

Staffordville Lake and Watershed An Update



Stafford, Connecticut

Eastern Connecticut Environmental Review Team Report

Eastern Connecticut Resource Conservation and Development Area, Inc.

Staffordville Lake and Watershed An Update Stafford, Connecticut



Environmental Review Team Report

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

for the

Conservation Commission
Stafford, Connecticut

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CT Environmental Review Team Program
1066 Saybrook Road, PO Box 70
Haddam, CT 06438
(860) 345-3977
e-mail: ctert@comcast.net
www.ctert.org

Acknowledgments

This report is an outgrowth of a request from the Stafford Conservation Commission to the North Central Conservation District and the Eastern Connecticut Resource Conservation and Development Area (RC&D) Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

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

The field review took place on, Wednesday, June 30, 2004.

David Askew	District Manager North Central Conservation District (860) 875-3881
Nicholas Bellantoni	State Archaeologist Office of State Archaeology (860) 486-5248
Jenny Dickson	Wildlife Biologist DEP – Wildlife Division (860) 675-8130
John Guskowski*	Regional Planner Capitol Region Council of Governments (860) 522-2217
Charles Lee	Lake Management Specialist DEP – Planning and Standards Inland Water Resources Division (860) 424-3716

Dawn McKay	Biologist/Environmental Analyst DEP - Environmental and Geographic Information Center (860) 424-3592
Michael Panasci* 	Resource Assistant DEP – Wildlife Division (860) 295-9523
David Poirier	Archaeologist State Historic Preservation Office (860) 566-3005
Eric Thomas**	Thames River Basin Coordinator DEP – Watershed Management (860) 424-3548

**These individuals are no longer with their respective agencies.*

***Never received a report.*

 In consultation with Judy Wilson, Wildlife Biologist, DEP Wildlife Division

I would also like to thank Ingrid Aarrestad, conservation commission, Joyce Arthur, Stafford Lake Association, and other concerned citizens that live in the watershed for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. Some Team members made separate or follow-up visits to the site. 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 and landowners. 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 Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in the review of Staffordville Lake and watershed.

If you require additional information please contact:

Elaine Sych, ERT Coordinator

CT ERT Program

P. O. Box 70

Haddam, CT 06438

Tel: (860) 345-3977 e-mail: connecticutert@comcast.net

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Introduction

Introduction and Objectives

The Stafford Conservation Commission has requested Environmental Review Team (ERT) assistance in updating a 1986 ERT report entitled “Staffordville Reservoir.”

The 1986 report was also conducted at the request of the Conservation Commission and contained a natural resource inventory and an evaluation of the lake and its watershed. The town had requested the review in the interest of managing the watershed for future planning and improving and ensuring the quality of the environment of the lake and surrounding area.

The present request was made because of changes that have occurred in the past 18 years. There has been an increase in the number of year round homes, silt buildup in the lake, storm and winter drainage issues and the impression that the lake has undergone negative changes. The goal of the commission is to assist the town wetlands commission and the planning and zoning commission to make sound decisions and judgment on future land development and regulations of homes. They want to protect the watershed and keep Staffordville Lake a clean and viable source of recreation for the town.



This report focused on concerns with erosion and sedimentation, lake management and water quality monitoring, assessment of wildlife habitat and land use concerns.

The ERT Process

Through the efforts of the Stafford Conservation Commission this environmental review and report was prepared for the Town of Stafford.

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

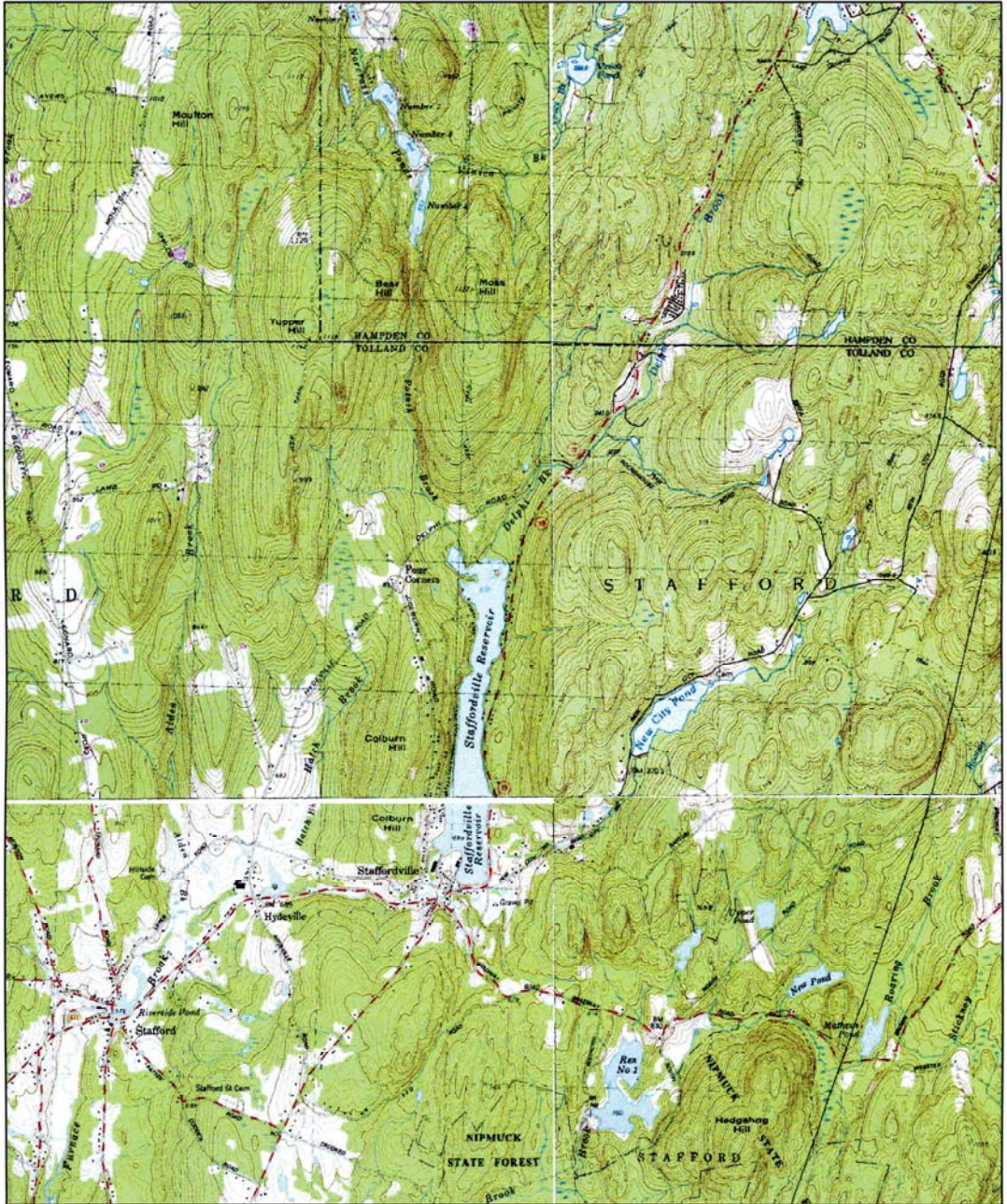
The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of available 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 Wednesday, June 30, 2004. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

