

INTRODUCTION:

Research summary

This past year's research on Otsego Lake and its watershed has provided some important insights into current policy issues, the pace of expected improvements and a potential road map for reaching an important goal. As earlier BFS research provided the scientific underpinning for the Lake Management Plan, this past year's provides the basis for a focused study to implement that plan.

Though only a small component of the phosphorus loading that is the root cause of the lake's problems, lakeside septic systems have been recognized as having a large impact. That's because this nutrient leaches into the lake in soluble form from homes that are used primarily in warm weather when algae is growing. It's just like adding fertilizer. And this is true even if the septic system is working properly. Phosphorus makes its way through leach fields and migrates through unsuitable soils, eventually reaching the lake.

While the focus of phosphorus control has been to stem the flow of manure residue that washes into feeder streams from dairy farms, little has been done about the impact of septic systems—until now. One goal of the Lake Management Plan calls for testing and upgrading, if necessary, septic systems within a certain distance from the lake and its tributaries. Research reported in this 34th Annual Report discusses technologies for measuring phosphorus concentrations near septic systems and the development of chemical reactive mixtures that reduce them, mitigating the negative effect on the lake.

We are through two years of a three-year locally sponsored study on the effects of walleye stocking on the lake. This stocking program—a goal of the Plan—is designed not only to restore the walleye fishery but to help control the alewife population. The latter feed on large plankton that, in turn, graze on algae resulting in cloudy waters. And when algae die their decomposition causes oxygen loss in deep waters, threatening the cold-water fishery.

One contribution examined how walleye have survived after two years of stocking. The results of the study are inconclusive, in no small measure due to another study's finding that five other species were found to be predators of stocked walleye. The stocking program will continue to at least the fall of this year. The next evaluation will help determine whether this program should be continued. Clearly if walleye take hold, one constructive step toward reducing the alewife population will have been taken. If they don't establish themselves, alternative approaches will have to be examined.

A significant component of the lake's phosphorus loading stems from agricultural activities at the north end. Shadow Brook is the largest contributor of phosphorus and sediments. In 1996, Federal legislation provided the bulk of funding for agricultural Best Management Practices (BMPs), designed to reduce nutrient and sediment flow from the land which, in turn,

could improve water quality. The first four BMPs in the Shadow Brook basin were completed in 1999, one in 2000 and another in 2001. And three others are under construction. This created an opportunity for BFS to study BMPs long-term effects on the lake. One study looking at phosphorus and sediments was based upon runoff events associated with storms. It did not provide adequate information indicating that water quality has improved following the implementation of BMPs. Variable storm intensity, lots of material accumulated in that watershed and BMPs not all in place suggest that more time will be needed for continued monitoring of Shadow Brook to provide a better understanding of the influence of BMPs on water quality.

Another monitoring study looked at five of the lake's tributaries including Shadow Brook. It was not based upon precipitation events but rather involved measuring such factors as temperature, dissolved oxygen, nitrogen and phosphorus. Using data from 1991, an overall improvement in water quality was indicated except for the period since 2000. Another study monitoring these same streams for fecal coliform indicated that concentrations were relatively stable.

Field Station monitoring of biological control efforts to combat exotics species has had mixed results. The Goodyear Swamp Sanctuary, just off the northwestern part of the lake, has been plagued by purple loosestrife, a perennial plant that aggressively invades and degrades wetlands—at least, until recently. In 1997, two species of beetles that feed exclusively on loosestrife were introduced to control it. These beetles have been so successful in decimating the loosestrife stands in the Sanctuary that they have dispersed. Continuing monitoring of the swamp will be required to see if loosestrife rebounds and the beetles return.

Moraine Lake in Madison County, on the other hand, has also been the object of Field Station involvement in biological control. Invited by its lake association, Field Station personnel have focused upon efforts to control an aggressive, exotic plant-- Eurasian water-milfoil. The introduction of a weevil known to feed on the growing tip of this nuisance plant has not reduced its density, suggesting that alternative measures must be used to cope with the problem.

