

**Feasibility Study to Eradicate Aquatic Invasive/Nuisance Species in
Canaan Lake, North Patchogue and Upper and Lower Lakes, Yaphank**

2nd Public Meeting for Canaan Lake, North Patchogue

September 13, 2010

Canaan Elementary School

7:00 – 9:00 PM

Present:

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Note: Names in bold are members of steering committee.

Frank Castelli began the meeting at 7:00 and introduced Assemblyman Dean Murray. Assemblyman Murray voiced that he has heard the frustration from citizens, it is important to get things moving, and he will do everything he can to push this project forward once the best solution has been selected.

Chic Voorhis began the power point slide presentation, “*Fixing the Problem – A Feasibility Study to Eradicate Aquatic Invasive/Nuisance Species in Upper and Lower Lakes, Yaphank.*” Sara da Silva reminded everyone that all material is on the website: www.suffolkcountylakes.net.

Water Quality

Sara da Silva provided a summary of historic water quality conditions. Dr. Chris Gobler provided a summary of SUNY’s 4-season water quality sampling in the lakes (October 2009 – August 2010). He indicated Canaan Lake experiences high levels of nutrients (particularly nitrogen) which have likely been entering the lake for many years from sources such as cesspools and septic tanks via groundwater, but the high groundwater flow into the lake keeps the system flushed and limits microalgae and blue green algae blooms. Microalgae and chlorophyll levels (indicators of algal blooms) were very low. Cyanobacteria levels and their toxin, microcystin, were measured to be 1 ug/L (the state standard), and were much lower than at other lakes in Suffolk County (e.g. Lake Ronkonkoma). There may still be potential for algal blooms in the future because of the continued flow of nutrients in groundwater which are likely to continue for the next several years. Reducing nutrient levels will be important to limit potential for algal blooms to occur.

Management Alternatives to Control Aquatic Weeds

Mike Bontje of B. Laing Associates next presented information on optimum conditions for invasive plants and what would be needed to make conditions in the lake less optimal for these plants. Canaan Lake is co-dominated by both fanwort (*Cabomba caroliniana*) and variable-leaved milfoil (*Myriophyllum heterophyllum*). It was re-iterated that there is no silver bullet for restoring these systems. Any solution will require an aggressive approach and will require some sort of follow-up or long-term actions.

Developed a matrix to assess/summarize each alternative and its impacts. Impact analysis considered in the matrix:

- Constraints
 - o Engineering constraints surrounding existing development.
 - o Downstream impacts to the Carmans River
 - o Environmental constraints surrounding habitat and water quality
 - o Cultural constraints regarding recreation and history.
- direct and indirect impacts
- maintenance effort/cost for short and long term control
- regulatory requirements/considerations
- community support

Summary matrix was presented of what would be the most effective, feasible, and economic alternatives based upon characteristics of the lakes, personal experience and literature review. Mike presented the pros and cons for the less preferable alternatives/actions, and then the pros/cons for three preferred alternatives.

Alternatives Considered:

- Benthic barriers (blanketing)
 - The lake is already shallow; this would make it more shallow and not have much benefit.
- Biological control (e.g. sterile triploid grass carp)
 - Carp tear up the bottom; common carp muddy water and don't eat; triploid carp are non-breeding and eat, but appetites decrease after a couple of years; sterile carp also need to be left contained in the lake until they die (as much as 10 yrs) and is not preferable for the desired connectivity of the lake to the rest of the river. A fish ladder was also just installed at the newly reconstructed Traction Boulevard culvert. The ladder would have to be blocked off if carp were added.
 - Grass carp were stocked a couple of times at Canaan Lake in previous years, but had limited success.
 - No known beetles to control fanwort. There is another species known to have some control on Eurasian milfoil, but not known if would have same control on variable-leaved milfoil.
- Dam removal
 - Removal would allow for more flowing water and natural conditions which do not favor invasive aquatic weeds. But, removing the dam is not possible because the cultural and economic impact constraints would not allow for this. Also, money has just been spent to reconstruct the culvert at the Traction Boulevard Dam to allow for fish passage (a main reason to often take out dams).
- Hand/suction pulling
 - Problem is too extensive for hand-pulling.
- Mechanical harvesting (*existing*)
 - Was ineffective when tried in the 1980's. Also attempted at Donahue Pond and by Nassau County DPW, but has not proven to be effective in those locations.
- Shading (chemical dyes)
 - Too much flow for dyes to work in these systems (needs to be completely quiescent).
- Water Level Manipulation
 - Draw-up not possible, would pose a serious problem for homes, would cause flooding, and would require substantial reconstruction of adjacent roads.
 - Draw-down would not completely dry out the lake since it is predominantly groundwater fed, and cannot ensure that the sediments would sufficiently freeze over winter to kill the weeds.

