Transylvania Pond
Southbury, Connecticut

Eastern Connecticut
Environmental Review Team Report

Eastern Connecticut Resource Conservation and Development Area, Inc.

Transylvania Pond
Southbury, Connecticut

Environmental Review Team Report

Prepared by the
Eastern Connecticut Environmental Review Team

Of the

Eastern Connecticut
Resource Conservation & Development Area, Inc.

For the

First Selectman
Southbury, Connecticut

September 2008

Report #348

Acknowledgments

This report is an outgrowth of a request from the Southbury First Selectman to the Northwest Conservation District (NWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Council for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

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

The field review took place on Thursday, May 1, 2008.

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I would also like to thank Mark Cooper, first selectman, Jennifer Naylor, assistant to first selectman, DeLoris Curtis, land use administrator, Mark Massoud, inland wetland agent and zoning official, Ed Nagy and Mary Luf, conservation commission, and Ed Edelson and Donna Lesch, Pomeraug River Watershed Coalition, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with various maps and copies of a previous ERT report for Pierce Park dated January 1985. During the field review Team members were given additional information. Some Team members conducted a map review only. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the reviewing the condition of Transylvania Pond.

If you require additional information please contact:

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Introduction

The Southbury First Selectman has requested assistance from the King's Mark Environmental Review Team (ERT) in conducting a review of Transylvania Pond.

Transylvania Pond is a manmade pond (1868 and 1893 maps of the area show the pond) of approximately 35 acres in size. It is located within Janie Pierce Park, a town owned park located astride the Southbury - Woodbury town line. Access to the pond is from Transylvania Road (Route 67). An ERT report was prepared for the entire park property in 1985 with considerable focus on the pond at that time. (A copy of the 1985 Report *Pierce Park* made be found on the ERT website www.ctert.org.)

Objectives

The Town is requesting the ERT to determine their options for the future existence of Transylvania Pond. At issue are problems with weed growth that are affecting recreational and aesthetic values. They are interested in determining the feasibility of dredging, herbicide treatments, other methods for weed control or allowing the natural eutrophication process to occur. Other concerns addressed are the condition of the dam, soil erosion and stormwater management problems and a land use and regional perspective.

The ERT Process

Through the efforts of the Southbury First Selectman this environmental review and report was prepared for the Town of Southbury.

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

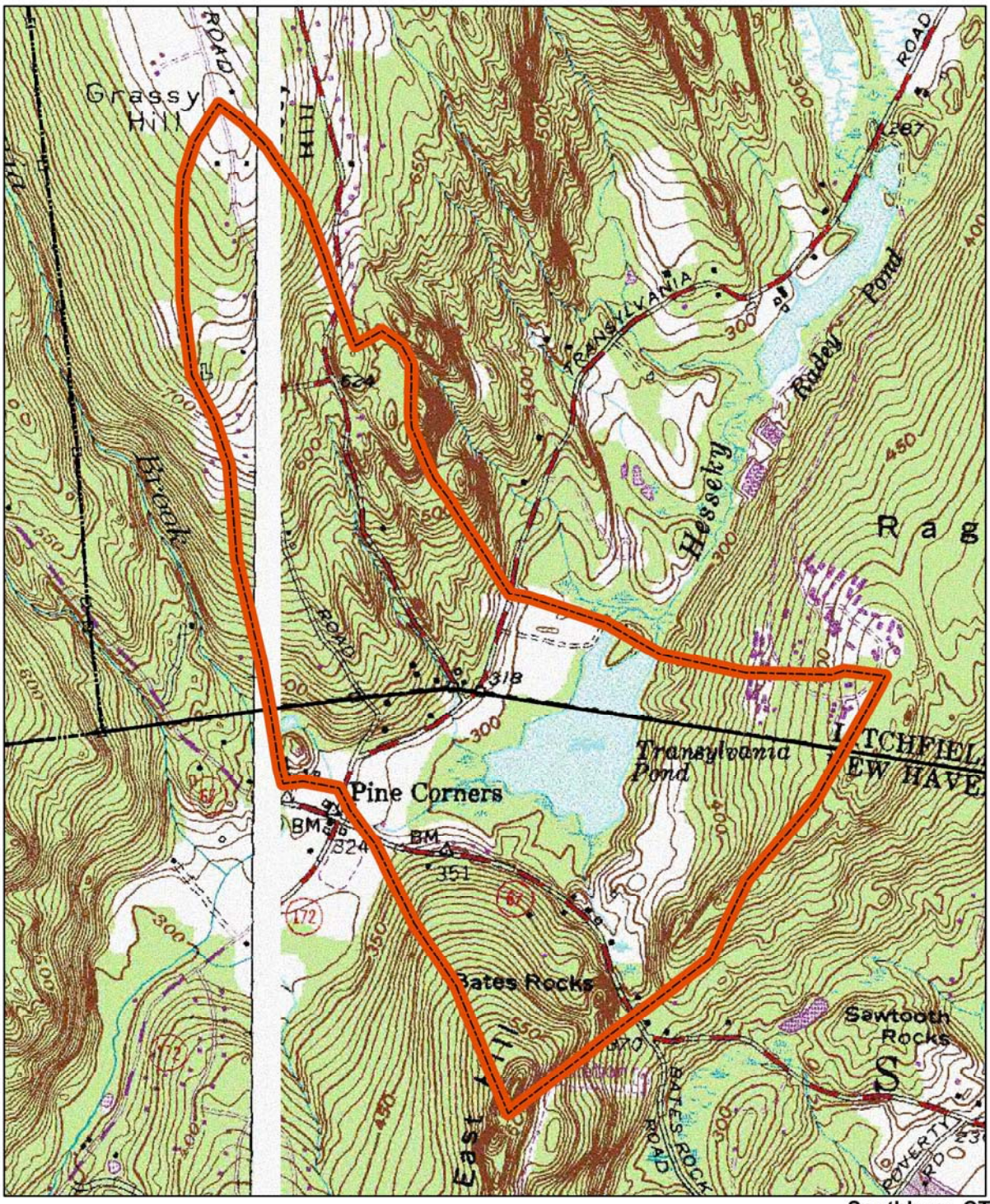
The review process consisted of four phases:

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

The data collection phase involved both literature and field research. The field review was conducted on Thursday, May 1, 2008. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Some Team members made separate and/or additional site visits. The field reviews allowed Team members to verify information and to identify other resources.

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

Transylvania Pond Watershed Boundary Map



The Connecticut Environmental Review Team

This map was prepared by Amanda Fargo-Johnson for the Connecticut Environmental Review Team. This map is for educational use only. It contains no authoritative data. September 2008.

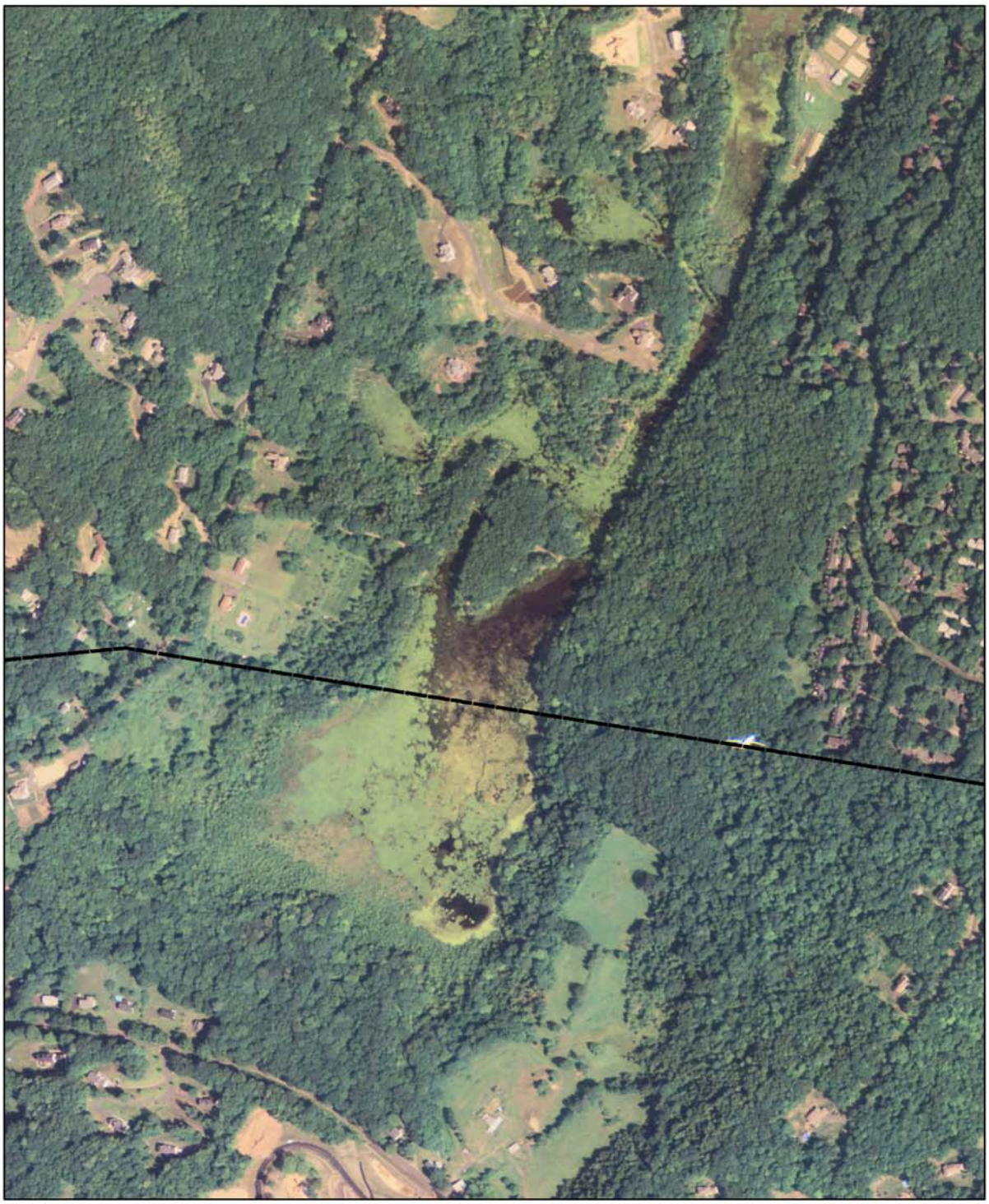
Watershed Boundary for Transylvania Pond

