Environmental Review Team Report



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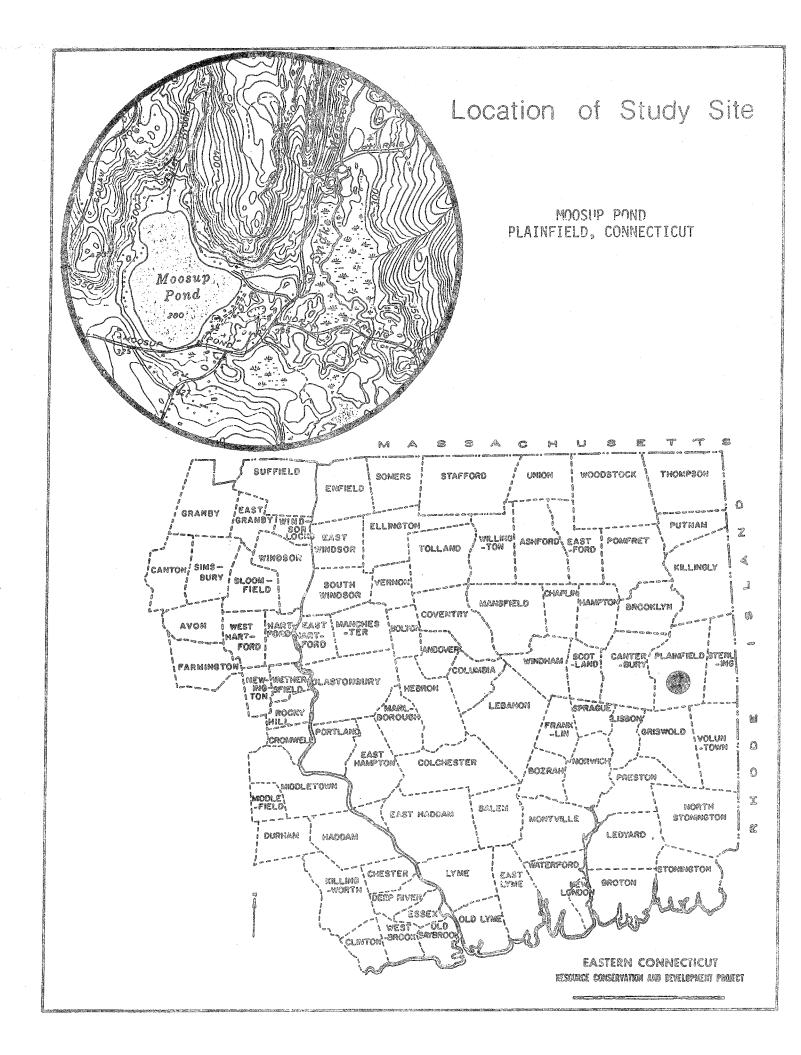
Moosup Pond Plainfield, Connecticut

August 1983



Eastern Connecticut Resource Conservation & Development Area

Environmental Review Team
PO Box 198
Brooklyn, Connecticut 06234



ENVIRONMENTAL REVIEW TEAM REPORT ON MOOSUP POND PLAINFIELD, CONNECTICUT

This report is an outgrowth of a request from the First Selectman of Plainfield to the Windham County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval. The request was approved by the RC&D Executive Committee and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

The ERT that field-checked the site consisted of the following personnel: Howard Denslow, District Conservationist, Soil Conservation Service (SCS); Bill Warzecha, Geologist, Connecticut Department of Environmental Protection (DEP); Dick Raymond, Forester, DEP; Marcia Banach, Regional Planner, Northeastern Connecticut Regional Planning Agency (NECRPA); Joe Piza, Fisheries Biologist, DEP; Don Capellaro, Sanitarian, State Department of Health; Thom Haze, Lake Specialist, Water Compliance Unit, DEP; Charles Fredette, Lake Specialist, Water Compliance, DEP; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, November 18, 1982. Reports from each contributing member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. 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 developer and the Town of Plainfield. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

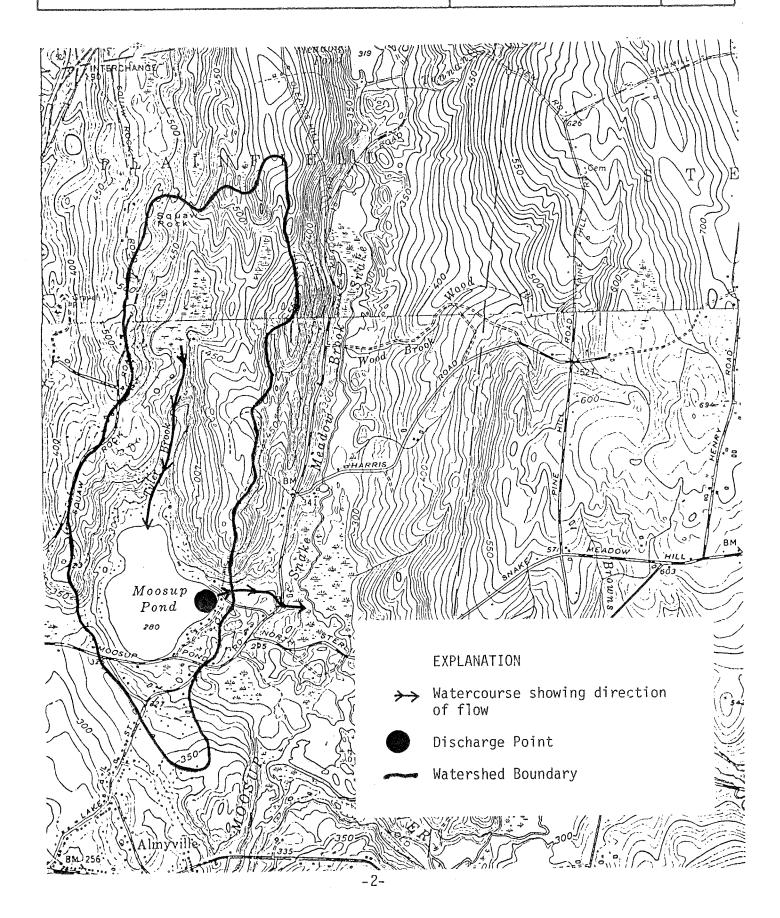
The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut, 06234, 774-1253.

Drainage Areas







INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare a natural resource inventory and watershed planning recommendations for the Moosup Pond watershed in the Town of Plainfield. Moosup Pond serves as a source of private and public recreation for the Town. It has periodically experienced algal blooms. One of the most serious blooms occurred during the summer of 1982 and was the impetus for this study. Water quality has been tested by the local health department at the time of the blooms and has been found satisfactory.