Recommended alternatives – Comments and discussion:

- Chemical (Herbicides)
- Dredging
- Combination (Integrated Plant Management)

Ideally, recommend application of SONAR herbicide to first kill the plants, followed by dredging to remove the preferred substrate (muck) and discourage re-establishment. Bisecting the lake in half before conducting dredging would allow for one half of the lake to act as an “inoculant” of benthic organisms that can move to the other side and repopulate the newly dredged areas.

Option 1: Herbicides (fluridone, under brand name SONAR)

- Donahue Pond (Peconic River) is good local example of control over fanwort using fluridone herbicide treatment (slow-release granules, which are best for use in flow through areas). Photos of Donahue Pond were shown and indicate a very stark contrast between the before and after through June 2010 with only sparse weeds. There were some remaining plants around the edges because they couldn't treat any area that contained less than two feet of water with the slow-release granular form of the herbicide.
- Herbicides are typically not a one-time application, still require follow-up until the weed has been controlled.
- Donahue full-lake treatment had a 4-year effective cycle, but 2' fringe not treated and acting as inoculant for regrowth of fanwort throughout the lake. As of August 2010, significant weed growth returned and will likely need a full lake treatment next year

- Donahue was predominantly fanwort (*Cabomba caroliniana*). But Canaan Lake also has substantial amount of variable-leaved milfoil (*Myriophyllum heterophyllum*). Fluridone will work on milfoil, but less effectively. On fanwort, fluridone is 95% effective, on milfoil it is 85-90% effective.
- If apply fluridone early enough (March or mid-April), don't need to harvest dead vegetation because not much of it (didn't have to harvest at Donahue), but dead vegetation from prior years has significantly built up the muck layer in the lakes. Key is to target roots of the plant before rapid growth begins.
- SONAR granules can't be used in <2' water. Liquid form can be used in more shallow areas, but requires no flow otherwise it doesn't stay put long enough to work. Flow may be problematic, but can be controlled through lake partitioning using turbidity curtains that float at the water's surface and drop to the bottom.
- Turbidity curtains in Donahue pond were used, but were not aligned to divert flow. Here, we would place the curtains in a manner that would divert flow so there would be less flow through and better containment to optimize contact time on the weeds (maintain concentration) and to keep chemicals from traveling downstream.
- Emergent plants are not affected by fluridone if they have above-ground parts. Fluridone works by interfering with chlorophyll production in submerged leaves, as it is only added to the water column (not sprayed). If weeds are targeted early before they reach the surface, fluridone can have a very targeted effect.
- No known disasters with SONAR.
- Herbicide is cost-effective option and provides immediate relief, but doesn't treat the problem, only the symptom (excessive weed growth). Herbicide use still leaves the substrate that is favored by the weeds and which acts as a nutrient source.
- One hurdle is that Suffolk County Center for Environmental Quality (CEQ) needs to approve any project on County land (the County owns a portion of Canaan Lake), and they are generally not in favor of herbicides. The County's Conservation Advisory Committee (CAC) would also need to give approval regarding pesticide application on County land.