Southbury, CT

0 0.1 0.2 0.4 0.6 Miles

N

Transylvania Pond Color Aerial Map



The Connecticut Environmental Review Team

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September 2008.

Southbury, CT

0 0.03 0.06 0.12 0.18 Miles

N

Transylvania Pond Aerial Map

The Connecticut Environmental Review Team

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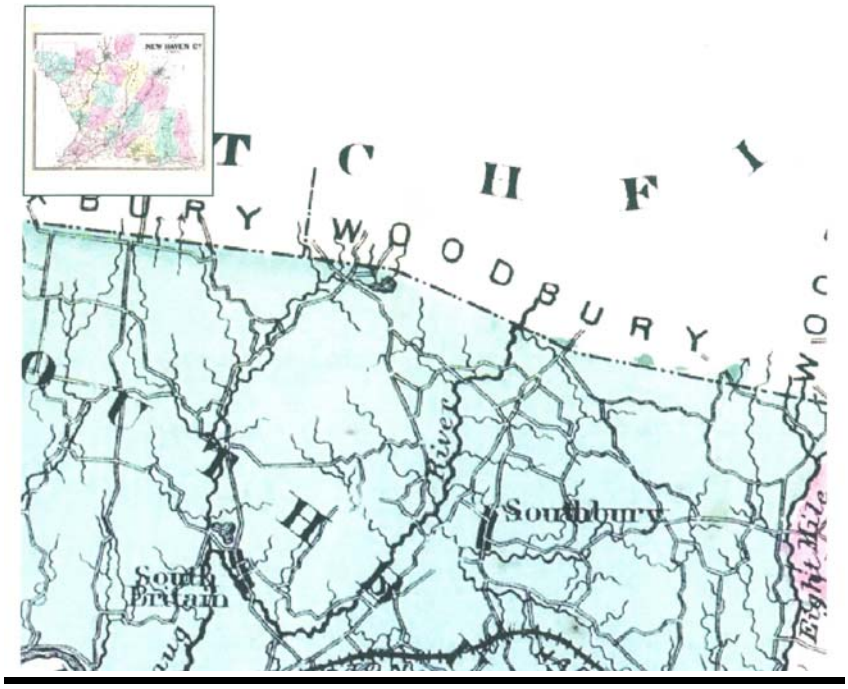
It contains no authoritative data.
September 2008.

Southbury, CT

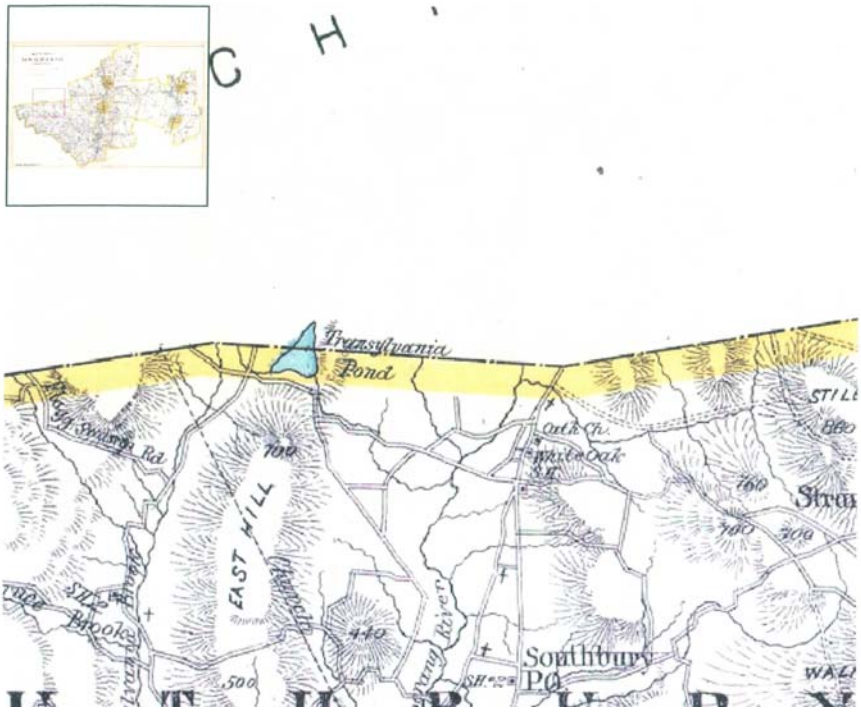
0 0.025 0.05 0.1 0.15 Miles

N

1868 Map



1893 Map



Topography and Geology

Topography

Transylvania Pond, elevation 294', is a man-made impoundment at the headwaters of Hesseky Brook in Janie Pierce Park. The pond has an area approximating 35 acres; it has a drainage basin of about 450 acres that lies in the upper part of the watershed of the Hesseky Brook (Figure 1). Hesseky Brook flows in a valley along the geologic boundary between metamorphic bedrock to the west and relatively easily erodable sedimentary rocks to the east (see discussion later in text).

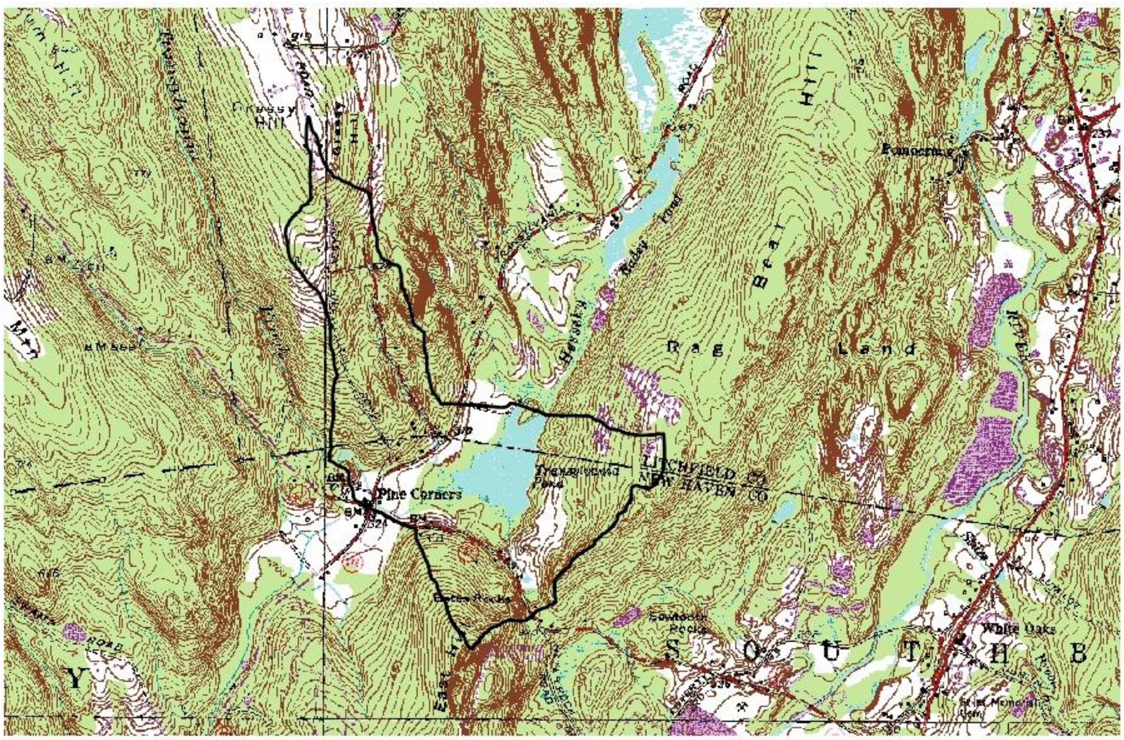


Figure 1. Topographic map (C.I. = 10') showing drainage basin (watershed) for Transylvania Pond.