Natural in origin, Moosup Pond is fed primarily by Tyler Brook, other surrounding surface runoff, and bottom springs. It has a surface area of 97.2 acres, a maximum depth of 26 feet and an average depth of 9.3 feet. The bottom material is composed of sand, gravel, coarse rubble, and mud. Aquatic vegetation both submerged and emergent is abundant in shallow waters. Shoreline development is moderate and includes seasonal cottages and year round homes.

The watershed characteristics of the Pond are varied, with most residential development immediately around the pond or within a few hundred feet of it. The 730+ acre watershed is mostly wooded and steeply sloped north of the pond. Rainfall runoff flows to Tyler Brook and then into the pond. The watershed area south and east of the pond is less steeply sloped and more developed. The soils immediately around the pond are mostly well drained, meaning that surface and subsurface water will generally move quickly through them.

Moosup Pond is shallowest on its northwest side. Depth measurements taken from a boat indicated less than 4 feet of water at a distance several hundred feet from the shore. This is not unexpected since Tyler Brook feeds the pond in this area. Over years the brook has carried in naturally eroded soil and debris from the watershed above. It has settled out in this quiet-water area. Also, during the process of residential building in this northern area, additional erosion has occurred sending more soil and debris into the pond gradually. The water has shallowed, weeds have taken hold and now flourish. A process of natural aging or entrophication is occurring. This process has been augmented by development.

The following sections of this report discuss Team members' findings and concerns in detail. The Water Quality/Planning Concerns section will be of particular significance to those property owners within the watershed. The Connecticut Department of Environmental Protection has published A Watershed Management Guide for Connecticut Lakes. It contains suggestions for managing land and water around lakes to slow the entrophication process which will occur. It is suggested the Lake Association members review this publication. It is certainly important that all septic systems of homes and cottages along the shoreline are functioning well and cleaned regularly. If dredging the lake is planned further assistance from the Windham County Soil and Water Conservation District will be available in terms of evaluating the amount to be dredged and suggestions for the type of equipment to use.

ENVIRONMENTAL ASSESSMENT

TOPOGRAPHY

Moosup Pond, which is located in the northern section of the Town of Plainfield,

has a surface area of ± 97.2 acres. The pond has a maximum depth of 26 feet and an average depth of 9.3 feet. The pond is natural in origin and is fed by one inlet stream, Tyler Brook to the north, surface runoff and bottom springs. The maximum elevation in the watershed is 550 feet above sea level at the top of a ridge in the northern section of the watershed. The minimum elevation is the same as the existing lake level (usually 280 feet). The landscape is relatively flat in the southern section of the watershed with steeper slopes throughout the middle and northern portions. Most of the hills in the watershed appear to have bedrock controlled topography.

GEOLOGY

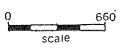
The watershed of Moosup Pond comprises approximately ±730 acres (about 1.14 square miles) and is encompassed by two U.S. Geological Survey topographic quadrangle maps: Oneco and East Killingly quadrangles. Both the bedrock (GQ-930) and surficial geologic maps of the Oneco topographic quadrangle were prepared by David S. Harwood and Richard Goldsmith (1971) and published by the U.S. Geological Survey. The bedrock and surficial geologic maps for the East Killingly quadrangle have not been published to date; however, they are on file at the Natural Resource Center, Department of Environmental Protection in Hartford.

Bedrock underlying and cropping out in the watershed is classified as part of three major rock formations. (1) Plainfield Formation, (2) Hope Valley Alaskite Gneiss - "alaskite" is a term given to granitic rocks containing only a small percentage of dark minerals, and (3) Scituate Granitic Gneiss.

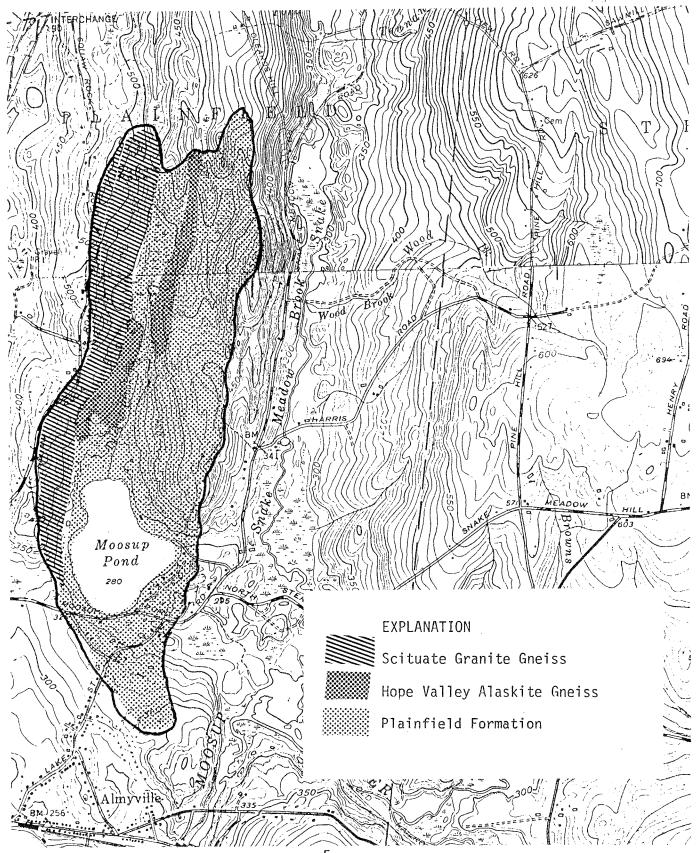
The approximate distribution of the three formations in the watershed are shown in the accompanying map. The Plainfield Formation, which comprises most of the watershed, consists largely of a light-tan to white, fine to medium grained quartzite. "Quartzite" is a metamorphosed sandstone (rocks that have been geologically altered by great heat and pressure). It was formed when sufficient quantities of heat resulted in the recrystallization of quartz and feldspar. Dominant minerals include quartz, biotite, muscovite, zircon and magnetite. The Hope Valley Alaskite Gneiss consists of a light gray to flesh colored, fine to medium grained alaskite gneiss. It is composed chiefly of the minerals quartz, microcline, sodic plagioclase and biotite. Minor minerals include magnetite, apatite, zircon and allanite. The Scituate Granite Gneiss, which borders the western section of the watershed is a gray to pinkish gray, coarse grained granitic gneiss. It is composed mainly of the minerals microcline, quartz plagioclase and biotite. "Gneisses" are rocks in which thin bands of elongate, platy or flaky minerals alternate with bands or layers of more rounded mineral grains.

