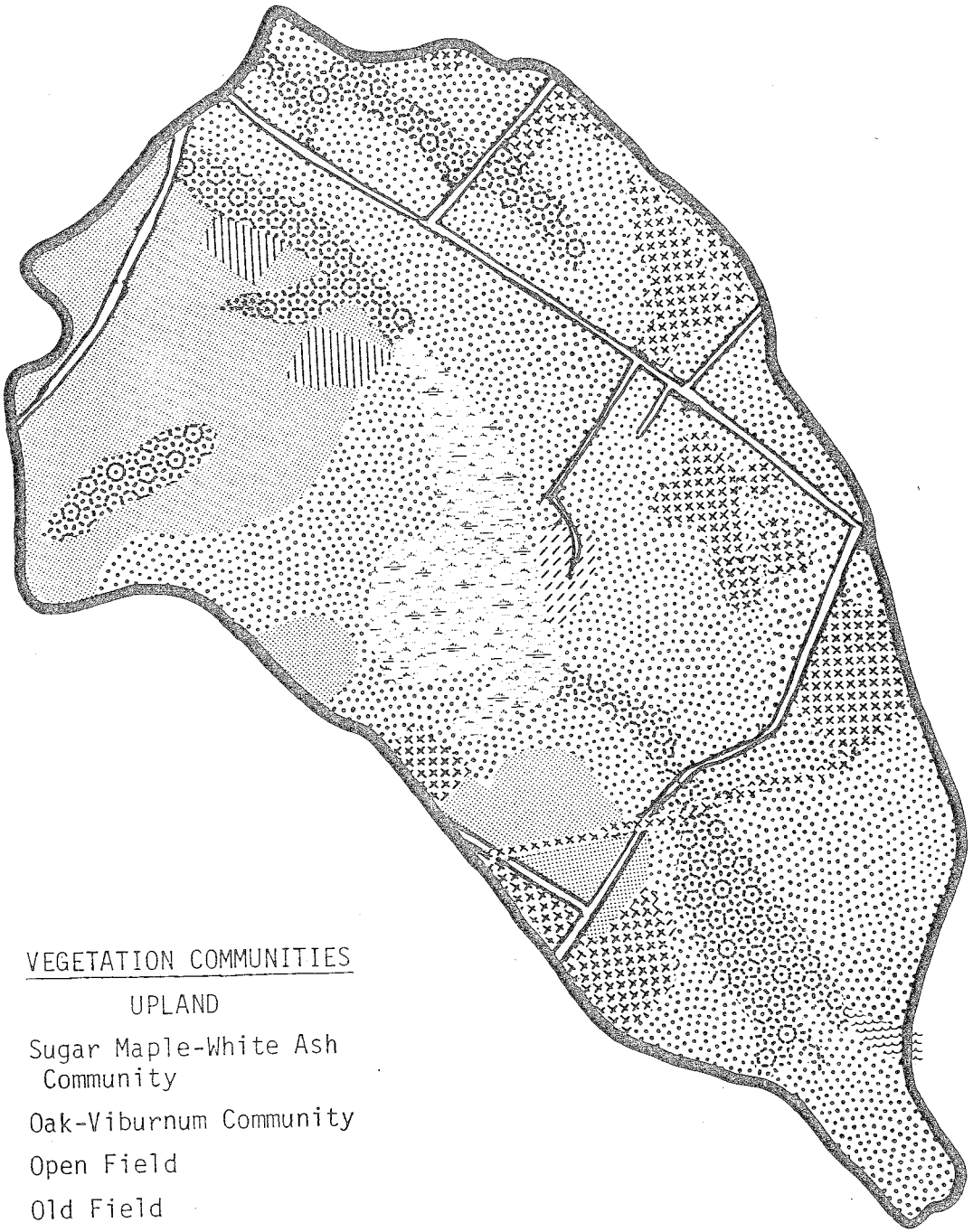
The shrub stratum is generally not well-developed and is limited to tree saplings, especially those of sugar maple. Spice bush (Lindera benzoin), musclewood (Carpinus caroliniana) hop hornbeam (Ostrya virginiana), maple-leaved viburnum (Viburnum acerifolium) may occur interspersed throughout, but do not take on any importance.

The herbaceous layer in the sugar maple-white ash forest is very lush in response to a favorable moisture regime. The flora is typical for rich moist sites; ferns may become a dominant element in this forest and include Christmas fern (Polystichum acrostichoides), lady fern (Athyrium felix-femina), silvery spleenwort (Athyrium thelypteroides), maidenhair fern (Adiantum pedatum), marginal fern (Dryopteris marginalis), rattlesnake fern (Botrychium virginianum), and New York fern (Dryopteris noveboracensis). Other herbs indicative of this habitat are: trillium (Trillium erectum), Virginia creeper (Parthenocissus quinquefolia), Solomon's seal (Polygonatum pubescens), doll's eyes (Actaea pachypoda), Jack-in-the-pulpit (Arisaema atrorubens), richweed (Collinsonia canadensis), enchanter's nightshade (Circaea quadrisculata), and wild spikenard (Aralia racemosa).

Oak/Maple-leaved Viburnum Community

Oak (Quercus spp) - viburnum (Viburnum acerifolium) is found in scattered patches on the western margin of the watershed and occupies less than one-fourth of the total acreage of the watershed. Its distribution appears to be correlated with the well-drained Charlton and Cheshire soils on upper slopes. The gentle slopes trend eastward.

VEGETATION COMMUNITIES



VEGETATION COMMUNITIES

UPLAND

- Sugar Maple-White Ash Community
- Oak-Viburnum Community
- Open Field
- Old Field

WETLAND

- Swamp Community
- Streambank Community
- Bicentennial Pond

The oak/maple-leaved viburnum community is poorly represented in the Schoolhouse brook watershed. It infrequently reaches its best development and in most cases grades inperceptibly into the sugar maple-white ash forest.

The nut-bearing trees of this community are of moderate value for wildlife. Wildlife habitat is enhanced if the woods are bordered by open or old fields.

Open Field

Land, whose natural forest cover has been removed for agricultural purposes, occupies 5% of the watershed. Open fields, scattered throughout the watershed, are generally located on relatively flat areas of upper slopes characterized by well- and moderately well-drained soils.

Vegetation of open fields varies with the agricultural use of the land. Use ranges from vegetable crop cultivation, to mowlot, and pasture. Vegetation of a pipeline right-of-way is included in this community.