Option 2: Dredging

- Bontje explained that the harder the lake bottom is, the harder it is for weeds to become established and thrive. Weed control through substantial deepening is very effective. Natural bottoms of these lakes were sand and gravel, whereas now there are several feet of built-up muck.
- Shallow (less than 10 ft) dredging to remove built up organic materials would be better here due to shallow nature of lakes and very high cost to deepen further. Built up organic sediments would be removed to reveal the natural hard bottom which existed prior to the weed infestation.
- Sediments have built up over time as a result of sediment inputs, nutrient inputs (septics, fertilizers) that fuel plant growth, and restricted flow caused by the dam, which cause sediments and organic material to settle to the bottom instead of washing downstream.
- If dredging occurred, hydraulic dredging would be preferred. This would help avoid breaking plants into smaller pieces. It would remove both sediments and weed species. As with Option 1, there would also be use of a turbidity curtain to separate the lake into workable halves.
- Dredging would ideally occur in early spring, after ice melts.
- Geotubes would be used to take the material and de-water it with as little sediment as possible escaping back into the lake. They have a smaller footprint than sediment basins because they can be stacked if we have to work in a small area.
- Geotubes were successfully used in Patchogue River as well as often used by Nassau County DPW when conducting pond dredging. Nassau County DPW has had very good success with dredging to alleviate weed conditions.
- One of the issues we have to deal with is water access and geotube dewatering locations – the County-owned land on the east side of the lake is an ideal location because it is centralized. It is hoped that following the lake restoration, the County land can be used as a boat ramp and park for public access to the lake. Additional County land on the north side of the lake may also be needed to provide additional dewatering areas.
- Dredging would be expensive, but would have additional benefit of increased depth for recreation and reversing the succession of the lake system.
- Dredging may take 6-8 weeks for one side of Canaan Lake. Prior to dredging, sediment would have to be tested for contamination and to assess potential for beneficial reuse.
- The tubes would then likely take 6-8 weeks per tube to de-water because of the finer materials.

- Potential problem with dredging is that the value of the dredging could be negated in a short period of time if there are many nutrient inputs, but these inputs have been cut back over the years – less agriculture, better BMPs, though more would need to be done.
- Concern with dredging is we don't know if the sediments will be contaminated, and so don't know if dredging would be cost prohibitive.
 - Sediment toxicity testing required by NYSDEC prior to issuance of a dredging permit has not yet been done. Chemical toxicity testing was not part of the scope of this project.
 - Most of the sediment is assumed to be clean material, but if contaminated sediment is encountered (particularly at mouth of western tributary) it could be very costly to deal with. Also, there is higher potential for contamination near storm pipes. If found, it will have to be handled appropriately.
 - It is acknowledged that the NYSDEC recommended utilizing existing pilot money to start the permitting process and do the sediment toxicity testing on each of the lakes.
 - NYSDEC will weigh in on sampling and disposal requirements. Until sampling is done and characterized, best use, disposal, or more exact costs cannot be determined. However, the sampling itself is expensive: ~\$75K for all three lakes (Canaan sampling could run as high as \$28-43k for private lab costs alone because of potential for contamination near western tributary; more than \$20-32k just in lab costs alone to sample Upper and Lower Lake;). Entire \$50k pilot project budget is not enough to cover all sediment toxicity testing costs. If DEC loosens their sampling requirements, # of required samples and parameters may be reduced to help lower costs. Use of County lab to do the testing may be another option to help lower these costs.
 - Question was asked whether if sediment is found to be contaminated, would superfund \$ cover the cost of cleanup/dredging? Possibly.
 - *[New information following the meeting – Mott's Pond, farther up on western tributary, has received a DEC permit to dredge out the pond sediment and install a permeable reactive barrier that would mitigate high levels of iron which are precipitating into the pond from landfill leachate, and then flowing downstream into Canaan Lake – causing the orange staining. Work is anticipated to begin early next year. Further mitigation of contamination not specified and possible that material is not as contaminated as feared.]*