There are essentially four types of surficial geologic materials found throughout the watershed area, (1) till, (2) stratified drift, (3) alluvium, and (4) swamp deposits, and their locations are shown in an accompanying map. Surficial geologic materials consist of those unconsolidated rock particles and fragments, organic matter, or other loose debris that overlie bedrock. The predominant surficial unit in the watershed is till. "Till" consists of rock debris and occasional organic materials which were accumulated on or within a moving sheet of glacier ice and which were later redeposited directly from the ice. Because the ice was indiscriminate in collecting and redepositing its constituent particles, till contains a nonsorted mixture of clay, silt, sand and gravel boulders. Within the State of Connecticut, two types of till have been identified; one, which may be generally

Bedrock Geology



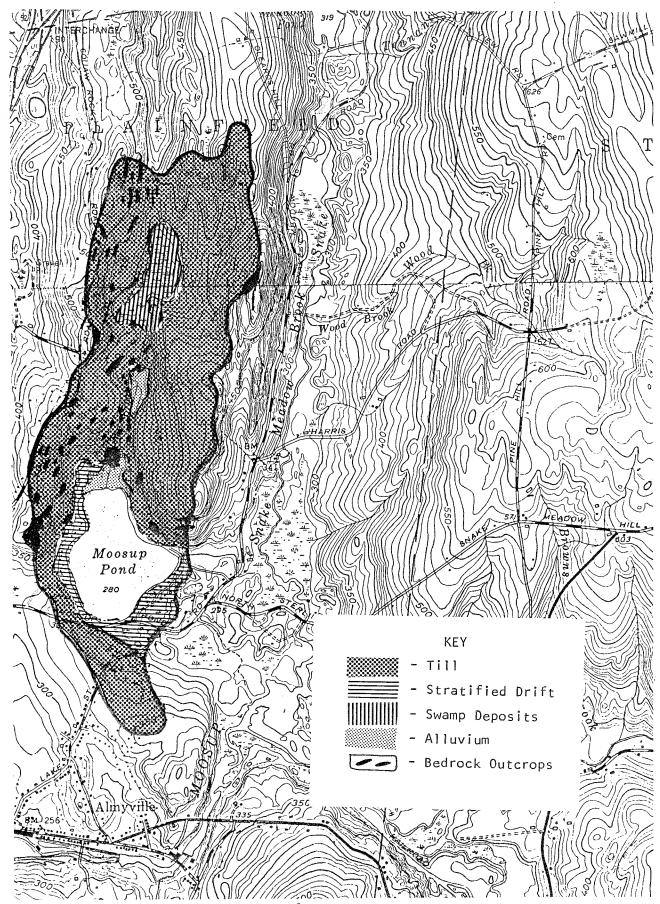
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Surficial Geology







thin, relatively loose and low in fine (silt and clay) or the other which may be tough, compact, relatively high in fines and often thick. In most parts of this watershed, till deposits are probably less than 10 feet thick.

Another type of glacial sediment which fringes along the western and southern sections of Moosup Pond is stratified drift. "Stratified drift" was deposited by meltwater that flowed from wasting ice during a period of glacial regression. It is composed chiefly of well-sorted silt, sand, gravel, cobbles and boulders. Thickness of these deposits probably range between 10 and 40 feet. "Alluvium" consists of sand, silt and gravel deposited by Tyler Brook. The greatest deposits of alluvium are found just north of the pond. "Swamp deposits", located in the northern section of the watershed consist of partly decomposed organic material mixed with silt, sand and gravel. These deposits are generally 5 to 10 feet thick and are probably underlain by glacial till.

HYDROLOGY

By definition, the watershed of Moosup Pond comprises all land area from which water drains into the pond. A raindrop falling on the watershed boundary would have a 50 percent chance of passing into or out of the watershed. This drainage divide tends to follow the crests of local hills and ridges. The watershed as depicted comprises approximately +730 acres.

Residences within the watershed area are served by individual on-site sewage disposal systems. It should be noted that septic system effluent is one of the most common pollutants of lakes in Connecticut. However, the Team has no reason at this time to believe that Moosup Pond is presently threatened by such effluent. The heaviest concentration of residences, which appear to be of mixed temporary and year round use, is in the northern section of the pond on Pond Hill Road and Smith Road. Due to the moderate density of these residences and presence of soils (stratified drift) that may have rapid percolation rates in this area, it seems likely that the pond could be threatened by septic system effluent.

The remaining portion of the watershed, primarily north of Moosup Pond, has a low density of residences. Therefore, possible sources of pollution in those areas are less likely to pose a threat to the pond at this time. This does not mean excessive development in this area in the future would add to a problem that may exist in Moosup Pond presently. The reason for this is that pollutants originating in these areas will become more diluted as they travel downstream towards the pond. Most pollutants can be eliminated by natural processes through chemical and biological action, sedimentation or by other means as they travel downstream. Therefore, it seems that the Town should concentrate their attention on possible pollutants such as overflowing or discharging septic system effluent and/or fertilizer runoff from lawns, gardens, etc. which maybe discharging directly into the Pond as opposed to those pollutants originating from further upstream. One way to determine if there are any discharging or malfunctioning sewage systems would be to conduct a sanitary survey of residences in close proximity to the pond. The sanitary survey should be conducted during the wettest time of the year (spring) when septic systems are most likely to malfunction.

If there are any overflows or discharges identified, steps should be taken immediately to correct these problems. Request for assistance to organize and conduct such a survey may be directed to the local health department in the town.

SOILS

A detailed soils map of this site is included in the appendix to this report accompanied by a chart which indicates soil limitations for various urban uses. As the soils map is an enlargement from the original 1,320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, buildings with basements, buildings without basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey, Windham County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Soil series typical of this watershed area include Canton and Charlton, Charlton-Hollis, Hinckley, Paxton, Woodbridge and Ridgebury-Leicester and Whitman complex. These soils and their limitations are described in detail below.

(CCB) - Canton and Charlton very stony fine sandy loams, 3 to 8 percent slopes. This unit consists of gently sloping, well drained soils on ridges, hills, and side slopes of glacial till uplands. Slopes are mainly smooth and convex. Stones cover 1 to 8 percent of the surface. About 45 percent of the total acreage of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sandy loam 21 inches thick. The substratum is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few large, nearly level areas and a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. The permeability of the Canton soils is moderately rapid in the surface layer and subscil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have moderate available water capacity and medium runoff, and both are very stongly acid to medium acid.

