



October 16, 1989

Ms. Celeste Benoit
Hidden Lake Committee
98 East Shore Drive
Higganum, CT 06441

Dear Ms. Benoit:

On August 7, 1989, Dan Helsel, Sr Aquatic Botanist, conducted a biological survey of Hidden Lake accompanied by Ms. Benoit. The objectives of the survey were to inspect and make recommendations concerning the nuisance aquatic vegetation in Hidden Lake.

Lake Assessment

As part of the survey, some basic water parameters were measured in the center of the lake. The pH was just slightly below neutral at 6.5, which is in the normal range for small, productive lake in this area of Connecticut. The dissolved oxygen concentration in the water was 8.0 ppm (mg/l) and the water temperature was 72°F. Both of these are within the normal range and the dissolved oxygen is sufficiently high to provide plenty of oxygen to the fish and other aquatic organisms.

Identification and mapping of the relative abundance of the aquatic plant species present in Hidden Lake was done with a long handled rake and/or visually from the boat. There was "reasonable diversity" or in other words a healthy number of different plants present in the lake. The dominant plants occurring at nuisance densities in Hidden Lake include floating white and yellow water lilies (Nymphaea and Nuphar, respectively) and water shield (Brasenia). The shoreline plants, pickerel weed (Pontedaria) and common reed (Phragmites) were also present at nuisance levels, encroaching individual beach areas and shorelines. Other aquatic plants observed were thin leaf pondweed (Potamogeton sp.), bur reed (Sparganium) and a submerged form of arrowhead (Sagittaria).

Though the aquatic plant diversity was healthy, the densities of the aquatic plants in certain areas was extremely heavy. Besides restricting recreational activities such as boating, swimming and fishing, such high plant densities can have negative effects such as a reduction in the ability of fish to feed and nest. Additionally, since aquatic plants acquire 90% of their nutrients from the lake sediments and then release these nutrients into the water column as they die. These released nutrients are often used by the algae in a lake, causing excessive algae blooms or "pond scum".

Lake Management Recommendations

When we develop and recommend a lake management program we take into account a variety of concerns including the goals and objectives of the lake owners and the biological and physical characteristics of the lake.

In our opinion, selective aquatic weed control in Hidden Lake is warranted. The goals of the aquatic weed management program would be:

- 1) to remove nuisance vegetation from areas of high recreational value such as private and community swimming and boating areas;
- 2) to create lanes or windows free of nuisance aquatic plants in front of individual lots to provide for improved fishing areas, aesthetics and wildlife habitat.

Though chemical treatment of the weeds would be an option, we recommend mechanical hydro-raking to remove vegetation. Mechanical hydro-raking does not possess the negative public "opinion" that aquatic herbicides do, does not require a restrictive period of water use and can provide control for smaller areas with better selectivity. This summer alone, we have contracted our Hydro-rake to more than 15 different lakes, including many town owned swimming beaches.

By removing both the stem and roots of the plants, not only is control provided, but the nutrients stored in the plants and sediments are also removed. The particular plants present in Hidden Lake would be susceptible to control by Hydro-raking. Some regrowth will occur in raked areas but infestation by uncontrolled areas is unlikely. Besides removing the nuisance vegetation, the Hydro-rake can also remove rotten stumps, decaying leaves and debris. The Hydro-rake can reach to a maximum depth of 12 feet, can work in a minimum of 18 inches of water and can remove as much as 600 lbs. in one scoop.

The 1990 charge rate for the Hydro-rake is \$145/hr. plus a lump sum mobilization fee of \$600.00. A recommended budget for weed removal in individual areas would be 1-3 hours for an area approximately 50' x 75'. The Hydro-rake requires more time to cover the same area if water lilies or water shield are present. We estimate approximately 40-50 hours of Hydro-raking would be able to remove nuisance vegetation from the high priority beach areas. This equates to a recommended budget of \$6,400 to \$7,850, excluding disposal.

The total cost and final billing will be based upon the hourly rates specified above. Depending on the available budget and the successfulness of winter drawdown, the total number of hydro-rake hours can be reduced. However, we do have a 16 hour minimum of total contracted hours, with a minimum of 1 hour for individual beach areas.

The raked material will be deposited along the lake shoreline, and the individual or community association will be responsible for trucking and disposal of the material to an upland disposal site. A dump truck and/or small bobcat will be needed to spread and/or truck the material. Enclosed you'll find a prototype for an "Individual Beach Area Sign-Up Sheet" other clients have used in the past. We need one individual to organize the project and collect the payments.

October 16, 1989

The items that should be included on the sign-up sheets are:

- 1) name/address of the participant
- 2) brief description and color of the residence as viewed from the water
- 3) hour of machine time authorized
- 4) hourly rate, mobilization charges (if applicable) and total amount authorized
- 5) a simple sketch of the waterfront area/beach area to be raked from highest to lowest priority in the event the authorized hours does not allow for clearing the entire property
- 6) a clear description on the sketch of where to deposit the weed/root/bottom material along the waters edge. This should be within 100 feet of the raking area and no further away than 200 feet

Be sure to include a statement on the form that the project participant agrees to dispose/truck the material away and have the participant sign the bottom of the form agreeing to the terms and conditions of the work.

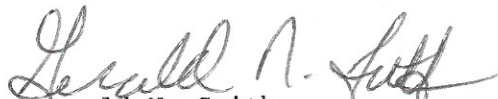
The client(s) are also responsible for acquiring required permits and/or approval from the appropriate local/State agencies. We will assist you with technical information.

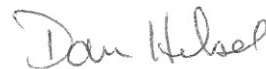
The time frame of this recommended project depends on the availability of a Hydro-rake and the approval of any necessary permits. If the Hydro-raking proposal presented here meets with your agreement, we request written acceptance of this proposal, in order for us to efficiently set-up a schedule for 1990.

We look forward to working with you and creating a viable and quality lake management program that will protect and maintain Hidden Lake. If you have any questions or need further information, please contact either one of us.

Sincerely,

AQUATIC CONTROL TECHNOLOGY, INC.


Gerald N. Smith
President
Aquatic Biologist


Dan Helsel
Sr. Aquatic Botanist

Enclosures