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

Staffordville Lake Location 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.
March 2006.

0 0.25 0.5 1 1.5 Miles
(Approx.)





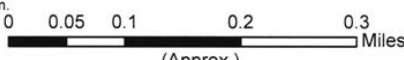

Staffordville Lake Aerial Photo (Northern Section)



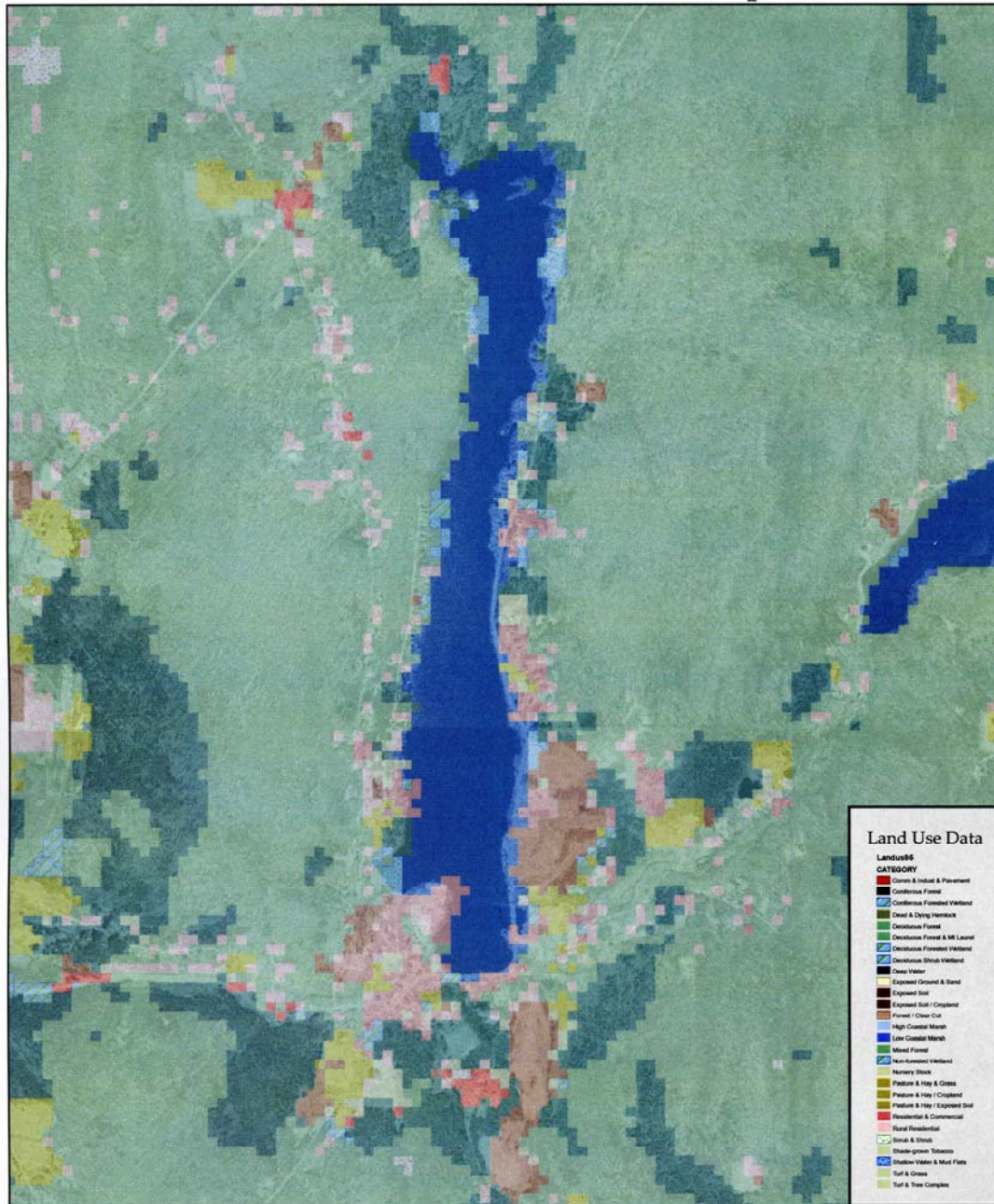
The Connecticut Environmental Review Team  This map was prepared by Amanda Fargo-Johnson for the Connecticut Environmental Review Team. This map is for educational use only. It contains no authoritative data. March 2006.  0 0.05 0.1 0.2 0.3 Miles (Approx.) 

Staffordville Lake Aerial Photo (Southern Section)



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. March 2006.  (Approx.)  N

Staffordville Lake Land Use Map




Land Use Data

Landuse95

CATEGORY

- Common & Industrial & Pavement
- Coniferous Forest
- Coniferous Forested Wetland
- Dead & Dying Herbaceous
- Deciduous Forest
- Deciduous Forest & Mt Laurel
- Deciduous Forested Wetland
- Deciduous Shrub Wetland
- Deep Water
- Exposed Ground & Sand
- Exposed Soil
- Exposed Soil / Crispland
- Forest / Clear Cut
- High Center Marsh
- Low Center Marsh
- Mixed Forest
- Non-timbered Wetland
- Nursery Stock
- Pasture & Hay & Grass
- Pasture & Hay / Crispland
- Pasture & Hay / Exposed Soil
- Residential & Commercial
- Rural Residential
- Shrub & Shrub
- Shade-grown Tobacco
- Shallow Water & Mud Flats
- Turf & Grass
- Turf & Tree Complex

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. March 2006.