Historically fields covered about two-thirds of the Connecticut landscape. Fertile soils of the watershed were cultivated, while poor, rocky soils were grazed. Today, the opposite is true. Two-thirds of the landscape is forested and the percentage of open field is continually dwindling. The open fields of the watershed should remain in agricultural production be prevented from reverting to forest. Open fields interspersed with woods significantly adds to the habitat diversity and wildlife value of the watershed.

Old Field

Old field, or open field reverting to grassland, shrubland, and eventually to forest, occupies two small lots totaling several acres in the northern part of the watershed. The lots were cultivated perhaps as long ago as fifty years. Soils are well-drained Charlton which slope gently to the east.

The old fields are characterized by a mixture of low shrubs, grasses, and forbs (wildflowers). The northernmost old field exhibits about equal coverage of shrubs and herbs, while the southern old field has less of a shrub coverage (30%). This difference in the proportion of growth forms may be attributed to differences in time since abandonment.

Grasses and forbs are the first to invade abandoned fields. Little blue stem (Andropogon virginiana) and goldenrods (Solidago spp) give these fields their characteristic appearance, but are gradually being shaded out by shrubs.

Shrubs, whose seeds have been carried in by animals or disseminated by wind, are quickly invading both fields. Highbush blueberry (Vaccinium corymbosum) and gray-stemmed dogwood (Cornus racemosa) comprise the most important component of the shrub layer and form a locally dense cover at a height of four to five feet. These species are joined by bayberry (Myrica pennsylvanica), pasture juniper (Juniperus communis), meadow sweet (Spiraea latifolia), grapes (Vitis sp), Asiatic bittersweet (Celastrus orbiculatus), and winged sumac (Rhus coppalina). Saplings of trees in the old field, such as red maple (Acer rubrum), oaks (Quercus spp) aspens (Populus spp), foreshadow the composition of the future forest.

Swamp Community

A large swamp, covering 5-10% of the watershed, is located in a depression in the center of the watershed. Schoolhouse Brook and several intermittent streams feed into the swamp, while Schoolhouse Brook meanders through the swamp and flows southward into Bicentennial Pond. Deep deposits of peat and muck have developed in the depression and are characterized by a high water table at or near the surface for much of the year.

The tree stratum, comprised of yellow birch (Betula lutea), red maple (Acer rubrum), black ash (Fraxinus nigra) and elm (Ulmus rubra) form a moderately open canopy at 45 feet. Shrubs locally form thickets with spicebush (Lindera benzoin), winterberry (Ilex verticillata), sweet pepperbush (Clethra alnifolia) and silky dogwood (Cornus amomum) prevailing. The herbaceous layer is luxuriant and covers approximately 85% of the forest floor at a height of two and one-half feet. Ferns make an important component of the herb layer and commonly include: marsh fern (Dryopteris thelypteris), cinnamon fern (Osmunda cinnamomea), sensitive fern (Onoclea sensibilis), royal fern (O. regalis), silvery spleenwort (Athyrium thelyptroides), and crested woodfern (D. cristata). The following herbs are found growing amongst the ferns: skunk cabbage (Symplocarpus foetidus), halberd-leaved tearthumb (Polygonum arifolium), tussock sedge (Carex stricta), tall meadow rue (Thalictrum polygamum), jewelweed (Impatiens capensis), swamp saxifrage (Saxifraga pensylvanica), marsh skullcap (Scutellaria epilobiifolia), false nettle (Boehmeria cylindrica), blue flag (Iris versicolor) and Jack-in-the-pulpit (Arisaema atrorubens).

The swamp is of practical value because of its ability to slow down and retain floodwaters and thereby reducing flooding downstream. The swamp also acts to trap sediment present in the waters of the feeder streams. A buffer strip is recommended to protect the swamp and insure the continued high water quality of Bicentennial Pond. The swamp is of moderate value for wildlife, since it lacks areas of open water.

Streambank Community

Several streams, occupying a small percentage of the watershed area, drain the uplands. Two intermittent streams drain into Schoolhouse Brook, a perennial stream. Schoolhouse Brook, in turn, flows into Bicentennial Pond and thus is important in maintaining the water level in the pond. The streams are primarily found in flat to gently sloping sites in association with the Ridgebury, Leicester, Whitman complex of poorly-drained soils over compact till. During spring and heavy rains, water percolates down to the hardpan and then is forced to flow laterally due to the impervious hardpan. The streams dry out somewhat in summer, leaving a dry, rocky streambed.

Red maple (Acer rubrum) and yellow birch (Betula lutea) occur on hummocks along the narrow streambed, accompanied by a dense shrub cover of spice bush (Lindera benzoin). A layer of ferns is well-developed in this community comprised of New York fern (Dryopteris noveboracensis), Christmas fern (Polystichum acrostichoides), sensitive fern (Onoclea sensibilis), lady fern (Athyrium felix-

femina), cinnamon fern (Osmunda cinnamomea), marsh fern (D. thelypteris), and spinulose wood fern (Dryopteris spinulosa).

A buffer strip is recommended to insure the continued high water quality of Bicentennial Pond.

Bicentennial Pond

Bicentennial Pond, formed in 1976 by impoundment of Schoolhouse Brook, is located in the extreme southern portion of the watershed and occupies approximately five-to-ten acres. Depth ranges from approximately fifteen-to-twenty feet at its deepest point near the dam, to several feet near the town's swimming area.

A narrow band (10' wide) of marsh borders the pond and was artificially created by removal of trees. The pond's margins support primarily sedges (Carex crinita, Scirpus cyperinus, C. spp) mixed with forbs (marsh St. Johnswort, Hypericum virginicus; Virginia bugleweed, Lycopus virginicus; vervain, Verbena hastata; halberd-leaved tearthumb, Polygonum arifolium; jewelweed, Impatiens capensis, monkey flow, Mimulus ringens).

The pond and its marshy margins are a productive wildlife habitat.

FOREST RESOURCES

The vegetation dominating the 468 acre Schoolhouse Brook Watershed is typical of Connecticut's Northern Hills-Central Hardwoods-White Pine Zone. According to Dowhan and Craig,* the dominant Central Hardwoods of this region include red oak, black oak, white oak, shagbark hickory, pignut hickory, mockernut hickory along with hemlock and white pine. Included are also scarlet oak and chestnut oak on the drier ridges. Red cedar, white pine and gray birch dominate the early phases of old field succession. Some rare plant species occurring in this region are dragon's-mouth, showy lady's slipper, cotton bullrush, bog aster and hyssop hedge-nettle.

For the purposes of this report, the Schoolhouse Brook Watershed area may be divided into seven major vegetation types. These include mixed hardwoods which total approximately 196 acres; hardwood swamp/streambelt, 58± acres; open field/agricultural land, 47± acres; old field, 36± acres; plantation, 7± acres; nursery/plantation, 4± acres; and open swamp, 2± acres. (Please refer to the Vegetation Type Descriptions and Vegetation Type Map for a description and the location of these vegetation types).

