Steve LaMere
Vegetation Assessment 8/5/11

A limited reconnaissance inspection of Big Bowman Pond in Rensselaer County was performed by Adirondack Ecologists, LLC (***AE***) on August 5, 2011. The inspection was precipitated by an email from Tom Simons of the Bowman Lake Association (***BLA***) indicating that a growing concern on the part of many lakefront property owners was developing regarding a steady increase in aquatic plant coverage in the lake. Thus, the primary objective of the inspection was to determine the nature and extent of the vegetative growth.

A survey performed by ***AE*** on the pond during the summer of 2003 indicated, among other things, that the pond contained a diverse and healthy aquatic plant community. Due to the relatively shallow average depth of the pond, however, a proliferation of water lilies (particularly fragrant or white water lilies) was present in the northern arm of the pond and along the shoreline in certain other areas.

The 8/5/11 inspection indicated that bladderwort (*Utricularia vulgaris*) was the primary species proliferating in the littoral zone of the pond (with the exception of fragrant water lilies, which still dominate in the shallowest sections). This annual plant is one of the few species that does not grow rooted to the lake bottom, but instead gets its nutrients directly from the water column and from consuming small aquatic organisms (Note: It is a carnivorous plant that traps, dissolves and digests its prey through the walls of its many oval "bladders"). Bladderwort spreads by seed dispersal and by fragmentation, and it is generally found in relatively quiet, shallow, acidic waters.

Aquatic plants, including bladderwort, offer many beneficial attributes to a healthy lake system, including: the production of dissolved oxygen to the lake environment via the process of photosynthesis, providing habitat and food to aquatic and terrestrial organisms, and the absorption of nutrients from the water column. However, an overabundance of any particular species can create issues with lake use and that is when solutions to managing nuisance levels of aquatic vegetation must be evaluated and considered.

Bladderwort is most problematic when it collects on the surface of a body of water. This occurs when it is ready to fruit and becomes more buoyant, causing it to float to the top of the pond. This occurrence is an ecological adaptation aimed at offering flying insects like bees the opportunity to pollinate the plant. It is at this point that this species can form dense mats which can affect recreational use and aesthetic enjoyment of a body of water. This is exactly what is happening on Big Bowman Pond and it explains why some of the bladderwort is on the surface of the pond and why some of it is growing suspended in the water column.

After the on-site inspection of the pond was completed, ***AE*** evaluated the potential options available to the lake association for controlling this species. Due to cost considerations and potential environmental risks to non-target aquatic plants and other organisms, ***AE*** did not recommend chemical control be considered as a viable solution at this time. Large-scale mechanical control using specialized equipment to "seine" (collect) and remove bladderwort was also discarded due to related funding and logistical complications.

Bio-control utilizing sterile (triploid) grass carp was considered and it appears that this technique may potentially offer the most cost-effective alternative to controlling the overabundance of bladderwort

and possibly even the lily pad population. ***AE*** recommended that the permit application process be initiated with the NYS Department of Environmental Conservation (***DEC***) and that baseline information on the extent of the problem (e.g., amount of weed-acres of bladderwort) be obtained. Once this information is in hand, a determination on the appropriate stocking rate (i.e., number of carp per weed-acre) can be made.

The stocking rate is incredibly important, as adding too many carp can create an imbalance in the ecology of the pond, potentially creating more problems than it solves, and adding too few carp may not have enough of an effect on the nuisance aquatic vegetation population to be worth the time, effort and money. In addition, it is important to understand that once the carp are stocked, it is very difficult, if not impossible, to remove them from the pond, until they senesce and die. Also, research has shown that generally carp do not have a significant impact on target vegetation the first year they are stocked (it usually takes a year or so for them to become established), and that it is also quite possible that they will concentrate their feeding efforts on non-target plant species before they go after the species causing the problem.

As with any proposed lake management effort, there are pros and cons to undertaking a carp stocking program (attached, please find a summary listing of some of the benefits and risks associated with using sterile grass carp) and understanding and accepting some of these potential outcomes are important to properly evaluating whether it is a technique worth pursuing.

It is likely that the ***DEC*** will require a monitoring program be developed and adhered to as a caveat of granting a permit to stock carp in the pond. This program could potentially include the performance of an aquatic plant inventory (i.e., species composition and percent coverage) before, during and after carp stocking, and it may also include a condition that water quality sampling be performed and that a comprehensive report on the efficacy and effects of the stocking be completed.

**The following is a list of some, <u>but not all</u>, of the potential outcomes of stocking sterile grass carp:**

**PROS**

- May result in improved aesthetic and recreational use of the lake;
- A decrease in aquatic plant biomass will reduce the rate at which the lake "fills" in;
- May potentially decrease water temperature due to the fact that "mats" of floating vegetation absorb and store heat energy from the sun and end up passing this heat along to the water. Lower water temperature generally equates to a slower metabolic rate of aquatic organisms, including aquatic plants;
- May improve lake surface water circulation patterns and possibly minimize stagnation.

**CONS**

- The mosquito population may potentially increase since less mosquito larvae are consumed by bladderwort due to removal;

- Lake water phosphorus concentration could increase due to less nutrients being utilized by bladderwort. Also, since roughly 60% of what a carp eats is excreted back into the water column, a significant amount of phosphorus will be re-introduced into the lake water column;
- Water clarity may decrease as a result of increased algal abundance (removing aquatic plants may make more nutrients available to algae, thus increasing the amount of algae) and carp foraging (they stir up the lake bottom sediments at times when they forage);
- Other aquatic plant species may increase in growth if competition for nutrients, sunlight and space is reduced by the removal of the bladderwort;
- May decrease dissolved oxygen production during the day, but conversely, it may also decrease the consumption of dissolved oxygen by the plant community at night (both a potential pro and con);
- Loss of habitat and available food may occur to certain species of insects, mammals and waterfowl by removing the bladderwort;
- Adult carp can become quite large and there is the slight risk that a carp could startle a paddler and/or run into a canoe or kayak by mistake and cause it to overturn, thus causing potential personal injury.