Landuse Information 1995
 Provided by DEP GIS Data

0 0.1 0.2 0.4 0.6 Miles
 (Approx.)



North Central Conservation District Review

The following comments are intended to provide the Stafford Environmental Commission with “action items” to help protect Staffordville Lake. The 1986 ERT report is comprehensive in scope and essentially covers all of the standard resource-based items that the ERT Team typically covers. Since the general resources and landscapes of the area have not significantly changed, the following focuses on “next step” items can be addressed by the town and volunteers. The real goal of these next steps is to provide more focused baseline information so that the condition of the lake can be realistically assessed and changes in condition monitored. At this point, what resource managers at all levels lack is comprehensive information about water quality that can be used to prioritize future actions. The ERT review process does not generate such information, so the following discussion will attempt to provide some practical steps that can be taken by the town, volunteers and conservation partners.

The ERT request form requests information pertaining to a broad set of concerns and these concerns were reflected in the discussion with participants from the town. A number of these issues are somewhat “global” in their reach. Forestry (“deforestation”), fisheries, and wildlife are all important issues, but they are typically managed at the state level and local jurisdiction is limited. While maintaining an awareness of these issues is important at the local level, the District encourages town and citizen participants to focus on issues that are manageable at the local level and are within the jurisdiction of local officials and land use agencies. The following comments are focused on assisting with that effort and attempt to direct local efforts towards manageable issues. The

foregoing also assumes comments from other Team members will address some other watershed management strategies and regional planning issues.

For the purposes of this discussion, issues regarding the lake can be broken down into categories:

- Water quality monitoring
- Stormwater
- Land Use

Water Quality Monitoring

Although there is a general perception that water quality is declining, at this time there is no strong evidence that degradation is occurring. Volunteers have collected limited water quality data; but that information has not yet been analyzed (please see comments under Lake Management Review). The District encourages the town and citizens, with the help of the DEP and others, to develop a regular monitoring program for the lake. Without such a program it is impossible to determine necessary strategies for future action. In addition, any future funding for remediation is dependent on sound science. This Team member understands that the DEP Lakes Management division will provide the town and volunteers with monitoring and assessment protocol. According to the DEP twice a year monitoring is the minimal frequency to conduct diagnostic monitoring.

Stormwater

The four major inlets to the lake were inspected in 1986 and not found to be significant pollutant sources at that time. No significant changes in the watersheds of the four inlets are known to have occurred, so it is assumed that these inputs are relatively stable and unchanged from 1986.

Four potential sources of water borne sediments were identified in the 1986 report. All but the outlet of New City Pond was discussed by members of the watershed association and determined to be either non-existent or associated with projects that have since been completed. The New City Pond outlet should be re-inspected and its existing condition documented.

During the field review, a storm water outlet at the south end of the lake, along Route 19, was inspected by the ERT team. This particular location also has a direct discharge from the road surface. A sediment delta in the lake was evident. Such discharges can alter habitat and sediment may carry other pollutants. There is an indication in the review request that there are other stormwater discharges along the Route 19. However, no other discharges were inspected. The District intended to re-inspect the road, but time did not permit a more expansive review of the road. It's possible that a day or two of field work is necessary to inspect the entire length of road. The District is available to schedule an inspection at the request of the town or Environmental Commission if volunteers are unavailable.

As a pollution source, storm water discharges from the road are one of most easy to identify and monitor. The District recommends that all discharges be

systematically mapped and existing characteristics of the discharge recorded (general drainage area, slope, length of road, and number of catch basins, existence or absence of associated delta, machinery access).

Dredging the existing sediment deltas is probably unrealistic, unless funding sources are developed. Dredging is one of the more costly remedial measures to attempt. Therefore, it may be more practical to explore options for source control. There are a number of developing technologies to reduce storm water pollution and many can be retro-fitted to existing sites. Sediment chambers or “swirl” chambers may be appropriate for the discharging along Route 19, since space is limited.

Once inventoried and characterized, discharges that are identified as potentially significantly should brought to the attention of the Department of Transportation and options for their improvement can be discussed. It may be worthwhile to put the request to the DOT in writing, so that a formal response is issued. The DOT is subject to new storm water requirements and may have technical staff to assist with the assessment of the stormwater discharges. The foregoing discussion assumes there is an existing local volunteer base to conduct the inventory and to make the necessary contacts at the DOT. As stated above, the District has experience assessing stormwater discharges and is available for further assistance with this project.

Land Use

Land us in the watershed remains a mix of substantial undeveloped land and relatively sparse residential development. Residences are clustered around the

lake perimeter. Based on the discussion during our review, there has been an effort by a private concern to permanently preserve large tracts of land in this portion of Stafford.

Most of the zoning close to the lake is AA residential, which is equivalent to 1-acre zoning. The remaining watershed in Stafford is generally zoned AAA, which is equivalent to 2-acre zoning.

Based on discussions with project participants, there is a general concern regarding pollution from septic systems around the lake. Houses along the west side of the lake, specifically Lake Shore Boulevard, are served by public sewer. Houses along the east side of the lake have private septic systems. Rick Zulick, a sanitarian from the North Central Health District explained the process undertaken by the Health District when seasonal residences are converted to year-round use. The process is comprehensive and should be protective of ground and lake water quality.

Existing poorly functioning septic systems may degrade water quality. However, the sanitarian conducts seasonal monitoring at the town beach and there is no indication of frequent contamination. Monitoring for human-borne pollutants may be part of voluntary monitoring program.