The western slopes of the drainage basin for the pond reach a maximum height of just over 840' and are underlain by Paleozoic metamorphic rocks. The eastern slopes are underlain by the Mesozoic New Haven Arkose; the ridge tops are held up by traprock (Holyoke Basalt). Ridge-tops attain elevations of 500' to slightly greater than 600'.

The valley bottom is filled with glacial sediments that have an uneven topography. Small hills in the valley have elevation of 310-310 feet. Hesseky Brook flows at an elevation of 290-280 feet, decreasing to the north (downstream).

Bedrock Geology

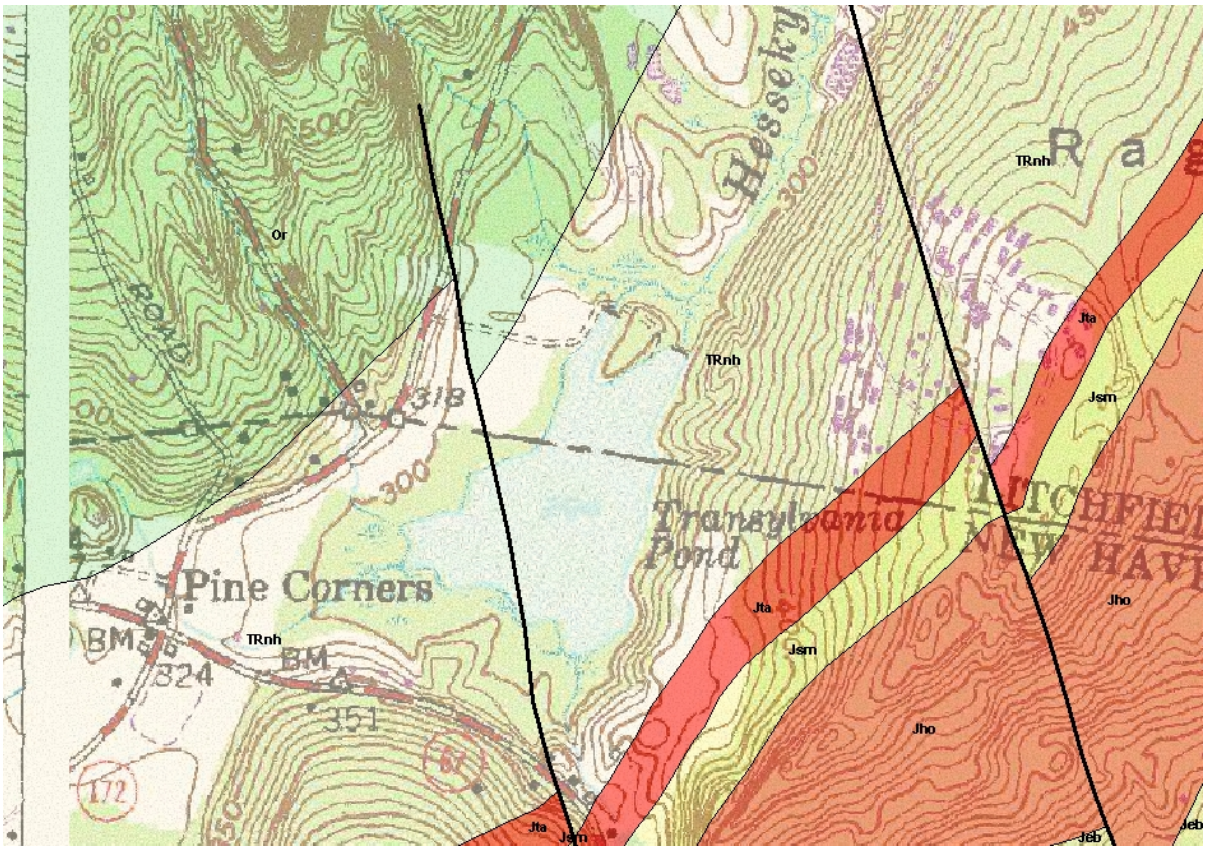


Figure 2. Bedrock geologic map of the immediate area surrounding Transylvania Pond. Metamorphic rocks of the Ratlum Mountain Schist (**Or**) underlie the northwestern hills. The foliation strikes parallel to the topographic grain (north-northwest), and dip steeply toward the southwest. Un-metamorphosed Mesozoic rocks underlie the area east of Hesseky Brook. The New Haven Arkose (**TRnh**) is exposed on the hill slope just east of Transylvania Pond. Holyoke Basalt (**Jho**), an ancient lava flow, is a resistant rock that forms the ridge-tops. The intervening Talcott Basalt (**Jta**) and Shuttle Meadow Formation (**Jsm**) are poorly exposed.

Rocks that form the western part of the Transylvania Pond watershed consist of Paleozoic metamorphic rocks referred to as the Ratlum Mountain Schist by Rodgers (1985). They consist of quartz-mica schist and gneiss and granofels. Although the Ratlum Mountain formation does not crop out in Pierce Park, it crops out near the base of the western slopes and was quarried there for use in constructing the western dike that impounds Transylvania Pond (Figure 3).

Figure 3. (Left) Large granofels boulders were used to construct the dike that impounds Transylvania Pond. (Center) In contrast, smaller boulders and cobbles of arkosic sandstone were used to construct the dam part of the impoundment. (Right) Arkose was likely derived from mining the hill slope immediately east of the dam.

Mesozoic rocks underlie the eastern part of the watershed. The lowest Mesozoic formation, the New Haven Arkose, is exposed at the base of the steep slopes immediately east of the dam for Transylvania Pond. The rock is a coarse-grained conglomeratic sandstone containing abundant grains of feldspar. The sandstone was used extensively in the construction of the eastern dam for the pond. It appears as though this rock was quarried just east of the pond where the glacial soils are thin.

The boundary between the older Paleozoic metamorphic rocks and the overlying non-metamorphosed Mesozoic rocks is not exposed, but is presumed to be an angular unconformity (Stanley and Caldwell, 1976).

Note the area is cut by several north-northwest trending normal faults that cause displacement of the geological contacts. These faults cause fractures in the local rocks and enhance the ground-water storage capacity of those rocks. In addition, the faults and fractures increase the permeability of the rocks. As a result, water wells drilled into the fractured rocks will likely have higher yield than wells drilled into adjacent, non-fractured rocks.

Surficial Geology

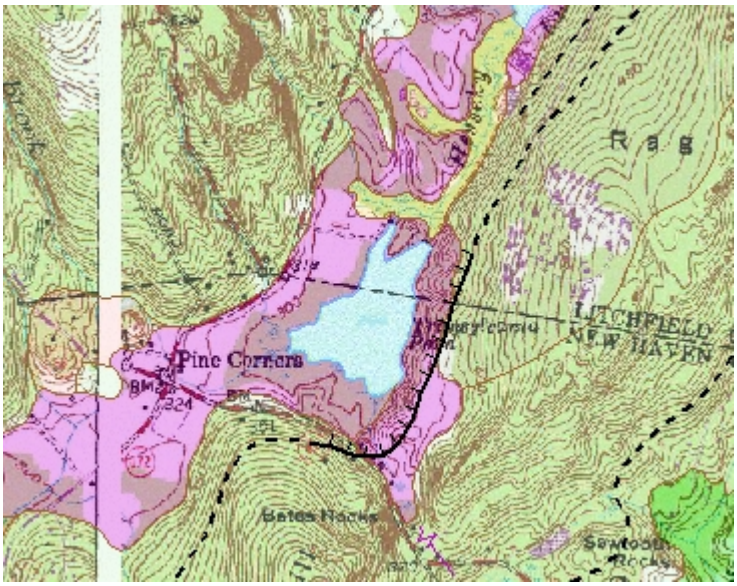


Figure 4. Map of the surficial deposits surrounding Transylvania Pond (after Stone, and others, 2005). Pink area shows extent of sand and gravel deposits. Green area is covered by glacial till. Yellow area shows modern alluvium deposited by Hesseky Brook. Hachured line with dashed extensions maps the position of the ice margin at some point in the melt-back history (16,000-16,500 years before present in this area).