In some places, these vegetation types gradually grade into one another, causing wide transition zones where tree species dominant in one type are present in the other. These conditions cause vegetation type boundaries and acreages to be only approximate.

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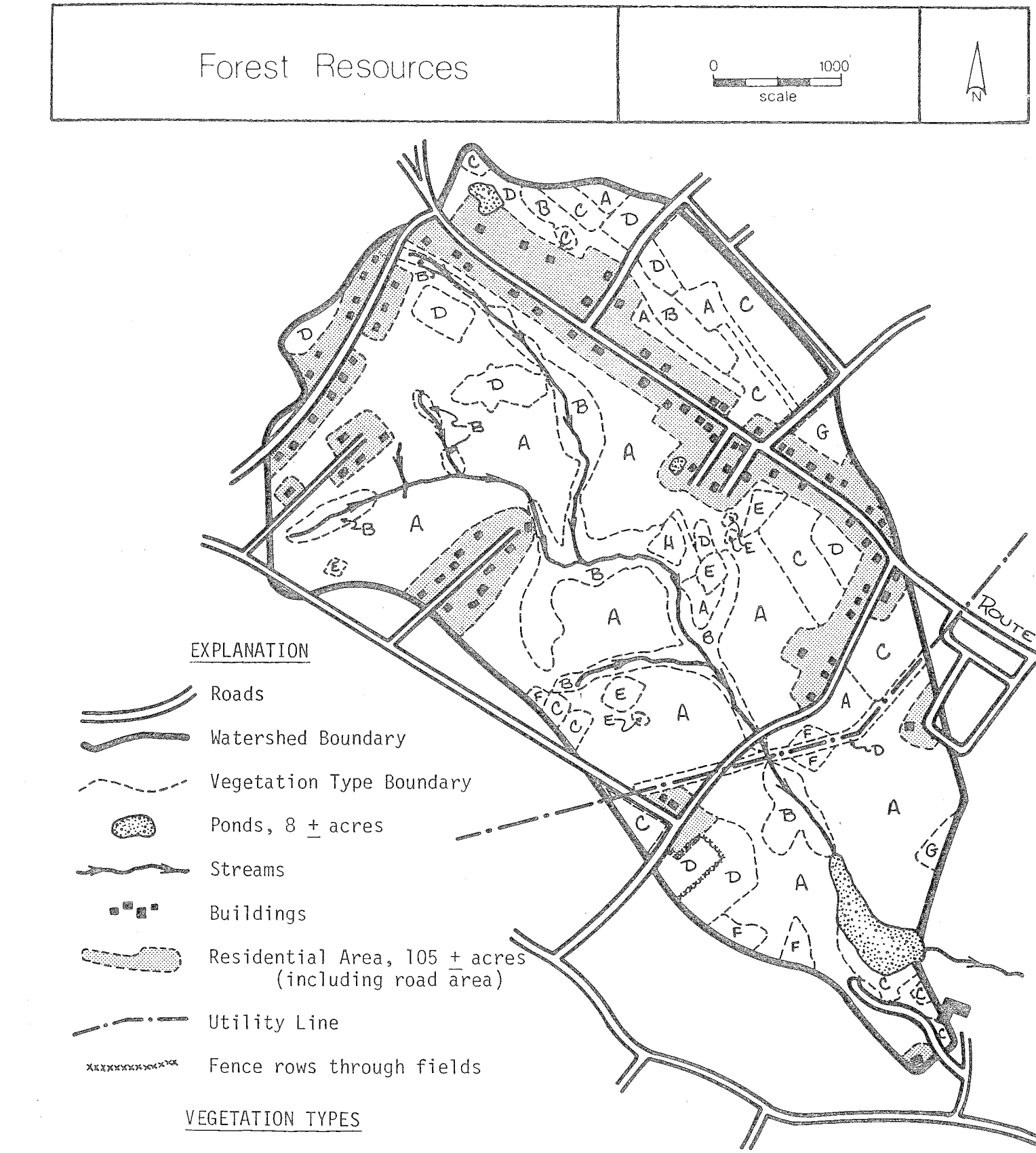
* Dowhan, J.J. and Craig, R.J., 1976, Rare and Endangered Species of Connecticut and Their Habitats. Connecticut Geological Natural History Survey Report, Investigation #6.

Forest Resources



EXPLANATION

- Roads
- Watershed Boundary
- Vegetation Type Boundary
- Ponds, 8 ± acres
- Streams
- Buildings
- Residential Area, 105 ± acres (including road area)
- Utility Line
- Fence rows through fields

VEGETATION TYPES

Type A. Mixed hardwoods. 190 ± acres.
Type B. Hardwood Swamp/Streambelt. 58 ± acres.
Type C. Open Field/Agricultural Land. 47 ± acres.
Type D. Old Fields. 36 ± acres.
Type E. Plantation. 7 ± acres.
Type F. Mixed Hardwoods. 6 ± acres.
Type G. Nursery/Plantation. 4 ± acres.
Type H. Open Swamp. 2 ± acres.

Vegetation Type Descriptions

Type A. (Mixed Hardwoods, 190± acres) The overstory in the drier mixed hardwood areas which are located on the upper hillsides and small knolls are dominated by black oak, white oak, shagbark hickory, mockernut hickory, American beech, black birch and scattered white pine. The understory is generally dominated by hardwood tree seedlings, chestnut sprouts, flowering dogwood, blue beech, hazelnut, hop hornbeam, maple-leaved viburnum and occasional mountain laurel. Ground cover consists of club moss, Pennsylvania sedge, huckleberry, indian pipe, and aster. On the lower slopes where soil moisture levels are higher, red oak, tuliptree, sugar maple, white ash, yellow birch, red maple and black birch predominate, with paper birch and black cherry intermixed. Understory species include maple-leaved viburnum, witch-hazel, highbush blueberry, spice bush, blue beech, hornbeam, and gray birch. Ground cover consists of poison ivy, Virginia creeper, club moss, aster, Christmas fern, bracken fern, hayscented fern, barberry, sheep laurel and doll's eyes.

Many of the tree species which are present in this vegetation type have high commercial value for sawtimber and fuelwood. The condition of these trees is, however, quite variable, as dictated by site conditions, past land use, and past vegetation management. Much of this area has high forest product productivity potential which can be realized through proper forest management. Trees in this area will respond well to periodic thinnings, aimed at removing the poorer quality trees. These thinnings will reduce competition between desirable trees and result in a healthier, higher quality forest environment.