In terms of general land use concerns, there are a number of issues to consider, including a generally conservative approach to land use in the Town of Stafford. Existing zoning is geared toward maintaining

“rural character”, as it is commonly perceived as 1 and 2 acre lot zoning. If there



is an attempt by local concerns to change zoning in an area, it should be focused on addressing clearly identifiable issues. For instance, the ERT Team inspected the town beach and noted the scenic character of the site. Development of nearby hills and ridges could significantly alter the view from the beach. A reasonable and focused zoning scheme could address this concern by limiting clearing and requiring screening for future development, while allowing development of the subject area under the existing AA or AAA zoning. Many towns have developed ridgeline zoning schemes that aim to maintain visual character without creating unnecessary restrictions on development. There are other options for zoning around lakes, such as special overlay areas. These will be addressed under the planning section of this report.

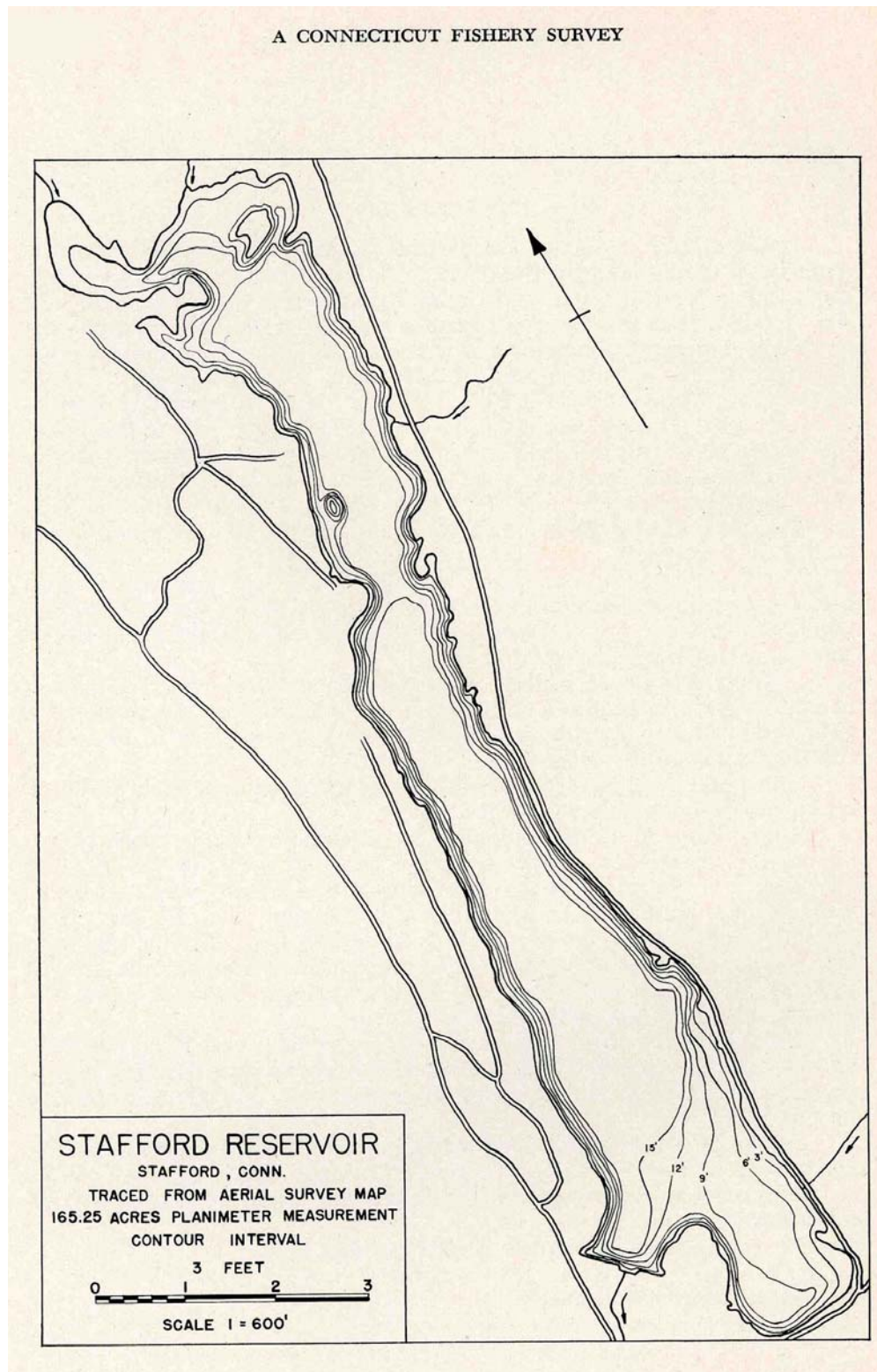
Lake Management Review

The request from the Town of Stafford to update a 1986 Environmental Review Team report on Staffordville Lake asked for information on the trophic state of the lake and that the ERT address a list of water quality issues such as erosion and sedimentation, stormwater drainage, and sewage disposal. However, this list of issues was not presented with documentation that could be used to determine to what extent water quality is being impacted or whether the issues are current concerns for Staffordville Lake. In an effort to obtain more information on these issues, the lake management Team member requested to see any water quality data the Town of Stafford or the lake association had available. The water quality data provided did not substantiate these issues and did not analyze meaningful parameters for assessing lake water quality.

According to *A Fishery Survey of the Lakes and Ponds of Connecticut – 1959*, State Board of Fisheries and Game, Staffordville Lake is 165.2 acres and has a maximum and mean depth of 16 feet and 9.5 feet respectively. The watershed, also known as the drainage basin, is 5,206 acres. Staffordville Lake has a relatively large drainage basin to surface area ratio of 32:1 and a retention time of approximately 52 days. Beyond this information, very little water quality data has been collected and published on Staffordville Lake. Many Connecticut lakes have been the subject of detailed diagnostic feasibility studies or have had baseline data collected and analyzed to determine the lake's trophic state. These studies focus on collecting data to assess the lake's level of fertility or trophic state. The trophic state is determined by measuring parameters such as phosphorus, nitrogen, chlorophylla (an indicator of algal cell concentration), and

water clarity. These data are then compared to levels that correspond to various trophic categories. To this Team member's knowledge, Staffordville Lake has never been studied with the intent of determining its trophic state.

