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Annual Report of the Water Quality Task Force Cossayuna Lake Improvement Association February 1988

Submitted by the Task Force Chairpersons
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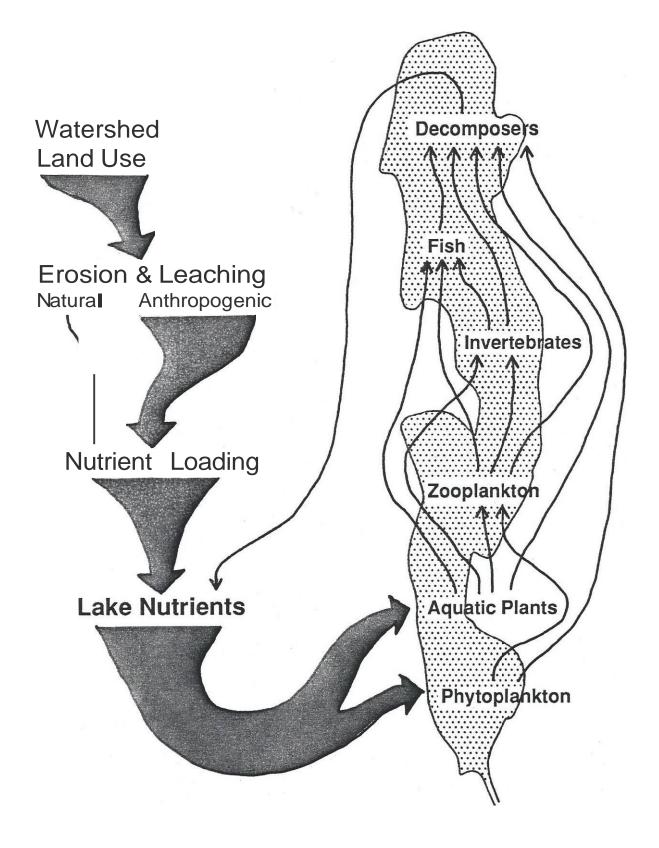
Cossayuna Lake is a eutrophic lake, meaning it is geologically rather old and it has become rich in nutrients, plankton and submerged - emergent plants. Lakes of this type are productive and therefore may exhibit areas of oxygen depletion by the end of the summer. As these lakes get older, they become warmer, shallower and more pond-like because the silt and partially decomposed plant material turn the shoreline into a marsh and fill the deeper areas to create new shallows. This continues until the aquatic plants meet in the middle of the lake and the last vestiges of open water disappear. Soon the lake is a bog or marsh and in time shrubs may grow and a forest appear.

This predictable, orderly sequence of changes is known as ecological succession and it is the natural end to any lake. Under natural conditions however, it should take hundreds to thousands of years for this to happen, and yet long time residents of the Cossayuna Lake area can document some of the changes described above during their lifetime.

Although eutrophication (becoming more eutrophic) is a natural process, the events that are forcing the lake to grow old before its time fall more into the class of cultural eutrophication, that is human generated enrichment. When the human population of the watershed was small, its collective influence on the lake was also small. However as time passed and the population grew, all the small effects added up to create a larger one which began to accumulate. The point here is to illustrate the complex and intricate pattern of causes and effects that have ultimately caused Cossayuna Lake to be what we see today.

To date, the Lake Association has addressed this problem of eutrophication by studying the nutrient loads and bacteria levels of the lake and its inflowing streams. The report on that work has been submitted to the chairperson of the Environmental Water Committee and the president and secretary of the Association. The report documents the relatively high levels of nutrients in the lake and the streams flowing into the lake and suggests that while things are now bad, they could and probably will get much worse. We cannot study only the biology and chemistry of the lake if we seek to solve the problems of eutrophication; we must also look to the terrestrial ecosystem which surrounds the lake. The following diagram attempts to illustrate some of the relationships between a lake and the watershed it drains. It must be clear that most of the connections shown are natural and cannot be altered, at least not to any great extent without changing the lake in an adverse way. The bold arrows illustrate the effects of humans and it is here that we can and must intervene if the lake is to be reclaimed. Cuts in any and or all of the anthropogenic agents of eutrophication will eventually result in an improvement in the lake.

Because it is the watershed that determines many of the lake characteristics that we hope to alter in our attempt to reclaim Cossayuna Lake, it is within the watershed that the Association must seek solutions.