Three other lakes in Otsego County and one in Oneida were studied by the Field Station to provide information for their respective lake associations to formulate management recommendations to control nutrient runoff and exotic plants and animals. The Power Authority of the State of New York has for three years hired the Field Station to document changes in vegetation along a right-of-way that runs through Greenwoods Conservancy, a nature preserve that BFS manages for education and research. Maintaining the right-of-way for that portion of the Marcy-South power line that runs through Greenwoods is important for the Power Authority to prevent interference from tall trees and to provide a corridor for maintenance access.

There's another aspect of BFS research that goes on year after year that doesn't have obvious policy implications yet is invaluable for taking the pulse of the lake and its watershed. A bird census was first taken in the late 1960s and continues to this day. Mosquitoes have also been studied for many years. And other studies which add to our valuable store of knowledge continue to be produced by our able staff.

OVERVIEW OF ACTIVITIES

Willard N. Harman

Jeane Bennett O'Dea and Laurie Trotta completed their requirements for the MA in biology with their work with the vascular flora at Greenwoods and a fisheries survey of Peck's Lake, respectively. Andy Fetterman finished his work on the hydrology of the Otsego Lake basin completing his requirements for the MA in Earth Sciences. Paul Lord continued his graduate work with Eurasian water milfoil herbivory. Mark Cornwell is involved with monitoring the impacts of recently stocked walleye on Otsego Lake alewife populations and lake water quality. Mike Stensland is beginning work on the macrobenthic invertebrates of the upper reaches of Butternut Creek. Wesley Tibbits, with an interest in Otsego Lake lake trout, has applied to the MA in biology program. Mike Gray, also with interests in fisheries biology, is enrolling in courses at Oneonta in anticipation of applying to the graduate program.

Four high school students were supported via FHV Mecklenburg Conservation fellowships: Holly Meehan from Cherry Valley/Springfield, Kevyn Hill from Cooperstown Central, David Albright from Southwestern Central (Chautauqua County) and Katie Wayman from Worcester.

College undergraduate interns were: Bekka Brodie and Joyce Green from SUNY Oneonta, shared responsibilities for the NYS Power Authority and Greenwoods Conservancy internships. Brian McDonnell and Kim Wojnar from SUNY Cobleskill, both held R. C. MacWatters Internships in the Aquatic Sciences. Mary-Elizabeth Miller from the University of Rhode Island held a Madison County Planning Department internship. Caitlin Parker, Cornell University, held a Rufus J. Thayer Otsego Lake Research Assistantship. Sarah Groff from Middlebury College was supported by a Cooperstown Lake and Valley Garden Club internship.

Soren Dahl, SUNY Oneonta, was involved in a biology independent research project. David Donnelly, Bowdoin College, worked at the Thayer Farm and conducted an avian survey in the northern Otsego Lake watershed. Albert (Gordie) Morgan, SUNY Oneonta, worked at the Thayer farm. Pilar Conde, SUNY Oneonta, worked in a diversity of areas supporting the pre-college "Learning Adventures" program with funding from Americorps.

Dr. Thomas Horvath, US Geological Survey, Great Lakes Research Center, Porter, IN, worked as a BFS Visiting Researcher on local meiofauna (microscopic aquatic invertebrates living in the interstices of littoral substrates) while facilitating Biol. 685, a graduate course in limnology at the BFS. Students were enrolled in several SUNY Oneonta and SUNY Cobleskill on-campus courses and attended field exercises on site. Biol. 184, An Introduction to Aquatic Biology and Biol. 384 Aquatic Biology, were taught to high school and college undergraduates by Bill Harman. More than 1,000 K-12 students visited the BFS and received hands-on experiences on Otsego Lake and BFS woodlands over the year.

For the second year no water chestnuts (*Trapa natans*) were found in Otsego Lake despite

several days of intensive searching by BFS interns, graduate students and a cadre of volunteers. Early recognition of the problem and removal of plants in 1999 apparently contributed to its eradication. We will continue to keep an eye on the situation. Thanks to Otsego 2000 and the OCCA for their far-sighted support.