(A Fishery Survey of the Lakes and Ponds of Connecticut, 1959)



Based on the lack of water quality data available on Staffordville Lake and the absence of information provided with the issues listed for conducting a new ERT, it appears that management of the Staffordville Lake should initially focus on collecting and assessing useable water quality data. The recommendations below outline a monitoring program that, conducted annually, will provide water quality data in a consistent manner so that trends can be documented and analyzed using reliable information. Without recorded data collected properly and consistently, the Town of Stafford and the Staffordville Lake community cannot determine to what extent water quality in the lake is changing and therefore cannot make informed management decisions regarding the lake and its watershed.

In 2005 the Connecticut Agricultural Experiment Station (CAES) implemented a program to collect aquatic plant data in lakes throughout Connecticut. As part of this program, the CAES offered to provide their services to communities that were interested in having data collected on their lakes. Information on this program may be found at: <http://www.caes.state.us/AquaticPlants>.

In 2005 CAES visited Staffordville Lake. At this writing, a report on Staffordville Lake from the CAES is forthcoming. (A preliminary report and data has been provided to the ERT by Robert Capers, CAES, it may be found in the Appendix of this report.) The CAES information will provide a comprehensive list of plants and a snapshot of phosphorus and nitrogen concentrations. However, this survey was part of an effort to develop a statewide aquatic plant database and not a complete assessment of Staffordville Lake. Rather than rely on this one time partial assessment it is recommended to incorporate the data from the

CAES into a long-term program of data collection and assessment based on the following outline.

Water Quality Monitoring

In order to develop reliable data that can be used to detect trends and make informed management decisions, monitoring should be conducted by a qualified consulting limnologist. Ideally during the first year, monitoring would take place monthly April through September. Sampling trips can be reduced and still have value, but important characteristics of the lake may be missed. Depending on the result of the first year monitoring, sampling trips can be cut back to a minimum of three times per year, once in spring and twice during the summer.

Lake monitoring should be conducted at a station located in the deepest area of the lake. Water clarity should be measured with a black and white disk known as a secchi disk. Temperature and dissolved oxygen should be measured from surface to bottom at depth intervals of one meter or less. Grab samples should be collected at the surface, mid depth, and bottom for analysis of total phosphorus and nitrogen series (ammonium, nitrite/nitrate, organic). This Team member recommends collecting a surface phytoplankton (algae) sample for species identifications and counts. Additional phytoplankton samples should be collected if algae blooms occur at times other than regularly scheduled monthly monitoring. Tributary streams should be sampled near their mouths, once during high spring flows and once during low summer flows. Samples should be analyzed for total phosphorus and nitrogen series. An interpretive data

report should be prepared that characterizes water quality conditions, analyzes trends, and identifies particular concerns that warrant additional monitoring.

Aquatic Plants

Non-native invasive plants infest many lakes in Connecticut and require expensive management efforts such as herbicide treatments, grass carp stocking, and weed harvesting. Fortunately the CAES has reported that they did not find any non native invasive plants in their 2005 survey of Staffordville Lake. A much more cost effective approach still available to Staffordville Lake is annual aquatic plant surveys conducted by a knowledgeable biologist in conjunction with the water quality monitoring described above. Data from aquatic plant surveys can also be useful in evaluating how the native plant community is changing. If non-native invasive plants are found, DEP should be contacted immediately for advice on how to control and possibly eradicate the population. After each year's survey, a map should be prepared that depicts areal distribution, and species abundances. Below is the list of aquatic plants found by the CAES during their August 2005 survey.

Elodea nuttallii (waterweed)

Potamogeton bicupulatus (pondweed family)

P. pusillus

P. natans

P. epihydrus

Utricularia radiata (Bladderwort family)

U. purpurea

U. vulgaris

U. gibba
U. intermedia
Najas flexilis (Naiad)
N. gracillima
Brasenia schreberi (Pond-lily)
Vallisneria americana (Wild celery)
Eleocharis cf. Acicularia (Spike rush)
Eleocharis sp. 1
Pontederia cordata (Pickerelweed)
Sparganium sp. (Bur-reed)
Myriophyllum humile (Water-milfoil)
Gratiola aurea (Hedge-hyssop)
Elatine minima (Waterwort)
Nuphar variegata (Hornwort)
Nymphoides cordata (Floating Heart)
Juncus pelocarpus (Rush Family)
Isoetes echinospora (Quillwort Family)
Eriocaulon aquaticum (Pipewort Family)
Nymphaea odorata (Fragrant water-lily)
Proserpinaca palustris (Mermaid weed)

This list shows that Staffordville Lake has good species diversity and a desirable balance of aquatic plants. The diversity of aquatic plants in Staffordville Lake should be considered and protected when making any decisions regarding aquatic plant management. At this time, this Team member recommends that no lake wide program be implanted to manage aquatic plants at Staffordville Lake other than conducting annual aquatic plant surveys. (Please see the Appendix for

information on CAES volunteer lake monitoring workshops scheduled for this spring 2006.)

Watershed Management

In addition to inventorying the stormwater drainage system as discussed in another section of this report, this Team member recommends employing watershed models to help review existing land use regulations. Various land use models are available that can be used to predict water quality under different scenarios. For example a model can be run with existing land use conditions to predict current water quality conditions. The results from the modeling can be compared to actual water quality data to determine whether water quality is adequate given the current level of development in the watershed. A comparison of model predictions versus actual conditions can help determine whether watershed management efforts such as stormwater infrastructure improvements are warranted and the level of improvement that can be expected after corrective measures are in place. This same model can also be used to predict the changes to water quality that would occur if the drainage basin were built out to the maximum level possible under Stafford's current zoning and land use regulations. The results from modeling the watershed under a full built out scenario can be used to help determine whether changes to the regulations are necessary to protect water quality. Once the data for the lake and watershed have been put into the model, proposed land use changes can be incorporated into the model to determine expected changes in water quality.

During the ERT, concerns were raised about the impacts to Staffordville Lake from failing septic systems in the Lake George area of Wales, Massachusetts.

Lake George is not in the drainage basin of Staffordville Reservoir and therefore, septic system problems around Lake George will not affect Staffordville Lake.

The DEP's Bureau of Water Management, Lakes Management Program is available to meet with interested groups who may want to discuss these recommendations in more detail. Feel free to contact Chuck Lee at (860 424-3716 if you have any additional questions or would like to schedule a meeting.