The Water Quality Task Force has identified a number of things to be considered if the Lake Association wishes to improve the water quality of the lake and thereby control nuisance aquatic plants. Some of the items listed below may happen quickly while others may take many years. Some may result from Lake Association activities while others can only come about through the actions of the town, county or state. Regardless, the Task Force feels that certain things must ultimately come to pass if the lake is to be reclaimed:

- water quality must be improved by reducing nutrient and silt loading of the lake
- macrophyte communites should be returned to pre-milfoil conditions
- development must be controlled, both around the lake and within the watershed, by the appropriate agencies
- sanitary codes must be developed and septic systems must be improved within the watershed, in conjunction with the appropriate agencies
- land use must be addressed within the watershed
- an Association membership should be developed that includes all the people on the lake or within the roads that surround the lake

As a step towards accomplishing the goal of improving water quality and controlling aquatic weeds, the Task Force has identified below its proposed projects for 1988.

Water Monitoring

The Environmental Water Committee recommends that the basic sampling procedure used since 1984 be maintained for 1988. Some modifications and additions were proposed however, including

- 1) adding a sampling site at the outlet of the lake (north_of Route 338) in an attempt to determine how much nitrate and ortho-phosphate is being exported from the lake. When compared to that entering the lake through stream inflows a rough nutrient budget can be achieved. To accomplish this however, a permanent depth marker will have to be placed at this location. (see section on water level regulation for further details on depth markers)
- 2) the addition of chlorophyll determinations to the sampling regime. This would document the xtent of algal populations in the lake. Although this substantially adds to the analysis time, the results will be useful in assaying lake conditions.

3) the bacterial analysis be reduced to four (4) samples (pre-season, early season, late season and post-season). This should provide the same amount of data and yet allow for a partial streamlining of the sampling program.

In addition to the sampling program the Environmental Water Committee recommends the purchase of two rain gauges and the establishment of two (2) permanent sites to measure rain and snow fall. Although the sites have not yet been established, it is planned to locate one on the north end of the lake and one on the south. This will allow the committee to easily collect precipitation data which will be correlated to streamflow and lake height. Identical gauges, located and constructed in the same manner, will provide reliable measuring techniques which are essential if consistency and accuracy are to be maintained.

Finally, the Environmental Water Committee suggests that the Board of Directors look into the establishment of a laboratory space for the analysis of lake and stream samples. This space would need to be at least 12 x 12 feet, with water and electrical hook-ups and would have to have the capacity to be heated. The locked space should be located away from general public access since it would eventually contain sampling gear and other equipment.

Weed Control

Herbicide treatment of Cossayuna Lake was completed in May 1988 as directed by the Board of Directors. Paperwork was completed and permits received on May 17th, and the actual treatment was done on May 17th and 18th. The application was on-site inspected and approved by DEC officials.

The Task Force is recommending a weed harvest program for 1988 that will be similar in size and scope to that of 1987. For 1988 we hope to have better control of the time of the harvesting (assuring better weather conditions for harvesting than in 1987) as well as to employ booms around the harvest area. These two factors should substantially reduce the problems observed after the harvest of 1987. The Task Force feels it is imperative that we utilize a variety of weed control practices in the attempt to control the growth of Eurasian milfoil. Because heavy milfoil concentrations were targeted during 1987, we can assume that most of the 521,000 pounds of vegetation removed from Cossayuna Lake was milfoil and we can therefore estimate that 16,151 pounds of nitrogen and 2,605 pounds of phosphorous were removed from the lake (milfoil is known to be approximately 3.1% nitrogen and 0.5% phosphorous). This reduction in lake nutrient load is obviously substantial enough to warrant future harvesting at at least the same levels as in the past.

Water Level Regulation

The Dam Committee has pursued the problem of dam repair and arranged for E. Blackmer (Department of Soil and Water Conservation) to inspect the dam and the proposed repairs in order to meet the requirements for the DEC Dam Safety Division. Following the recommendations of Mr. Blackmer, a permit will be filed and plans for the repair work will be made. The Dam Committee estimates that the proposed work will be completed by November 1988, providing no new problems arise.

The Task Force plans to establish water level markers on the lake in 1988. Four sites have been proposed; at the damsite, on the north side of the Route 338 culvert, mid lake and at the north end of the lake. At some time (as yet unspecified) in the late spring - early summer 1988 the four markers will be placed and calibrated. Calibration will result from a transit sighting from the U. S. Geological Survey Benchmark near the Fireman's pond dam to the lake dam, resulting in a measurement of water level in feet above sea level. The marker at the Route 338 culvert will then be calibrated by a transit shot from the Cossayuna Lake dam. The markers at the damsite and the culvert will be permanent, while those at the mid and north lake sites will have to be removable to avoid ice damage in the winter. Because the lower two markers are permanent they can be used to recalibrate the lake markers when they are replaced after ice-out.