The soils of this unit are too stony for cultivation. Stone removal makes the soils suited to cultivated crops but is difficult. The soils are well suited to

woodland, but the Charlton soils have higher productivity than the Canton soils.

Slope is the main limitation of the soils for community development, especially for onsite septic systems. Slopes of excavations are unstable. The stones on the surface limit landscaping.

(CrC) - Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes. This unit consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Stones cover 1 to 8 percent of the surface, which is marked by a few narrow, intermittent drainageways and small, wet depressions. This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown gravelly fine sandy loam 12 inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Included with this unit in mapping are small areas of somewhat excessively drained Brimfield soils; well drained Brookfield, Canton, and Paxton soils; moderately well drained Sutton and Woodbridge soils; and poorly drained Leicester soils. Also included are small areas with bedrock at a depth of 20 to 40 inches and a few large areas that have been cleared of stones.

The water table in this unit is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff. Both are very strongly acid to medium acid.

The stones on the surface and areas of exposed rock hinder the use of farm equipment and make the soils generally unsuitable for cultivation. Some cleared areas are suitable for pasture and some for hay.

This unit is suited to woodland production. However, the Hollis soils are droughty, and seedling mortality is high. Uprooting during windy periods is common on the Hollis soils because of the shallow rooting depth.

The areas of exposed rock and the depth to bedrock in the Hollis soils limit this unit for community development, especially as a building site or as a site for onsite septic systems. The stones on the surface restrict landscaping.

(CrD) - Charlton-Hollis fine sandy loams, very rocky, 15 to 35 percent slopes. This unit consists of moderately steep to steep, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Slopes are mainly convex. Stones and boulders cover 1 to 8 percent of the surface. This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown gravelly fine sandy loam 12 inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Included with this unit in mapping are small areas of somewhat excessively drained Brimfield soils; well drained Brookfield, Canton, and Paxton soils; and moderately well drained Sutton and Woodbridge soils. Also included are areas with bedrock at a depth of 20 to 40 inches and a few small areas with slopes of more than 35 percent.

The water table in this unit is commonly at a depth of more than 6 feet. The available water capacity is moderate in Charlton soils and very low or low in the Hollis soils. Both soils have moderate to moderately rapid permeability and rapid runoff. Both are very strongly acid to medium acid.

The stones on the surface, the areas of exposed rock, and the slope limit the use of farming equipment and make the soils generally unsuitable for cultivation. Some cleared areas are suitable for pasture.

The soils are suited to use as woodland. However, the Hollis soils are droughty, and seedling mortality is high. Uprooting during windy periods is common on the Hollis soils because of the shallow depth to bedrock. The slope and the stones and exposed rock limit the use of timber harvesting equipment.

The slope, the exposed rock, and the depth to bedrock in the Hollis soils limit this unit for community development, especially as a site for onsite septic systems and buildings.

(HkC) - Hinckley gravelly sandy leam, 3 to 15 percent slopes. This is a gently sloping to sloping, excessively drained soil on terraces of stream vaileys and on glacial outwash plains. Slopes are convex or undulating and are mostly less than 200 feet long.

Typically, the surface layer is very dark grayish brown gravelly sandy loam 2 inches thick. The subsoil is dark yellowish brown, yellowish brown, and brownish yellow gravelly sandy loam and gravelly loamy sand 16 inches thick. The substratum is pale yellow gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Windsor soils, somewhat excessively drained Merrimac soils, well drained Agawam soils, and moderately well drained Sudbury soils. Also included are a few areas of a soil with a surface layer of fine sandy loam and a few small areas with a few stones on the surface. Included areas make up about 15 percent of the unit.

The water table in this Hinckley soil is commonly below a depth of 6 feet. The available water capacity is low. Runoff is rapid. This soil has rapid permeability in the surface layer and subsoil and very rapid permeability in the substratum, and it is extramely acid to medium acid.

Irrigated areas of this soil are well suited to cultivated crops; nonirrigated areas are fairly suited. The soil dries and warms early in the spring and is easy to till. Minimum tillage and cover crops help to minimize the moderate erosion hazard in cultivated areas.

Droughtiness makes this soil poorly suited to use as woodland; it increases seedling mortality.

This soil generally is suited to community development, but the rapid permeability imposes a hazard of groundwater pollution in areas used for septic tanks. The slopes in some excavated areas are unstable.

(HkD) - Hinckley gravelly sandy loam, 15 to 40 percent slopes. This soil is moderately steep to very steep and excessively drained. It is on side slopes and terrace breaks of stream valleys and outwash plains. Slopes are convex or undulating and are mostly less than 300 feet long.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 2 inches thick. The subsoil is dark yellowish brown, yellowish brown, and brownish yellow gravelly sandy loam and gravelly loamy sand 16 inches thick. The substratum is pale yellow gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Windsor soils, somewhat excessively drained Merrimac soils, and well drained Agawam soils. Included areas make up about 15 percent of the unit.

The water table in this Hinckley soil is commonly below a depth of 6 feet. The available water capacity is low. Runoff is rapid. This soil has rapid permeability in the surface layer and subsoil and very rapid permeability in the substratum, and it is extremely acid to medium acid.

Slope and a severe erosion hazard make this soil poorly suited to cultivated crops. Maintaining a permanent plant cover helps to control runoff and erosion in cultivated areas.

This soil is suited to woodland, but droughtiness causes a high rate of seedling mortality and slope hinders the use of some harvesting equipment.

Slope is the major limitation of this soil for community devalopment. The rapid permeability causes a hazard of groundwater pollution in areas used for septic tanks.

(PdB) - Paxton very stony fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping and well drained. It is on the tops and side slopes of drumlins and large hills of glacial till uplands. Stones and boulders cover 1 to 8 percent of the surface.

Typically, the surface layer is dark brown fine sandy loam 7 inches thick. The subsoil is yellowish brown and dark yellowish brown fine sandy loam 18 inches thick. The substratum is very firm to firm, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Charlton soils, moderately well drained Woodbridge soils, and poorly drained Ridgebury soils. Also included are a few nearly

level areas and small areas that have no stones on the surface. A few large areas have a substratum of loamy sand. Included areas make up about 10 percent of the unit.

This Paxton soil has a seasonal high water table perched at a depth of about 2 feet for several weeks in the spring. This soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum. Runoff is medium. The soil has moderate available water capacity and is very strongly acid to slightly acid.

This soil generally is too stony for cultivation but is well suited to woodland. Stone removal makes the soil well suited to cultivated crops but is difficult. Cover crops and minimum tillage help to control erosion and maintain tilth in cultivated areas.