Wildlife Review

The concern of the Stafford Conservation Commission regarding the decrease in wildlife due to expanding development within the area and especially along the shore of Staffordville Lake is very real and justified. Many wetland dependent species of wildlife, including invertebrates, reptiles, amphibians, birds, and mammals can not tolerate expansive development and the conversion of natural shoreline habitat to homes and lawns. Landscape characteristics thought to have aesthetic value to humans typically do not correlate with habitat requirements for most wildlife species. The reverse is also true; habitat characteristics that support the majority of wetland wildlife is considered unattractive to humans and often impede human recreation and decrease the “visual quality” of the area. For instance Staffordville Lake generally has very little emergent vegetation, and landowners actively try to prevent weeds from taking hold via winter freeze-outs. However, emergent vegetation is necessary for many invertebrates, amphibians, dabbler ducks such as wood ducks and mallards, shorebirds such as herons, and semi-aquatic mammals. Emergent vegetation provides essential food resources and cover for these types of wildlife.



On the contrary, there are wildlife species that adapt very well to human presence and we can expect their populations to increase with increasing development. Examples of these species include Canada geese, raccoons, skunks, and gray squirrels, and many are sometimes considered as pests. These species are very common in Connecticut and an increase in their abundance should not

be considered as advantageous to Connecticut's overall wildlife populations because of significant net negative impacts of development.

It is important that homeowners understand the difference between "eye pollution" (i.e., what they consider unappealing to the eye) and what truly is pollution in the sense that it has harmful effects on the environment. For example, it was stated at the ERT meeting that downed logs are removed from the water to prevent "pollution." In reality, downed logs provide sunning habitat to turtles, hiding places for fish and invertebrates, resting and sunning spots for birds such as herons and cormorants, and a substrate for insect production. Given this contradiction, actions that can be taken to promote wildlife at Staffordville Lake, especially those with specific habitat requirements, are limited. The fact that the area is under many different private ownerships, and that a large percentage of what little quality habitat remains is owned by a private landowner further limit the possibility of promoting wildlife to the area.

However, by protecting certain areas of the lake and watershed and by taking actions to stabilize or enhance certain wetland characteristics, the reduction of wildlife can be reversed and the number of wildlife species and their abundance can likely reach levels that satisfy homeowners while providing habitat to wetland dependent species. It is important to note that wetland habitat, especially large, high quality bodies of water, are extremely limited in Connecticut and continue to decrease throughout the state. This also correlates with significant decreases in wildlife numbers that depend on this habitat type. Therefore, any action taken to prevent further degradation of Staffordville Lake, or even better to reverse degradation and actively promote quality habitat restoration (in terms of quality wildlife habitat) will have regional benefits to a

large number of wildlife species. This will no doubt require some sacrifices on the part of private landowners, but it is necessary to demonstrate responsible environmental stewardship.

Recommendations

- The most important conservation action would be to protect existing upland habitat. The large privately owned parcel on the northwestern side of the lake is of greatest value, but the 300 acres currently for sale (June 2004) on the opposite side of Route 19 is also important. Many people fail to realize that most wetland species also depend on adjacent upland habitat. Many invertebrates, especially insects, will breed in the lake if upland habitat is nearby. The same is true for amphibians; with few exceptions, all amphibians spend a portion of their life cycle in upland habitat, with some only returning to wetlands to breed, lay eggs, and hibernate. Invertebrates using the wetland act as the prey base for reptiles, amphibians and small fish, which in turn are fed upon by larger fish and birds such as the great blue heron. Waterfowl and other birds also depend on aquatic invertebrates as a food source. Many wetland-dependent birds also depend on aquatic invertebrates as a food source. Many wetland-dependent birds also need adjacent upland habitat to nest in, such as the wood duck which nests in tree cavities.
- A second recommendation is to protect the three stream deltas. These areas are rich in oxygen and nutrients and will support both submergent and emergent vegetation. If homeowners will not tolerate aquatic vegetation elsewhere along the periphery of the lake, it is recommended

that vegetation be permitted, at the very least, to take hold at the mouths of streams.

- A concern was stated regarding beaver and their cutting of trees. First, beaver have most likely become established in the lake and are not simply migrants from the Massachusetts side of the watershed. Second, these animals often live in close proximity to people, which can sometimes lead to beaver/human conflicts, when beavers cut down trees and/or build dams that cause flooding. If tree loss is viewed as excessive, population control can be undertaken by allowing trappers onto the area during regulated winter trapping season, and individual trees can be fenced. Beaver, however, clear far fewer trees than a new development or lawn creation. Additionally, areas where beavers have cut trees often regrow quickly, providing food resources to early successional wildlife species.



- As stated at the meeting, water levels are currently reduced during the fall to a target of 40 inches below standard level. Stakeholders also expressed a desire to lower water levels in winter to “freeze-out” weedy vegetation established along the shoreline. These actions can have deleterious effects on wildlife, notably invertebrate, reptiles, and amphibians. These animals survive the winter by burying themselves into muddy substrate of the lake and hibernating until the temperatures rise again in the spring. If water levels drop during this period of hibernation and expose the substrate protecting these immobile, hibernating individuals, this can effectively prolong the winter months and expose these animals to colder

- temperatures, likely resulting in death. Any reduction in water level should occur before significant drops in ambient temperature in the fall.
- Discouraging or preventing the establishment of emergent vegetation along the shoreline during spring and summer months will also directly restrict invertebrate and amphibian populations. These animals need weedy vegetation for cover and foraging. A very simple but beneficial technique to avoid this would be for landowners with lake front property to refrain from mowing directly to the water's edge, and thereby creating a small 1- to 2- foot buffer of weedy vegetation that will provide cover for these animals.
 - Concerns regarding the invertebrate population of the lake and its ability to support bird populations are valid. The two main reasons for low invertebrate abundance are probably pollution and lack of habitat. If necessary action is taken to promote invertebrates and other organisms that function as the base of the food web, populations will increase naturally. In turn, bird and mammal populations will use these prey species for food. Heron and waterfowl (including cormorant) sightings provide hope. If these birds currently use the lake, there must be sufficient prey populations to sustain them at present. The same argument is true for mammalian predator populations. Increased sightings of fisher (which very rarely eat fish), otter, mink, and weasels suggest that the fish, amphibian, and invertebrate populations are still healthy enough to support these predators. However, it is important to note that fisher are forest inhabitants, and therefore people are likely confusing fisher with otter. Concern that these predators will be detrimental to fish populations is unwarranted. Instead, if the fish and amphibian population continues to decrease, reduced sightings of these predators can potentially function as

a warning mechanism that fish and amphibian numbers are decreasing and probably dangerously low. Moreover, foreign materials entering the lake due to humans, such as lawn fertilizers, salt and sand from roads and gasoline from boats is far more harmful to aquatic organisms than all impacts from other wildlife (beaver, birds) combined.