For the second year, we stocked Otsego Lake with walleye fingerlings varying in size from two to more than 6 inches in length. Monitoring was continued, staffed by BFS graduate student Mark Cornwell, with advice and help from Dave Warner and Tom Brooking from Cornell's BFS. Walleye from the first year of stocking have now attained about 12 inches in length. We received support from four lake associations: Canadarago, Kayuta, Arnold and Larchwood, to complete water quality and biological surveys for management purposes. The OCCA continued sponsorship of the precipitation based water quality monitoring in the Shadow Brook drainage basin. The NYS Dept. of Transportation continued to support research on highway deicers in the Village. Cooperstown Lake and Valley Garden Club support of work at Goodyear Swamp Sanctuary continued. For the first time biocontrol efforts there on purple loosestrife were obvious to observers.

The Biological Field Station has contracted with the United States Fish and Wildlife Service to cooperate with a United States Army Corps of Engineers wetland funded project. Approximately \$1.5 million has been dedicated to this project, which will create and restore wetlands in the Otsego Lake and upper Susquehanna watersheds. The intent is to improve wildlife habitat, reduce flood potential, and improve water quality. Our role will be to document any water quality changes that result from the projects. The bulk of our funding will be used to hire a research support specialist. If successful, this project may serve as a model for wetland projects throughout the Susquehanna watershed.

There has been a lot of work at the Thayer farm getting it ready for our use, and still much to be done. This summer the residence was made ready for Tom and Sirkka Horvath. Tom is Oneonta's new limnologist, taking Len Sohacki's position since the latter's retirement. All new utilities, a well, and new roof were installed along with many new lighting and plumbing fixtures. There has been a lot of cleanup, roads have been resurfaced, gates are up, mowing, pruning and gardening patterns have been established. The Getman equipment bay and part of the saphouse that were beyond repair have been razed. All outbuilding roofs are either new or resurfaced.

Several talented citizen volunteers again helped at the BFS during the year. They included Kathy Ernst, Earle Peterson, Dan Rosen, Marilyn Digasper, and Doug Willies and the following SCUBA divers: Dale Webster, Jeff Back, Jeff Opar, Lee Ferrara, Andrew Lachut, Jennifer Szarek, Heather Taggart and Brian Sydow.

We conducted the annual Otsego Lake Boat census on August 24th. The BFS provided personnel and boats for Otsego Lake Cleanup and Water Chestnut Days.

Recent Otsego Lake Boat Censuses

Types of Boats	7/27/94	7/14/95	7/23/96	7/18/97	7/7/98	7/29/99	8/24/00	8/10/01
Sailboats	208	208	207	183	236	238	187	190
Rowboats	311	313	325	312	372	309	349	389
Canoes								
Outboards	461	430	378	371	377	412	381	375
Inboards	16	13	36	13	20	15	23	9
Inboard-Outboards	227	267	260	275	261	265	287	285
Per. W. Craft	62	84	66	32	28	29	19	23
Misc.				40	57	49	53	66
TOTAL	1,285	1,315	1,272	1,235	1,351	1,317	1,299	1,359

Public support makes our work possible. Funding for BFS research and educational programs was procured in 2000 from many citizens and local organizations. Special thanks go to the Clark Foundation who generously supports our annual needs. Thanks also to the Gronewaldt Foundation and Doug Willies for providing the resources for the Otsego Lake walleye stocking program, Fred Doolittle, The Lake and Valley Garden Club, the Peterson Family Conservation Trust, the OCCA, Otsego 2000, the Village of Cooperstown, SUNY Oneonta, the SUNY Graduate Research Initiative, the Madison County Planning Department and the New York State Power Authority. The endowment for the Otsego Lake Research Chair now has a value of about \$800,000 (about \$1 million is needed in order to fill the position).

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3/15/2002