Evidence of gypsy moth infestation was apparent throughout this entire vegetation type. It is possible for two successive defoliations, caused by gypsy moth larva, to severely stress trees, allowing secondary insect and disease infestation to cause mortality. Oaks, being the preferred food of the gypsy moth are most susceptible. Thinnings in the stands which are over-stocked or becoming over-stocked should help to reduce the crowded condition and help trees to become healthier and more vigorous, lessening the chances of widespread mortality started by gypsy moth infestation. Even with such thinnings, eventual loss of the oak component is possible.

Type B. (Hardwood Swamp/Streambelt, 58± acres) Forested wetlands are common along Schoolhouse Brook and its tributaries. Red maple is the dominant tree species along with scattered white ash, yellow birch and occasional black gum, river birch, American elm and swamp white oak. The understories throughout these areas vary widely in both species composition and diversity. Highbush blueberry, spice bush, sweet pepperbush and several species of viburnum, including withe-rod and arrowwood are common throughout. Other understory species which are present, but not abundant, include swamp azalea, swamp rose, speckled alder, poison sumac, swamp elderberry and swamp dogwood. The herbaceous vegetation which is present includes cinnamon fern, lady fern, marsh fern, New York fern, hayscented fern, sensitive fern, spinulose-wood fern, silvery spleenwort, violet, tussock sedge, skunk cabbage, sphagum moss, false hellebore, touch-me-not, poison ivy, Virginia creeper, wild sarsaparilla, wild yam, indian cucumber root, star flower, enchanter's nightshade, tall meadow rue, water pennywort, Jack-in-the-pulpit, aster, wild leek, and trillium. The commercial utility of the trees in these areas must be evaluated on an individual wetland basis. Generally, tree growth potential is somewhat

limited by the high water table and saturated soils which prevail. Under these conditions, trees are shallow rooted and unable to become securely anchored, causing high potential for windthrow. These soil conditions also limit access and operability. Depending on the severity of these limitations, the feasibility of implementing timber management practices may be severely reduced or eliminated completely. Avoidance of these areas altogether by the establishment of undevelopable stream corridors will help to protect the water quality of Schoolhouse Brook.

Type C. (Open Fields/Agricultural Land, 47± acres) Some of the most highly productive areas in this watershed are occupied by open fields. These areas are at present being utilized as either cropland, mowed fields vegetated with grasses and assorted wild flower and weed species, and somewhat less productive pastureland vegetated primarily with grasses. Many of these areas have the potential to produce high quality timber if planted to softwoods or allowed to revert to woody vegetation. The establishment of Christmas trees would also be feasible within any of these areas.

Type D. (Old Fields, 36± acres) The old field areas which are present are either open fields which were abandoned and allowed to revert to woody vegetation, or the utility line right-of-way where the woody vegetation is periodically controlled. Generally, these old field areas are understocked with quality tree species. Those tree species which are present include seedling-size black cherry, gray birch, white ash, sugar maple, red maple, mockernut hickory, quaking aspen, bigtooth aspen, eastern red cedar and black oak. Shrub species are abundant throughout, with highbush blueberry, gray-stemmed dogwood, old field juniper, alder, bayberry, barberry, maleberry, multiflora rose, autumn olive, spirea, arrowwood, smooth sumac, stagnorn sumac, sweet fern and raspberry being most common.

Ground cover in these old field areas is dominated by grasses, goldenrod, milkweed, yarrow, black-eyed Susan, dewberry, common mullien, poison ivy, Queen Anne's lace, evening primrose, mountain mint, thistle, meadow sweet, spreading dogbane and Japanese knotweed. The commercial utility of the tree species found within this vegetation type is poor at the present time. Medium quality pole-size white ash, sugar maple, black cherry and red maple are present in the fence rows which divide some of these old field areas.

Type E. (Plantation, 7±) Several small softwood plantations are present within the watershed. These plantations are made up of predominantly pole-size red pine with occasional white pine, white spruce, Norway spruce and Douglas fir planted on abandoned agricultural land. Understory vegetation, where it is present, consists of sugar maple seedlings, black cherry seedlings, white pine seedlings and black birch seedlings. These seedlings have become established around the perimeter of these plantations where sunlight was able to penetrate. The trees in these plantations are declining rapidly in health and vigor as a result of their crowded condition. Periodic light thinnings will help to reduce the crowded condition and help to improve the health and stability of these trees. The red pine (removed for the thinnings) may be marketed as cabin poles.

Type F. (Mixed Hardwoods, 6± acres) Several small areas within this watershed are at present in a transition from old field vegetation to mixed hardwood

vegetation. Tree species which include black oak, red maple, black cherry, sugar maple, white ash and shagbark hickory are just beginning to dominate the overstory. Eastern red cedar, gray birch and blue beech no longer occupy a dominant position in the overstory. Pennsylvania sedge, poison ivy, aster and club moss form the ground cover in these areas. At present no forest management practices are needed within these stands. Re-evaluation for management opportunities would be desirable in approximately ten years.

Type G. (Nursery/Plantation, $4^{\pm}$ acres) Two areas have been planted with evergreen seedlings. These areas are maintained by the University of Connecticut.

Type H. (Open Swamp, $2^{\pm}$ acres) This $2^{\pm}$ acre area was recently harvested of all of its larger red maple. Shrub species including sweet pepperbush, highbush blueberry, spice bush, swamp rose, swamp azalea, pussy willow and speckled alder have become extremely dense. Cattail, phragmities, tussock sedge, skunk cabbage, touch-me-not, cinnamon fern and sensitive fern are also present.

General Forest Management Considerations

The Forestry Unit of the Department of Environmental Protection encourages all woodland owners to manage their forest lands. When properly prescribed and executed, forest management practices will increase the production of forest products, improve wildlife habitat and enhance the overall condition of the woodland with minimum negative environmental impact.

To reach a healthy and productive state, individual forest stands should be periodically evaluated to determine present and future management needs. A public service forester from the Department of Environmental Protection may be contacted to provide basic advice and technical assistance in woodland management. These services are provided free of charge. Services of a more intensive nature are available from private consulting foresters.

Forest Management and Water Quality

Healthy woodlands provide a protective influence on water quality: they stabilize soils, reduce the impact of precipitation and runoff, and moderate the effects of adverse weather conditions. By so doing, woodlands help to reduce erosion, sedimentation, siltation and flooding. Research has shown that soil protected by the cover of litter and humus associated with woodland areas contributes little or no sediment to streams.

