

BFS Technical Report # 12

**LIMNOLOGICAL INVESTIGATIONS OF FOUR SMALL
LAKES FOR THE DEVELOPMENT OF MANAGEMENT
RECOMMENDATIONS**

SUBMITTED TO:

**ARNOLD LAKE ASSOCIATION
CANADARAGO LAKE ASSOCIATION
KAYUTA LAKE ASSOCIATION
LARCHWOOD LAKE ASSOCIATION**

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EXECUTIVE SUMMARY

This contribution is a compilation of four separate studies which provide information for the purpose of developing management recommendations based on the physical, chemical and biological attributes of the lakes concerned. Any eventual actions must be developed from a melding of the agendas of involved stakeholders as they strive to attain their goals within the constraints imposed by the attributes and functional requirements of the target ecosystems.

The first characterizes Arnold Lake, Otsego County, N.Y. The second, also in Otsego County, is concerned with Canadarago Lake. The third, in Oneida County, N.Y., characterizes Kayuta Lake, formed by the damming of the headwaters of the Black River in the western Adirondacks. The fourth, again in Otsego County, presents information gathered on Larchwood Lake in Laurens, N.Y.

All four lakes are dimictic and eutrophic. Canadarago is a hardwater lake, exhibiting calcium and alkalinity concentrations well above the other lakes studied. It alone is at risk regarding potential introduction of zebra or quagga mussels. However, other exotic plants and animals that are common in nearby waterbodies could negatively impact all lakes studied.

Recreational users in all four lakes need to be concerned about controlling nutrient runoff from surrounding watershed lands. All need to understand that if nutrients such as phosphorus and nitrogen are in lake waters they will be used by primary producers, either rooted plants (benthic macrophytes) or pelagic phytoplankton (algae), or both. Typically one group or the other dominates in a particular lake.

All populations of primary producers can be reduced by reducing nutrient loading from watersheds surrounding lakes or from their release from bottom sediments in the lakes themselves. Alternatively, certain kinds of green plants can be reduced by herbivory (grazing), competition with other less noxious plants, or physical or chemical restraints that kill them directly. Any potential mitigating actions impact other attributes of lake utilization (e.g. altering plant communities changes the distribution and abundance of fish populations). Negative and positive attributes of each action need to be recognized and considered as it regards management objectives. Therefore, a "whole lake" plan should be drafted before any one problem is addressed.

The effectiveness, safety and negative impacts of these actions will vary depending on the character of each lake and its watershed and the specific goals of a management plan. That is why all stakeholders must understand and agree on common goals and priorities. For example, what are the problems? Which are most important? What are the most effective, acceptable, ways of attacking them? Often the most difficult problems to reconcile are getting all those concerned to remain supportive of a whole lake management plan that gives none precisely what they desire. This comes about because of the compromises necessary to give everyone incentive to remain a part of the process. For example: Property owners appreciating a sunset over the lake, sailors, power boaters, fishermen and swimmers may envision very different idyllic situations. They must be reconciled if a management plan is to be effective. We would be happy to help facilitate the planning processes in each situation in any way possible.