During the last Ice Age, the upland areas surrounding Transylvania Pond were covered by glacial till of variable thickness (generally thin). During melting of the ice at the end of the ice age, sand and gravel was deposited by melt-water streams on the valley floor. Left over ice masses filled most of the valley so the sand and gravel stream deposits were generally in contact with the ice at the ice margins. The sand and gravel forms a terrace surface with an elevation 300-310' (Fig. 5). The surface is pocked by numerous small depressions and unevenness in the topography. This is caused by sediment collapse after melting of ice upon which the sediment was deposited.

Figure 5. (Left) Flat topped terrace deposited by meltwater streams. Deposits consists of sand and gravel that at this location were mined, possibly to construct the dam. (Center) Top of meltwater stream terrace. (Right) Trail traverses top of terrace and exposes rounded river rocks, indicating the terrace is composed of stream-deposited sand and gravel.

Three more or less perennial streams enter Transylvania Pond. The sediment load of the streams that drain the hills to the west consists of fine-grained sand. The composition of the sediment includes appreciable muscovite mica. Two of the streams cross under Transylvania Road. Winter sand application to the road works its way into the streams. Winter road sand is coarse-grained (Figure 6). In addition to the fine-grained mica-rich sediment, coarse-grained sand is found in one of the streams just prior to its entering into the pond.

Figure 6. (Left) Winter road sand at side of Transylvania Road, spring, 2008. (Right) Team geologist with a hand-full of coarse-grained sand from tributary stream near its entrance into Transylvania Pond. 90% of the stream bed-load consists of fine-grained micaceous sand and silt that is eroding off the adjacent hill-slopes. 10% of the bed is coarse-grained sand that is likely derived from the winter road side.

Additional Comments

Two potential aquifers are found in the materials beneath Pierce Park. Sand and gravel is a porous and permeable material that should yield high quantities of water. The shallow aquifer is susceptible to contamination from adjacent development. Potential contaminants range from low levels of oil from the road, nutrient loads from septic tank effluent and fertilizer applications, and toxic loads from pesticide applications. More than likely, however, is that the water is of good quality. Fractured bedrock can also be a good aquifer yielding high output water wells. Zones of enhanced fractures are associated with the fault zones.

Run-off does make its way into the pond. Run-off has carried coarse-grained road sand into the pond's tributaries. Dissolved materials from developed areas can reach the pond more quickly. It is possible that some of the stimulus for recent plant growth in the pond is the result of nutrients washing into the pond through both surface and subsurface (groundwater) flow.

It is likely that considerable gravel underlies the pond. If the pond is dredged, consideration should be made concerning that gravel. It may be that the health of the pond would be improved by deepening the pond. If that is the case, the gravel could be recovered and used for town operations or sold to local gravel operators.

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Pond Management Review

Eutrophication and control of rooted aquatic plant growth in Transylvania Pond is the subject of this ERT. Transylvania Pond was created by constructing two small dams across an outlet of a wetland. Although no bathymetric map (depth Map) was supplied to the Environmental Review Team, it is assumed by the low height of the dams that Transylvania Pond is a relatively shallow pond. Transylvania Pond has a surface area of approximately 31 acres and a watershed of 440 acres. Transylvania Pond's shallow water and organic wetland soils provide ideal habitat for plant growth.

Very often rooted plant growth found in shallow ponds is more a function of the habitat than nutrients from non-point sources of pollution. In southern New England ponds were usually created by impounding watercourses and wetlands for such purposes as hydropower, agriculture, ice production, or fire safety. Usually the rooted aquatic plant growth did not interfere with the original intended use of the pond. As Connecticut became increasing more suburban, ponds like Transylvania Pond became used for swimming, boating, fishing or landscape amenities. These flooded wetlands were fine for the original utilitarian purpose but vegetation growth and algae blooms may prevent them for being used for the desired purposes today. So pond owners need to employ techniques to control vegetation and maintain an acceptable level of water clarity. The ERT was asked to determine options for the future existence of Transylvania Pond including the feasibility of dredging and other techniques to control rooted plant growth.

According to the information supplied to the Environmental Review Team, the Town of Southbury has been managing aquatic vegetation with herbicides. Southbury's current herbicide program appears to be an outcome of the recommendations supplied by the 1985 ERT. In 2007 Transylvania Pond was treated with floridone, a systemic herbicide used to control Fanwort (*Cabomba caroliniana)*. The cost of the 2007 treatment was $11,925. In 2008 Southbury's contractor submitted a proposal to use diquat for curly leaf Pondweed (*Potamogeton crispus)*, glyphosate for water lilies, and copper sulfate for algae blooms. The cost of the 2008 proposal was $8,350. Southbury elected not to implement the proposed 2008 treatment program. The cost of the 2007 and 2008 treatments are good estimates for planning purposes to determine whether the herbicide treatment program should continue.
Fanwort and curly leaf pondweed are non-native invasive plants that were not listed in the 1985 ERT report. Even though aquatic plant growth was a concern in 1985, the presence of fanwort and curly leaf pondweed has presumably made this problem worse. Curly leaf Pondweed grows early in the spring and is usually a nuisance in May and June. After flowering in June, curly leaf pondweed senesces and is no longer a nuisance. Fanwort grows throughout the spring reaching nuisance levels in summer. These two invasive plants probably have extended the length of time within the growing season that nuisance plants impair recreational use of Transylvania Pond.

To control both Curly leaf pondweed and fanwort with herbicides may require a two pronged approach. Contact herbicides usually require annual treatments to achieve consistent year to year results. Systemic herbicides can provide control for longer than a year but are usually more expensive than contact herbicides. Curly leaf Pondweed is more cost effectively controlled with the contact herbicide diquat than with the systemic herbicide fluridone. However, the only herbicide registered for use in Connecticut that effectively controls fanwort is fluridone. Fluridone could be used to treat both fanwort and curly leaf pondweed but depending on the timing and efficacy of treatments, supplemental diquat treatments may be needed to control curly leaf pondweed in years

when fluridone treatments are not needed for fanwort. The need to repeat fluridone treatments should be determined by annual mid to late summer aquatic vegetation surveys.

Though water lilies can achieve nuisance proportions they are native plants and provide good fish and wildlife habitat. Water lilies can be controlled by using fluridone or glyphosate. Glysophate is a systemic herbicide that can be applied more selectively than fluridone so areas can be left untreated to enhance habitat while at the same time reducing surface area coverage below nuisance levels.

The 1985 ERT discussed the use of herbicides as a reasonable option for vegetation control. Today products are available that were not available in 1985. Development and registration of these new herbicides is partially a result of the proliferation of non-native invasive plants like fanwort. In 1985 fanwort was not listed as present in Transylvania Pond and fluridone for aquatic use had yet to come to market. An herbicide treatment program will not eradicate nuisance plants at Transylvania Pond but should provide predictable year to year results. Given the high capital costs of other lake management techniques, the current program of herbicide treatments coupled with recommended annual vegetation surveys may still be the most desirable management option.

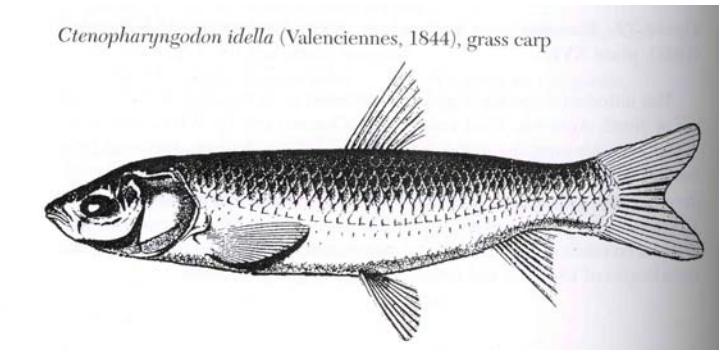
The ERT was asked to provide information on dredging. Dredging can be done by draining a waterbody and removing the sediments with earth moving equipment or hydraulically. Hydraulic dredging requires a dredge with a cutter head that breaks up the sediments and pumps the resulting mud/water slurry to a containment basin facility. In the containment basin solids settle and the supernatant is discharged to a second basin where a flocculate is introduced for settling of fine soil particles. Either conventional or hydraulic dredging usually requires a feasibility study to determine options and costs. After the feasibility study is completed, preliminary design plans are developed so that permit applications can be prepared. Once local, state and federal permits are approved, final design plans and specifications are developed for bidding. The cost for studies, design services and permits before dredging can begin is upward of $100,000 depending upon the project size, permitting concerns, and complexity.