Improper cultivation and harvesting of timber for commercial purposes may, however, lower water quality in several ways: 1) Erosion, siltation and sedimentation caused by improperly located and improperly constructed access roads, skid trails, yarding areas and stream crossings; 2) Siltation and sedimentation caused by logging debris left in streams, interferring with natural flows; 3) Thermal pollution resulting from complete or partial harvesting of streambank vegetation, eliminating shade; 4) Chemical pollution caused by improper application of herbicides and insecticides (it should be noted, however, that in Connecticut, the widespread use of chemicals in forest management is not prevalent and, therefore, does not constitute a great threat to water quality at this time); 5) Influx of nutrients caused by the application of fertilizer, soil conditioners and wetting agents (used in forest fire control). Research has determined that nutrient loss from normal silvicultural practices (i.e.,

practices involving the cultivation and harvesting of timber) does not, for the most part, result in significant deterioration of water quality.

Despite the potential adverse impacts to water quality, the harvesting of trees is a major and necessary tool used in forest land management. Adverse impacts to water quality can be minimized through good planning and responsible implementation.

A pamphlet entitled "Logging and Water Quality in Connecticut: A Practical Guide for Harvesting Forest Products and Protecting Water Quality" has been published and made available through the Department of Environmental Protection's Forestry Unit. A series of Best Management Practices (BMP's), which are recommendations designed to minimize the negative impact of silvicultural activities on water quality, are presented in this pamphlet.

A "BMP" as defined in the pamphlet is "a practical, economical and effective management or control practice which will reduce or prevent the generation of pollution."

Examples of recommended BMP's for preventing or reducing degradation of water quality resulting from silvicultural activities include:

Phase I. Planning the Job.

a. Locate all streams, wetlands and poorly drained soils (sensitive areas) on USGS topographic maps and/or county soils maps.

b. Plan preliminary locations of access roads, skid roads and yarding areas to avoid the sensitive areas. Locate potential stream crossings.

c. Plan for the best time of year to implement individual silvicultural activities. Sensitive areas that cannot be avoided should be planned for winter when the ground is frozen and more stable.

d. Plan Stream Management Zones which are aimed at protecting stream beds and stream banks.

Phase II. Implementing the Job.

a. Locate logging roads and skid trails so that the slopes of these roads do not exceed 10% except for short distances.

b. Locate yarding areas on well drained soils with a slight slope, avoiding drainage discharge directly into access roads or streams.

c. Locate Stream Management Zones and avoid equipment operation in these areas to the greatest extent possible.

d. Provide undisturbed buffer strips between streams and roads or yarding areas. The width of these buffer strips is generally between 30 and 100 feet but should depend on slope, soil erodability and the magnitude of road or yarding area drainage discharge.

e. Avoid, when possible, equipment operation on poorly drained soils, in swales and around or in stream channels.

f. Avoid complete clearing of vegetation in the Stream Management Zone.

g. Avoid disturbing understory vegetation within 30 feet of a stream channel.

h. Avoid reducing overstory crown cover below 50% within 30 feet of stream channel.

i. Avoid felling trees in streams; if this occurs, remove debris as soon as possible.

j. Avoid stream crossings if possible; if not, consider building temporary bridges. Crossings should be made at right angles to the stream over stable rock or gravel bottoms, and should avoid steep or unstable banks.

Phase III. Completing the Job.

a. Install erosion control measures on access roads and primary skid trails, including properly placed waterbars and reconditioned cross drains, located at intervals which take into account road length, slope and common sense.

b. Remove all temporary bridges and culverts from streams.

c. Lime and seed specific critical areas, such as steeply sloped roads or problem areas.

d. Close roads to prevent continuing access.

Following these BMP's along with the use of common sense will help to avoid water quality degradation resulting from silvicultural operations.

The implementation of the recommended BMP's will most likely be of a voluntary nature, aided through an accelerated educational program and perhaps an incentive program, rather than through regulation. At this time, local regulation of forest product harvesting is contrary to State Forestry policy.

Educational and incentive programs may be reinforced by the use of timber sale contracts which reflect the use of BMP's between landowners and loggers. A public or private professional forester can assist landowners in developing an effective timber sale contract. The posting of reasonable performance bonds by the logger may be necessary to help insure proper completion of the logging operation. Periodic on-site inspection may also be essential to see that the logging activities meet the contract terms. Proper education of the landowner and logger can be the key to successful use of BMP's in forest management.

Further guidelines to maintain water quality on managed woodlands may be found in the pamphlet "Timber Harvesting Guidelines" by the Wood Producer's Association of Connecticut. The principles set forth in this publication are aimed at protecting the forest ecosystem from thoughtless timber harvesting

practices that may lower environmental quality in both the long and short run. Copies of this pamphlet are available from the Department of Environmental Protection's Forestry Unit and members of the Wood Producer's Association of Connecticut.

WATER SUPPLY

If future development were in the form of subdivision, then water could be supplied by individual on-site drilled wells or a community well(s). If the latter is utilized, the water service would be a public water supply and would have to be reviewed and approved by members of the Water Supply Section of the State Department of Health Services. If individual on-site wells are utilized, they must be properly located to maintain separating distances.

WATER QUALITY

A review of State Health Department Laboratory analysis reports over the past several years indicates that the water quality of Bicentennial Pond fluctuates during the summer months, but are acceptable for bathing. Depending upon rainfall, inflow, dilution and temperature, the water quality in any impounded body of water will fluctuate. However, if the quality of water entering the impoundment is of a low quality, this can only aggravate the situation and lessen the overall water quality.

If the watershed is heavily developed in the future, the water quality of the small watercourses which feed Bicentennial Pond may deteriorate to some degree. This may occur through several means with the obvious being the addition of nutrients which could enhance algae and aquatic plant growth.

Sources of nutrients are commercial lawn fertilizers, sewage from failing septic systems and other organics which may be washed into the streams which feed Bicentennial Pond.

Therefore, precautions should be taken on the location of any storm sewage discharge points. Preferably, they should not discharge to any watercourses on the watershed.

The removal of trees and shrubs could also contribute to the deterioration of the water quality through surface wash which will cause silting and add to the turbidity of the water.

WASTE DISPOSAL

Based on soil mapping data of this property and consideration of various physical features, it is apparent that a considerable portion of this area would have limitations for the installation of subsurface sewage disposal systems. In addition to wetness and slope, there are some portions with hardpan.

Because of these limitations, lot size should be at least one acre to provide adequate area for the location and installation of subsurface sewage disposal systems while maintaining proper separating distances and adequate room

for a reserve area. Installation would also be contingent upon soil investigation and testing, a good engineering design and proper construction and supervision.

If large portions of the watershed are to be developed, precautions should be taken to minimize the possibilities of adversely affecting the surrounding environment, especially the water quality of the streams and subsequently Bicentennial Pond.