The slow to very slow permeability of the substratum limits this soil for community development, especially for onsite septic systems. Steep slopes of excavations in this soil slump when saturated. Lawns are commonly soggy in autumn and spring. The stones on the surface hinder landscaping.

(PdC) - Paxton very stony fine sandy loam, 8 to 15 percent slopes. This soil is sloping and well drained. It is on the side slopes of drumlins and hills of glacial till uplands. Stones and boulders cover 1 to 8 percent of the surface.

Typically, the surface layer is dark brown fine sandy loam 7 inches thick. The subsoil is yellowish brown and dark yellowish brown fine sandy loam 18 inches thick. The substratum is very firm to firm, olive brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Charlton soils, moderately well drained Woodbridge soils, and poorly drained Ridgebury soils. Also included are a few small areas with no stones on the surface and a few large areas that have a substratum of loamy sand. Included areas make up about 10 percent of the unit.

This Paxton soil has a seasonal high water table perched at a depth of about 2 feet for several weeks in the spring. This soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum. Runoff is rapid. The soil has moderate available water capacity and is very strongly acid to slightly acid.

This soil generally is too stony for cultivation but is well suited to woodland. Stone removal makes this soil suited to cultivated crops but is difficult. Maintaining a permanent plant cover helps to control erosion in cultivated areas.

Slope and the slow or very slow permeability of the substratum limit this soil for community development, especially for onsite septic systems. Steep slopes of excavations in this soil slump when saturated. Lawns are commonly soggy in autumn and spring. The stones on the surface hinder landscaping.

(WzC) - Woodbridge extremely stony fine sandy loam, 3 to 15 percent slopes. This soil is gently sloping to sloping and moderately well drained. It is on the tops of large drumlins and hills on glacial till uplands. Stones cover 8 to 25 percent of the surface.

Typically, the surface layer is very dark grayish brown fine sandy loam 8 inches thick. The subsoil is mottled, dark yellowish brown and yellowish brown fine sandy loam 22 inches thick. The substratum is firm to very firm, olive gray fine sandy loam and gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Paxton soils, moderately well drained Sutton soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of the unit.

This Woodbridge soil has a seasonal high water table at a depth of about 20 inches from fall to spring. It has moderate available water capacity. The soil has moderate permeability in the surface layer and subsoil and slow to very slow permeability in the substratum. Runoff is rapid. This soil is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

This soil generally is too stony for cultivation but is well suited to woodland. Stone removal makes the soil well suited to crops but is difficult. Seasonal wetness in fall and spring is an additional limitation for crops.

The water table and the slow or very slow permeability in the substratum are the main limitations of this soil for community development, especially for onsite septic systems. Lawns on this soil are soggy in autumn and spring and after heavy rains.

(Rn) - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. This unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. Slopes range from 0 to 3 percent. Stones cover 8 to 25 percent of the surface. About 40 percent of the total acreage of this unit is Ridgebury soils, 35 percent is Leicester soils, 15 percent is Whitman soils, and 10 percent is other soils. Some areas of this unit consist of one of these soils, and some others consist of two or three. The soils of this unit were mapped together because they have no significant differences in use and management.

Typically, the Ridgebury soils have a surface layer of very dark brown fine sandy loam 8 inches thick. The subsoil is mottled, light brownish gray fine sandy loam 8 inches thick. The substratum is very firm to firm, grayish brown and light brownish gray fine sandy loam and sandy loam to a depth of 50 inches or more.

Typically, the Leicester soils have a surface layer of very dark brown fine sandy loam 7 inches thick. The subsoil is mottled, grayish brown and light olive brown fine sandy loam 23 inches thick. The substratum is mottled, light olive brown and grayish brown sandy loam to a depth of 60 inches or more.

Typically, the Whitman soils have a surface layer of very dark gray fine sandy loam 9 inches thick. The subsoil is gray, mottled fine sandy loam 5 inches thick. The substratum is mettled, light olive gray fine sandy loam and sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are small areas of moderately well drained Sutton and Woodbridge soils and very poorly drained Adrian and Palms soils. Also included are a few areas where stones cover less than 8 percent of the surface.

The Ridgebury soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate to

moderately rapid in the surface layer and subsoil and slow to very slow in the substratum. Runoff is slow. The Ridgebury soils have moderate available water capacity and are very strongly acid to medium acid.

The Leicester soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate or moderately rapid. Runoff is slow. The Leicester soils have moderate available water capacity and are very strongly acid to medium acid.

The Whitman soils have a seasonal high water table at or near the surface from fall through spring. The permeability of the soils is moderate or moderately rapid in the surface layer and subsoil and slow to very slow in the substratum. Runoff is slow. The Whitman soils have moderate available water capacity and are very strongly acid to slightly acid.

The soils of this unit are too stony for cultivation. The unit is suited to woodland. However, the stones on the surface and the high water table hinder the use of harvesting equipment. The water table causes a high rate of seedling mortality and restricts rooting, causing a hazard of uprooting during windy periods.

The high water table and slow to very slow permeability are major limitations of the soils of this unit for community development. Steep slopes of excavations in these soils slump when saturated. The stones on the surface restrict landscaping, and lawns are soggy most of the year. The use of this soil is regulated in Connecticut under Public Act 155.

FISH RESOURCES

Moosup Pond is stocked with Rainbow and Brown Trout. Sunfish are numerous. Bass, Pickerel, Yellow Perch, Calico Bass, Golden Shiners and Bullheads are common. Included in the Appendix to this report is a chemistry report from August 13, 1973, indicating the eutrophic nature of the pond at that time.

Weeds and algae are most abundant at the north end of the pond where Tyler Brook enters. According to one of the long term residents who spoke to the Team, the pond has silted in several feet at this point. Team members found two to three feet of muck sedimentation in this area by sounding the bottom from a boat. There is a hard bottom below the silt.

A check of the dam height revealed the pond could be drawn down at least four feet. A draw down of six or more feet could be accomplished by digging a trench or laying a temporary pipe from the deeper section of the pond to the dam outlet. This draw down would help control weed growth by exposing their roots to frost action during the winter months.

Sedimentation currently has reduced water depths, creating shoals which are conducive to the growth of aquatic plants and algae. Drawing down the pond and removing the sediment (organic materials, water lillies, etc.) is desireable. Drainage spoils should be disposed of in a manner that will prevent recontamination.