In conclusion, this Team member recommends that policies regarding downed logs, emergent and shoreline vegetation prevention, and water-level fluctuations are modified. Most importantly, efforts should be made to conserve as much remaining adjacent upland habitat as possible. Wetland-dependent wildlife diversity and abundance will increase as a response to these recommendations.

The Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding Staffordville Lake and its watershed area have been reviewed. According to our information, there are known extant populations of State Special Concern *Caprimulgus vociferous* (whip-poor-will) that occur within the watershed boundaries. There is also a 1984 record for State Threatened *Gyrinophilus porphyriticus* (northern spring salamander) from the Delphi Brook area of the watershed.

Whip-poor-wills favor open mixed hardwood forest, often second-growth or sapling stage areas. It is a ground-nesting bird that is only found in Connecticut during



the breeding season (late May through July) and spends the winter in South America. If construction or timber harvesting is anticipated in the watershed, planning activities to occur outside of the breeding season will reduce the potential for destruction of nests, eggs or young.



The northern spring salamander requires cold, clean, well-oxygenated springs, brooks or seepage areas. Their favored habitat is heavily forested steep rocky ravines. While they could probably tolerate a decrease in water supply if it remained cold – the complete lack of water would jeopardize this species existence.

This section of the wildlife division has not made an on-site inspection of the project area. Consultation with this office should not be substituted for site-specific surveys that may be required for environmental assessments. This is a preliminary site review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit application submitted to the DEP for the proposed site. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested and species-specific surveys may be required.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes 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

Since the last Environmental Review Team report on Staffordville Reservoir (Lake) in 1986, several important developments have occurred within the Lake watershed area. According to estimates from the Stafford Assessor, approximately 60 single-family residences have been constructed within the watershed, and a significant number of the approximately 65 waterside residences have been converted from seasonal to year-round use. With sewer access along the west shore of the Lake and several large tracts currently or projected to be available for development, the trend of adding residences to the Lake area is likely to intensify in the next decade.

On the west side of the Lake, where sewer lines are currently available, it is likely that sewers will be extended to future development northerly of where Lake Shore Blvd ends. For this reason, the largest threat to the Lake on this shore would come from non-point sources such as lawn fertilizers, roof runoff, and increased automobile use along the road and in driveways.

In the narrow strip of land between the Lake and Route 19, there are a smaller number of residences (both seasonal and year-round) which are dependent on septic systems for wastewater. Unless sewer lines are extended along Route 19, it is highly unlikely that additional residences will be added in this area. There is simply not enough land west of Route 19 to provide for residential septic systems. In fact, vigilant monitoring of the existing septic systems in this area would be in the Lake's and the Town's best interest.

From a residential-development perspective, the area of largest concern is most likely the approximately 380 acre tract between the east side of Route 19 and New City Road. Though this is an area with occasionally steep slopes and a zoning designation (AAA Residential) that requires a 2-acre minimum lot size, its potential as a development site

could add 100 or more new residences uphill from the Lake. Apart from the construction of these residences, which would pose significant erosion/sedimentation concerns to the Lake, the existence of so many new residences upslope from the Lake are in and of themselves cause for concern. The increased intensity of use, particularly involving lawn chemicals, automotive traffic and storage, household chemicals and roof runoff is all likely to have a negative impact on the water quality in the watershed and the Lake.

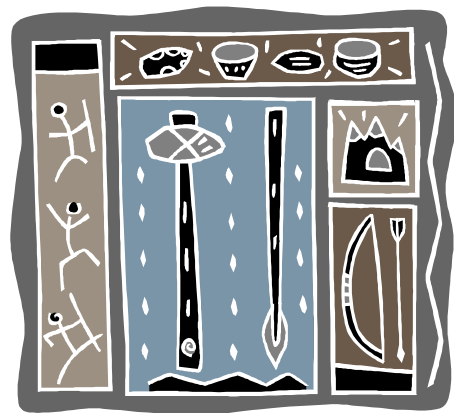
The most obvious suggestions to be made in the face of these potential developments are simply to enforce existing laws. Inland wetlands, erosion and sedimentation, and zoning regulations are in place to protect the citizens and the environment. Strict enforcement of these regulations, from proposal through construction, will help minimize the short-term environmental impacts of development. It would be further helpful to support the Staffordville Lake Association and other conservation-minded organizations to continue and expand their education efforts that would discourage homeowners within the watershed from using harmful lawn or household chemicals that could find their way into the Lake. An additional step in this direction would be to encourage the Planning and Zoning Commission to create an overlay zone in the watershed area that would include additional constraints on development intensity, use, minimum lot sizes, septic system regulation, buffers, open space requirements, and construction precautions in an effort to maintain the integrity of the Lake's ecology. An additional layer of protection in this area, while not removing the ability of a landowner from developing their property, would go a long way toward ensuring that existing residents can continue to enjoy a healthy and vibrant lake community.

Archaeological and Historical Review

A review of the State of Connecticut Archaeological Site files and maps shows one known archaeological site listed for the project area. This cultural resource represents a prehistoric campsite of Native Americans origin dating to 4,000 years ago and located along the east bank of the Staffordville Lake.

Archaeologists have recovered numbers of stone tools including spear point and scrapers associated with Native American hunting and gathering activities along Delphi Brook.