Because this portion of town is not served by public sanitary sewers or a municipal water system, any future development will have to be served by on-site waste disposal systems and either individual wells or a community water supply. The area is presently zoned for residential development, therefore, future development would be subdivisions unless the area is rezoned to encompass other forms of development.

RECREATION POTENTIAL

The area inspected includes the upper portion of the Schoolhouse Brook watershed. It is in large part open space land which is in private ownership. Development has been confined primarily to residential development along the roads near the perimeter of the study area. The water from the brook feeds Bicentennial Pond lying downstream of the study area. This pond is the swimming component of the Schoolhouse Brook town park. Concern has been expressed that certain types of upstream development could have a negative impact on water quality in the swimming area. In general, development of the watershed which will increase sedimentation, flash runoff, and soluble nutrients downstream can be looked on as having a potentially negative effect on that water quality.

The land parcels comprising the watershed area are privately owned. Recreation use of the watershed would be contingent upon permission being granted by these landowners for use of their land. Conceivably, the town could take the role of broker in trying to coordinate passive recreation use of this area as a single block of land. This may be difficult to accomplish without providing these landowners an incentive to let their land be so used.

The watershed contains considerable open space which would lend itself to passive recreational uses such as hiking, jogging, bird watching, and other nature studies, as well as cross-country skiing, and snowshoeing. There are cart paths and trails which would enable these activities without modification. Portions of the woodland would also be suitable for backpack camping, but this activity would be better provided for on town lands where the activity could be controlled such as at Schoolhouse Brook Park. The Nipmuck hiking trail is routed through the town park. A designated backpack camping area in the park would reduce the need for this activity being provided on other lands.

The aforementioned paths in the study area could be expanded upon and possibly tied together via a forest management program. Logging tote roads installed by such a program should be according to guidelines to ensure minimal site disruption. Large blocks of woodland make possible a more economically viable (to the logger) logging operation with the potential for coordinated

timber stand improvement. If abutting landowners with these larger parcels are interested in managing their woodlot on a cooperative basis, those with access limitations from main roads may benefit from such an arrangement if the adjacent properties can be used for access and egress. The profit potential may also be better under this type of arrangement.

The woodland character of the study area offers maximum buffering capacity to the wetlands and watershed. A change in that woodland character by clear cutting, stream rerouting, high density building construction, et cetera, would have a direct bearing on the quality of water in that watershed. Recreation use of the type envisioned would have virtually no impact on the watershed. Even if the study area were to be developed for active recreation uses (not now possible with private ownership), the effect on the watershed would be slight when compared to some other development activities which might be undertaken.

Identification of any significant features of human origin (such as mill sites, Indian structures, or artifacts) would help in documenting the historical use of this area and these features should, where practical, be preserved.

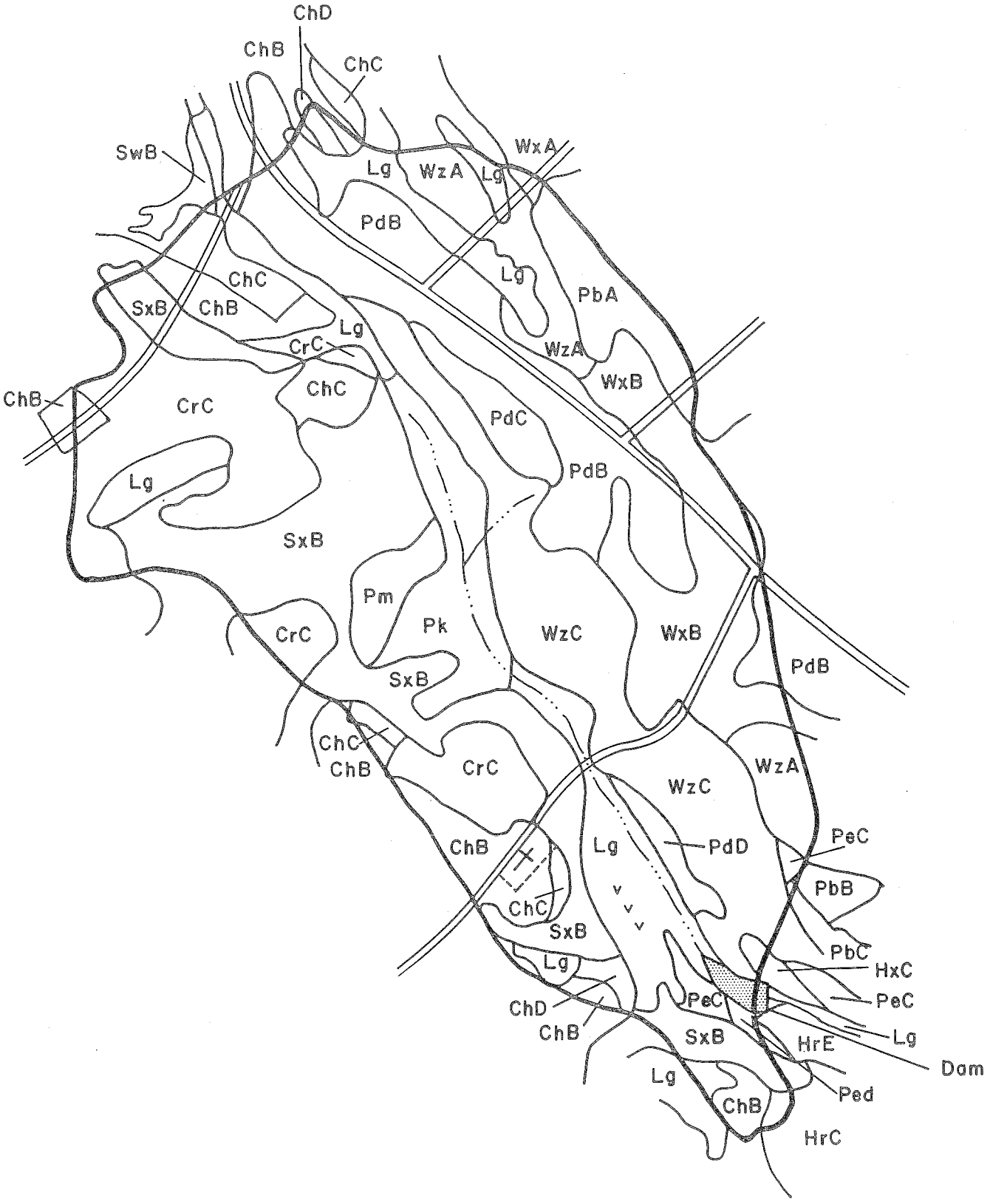
The town has a sizable investment in its Schoolhouse Brook Park, and it is wise for it to be seeking ways to protect an investment which offers direct benefits to its residents. Forest management (for income and tax relief, as well as timber stand improvement,) of private lands in the upstream portion of the watershed could help to achieve this in a way that benefits the landowners and the town. Tax incentives provided to landowners for this type of use may be looked on as a rather cheap method for the town to help preserve the desirable character of this watershed. Public use of trails and paths in the study area, via landowner permission, would provide further benefits to the town's residents, and could be looked on as a trade-off for any taxes lost by such incentives provided.