During the Review Team tour of the pond, another long time resident pointed out suspected sources of septic tank overflows. As many of the homes are now used year round and properties slope towards the pond, nutrients could be leaching into the pond. It is not always easy to detect the leaching as it may only occur during heavy rains.

A conscious effort will have to be made on the part of all individual landowners to minimize the entry of nutrients. Use of low phosphates in household products should be encouraged. Also use of fertilizers and herbicides on lawns and plants should be discouraged.

VEGETATION

The 730+ acre Moosup Pond watershed may be divided into three major vegetation types. Approximately 144 acres are considered as commercial forest land with built-up residential areas occupying an additional 112 acres. Moosup Pond is 97.2 acres in size while several small ponds contribute another 3 acres of open water.

General Vegetation Descriptions

Mixed Hardwoods - (80 acres) - The overstory in this type is dominated by white oak, red oak, black oak, scarlet oak, red maple, shagbark hickory, pignut hickory and black birch. The understory contains many hardwood tree seedlings and saplings, including American chestnut, are widespread, along with many shrub species including but not limited to blue beech, hazelnut, mountain laurel, flowering dogwood and iron wood. Ground cover is dominated by mosses, grasses, and many species of ferns.

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

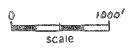
Softwoods/Hardwoods - (48 acres) - The dominant hardwoods are black oak, scarlet oak, white oak, red maple, shagbark hickory and black birch, while eastern white pine and Canadian hemlock form the softwood component. White pine and hardwood tree seedlings and saplings, mountain laurel, low bush blueberry and huckleberry are the most abundant vegetation forms in the understory. Groundcover consists of mosses, ferns and grasses.

The tree species present in this type also have commercial value. However, due to poor growth conditions, the hardwoods may be of lower quality than those in the mixed hardwood type.

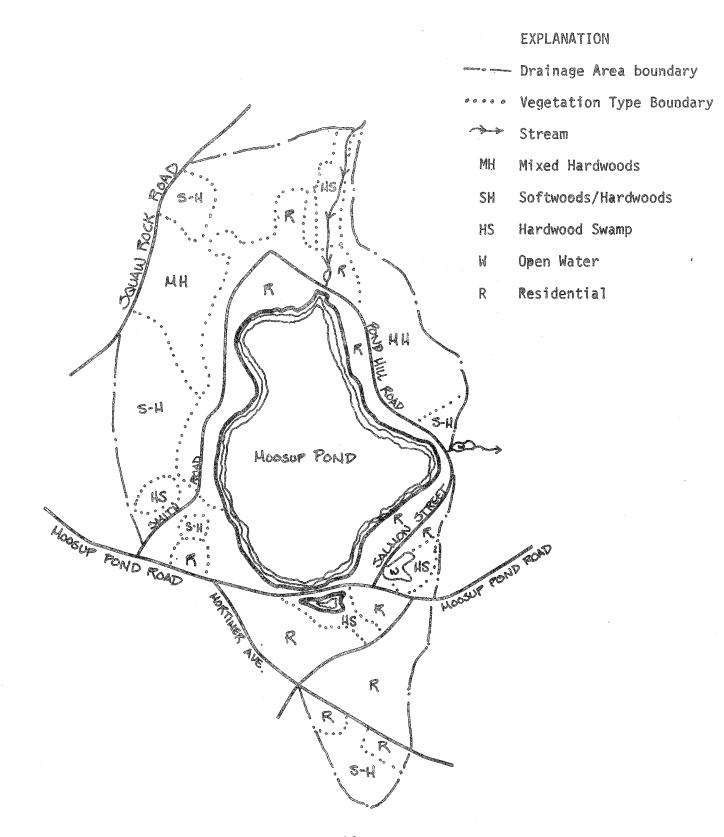
Hardwood Swamp/Streamhelt - (16 acres) - Red maple is the dominant tree species along with scattered white ash, black ash, and yellow block in these forested wetlands. The understories throughout these areas vary widely in both species, composition and diversity. High bush blueberry, spicelush, sweet peper-bush and several species of viburnum are common throughout. Skunk cabbage, tussock sedge, cinnamon term, sensitive ferm and sphagnum mass are widespread as ground cover.

The commercial utility of the trees in these areas must be evaluated on an individual wetland basis. Generally, tree growth potential is somewhat limited

Vegetation







by the high water table and the saturated soils which are present. Under these conditions, trees are shallow rooted and unable to become securely anchored, causing a 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.

Limitations to Forest Management

Some areas of this watershed may present limitations to forest management. These limitations may be divided into two major categories: those that restrict operability as related to forest management and those that restrict tree growth.

Operability as related to forest management may be limited by poor access, proximity to a residential development, extremely steep slopes and/or severe rockiness. These obstacles may restrict or even preclude the actual implementation of forest management and harvest operations.

Included in the second form of limitation are excessively well drained soils, shallow to bedrock soils and wetland soils. These soils may limit or restrict tree growth, quality and health to a point where the trees that are present have little or no commercial value.

It should be recognized that the limitations described above may not preclude forest management. However, proper planning and implementation is essential in these areas to insure an effective, efficient and environmentally sound operation.

Management Considerations

The Department of Environmental Protection's Bureau of Forestry encourages all woodland owners to manage their forestlands. 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 minimal 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 forest management. These services are provided free of charge. Services of a more intensive nature are available from private consulting firms.

Effects of Forest Management on 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 a 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 constructed access reads, skid trails,

yarding areas and stream crossings; 2) siltation and sedimentation caused by logging debris left in streams, impeding natural flow; 3) thermal pollution resulting from complete or partial harvesting of streambank vegetation, eliminating shade; and 4) chemical pollution caused by improper application of herbicides and insecticides (It should be noted that in Connecticut, widespread use of chemicals in forest management is not prevalent and therefore does not constitute a great threat to water quality at this time.).

Despite the potential adverse impacts to water quality, the harvesting of trees is a major and necessary tool used in forestland 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 Protecting Water Quality While Harvesting Forest Products" was published in 1982 and is available from the Department of Environmental Protection, Bureau of Forestry. 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" is defined in the pamphlet as "a practical, economical and effective management or control practice which will reduce or prevent the generation of pollution". 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 is of a voluntary nature, rather than through regulation. At this time, local regulation of forest product harvesting is contrary to State forestry policy.

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

WATER OUALITY/PLANNING CONCERNS

Moosup Pond is located in Windham County in the northern section of Plainfield. The shoreline is moderately wooded and has approximately fifty homes and an apartment complex. All of the homes are serviced by on-site septic systems. The pond has a surface area of 97.2 acres, an average depth of 9.2 feet and a maximum depth of 26 feet. There are two noticeable inflows, Tyler Brook and an unnamed brook. Tyler Brook enters the lake at the northern shoreline draining a marsh. The unnamed brook enters the lake at the western shoreline and drains a "cranberry bog".