Estimating the cost of a dredging project can be done by comparing past project costs to conditions of the subject waterbody. It should not be assumed that these estimates reflect actual project costs as conditions can vary greatly. Rather these estimates can be used to determine the range of potential costs to help decide whether a feasibility study is even worth pursuing. Based on a review of past dredging projects a reasonable volume of sediment removed per surface acre dredged is 5,000 cubic yards (cy). Transylvania Pond has a surface area of 31 acres so an estimation of the quantity of sediment that would be removed if the entire waterbody were dredged is 155,000cy. This quantity could be reduced if some portions of the pond were left un-dredged. On average the cost per cubic yard removed from a waterbody $20.00. This estimate can change depending on site conditions and the location of the disposal area. This figure includes engineering costs for the above mentioned studies needed to bring a dredging project to fruition. It should be noted that this estimate is assumed to be somewhat dated as fuel costs have increased considerably over the past few years. However using this figure an estimated cost of dredging Transylvania Pond would be 3.1 million dollars. The reader should keep in mind these figures can change depending on a number of currently undermined variables but suggest that the cost to dredge an area large and deep enough to reduce rooted aquatic plant habitat would be several million dollars.

Mechanical weed harvesting can be an effective method of controlling aquatic vegetation but is labor intensive over a long period. It was reported to the ERT that in the 1980s Southbury borrowed the Lake Zoar weed harvester in an attempt to explore the effectiveness of this method for Transylvania Pond. Apparently mechanical weed harvesting was not pursued as a long term solution. Several reasons may have lead to a decision. Weed harvesting needs to be conducted on a continuous basis, perhaps several times per season. Due to the required frequency, hiring a contractor may not be cost effective. Developing a town run program entails purchasing a mechanical weed harvester, hiring a crew, and trucking away harvested vegetation. Additionally a mechanical weed harvesting program requires a disposal location and maintenance and storage of the machine.

Before replacing the current herbicide program with a weed harvesting program, whether commercially or town operated, careful consideration should be given to the issues listed above. If Southbury elects to hire a contractor, assurances should be made to prevent infestations of new non-native aquatic plants. Commercial weed harvesting equipment is usually moved from lake to lake during the height of the growing season. This rate of use provides little time to decontaminate equipment of plant fragments from other lakes and increases the likelihood that new problematic plants could be introduced into Transylvania Pond.

(From Freshwater Fishes of Connecticut by W. Whitworth)



Another method of aquatic vegetation control is sterile triploid grass carp (*Ctenopharyngodon idella).*

Grass carp feed exclusively on vegetation and do not reproduce. In 1985 when the previous ERT was conducted, it was illegal to stock grass carp. In the late 1980s legislation was passed giving DEP's Division of Inland Fisheries the authority to issue permits to stock grass carp. As with any lake management technique, there are advantages and disadvantages with grass carp. The primary advantage is it relatively inexpensive compared to other techniques. A disadvantage is the inability to predict where and on what grass carp will feed. Another concern is very often as grass carp begin to produce a noticeable reduction in rooted aquatic plant growth, algae blooms become more intense and last longer. Algae blooms increase because the feces from the grass carp provide available nutrients for algae. Essentially plant biomass is changed from rooted aquatic plants to algae. Grass carp can also impact the fishery of a pond by removing vegetation that would be desirable habitat for other fish species.

Prior to issuing a permit, DEP Division of Inland Fisheries will inspect a pond. The pond's outlets and inlets must be isolated so that fish cannot escape. Due to watershed size and morphology, not all ponds are good candidates for grass carp. The watershed and morphology of Transylvania Pond do not immediately dismiss grass carp as an option for Transylvania Pond. If Southbury is interested in pursuing grass carp, DEP Division of Inland Fisheries should be contacted for further exploration.

Listed above is a brief outline of some of the concerns and considerations for controlling vegetation at Transylvania Pond. The current herbicide program that was recommended in the 1985 ERT is still a practical approach to addressing nuisance aquatic plants.

Additionally, it is recommended that aquatic plant surveys be conducted annually in mid to late summer. If other methods discussed above are pursued, DEP is available to meet with representatives from the Town of Southbury to discuss them in more detail. Feel free to contact DEP's Lakes Management Program at (860) 424-3716.

Conservation District Review

Much of the 440 acre watershed that feeds to Transylvania Pond has been developed or is part of the Town park system. To assess the condition of the watershed the District Team member drove and walked accessible areas to identify any current soil erosion and stormwater management problems. He also reviewed existing high resolution aerial photography to assess if there were any land use activities that could cause sediment/nutrient deposition into the pond. To help assess the viability of removing large amounts of sediments from Transylvania Pond it will be important to understand the activities within the watershed that add sediments and nutrients to the Pond:

1) The application of traction sand to Grassy Hill Road, Upper Grassy Hill Road and Transylvania Road (The State DOT no longer applies traction sand to Route #67).
2) Sediment and nutrient runoff from all the impervious surfaces within the 440 acre watershed.
3) Erosion and sedimentation from construction activities in a portion of the watershed currently under development.
4) Uncontrolled runoff, erosion and sedimentation from developed neighborhoods within the watershed of the pond.

The small streams adjacent to the local roads mentioned above that run directly into the lake, are transporting sediments and nutrients into the park and pond. If possible, the town should retrofit "sacrificial basins" in locations where they will capture and settle traction sand. These basins should be placed in areas that can be accessed for regular clean outs. Currently Transylvania Pond is the sacrificial basin and it collects everything that flushes out of the watershed. The Christ the Savior Orthodox Church has two examples of basins that are functioning well to protect Transylvania Pond from impervious surface impacts. These types of basins would be needed at a number of locations along Transylvania Road to stop sediments and excess nutrients from getting into the lake.

Most of the developed and undeveloped land within the upper part of the watershed is classified as Highly Erodible Land by the U.S. Department of Agriculture. Much of the upper watershed has been developed or is currently under development at Country Woods Lane. The soil types in this area are formed on dense compact glacial till which are famous for their inability to infiltrate water. There are currently some lots being developed and there is severe erosion and sedimentation problems occurring (see photo below). This is not surprising given the soil properties described above. Therefore, if any further development is to occur in the watershed the plan of development needs to be reviewed by a certified professional in sediment and erosion control (or equivalent). This same type of professional needs to be retained to perform inspections during construction to ensure that the Erosion and Sediment Control Plan as well as the Stormwater Management Plan are being followed.

Slope Failure on Country Woods Lane

Silt Barrier Failure on
Country Woods Lane

The Country Woods subdivision did not implement major concepts described in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and the 2004 Connecticut Stormwater Quality Manual. This created major shortfalls in the implementation of the soil erosion and sediment control plan as well as the stormwater management plan. As a result major soil erosion and sedimentation has occurred and continues to be a problem. There is a failing stormwater basin on site, and it is only 900 feet from Transylvania Pond. Stormwater pollutants and sediments could have been kept out of the Pond if the following issues were addressed.

Soil Erosion and Sediment Control Shortfalls

1) This development did not work with existing topography to minimize cut and fill slopes.
2) House lot density was likely too ambitious for such a steep site with highly erodible compact till soils. Therefore roads and driveways could not follow contours as recommended by the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.
3) There does not appear to be any use of temporary sediment traps.
4) Slope stabilization techniques are failing and require upgraded slope stabilization measures.
5) Silt fence barriers are being used below areas that require additional/redundant silt barrier measures (i.e. silt fence / dirt berm or silt barrier with sediment trap or diversion swale to sediment trap)
6) It appears that “clean” stormwater runoff from undisturbed areas above was not diverted around exposed soil areas.

Stormwater Management Plan Shortfalls

Currently the amount of sediment coming out of the development is filling the useful capacity of the basin and short circuiting through the basin into a stream that feeds to Transylvania Pond. Even if the stormwater basin is cleaned out and the development is completely stabilized, the basin will not renovate stormwater runoff. Pollutants suspended in stormwater runoff from impervious surfaces and lawn areas will still go straight to the Pond. The basin should be designed using examples in Chapter 11 of the 2004 Connecticut Stormwater Manual to ensure that stormwater is renovated prior to release.