It is proposed that lake levels be maintained generally as they have in the past, only now the levels can be quantitatively maintained. This will allow for a better comparison of lake levels from one year to the next, a subject of considerable concern during recent months. The members of the Dam Committee will have the day-to-day responsibility of maintaining lake level, again as they have in the past; however the Task Force may request that the lake be raised or lowered (for short periods of time) to allow the flushing of nutrients from the lake (during algal blooms for example). This change in how and why the lake level is mantained at any given point is not expected to cause undo stress on anyone and the Task Force will not knowingly damage any lake property but we feel that if lake restoration is to be achieved this control over lake level is mandatory. It will be very important that the Board of Directors back the Task Force on this issue.

Water Quality Task Force Contacts

Efforts are being made to contact all town, county and state municipal offices as well as all other organizations that have an interest in, or the potentialfor impact on the Cossayuna Lake watershed. The purpose of these contacts isto declare the intent of the Task Force to develop realistic plans to monitor the impact of all activities within the watershed which affect water quality. The value of these contacts is to establish a "network" of informed people in key positions who can provide an early warning of any

activity which could impact the basin and thereby influence water quality. The contacts also serve to alert key persons as to the future need for assistance to the Task Force, technically and otherwise. The risks of precipitating outside interference as a result of these contacts appears to be minimal. The Task Force anticipates that any problems that should arise as a result of these contacts will be more than outweighed by the assistance and generalgoodwill that will result because of the contacts.

The following initial contacts have been made:

Kenneth Burch - Chairman, Washingon Co. Board of Supervisors

Malcolm Douglas - Clerk,

Robert Page - Director, Washington Co. Planning Dept.

Kenneth Wheeler - Superintendent, Washington Co. Highway Dept.

William McCarty - Director, Washington Co. Real Property Services

Fred Wagar - Resident Engineer, NYS Dept. of Transportation

James Perry - Soil and Water Conservation District Officer

Alan L. Koechlein - Wildlife Biologist, DEC

William Miller - Dept. of Fisheries, DEC

William A. Muermann - Asst. Hydraulic Engineer-Regulatory Affairs, DEC

Thomas Foster - Ducks Unlimited member

Waterfowl Improvement Association Treasurer

These additional contacts are planned:

Dave Pierce - Washington County Sportsmans Federation

NYS Farm Bureau

Various Fish and Game Clubs

Gary Will - Regional Director, Ducks Unlimited

Board of Directors - Waterfowl Improvement Association

David Holck - Agricultural Stabilization & Conservation Services

Brian Fear - District Sanitary Engineer, NYS Department of Health

All Washington County Board of Supervisors members

Others yet unidentified

Other Projects and Suggestions

Additional items planned by the Task Force include the establishment of groups of Association members to investigate potential lake restorative techniques. Materials from their research, as well as other related items will be placed in a library for use by Association members. The Task Force would like to develop and distribute pamphlets on the hand-harvesting of macrophytes in front of camps and investigate the placement of a receptacle at the State boat launch for use by people who clean the aquatic weeds from their trailers before and after boat launching. Signs on the receptacle will

encourage boaters to do this and it is hoped that this action will reduce further contamination of our lake as well as other lakes.

Following the suggestions by the Dam Committee, the Task Force recommends that the Association work to develop the aethestic value of the dam and its surrounding areas. If this work included the upper and lower ponds in the hamlet, the Task Force feels that a substantial amount of good willwould be generated as well as beautifying the general lake area. At the very least, these areas could be included in the proposed Lake Clean-Up Day (see Task Force Report of 16 January 1988).

The Task Force would like to see the Social Activities Committee initiate a more comprehensive social calendar in 1988, which could include but not be limited to:

- 1) an Annual Lake Clean-Up Day for the lake and surrounding areas
- 2) aboat safety clinic
- 3) a general boat maintainence clinic
- 4) a sailing clinic
- 5) a water skiing clinic
- 6) a fishing contest run by the CUA

Glossary of terms

anthropogenic - of human origin

eutrophication - the increase of nutrients in lakes, either naturally or artificially by pollution

phytoplankton - the usually microscopic plants that live free-floating in water

watershed - the land surrounding a body of water (such as a lake or stream) from which all precipitation runoff drains into that body of water

zooplankton - the usually microscopic animals that live free-floating in water