The Office of State Archaeology (OSA) and the State Historic Preservation Office (SHPO) both note that the project area possess moderate to high sensitivity for prehistoric and historic archaeological resources. Therefore, they strongly encourage the Stafford Conservation Commission to recommend and require that a professional reconnaissance survey be undertaken to identify and evaluate all archaeological resources when economic development applications are pending in the watershed. These surveys should be conducted in accordance with Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources*.



No ground disturbance or construction-related activities should be initiated until the OSA and the SHPO have had an opportunity to review the recommended

archaeological survey report and to subsequently provide further substantive guidance to the Stafford Conservation Commission.

Appendix

- 1) Draft report and preliminary data for Staffordville Lake from the Connecticut Agricultural Experiment Station, Invasive Aquatic Plant Program, Aquatic Plant Survey Program for Connecticut Lakes.
- 2) Information for Volunteer Lake Monitoring Workshops

Staffordville Lake, Stafford

The diversity of aquatic plants was found to be high during an August 2005 survey of this 149-acre lake. A total of 29 species of aquatic plants were recorded, all of them native. Aquatic plants grew sparsely through most of the lake. However, plants became very dense in a cove to the west off the lake's northern end. The northern half of this cove supported dense cover of floating-leaved species, primarily *Nymphaea odorata* and *Nuphar variegata*, under which grew *Utricularia vulgaris*. The southern half of the cove supported greater diversity and very high abundance of submerged species, including *Proserpinaca palustris*, *Utricularia purpurea*, *Potamogeton pusillus*, *Elodea nuttallii* and *Najas flexilis*. The floating-leaved *Brasenia schreberi* and *Potamogeton natans* occurred in this area as well.

Diversity in the shallow water at the north end of the lake itself was very high. *Nymphaea* grew in several patches along the shore, and *Vallisneria americana* and *Sagittaria* sp. occurred in deeper water. *Nymphoides cordata* grew near the shore in one location. Other species observed in the area included *Brasenia schreberi*, *Potamogeton pusillus*, *P. epihydrus* and an *Elatine minima*. Few species grew along the eastern shore of the lake, and these were almost all submerged. The most frequently found species in the area was *Gratiola aurea*, which grew in very shallow water or exposed on the shore. Other species that occurred along the eastern shore as isolated plants or small patches included an *Isoetes echinispora*, *Najas flexilis*, *Pontederia cordata*, a *Sagittaria* sp., *Vallisneria americana*, *Eleocharis acicularis* and *Potamogeton epihydrus*. Charaphyte algae carpeted the bottom in deeper water.

The western shore of the lake supported even fewer plants, especially where the shore was steep and rocky. *Utricularia purpurea* occurred in water 1-2 m deep, with Charaphytes in deeper water. The south end supported more dense growth of plants than did either side of the lake. *Elodea nuttallii*, a *Sagittaria* sp., *Eleocharis aquaticum*, *Gratiola aurea* and *Potamogeton pusillus* all were collected in the shallow water. Charaphytes grew thickly on the bottom and *Myriophyllum humile* was collected in one location.

The eastern side of Staffordville Lake is residentially developed; homes line the shore, and lawns extend to the edge of the lake. The north end of the lake is more forested; homes are set farther back from the shore and are surrounded by trees. Much of the northern end of the lake's west side is protected by forest as well, although many houses have been built on the southern end. There is a public beach at the south end of the lake.

Lake	Date	Latitude	Longitude
Staffordville Lake	8/11/2005	42.01228	-72.25539
Max Depth	4		
Secchi	3.2		
DO 0.5m	6.8		
Temp 0.5 m	28.4		
Bottom measurement depth (m)	4		
DO bottom	0.3		
Temp bottom	25.4		
Conductivity $\mu\text{s}/\text{ms}$ at 0.5 m	77		
pH, 0.5 m	6		
Alk, 0.5m	9		
Phosphorus, ppb, 0.5m	19		
Bottom depth	4		
Conductivity $\mu\text{s}/\text{ms}$, bottom	80		
pH, bottom	6		
Alk, bottom	10.5		
Phosphorus, ppb, bottom	52		

Species list

Elodea nuttallii
Vallisneria americana
Potamogeton bicupulatus
Potamogeton pusillus
Potamogeton natans
Potamogeton epihydrus
Utricularia radiata
Utricularia purpurea
Utricularia vulgaris
Utricularia gibba
Utricularia intermedia
Najas flexilis
Najas gracillima
Brasenia schreberi
Vallisneria americana
Myriophyllum humile
Proserpinaca palustris
Gratiola aurea
Nuphar variegata
Nymphaea odorata
Nymphoides cordata
Sparganium sp.
Pontederia cordata
Eleocharis acicularia
Eleocharis sp. 1
Juncus pelocarpus
Elatine minima
Isoëtes echinospora
Eriocaulon aquaticum

Invasive Aquatic Plant Program

Volunteer Lake Monitoring

Three volunteer lake monitoring workshops have been scheduled to introduce a volunteer lake monitoring program intended to reduce the spread of invasive aquatic plants in Connecticut ponds and lakes. The volunteer program, modeled on similar programs in other New England states, is being organized by the Connecticut Agricultural Experiment Station in conjunction with the Connecticut Federation of Lakes. During the workshops, the various activities in which volunteers can become involved will be explained. These include surveys for invasive aquatic plants and monitoring of boat ramps, among other activities. Volunteers will also be shown how to identify invasive aquatic plants.

Workshops are scheduled for:

Saturday, April 30, 2005, 10:00 a.m.-12:00 p.m. Jones Auditorium, The Connecticut Agricultural Experiment Station, 123 Huntington St. New Haven

Thursday, May 12, 2005, 7:00-9:00 p.m. The University of Connecticut Torrington Campus

Saturday, May 14, 2005, 10:00 a.m.- 12:00 p.m. Bolton United Methodist Church, Route 44 Bolton

People interested in participating should register by calling or emailing Bob Capers at the experiment station, (203) 984-8469 or robert.capers@po.state.ct.us.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area — an 86 town region.

The services of the Team are available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, landfills, commercial and industrial developments, sand and gravel excavations, active adult, recreation/open space projects, watershed studies and resource inventories.

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

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality and/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 Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is reviewed by the local Conservation District and approved by the ERT Subcommittee, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438. Web site: www.ctert.org