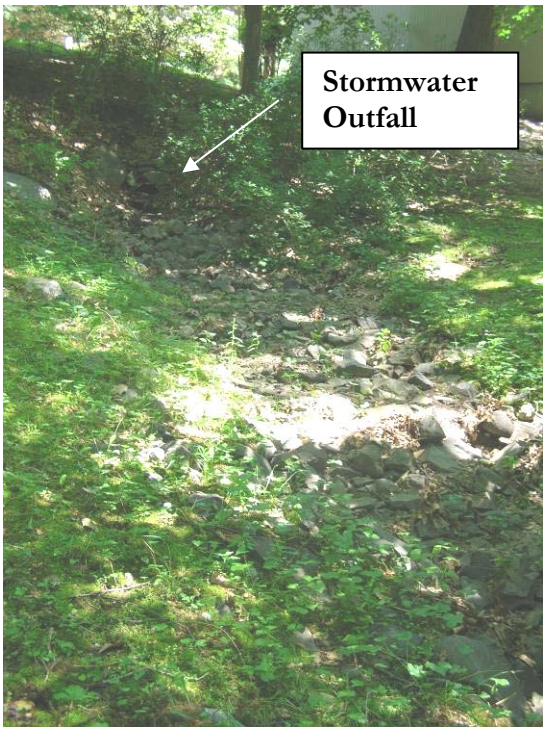
Any further development in the watershed should also incorporate the principals of Low Impact Development (LID). Most of the techniques mentioned below were not employed at the Country Woods Subdivision. Therefore, the pond will have to shoulder the burden of stormwater runoff renovation. The Town of Tolland has developed LID Regulations that require the implementation of post construction stormwater runoff management measures that are necessary to protect surface water quality. Examples of LID measures are listed below and a full description of these measures can be found in the documents list below the LID measures.

a) Rain Gardens (Bioretention Area)
b) Grass Lined Swale
c) Pervious Pavers and Pavement
d) Shared Driveways
e) Reduced Construction Envelope Footprint
f) Low-Mowing and No-Mowing Areas
g) Native Plantings
h) Weep Wall Rain Gardens
i) Infiltration Trenches
j) Level Lipped Spreaders
k) Develop with Terrain Contours

- 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (CT DEP, 2002)
- 2004 Stormwater Quality Manual (CT DEP, 2004) http://www.dep.state.ct.us/wtr/stormwater/strmwtrman.htm
- Bioretention Manual - Department of Environmental Resources, Prince Georges County Maryland
- UNH Stormwater Center - www.unh.edu/erg/cstev
- UCONN Cooperative Extension Rain Garden Manual www.sustainability.uconn.edu/landscape/05-rain_gardens.html
- CT LID Inventory by NEMO clear.uconn.edu/tools/lid/lid_search.asp
- UCONN Cooperative Extension - Jordan Cove www.cag.uconn.edu/nrme/jordancove/

Existing Development Stormwater Management Shortfalls

About 15 acres of the Woodlake Community in Woodbury are within the Transylvania Pond watershed. The microtopograhy of this area captures drainage north of the pond in the Woodland Community and brings the drainage south into the pond. This 15 acre area of concern is completely covered by roads, driveways, parking areas, sidewalks, buildings and lawn. There are a few thin bands of trees within these 15 acres. The roads in the area of concern include Fox Run, Deer Hill and Lower Commons. There are catch basins in the roads, driveways and parking areas and some of these stormwater networks appear to dump stormwater uncontrolled onto the slopes above Transylvania Pond (see Photos below). There are no detention basins or LID practices in place to control the stormwater runoff.



Eroding Channel

Sediment Deposition from Eroded Channel

In addition, the uncontrolled runoff generated by the lawns below the lower units on Fox Run and Deer Hill are eroding soils and depositing sediments into Transylvania Pond (see photos below). If any fertilizers, herbicides or pesticides are being applied to these lawn areas, all the excess is being washed directly into the pond. There are no stormwater renovation measures in place to mitigate the negative impacts of stormwater from the area of concern. If any of the measures mentioned in the LID section of this chapter were retrofitted into the Fox Run and Deer Hill neighborhood sections of the Woodlake Development, it would go a long way towards protecting water quality in Transylvania Pond. If dredging is to take place in the pond retrofits should be in place first.

Lawn Area Runoff Eroding Soils

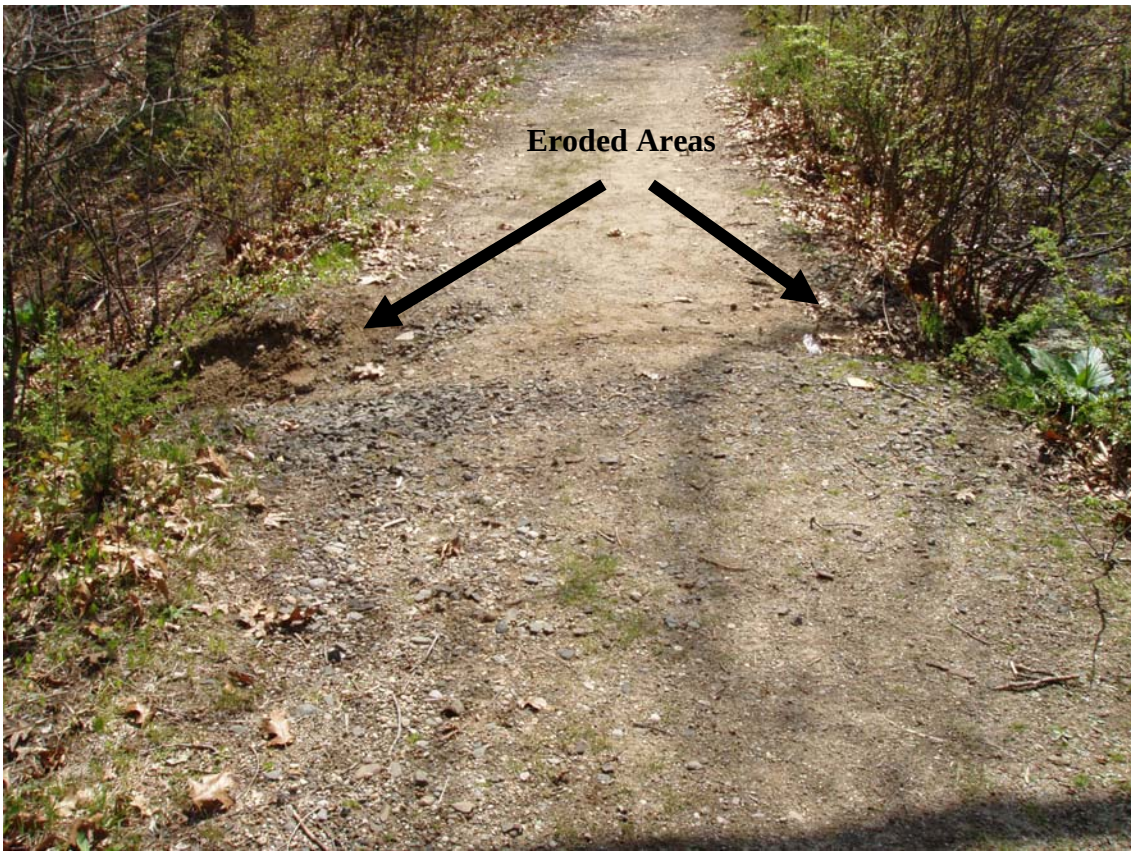
Lawn Area Runoff Depositing Sediments

Much of the watershed that feeds to Transylvania Pond has land use and land management practices that do not protect water quality and pond health. If the town or land owners need specific information on better house keeping practices that will protect the pond they should contact the Northwest Conservation District.

Transylvania Pond Dam Review

Transylvania Pond is located within Pierce Park, which is located in the towns of Southbury and Woodbury. Transylvania Pond is a 35± acre pond created by a dam and dike section: there is an earthen dike located at the northwest fork of the pond and an earthen embankment section with a centrally located spillway located on the northeast fork of the pond. The two sections are located in the Town of Woodbury and are identified on the DEP Dam Inventory as Dam #16818. There is no mechanism to drain or lower the pond and outflow is through the concrete spillway and the emergency spillway sections. There is a pond located immediately downstream of the tow of the main dam and dike sections. The dam is classified as a low (Class A*) hazard dam pursuant to DEP's Dam Inspection Regulations.

The dike section is 80± feet long and 6± feet in height. There are numerous trees and brush growing throughout the upstream and downstream embankments. There is a gravel crest along the top of the dike. There were eroded areas observed along the embankment.



There is a masonry wall on the downstream side of the dike embankment where numerous voids were observed and its stability is questionable. The dike section has reportedly overtopped during significant rain events in the past. The top of the dike section is a foot or more lower than the top of the main dam section.

The main dam section is 100± feet long and 8± feet in height. There are many trees and brush growing on the upstream and downstream embankments and along the crest. There is significant embankment erosion along the upstream and downstream embankments and along the crest as much as 2± feet deep in some areas. The crest of the main dam section has an irregular profile. There is a 30± foot long downstream masonry wall located on either side of the spillway section which has various cracks throughout the concrete. There is a walk bridge located over the spillway section. There are also four 18 inch corrugated metal pipes located to the right of the spillway, which serve as an emergency spillway. There is a concrete headwall on the upstream side of the auxiliary spillway and the outlet portion of he corrugated metal pipes has corroded.

Bank erosion and trees and brush growing along the embankments.

Walkway over spillway section.

Outlet portion of corrugated metal pipes.

Main dam section with spillway.

Downstream masonry wall with cracks and voids.

A hydraulic and hydrologic study should be performed to assess the dam's spillway capacity to safely pass the 100 year storm event**. The dam and dike sections are in poor condition and the above mentioned inadequacies should be addressed to ensure the integrity of the structures. These tasks will require the services of an engineer familiar with dams and dam construction to undertake the engineering investigation and design of repairs necessary.