An algal bloom during the summer of 1982 and considerable aquatic weed growth in the north cove have prompted this review. On the date seen (11/18/82) the water was clear with a transparency of about 10 feet except in the north cove where dark water from Tyler Brook has decreased transparency. The substrate is generally sand and gravel except in the north cove which has a considerable accumulation of muck. Aquatic weeds are sparse in density, but common throughout

the lake on littoral substrate. Again the one exception is the north cove in which aquatic weeds are somewhat dense. A few of the more common types are:

Nuphar sp. - spatter dock, Potamogeton sp. - pondweed, and Myriophyllum sp. - water milfoil. Although the water was clear on the date seen, an algai bloom was witnessed by residents and photographs show a wind-blown surface scum.

An increase in algal productivity, as witnessed by residents, indicates accelerated eutrophication. Eutrophication is the process of lake aging, caused by enrichment of the lake with plant nutrients from its watershed. Major consequences of this process are an increase in algal bloom frequency, intensity and duration; an increase in aquatic plants; accumulation of sediments, shoal areas develop and the lake becomes shallower; and the dissolved oxygen concentration of bottom waters declines. As a result, recreation becomes impaired and as the process continues, the lake evolves into a wetland - a swamp, marsh, or bog. Eutrophication is a natural process which normally progresses over many centuries. Man's development and use of watershed land accelerates the rate of eutrophication and can cause severe eutrophication in a matter of decades.

Some of the common sources of increased nutrient inputs to a lake and thus eutrophication are: 1) Erosion from construction and other land disturbance activities. Soil erosion from construction sites can be 10 to 100 times greater than erosion from agricultural land and must therefore be regarded as a major factor in lake eutrophication. Methods for controlling construction site erosion and sedimentation are described in Erosion and Sediment Control Handbook for Connecticut, U.S. Department of Agriculture, Soil Conservation Service, 1976. This document can be obtained from the SCS District Conservationists; 2) Improperly functioning septic systems. Failing septic systems will either result in backflow of wastewaters into the house or breakout of wastewaters on the surface of the ground. Such systems can contribute phosphorus and other pollutants to lake waters. Besides being a source of nutrients to the lake, it is a public health hazard; 3) Nutrients from properly functioning septic systems can, under certain conditions, be transported to the lake via groundwater; 4) Lawn and Garden Fertilizers. Fertilization should be properly timed and applied when needed. Soil test kits are available from the UCONN Cooperative Extension Service county offices. Soil samples will be analyzed to identify soil nutrient deficiencies; and 5) Waterfowl. Large numbers of resident waterfowl can contribute appreciable amounts of nutrients, phosphorus and nitrogen, to lake waters. It has been shown that the excrement of four geese in one month is equivalent to the annual phosphorus loading from 2.5 acres of watershed land. It is therefore obvious that resident waterfowl can be an important factor in the eutrophication process.

Aquatic weed growth in the north cove seems to be the result of sediment deposition from Tyler Brook. Sediment deposition promotes aquatic weed growth by providing: 1) Proper Substrate. Accumulations of silt and muck are favored over sand and gravel as a substrate by aquatic weeds; 2) Shallow Water. Sunlight, which is essential to plant growth, can only penetrate water to certain depths. For a given set of environmental conditions (e.g., angle of solar incidence, water clarity), the shallower the water, the greater the light penetration; and 3) Mutrients. Aquatic plants extract nutrients from the water and from the sediments they are rooted in. Thus if insufficient nutrients are available from the water, a given plant will thrive in sediments with adequate nutrients.

The following recommendations are suggested as a course of action to abate algal blooms and control weed bed growth in the north cove:

- I) Develop and implement a watershed mangement program using A Watershed Management Guide for Connecticut Lakes, Connecticut Department of Environmental Protection and Connecticut Areawide Waste Treatment Management Planning Program, 1982, as a guide. Some specific areas of concern that should receive attention are as follows:
 - 1) Control of Nutrient Inputs to the Lake.
 - a. Proper design and installation of new septic systems to minimize the possibility of failing systems. Failing existing systems, if any, should be corrected immediately.
 - b. Use of nonphosphate detergents by watershed residents can be considered.
 - c. Fertilization of lawns and gardens should be properly timed and properly applied. Need for application can be determined from soil testing kits available from the Soil Conservation Service.
 - d. Large numbers of waterfowl can be discouraged from residing on the lake. The Department of Environmental Protection Wildlife Unit may provide additional information and advice.
 - e. Erosion controls should be optimized during construction to minimize erosion and sedimentation.
 - 2) Control of Sedimentation Resulting in Aquatic Weed Growth.
 - a. Source(s) of sediment input to the north cove should be identified and corrected. Installation of a sediment trap near the mouth of Tyler Brook should be considered. The Soil Conservation Service (SCS) should be consulted for more information.
 - b. Sediments in the north cove can be removed to increase depth and remove substrate, thereby controlling weed bed growth. A feasibility study of dredging and drawdown-excavation should encompass cost, environmental impacts, impacts on residential wells, time involved, effectiveness, permanence of desired effect and sediment disposal.
- II) Cosmetic and Temporary Controls. In general the following methods are short-termed controls requiring periodic application. These methods are generally less expensive, but do not provide long term solutions. Subsequent applications over many years can be more expensive in the long run.
 - a. Weed harvesting can remove aquatic weeds by cutting below the water's surface and removing the weeds. Initial cost of purchasing a weed harvester may be significant but successive costs (labor, gas, etc.) are minimal. Harvesting is temporary being analagous to mowing a lawn, weeds will grow back in time.
 - b. Herbicides can be applied to kill aquatic weeds. Again, the

method is temporary and certain weed types are resistant to available herbicides. Residents are usually skeptical about chemical applications and a permit from the Department of Environmental Protection Pesticides Section is required.