In helping to meet its management objectives, the town can help protect its interests by providing information to its residents on those programs and that expertise available, at no cost, which can provide mutual benefits to the private landowners and the town government. The state service forester program is one such program available. Areas of sensitivity can simultaneously be identified and recommendations for appropriate uses of these areas offered. Appropriate use of lands whereby compatible integrated development occurs is usually the best guarantee of meeting the long-term objectives and needs of those persons concerned.

While parallels cannot be directly drawn between the study area and the Schoolhouse Brook Park and Barrows Property reviewed by the ERT in 1975, many of the concerns expressed and suggestions offered in the 1975 report are still relevant. As mentioned, private ownership of lands in the study area confine the recreational options to a relatively narrow range. Open space preservation will help protect the character of the Schoolhouse Brook and Bicentennial Pond located in the town park downstream, and even if these open spaces are not open to limited public use, they indirectly benefit the public by helping preserve the quality of the water and the recreational capacity of the watershed.

Appendix

Soils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HrE
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Dam
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Ped
ChB
HrC

KEY TO MAPPING SYMBOLS

Charlton: ChB - Charlton stony fine sandy loam, 3-8% slope
ChC - Charlton stony fine sandy loam, 8-15% slope
ChD - Charlton stony fine sandy loam, 15-25% slope
CrC - Charlton very stony fine sandy loam, 3-15% slope

Hollis: HrC - Hollis very rocky fine sandy loam, 3-15% slope

Leicester: Lg - Leicester-Ridgebury-Whitman very stony complex

Paxton: PdB - Paxton stony fine sandy loam, 3-8% slope
PdC - Paxton stony fine sandy loam, 8-15% slope
PdD - Paxton stony fine sandy loam, 15-25% slope
PeC - Paxton very stony fine sandy loam, 3-15% slope
PeD - Paxton very stony fine sandy loam, 15-25% slope

Peat and Muck: Pk
Pm - Peat and Muck, shallow

Sutton: SxB - Sutton very stony fine sandy loam 0-3% slope

Woodbridge: WxB - Woodbridge fine sandy loam, 3-8% slope
WzA - Woodbridge very stony fine sandy loam, 0-3% slope
WzC - Woodbridge very stony fine sandy loam, 3-15% slope

SCHOOLHOUSE BROOK WATERSHED

SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series and Map Symbol	On-Site Sewage	Buildings with Basements	Streets and Parking	Land-scaping	Camp Areas	Picnic Areas	Play-grounds	Trails and Paths	Principal Limiting Factors
Charlton									
ChB	1	1	1	2	2	2	3	1	Large Stones
ChC	2	2	2	2	2	2	3	1	Slope, Large Stones
Chd	3	3	3	3	3	3	3	2	Slope, Large Stones
Cheshire									
CrC	2	2	2	2	2	2	3	1	Slope
Hollis									
HrC	3	3	3	3	3	3	3	1	Depth to Bedrock
Leicester-Ridgebury-Whitman Complex									
*Lg	3	3	3	3	3	3	3	3	Wetness
Paxton									
PdB	3	2	2	1	2	2	3	1	Wetness (Seasonal), Large Stones
PdC	3	2	2	2	2	2	3	1	Wetness (Seasonal) Large Stones
PdD	3	3	3	3	3	3	3	2	Slope
PeC	3	2	2	2	2	2	3	1	Large Stones, Slope, Seasonal Wetness
PeD	3	3	3	3	3	3	3	2	Large Stones, Slope, Seasonal Wetness

Soil Series and Map Symbol	On-Site Sewage	Buildings with Basements	Streets and Parking	Land-scaping	Camp Areas	Picnic Areas	Play-grounds	Trails and Paths	Principal Limiting Factors
Peat & Muck									
*Pk	3	3	3	3	3	3	3	3	Wetness
*Pm	3	3	3	3	3	3	3	3	Wetness
Sutton									
SxB	3	3	2	2	2	1	3	2	Wetness, Large Stones
Woodbridge									
**WxB	3	3	3	2	2	2	3	2	Wetness
WzA	3	3	3	2	2	2	3	2	Wetness, Percs Slowly
WzC	3	3	3	2	2	2	3	2	Wetness, Percs Slowly

1 - Slight
2 - Moderate
3 - Severe

* Inland Wetlands as defined by P.A. 155 as amended

** Prime Farmlands as defined by USDA Soil Conservation Service

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

Criteria for Delination of Streambelts

Soil surveys provide the most suitable basis presently available for making land use decisions. The soil survey is based upon many of the soil properties which significantly affect the suitability, limitations, or hazards in using land for various purposes.

A standard soil survey has not been completed for _____. The streambelts delineated in this study should be regarded as tentative until such time as soil survey is completed. The streambelts should then be aligned in accordance with criteria as set forth below.

The criteria uses the Connecticut Natural Soil Group System in the process of streambelt delineation.

Areas in proximity to named streams and their tributaries shown on USGS topographical maps and consisting of the soils as specified in the following groupings shall be included in the streambelts. The watercourses consist of the beds, banks, and water of the named streams and their tributaries.

A-1a, A-1b, A-1d, A-1e, G-1: Excessively drained terrace soils and well drained terrace soils with slopes less than 15 percent:

Shall include the areas of these soils that because of proximity to the watercourses, the soil patterns, steepness of slope, or surface water drainage requires controlled land use to minimize the hazard of pollution, erosion and sedimentation. As a minimum, the streambelt zone shall include these soils that are less than 150 feet from any of the following: the watercourse, its floodplain, or poorly or very poorly drained soils contiguous to the watercourse or its floodplain. Also, it shall include areas of these soils that are within 50 feet of a terrace escarpment that is within the streambelt.

A-1c: Terrace escarpments:

Shall include terrace escarpments adjacent to either the watercourse or its floodplain, or poorly drained or very poorly drained soils contiguous to the watercourse or its floodplain.

A-2: Moderately well drained soils:

Shall include areas of these soils contiguous to the watercourse or its floodplain, or poorly or very poorly drained soils contiguous to the watercourse or its floodplain.