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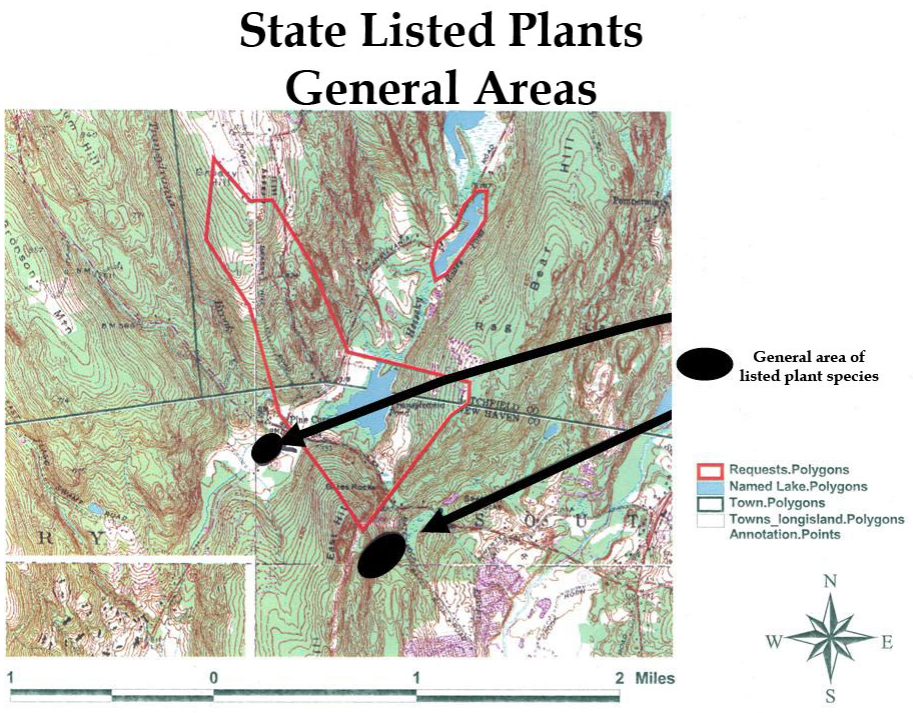
*A **Class A** dam is a low hazard potential dam which, if it were to fail, would result in any of the following:
(i) damage to agricultural land;
(ii) damage to unimproved roadways (less than 100 ADT);
(iii) minimal economic loss.

**A "100 year storm event" is a statistical event that has a one in one hundred or 1% chance of happening in any given year.

The Natural Diversity Data Base

The Natural Diversity Data Base (NDDB) maps and files regarding the project area have been reviewed. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species that occur at the site in questions. However, we do have records of State listed plants from areas south of the site. These species would not likely be affected by actions related to Transylvania Pond. It is recommended that the NDDB be contacted when a plan for the pond is proposed to ensure that these species are not negatively affected. The following map shows the general location of the listed plants. If the proposed project has not been initiated within 6 months of this review (5/1/2008), contact the NDDB for an updated review.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental and Geographic Information Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultation with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.



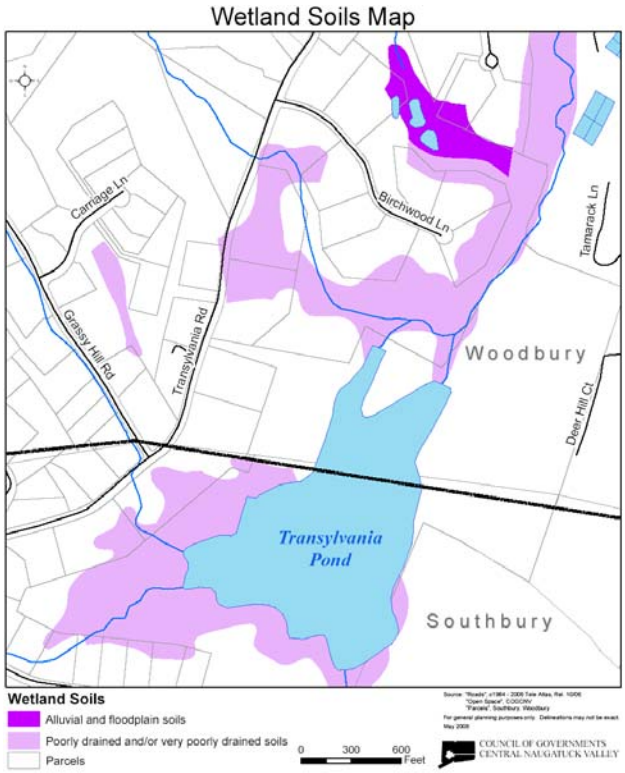
Planning Considerations

Site Overview

Transylvania Pond is in Janie Pierce Park, located at the junction of route 67 and route 172 on the Southbury-Woodbury town boundary. The site consists of a 60 acre parcel in Southbury and 45 acre parcel in Woodbury. Primary access to the site is a fifteen-foot wide gravel driveway extending from Transylvania Road in Woodbury to the pond. The gravel drive ends in a parking area capable of accommodating a dozen automobiles. Alternate pedestrian access is available from a trail extending north from route 67, although roadside parking is not permitted at that location.

The site is predominantly wooded with wetlands located to the north and south of the pond. Several small streams empty into the south end of the pond, which is dominated by aquatic weed growth. A dam at the north east part of the pond consists of a concrete spillway and overflow pipes that facilitate discharge into the northern wetland. Pedestrian traffic has partially eroded a dyke at the north-west end of the pond, allowing water to spill into the wetlands during times of high flow.

The site has a boat launch for small vessels such as kayaks and canoes as motorized vessels are not permitted in the pond. There is a 1.25 mile trail around the pond that partially goes through wetlands that are navigated using existing boardwalks. Several benches and picnic tables are situated at the north end of the site within view of the pond.



Current Land Use/Zoning

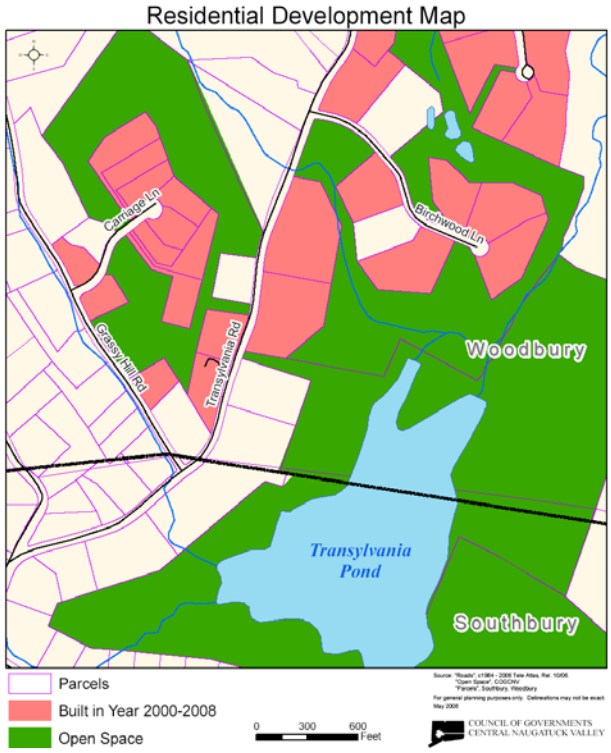
The site is zoned R-60 in Southbury and OS-60 in Woodbury, both consistent with low density residential. The sites two parcels are committed and dedicated open space, meaning that the land must be permanently preserved for its original open space intent.

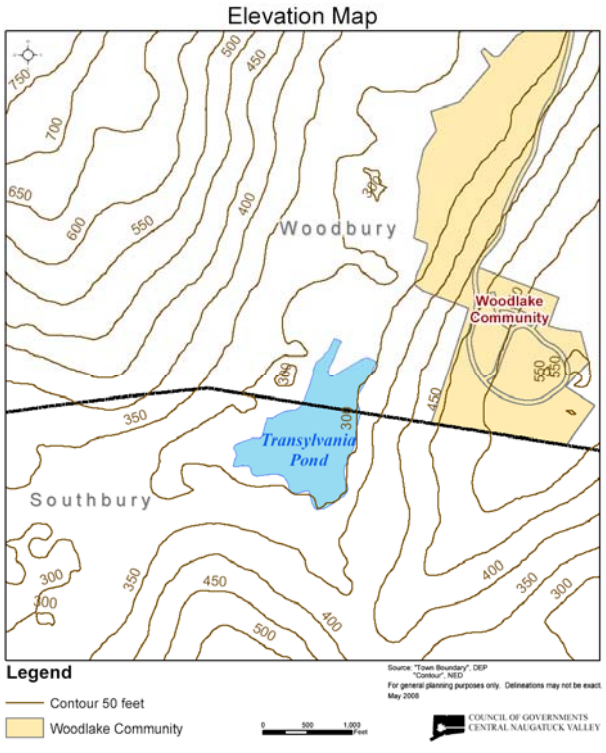
Current land use conforms to the deed restrictions requiring the site to be maintained as a natural area.