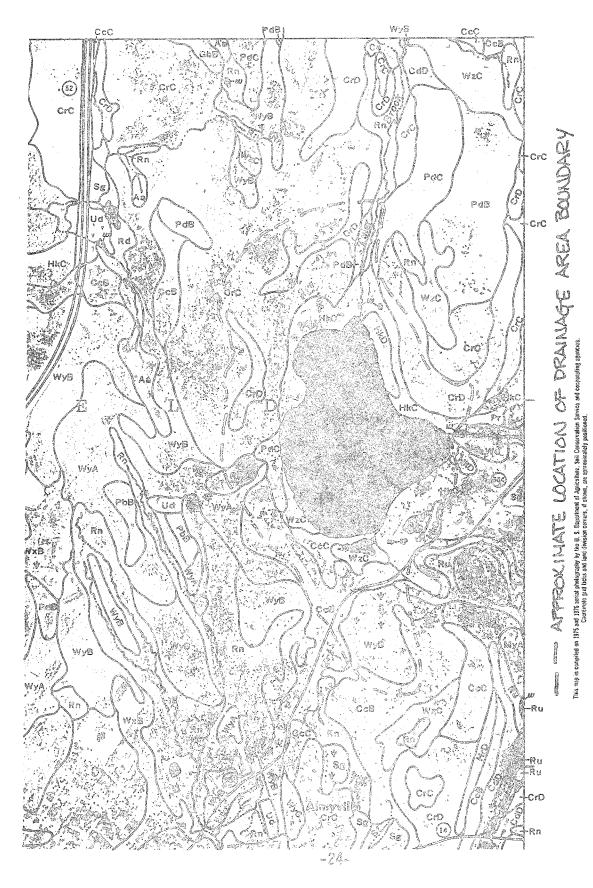
- c. Chemical applications can be used to control algal blooms. In general, copper sulfate is used and a permit is required. The results, again, are temporary.
- III) A public education and awareness program concerning the causes and controls of nuisance algae and weed growth should be developed. Residents should be informed as to what they can do to help manage the watershed land and improve conditions in the lake.

Appendix

Soils



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Continues guil lecis and land division centers, if shows, are agrountablely positioned.
WINDHAM COUNTY, CONNECTICUT SHEET NO. 50

Moosup Pond

Plainfield, Connecticut

Principal Limitations and Ratings of Watershed Soils

Drainage	Deep to water	Deep to water	Deep to water	Deep to water	Deep to water	Deep to vater	Deep to water	Deep to water	Deep to water	Deep to water	Deep to water	Deep to water
Septic Tank Absorption Fields	Slight	Slight	Moderaterslope	Moderate:slope	Moderate: slope	Severe: depth to rock	Severe:slope	Severe: slope, depth to rock	Severe:poor filter	Severe: alope, poor filter	Severe:percs.	Severe: percs. slowly
Local Roads and Streets	Silght	sileht	Moderate: slope	Moderate: slope	Moderate: slope	Severe:depth to rock	Severe: slope	Severe:slope, depth to rock	Moderate:slope, large stones	Severe: slope	Moderate:frost action, wetness	Moderate: slope, frost action, wetness
Dwellings with Basements	Silght	N 41 70 71 71	Noderate: slope	Moderate: slope	Moderate: slope	Severe: depth to rock	Severe: slope	Severe:slope, depth to rock	Moderate: slope, large stones	Severe: slope	Moderate: wetness	Moderate: slope, wetness
Soil Symbol and Series	CcB Canton	Charleon	CcC Canton	Charlton	Scre chariton		CrD Charlton	Hollie	HKC Hinckley	HkD Hinckley	PdB Paxton	PdC Paxton

Moosup Pond

Plainfield, Connecticut

Principal Limitations and Ratings of Watershed Soils

Whitman Severe: ponding	Leicester Severe;wetness	%An Kidgebury Severe; wetnes	WRC Woodbridge Severe: weiness	Soil Symbol Dwellings with Series Basements
		€29		in in E
Savere: frost action, ponding	Severe:wetwass,	Reverelweiners,	Severe: Frast 20thon	Local Roads Streets
Severe:peras.	Severe: Weiness	Severe: percs.	Severe: percs . s lowly , wetness	Septic Tank Absorption Fields
Ferce alowly,	Fromt motion	fares, slowly,	siope, slowly,	Drainase

Designated wetland soil by Public Act 135

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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 consistant 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 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.

APPENDIK B

MOOSUP POND, PLAINFIELD

August 13, 1973 Chemistry

Station	Depth	Water Temp. in ^O C.	Oxygen F.P.M.	
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A	Surface	28	8.1	
A	5 '	28	8.1	
A	6 1	28	8.1	
Α	7.	27.8	8.3	
A A A A	8 °	27.8	8.2	
A	9 6	27.8	8.2	
A	10'	27.8	8.2	
Á	114	27.5	7.9	
A	12"	26.3	8.0	
Ā	13	25.5	8.0	
A	14.	24.3	7.8	
	15	22.7	7.0	
A	16	. 21	5.1	
A			3.2	
A	17'	19.5		
A	184	18.7	1.5	
A	19.	18	0.6	
A	20 °	17	0.3	
A	21 %	1.7	0.4	

Calibration of oxygen made at Sea level Air temperature 28° C Weather - sunny with a NN wind Time - 1:30 p.m.

Transparency -- 15*4"

pH -- 7.3

MV -- -30

Conductivity -- 60 umho^S on XI scale Y^SI meter Conductivity -- At surface at
$$28^{\circ}$$
 C

$$C_{18} = C_{t} \quad (1 + a(t - 18))$$

$$C_{18} = 60 \quad (1 + .025(28-18))$$

 $C_{18} = 75$

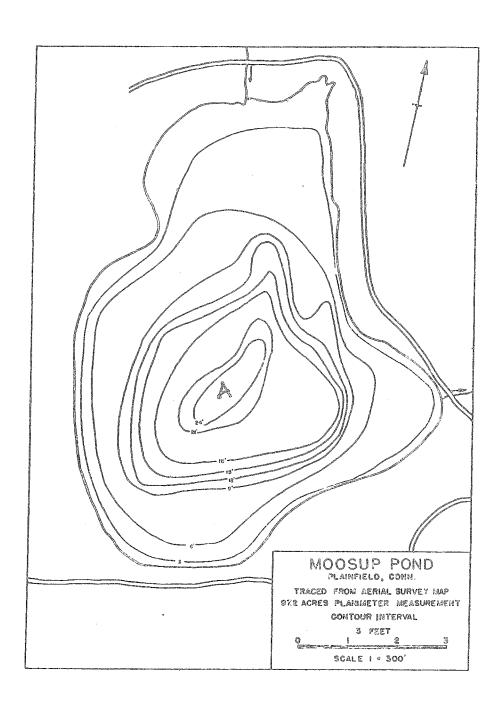
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Submerged (Fern Pondweek & Bladderworth) and emergent vegetation (Lilly Pads & Pickerelweed) is abundant in shoal areas.

Taken by: R. Capiga

J. Piza

-28-



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 activitis. 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 (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.