A-3, B-3, C-3: Poorly and very poorly drained terrace soils:

Shall include these soils where they are contiguous to either the watercourse or its floodplain.

B-1a, B1b, B-1c, C-1a, C-1b, C-1c: Well drained upland soils with slopes less than 15 percent:

Sufficient areas of these soils shall be included to provide suitable width and continuity for a streambelt to meet public objectives. As a minimum, the streambelt shall include these soils less than 150 feet from any of the following: the watercourse, its floodplain, or poorly or very poorly drained soils contiguous to the watercourse or its floodplain.

B-1d, B-1e, C-1d, C-1e: Well drained upland soils with slopes more than 15 percent:

Shall include the areas of these soils that because of proximity to the watercourse, the soil patterns, or surface water drainage requires controlled land use to minimize the hazard of pollution or erosion and sedimentation. As a minimum, the streambelts shall include areas of these soils that are contiguous to the watercourse or its floodplain, and which are within 200 feet of the watercourse, its floodplain or poorly drained or very poorly drained soils contiguous to the watercourse or its floodplain.

B-2, C-2: Moderately well drained upland soils:

Shall include sufficient areas of these soils to provide suitable width and continuity for a streambelt to meet public objectives. As a minimum, the streambelt shall include these soils that are less than 150 feet from any of the following: the watercourse, its floodplain, or poorly or very poorly drained soils contiguous to the watercourse or its floodplain.

D-1: Rocky and very rocky upland soils with slopes less than 15 percent:

Shall include areas of these soils where proximity to the watercourse, soil patterns, or surface water drainage requires controlled land use to minimize the hazard of pollution or erosion and sedimentation. As a minimum, it shall include these soils which are contiguous to the watercourse or its floodplain and which are within 200 feet of the watercourse, its floodplain, or poorly or very poorly drained soils contiguous to the watercourse or its floodplain.

D-2: Rocky and very rocky upland soils with slopes more than 15 percent:

Shall include areas of these soils where proximity to the watercourse and soil patterns or surface water drainage requires controlled land use to minimize the hazard of pollution or erosion and sedimentation. As a minimum, it shall include these soils that are contiguous to the watercourse or its floodplain, and which are less than 300 feet from the watercourse, its floodplain or poorly drained or very poorly drained soils contiguous to the watercourse or its floodplain.

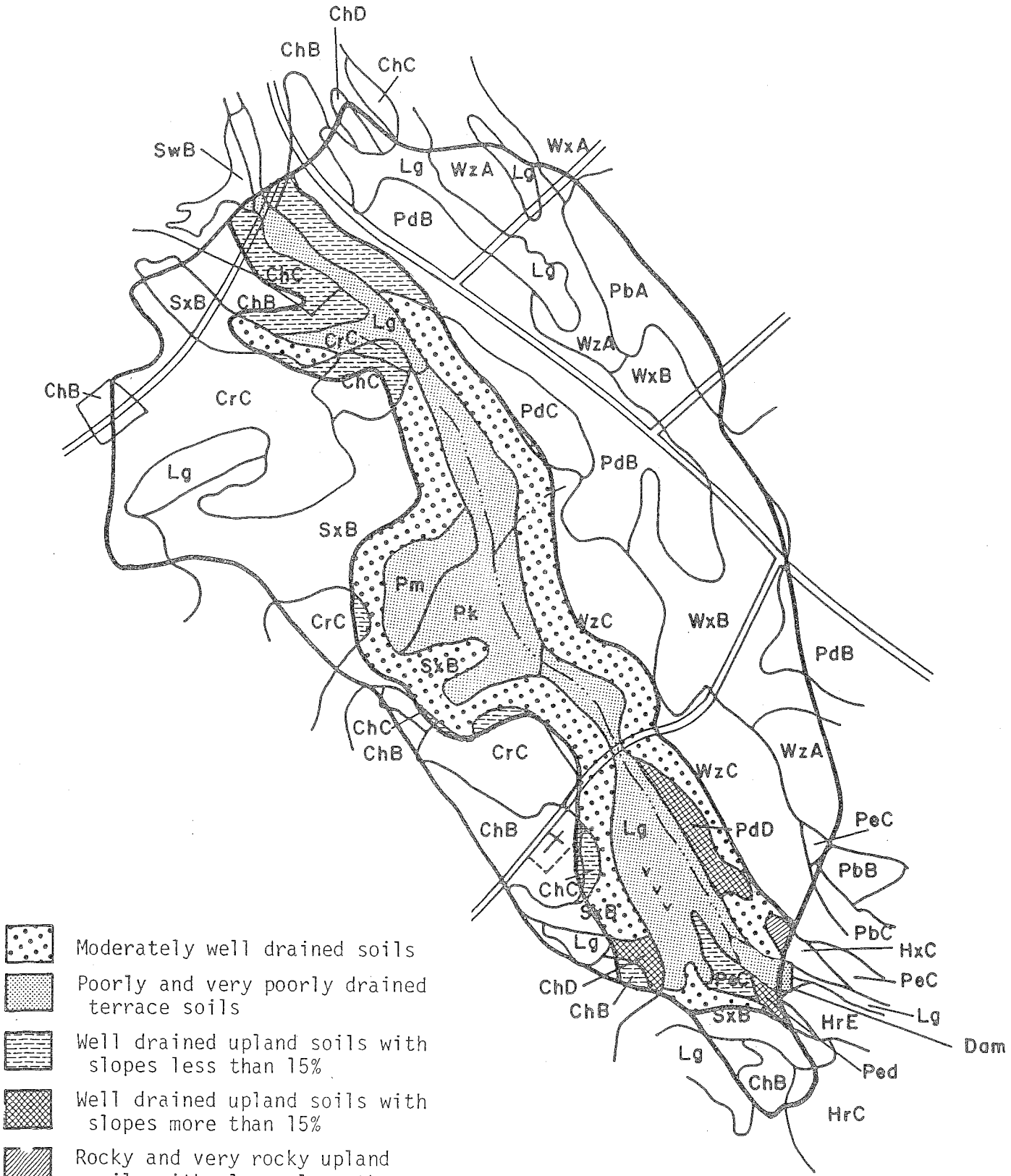
E: Floodplain soils:

Shall include all floodplain soils.

F: Marsh and swamp soils:

Shall include the areas of these soils which adjoin the watercourse or its floodplain.

NATURAL SOIL GROUPS IN THE STREAMBELT



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, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area.

The Team is 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, sanitary landfills, commercial and industrial developments, sand and gravel operations, 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 officials 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. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. 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 regarding the Environmental Review Team, please contact Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.