Adjacent Land Uses

Low density residential development is located primarily north west of the pond in the form of open space subdivisions, most recently built along Carriage and Birchwood Lanes in Woodbury. Despite this construction houses are only visible along the border of the site. Development around the pond is fairly built out making the possibility of future development unlikely.

North east of Transylvania Pond is the Woodlake community, a four-hundred unit condominium development in Woodbury. Although the parcels are adjacent, Woodlake lies at an elevation one-hundred fifty feet higher than the pond and is nearly a quarter mile away. A forty-five acre cattle farm east of the pond was recently acquired by the town of Southbury for designated open space. An open space parcel across route 67 connects the nature trail surrounding the pond to other open space parcels in the town.





Regional Plan of Conservation and Development: 2008 (draft)

The property is identified as committed open space on the future land use map with surrounding areas having severe environmental constraints, primarily wetlands. The Heritage Village aquifer protection area is south-east of the pond, contiguous to the cattle farm open space parcel. Open space subdivisions in Woodbury contribute additional open space north and west of the site.

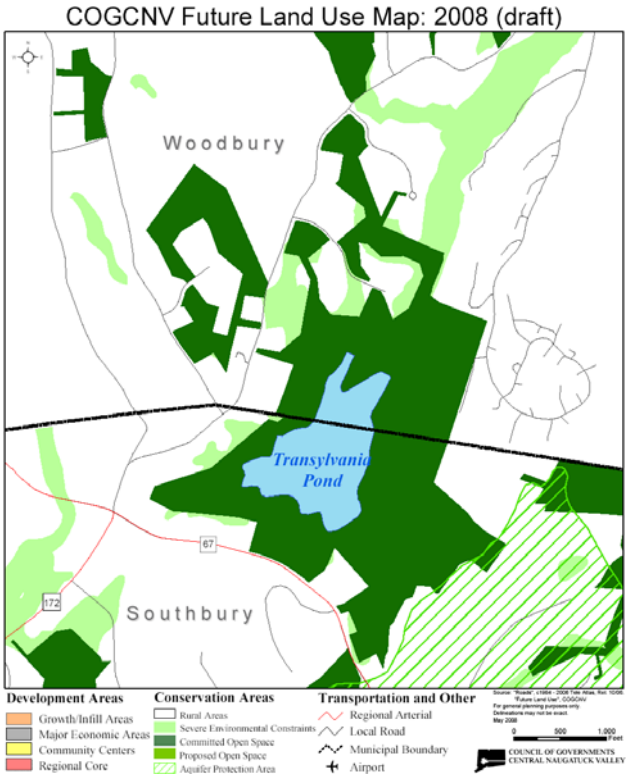
The Regional Plan advocates protection and preservation of open space, especially sites having water based recreation:

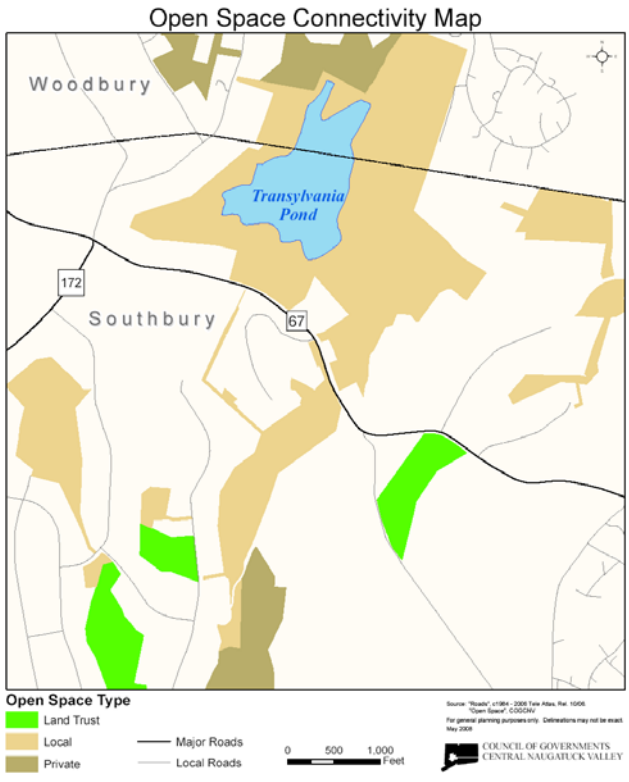
- Encourage efforts to address the region's needs for access to local rivers and lakes, especially new beaches.

The Plan also recommends maximizing the benefits of open space by giving priority to:

- The establishment of greenways (for wetland protection and wildlife habitat), open space connections (including trails and wildlife corridors), and forest.
- Multi-purpose areas.
- The preservation of visible parcels (ridgelines, scenic view areas, steep slopes, and historical or archeological sites).
- The protection of water resources and lands which protect water quality.

Particular emphasis is placed on preserving water resources serving as access points for boating, fishing, and swimming. Transylvania Pond not only functions as a multi-purpose recreation area but has open space connections used by wildlife. Beaver activity was evident from numerous gnawed trees around the pond and lodge in the northern wetland. Wildlife habitat is conducive to maintaining a diverse landscape and is an important part of ecosystem management.





Conservation and Development Policies Plan for Connecticut: 2005 - 2010

The property is defined as preservation area and existing preserved open space, areas in the state representing the highest priority for conservation and permanent open space use. According to the state plan, this type of area contains significant wildlife and natural resources that should be effectively managed to preserve the state's unique heritage. Several state policies are outlined describing the approach to open space, wetlands, and lake resources:

- Manage Connecticut lakes and associated watersheds to enjoy optimal water quality and recreational benefits
- Encourage public use in conformance with management plans that foster long-range, multi-purpose usage
- Restore, enhance and create productive wetlands or watercourses
- Provide technical assistance and support to communities for lake studies, restoration projects and land use planning

The plan identifies eutrophication as a threat to existing ponds and recreational open space areas. This process allows nutrients and algae to build up in the pond, reducing water quality and fish populations. Resulting aquatic weed growth and invasive species deter recreational activities such as boating and fishing, potentially limiting site use.

Southbury Plan of Conservation and Development: 2002

The site is identified as open space on the future land use map in the Southbury plan. To maintain consistency with the plan, existing open space areas vital for open space functions supported by the community should be preserved. The plan accentuates the importance of open space connectivity by recognizing its value in conserving the character and visual appeal of the community. An open space system could:

- enhance the value of existing open space areas,
- provide new opportunities for recreational use, and
- contribute to the enjoyment and quality of life for residents

The plan further describes the significance of Southbury's natural resources:

- contribute to the visual appeal of the community
- protect ground and surface water quality
- help foster habitats for a diverse range of wildlife

Summary

Dredging, if it is deemed the appropriate measure for Transylvania Pond to restore it to its original condition, is consistent with the state, local, and regional future land use plans. Deed restrictions limit the site to "forever be held as a natural area, for scientific, educational, and esthetic purposes, and such recreational uses as are fully consistent with such purposes." The site preserves the rural nature of the town while maintaining accessibility to the community.

This multi-purpose site provides passive recreational opportunities unique to the area and is used by a variety of residents. Southbury has the highest percent elderly population in Connecticut, many of whom reside at Heritage Village. This active adult condominium community is in close proximity to a trail following an open space corridor to the pond. Various youth groups such as the boy scouts use the site for camping and fishing excursions. In addition to hosting group functions, the site benefits from a boardwalk built by scouts that traverses wetlands connecting the nature trail.

Wetlands to the south and west of the pond as well as steep slopes to the east discourage all-terrain vehicles and motor bikes. Motorized vehicles pose a threat to recreation areas statewide by contributing to erosion and water quality degradation. Injuries from these types of vehicles can result in liabilities for land owners.

In determining the future of the site several considerations should be examined including:

- Cost of dredging and restoring dam structures on the pond may not be feasible for the town. In addition to annual aquatic weed growth removal costs estimated at $12,000 per year, rejuvenating the pond may be prohibitive.
- Funding from multiple sources may be available. Cost-share programs administered by Department of Environmental Protection or Office of Policy and Management may contribute to lake studies and dam replacement.
- Reconstruction of the eroded dyke at the north-west end of pond by local youth groups. Rebuilding the earthen dyke to its original form may not be an arduous undertaking. The boardwalk was built as an Eagle Scout project and other volunteer possibilities may exist that would save the town money.
- Restrictions in the deed may not allow the town to profit from the dredged material. If lucrative material such as gravel is found at the bottom of the pond the town may partially off-set dredging costs.

About the Team

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

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

Purpose of the Environmental Review Team

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

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision making. This is done through identifying the natural resource base of the site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

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

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