Option 3: Combination of Dredging and Herbicide Treatment

- There is a chance that weeds would come back after a few years following dredging or treatment with Sonar. The ideal situation would be to treat with Sonar to kill the plants, then follow with dredging to remove the organic sediments favored by the invasive plants.
- Concern that if use SONAR, won't be able to raise additional \$ to do dredging but will likely have to retreat every few years.
- SONAR is a quick solution that would provide immediate results at relatively low cost. No sediment sampling needed.
- Long-term, dredging is preferable as longer lasting results. But, it is much more costly and would take longer to permit (requires detailed sediment sampling, analyses, specific dewatering locations). Funding is likely to be the most difficult component. Dredged material could be used for compost or as cover at the Town landfill.
- Question asked as to why do both. Either one or the other could be used, but both could be used as part of a long-term maintenance program. Sonar would enable immediate results because would be easier to fund, but dredging desirable as long-term solution. Even with dredging, there may be need for spot control long-term, for which Sonar could be used depending upon the circumstances of where and which weeds grew back.

Overall

- Question was asked what the next steps are. As a planning firm, we know that funding doesn't become available until you have a plan. This feasibility study includes the characterization through the water quality testing part of the plan so that options can be appropriately assessed.
- Rob Calarco from Legislator Eddington's office stated that this study is grant funded by the County to come up with the best plan based on science, public input, and constraints. The County has been working on this project for many years and is working towards a solution. Avenues for funding have been identified. Once we know our final outcome and approximate costs, then, we can apply for funding. There is a dedicated stream of funding for

environmental protection/restoration projects and he hopes to get funding for the recommendation through this pathway.

- Question was asked whether this could be done in a year. It is not possible to say for certain because it depends on funding, but testing and the final plan need to be in place first. Once funding is in place, it would take approximately 3-4 months for implementation. Fluridone treatment would require 30-90 days over 2 seasons, because it could only be done one half of the lake at a time. Turbidity curtains/booms could be reused for the 2nd season.
- Legislator Eddington and Assemblyman Murray are both present at this meeting and committed to do what needs to be done to push a final plan through to implementation.
- The question was asked whether testing has been done in contaminated areas of the lake (e.g. near the landfill). Yes, the County and Town have been monitoring since 1990 – it is interesting that there are no weeds near the mouth of the western tributary and presents a Pandora’s box... do we test it all now to see if that area is contaminated? It is likely that leachate is still coming from the landfill. Thirty-nine years later, one resident still worries that the water is contaminated. She commented that this can’t be a family lake if it is contaminated and that the contamination issue needs to be addressed, not just the weeds.
- One resident asked whether the Northville oil spill near Woodside Avenue several years ago affected Canaan Lake. Chic Voorhis responded that he remembered the event and recalled that it did not occur in a contributing area to Canaan Lake.
- One resident expressed they didn’t think the fish ladder at Traction Boulevard was going to help because fish aren’t getting up that far. Response was given that according to Trout Unlimited, the fish are getting up as far as below the dam and the ladder will help get them over.
- One resident commented that the weeds are worse just south of Traction Boulevard and asked whether that area was being addressed. Response was that it is not directly in this study, however, our findings will apply to other areas.
- It was asked how herbicides would be applied. Response was that they would be applied by boat.
- One resident commented that dumping is a problem and asked how that can be fixed. Residents need to be alert and report problems to the Town.
- One resident commented that the gate at the dam is hurting the lake/impeding access and needs to be removed. Response was that this is being addressed with the fish ladder project and culvert reconstruction.

What you can do NOW to help save Canaan Lake

- Da Silva presented ways in which residents can start helping Canaan Lake by reducing nutrient inputs from their own properties.
 - Fertilize responsibly
 - Pick up after your pet
 - Minimize storm runoff from roofs and driveways
 - Maintain your septic system

The meeting ended at 9:00 pm