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THE SHALLOW LAKES INITIATIVE: RESTORING AQUATIC HABITAT IN WISCONSIN

by Sandy Engel

Why Restore Habitat?

Like other midwestern states, Wisconsin has lost many of its natural wetlands. In particular, shallow lakes have been converted to farmlands or turbid open water and no longer support a rich marsh life. Shoreline plants that protected nesting ducks or broods are gone. Blue-green algae have replaced underwater flowering plants that harbored fish fry and invertebrate prey. Noxious species, like purple loosestrife (*Lythrum salicaria*) and Eurasian water milfoil (*Myriophyllum spicatum*), stand where native flora grew.

Restoring habitat yields more than aquatic plants. Rooted plants improve water clarity by trapping sediments and storing nutrients. They keep winds from stirring shallow bottoms and retard shore erosion. The plants also provide food, shelter, and breeding sites for fish and wildlife. Bordering sedges (*Carex* spp.) become spawning beds for northern pike (*Esox lucius*) in spring, wild rice beds (*Zizania aquatica*) sing with shore birds in summer, and wild celery (*Vallisneria americana*) develop tubers that attract canvasbacks (*Aythya valisineria*) in fall. Thus, restoring habitat can mean a more diverse ecosystem.

Taking the Initiative

Restoring habitat in shallow lakes takes thoughtful planning, cooperation from many people, and an ecosystem approach to problem solving. That's why the Wisconsin Department of Natural Resources (DNR) launched its Shallow Lakes Initiative. Begun in 1986, the initiative is dedicated to promoting:

- integration of management efforts on shallow lakes,
- awareness of shallow lakes as fish and wildlife habitat,
- new approaches to habitat restoration on shallow lakes,
- formation of a lake classification system.

Coordination, management, and research are cornerstones of the Shallow Lakes Initiative. Relying on networking, the initiative involves people from many disciplines and strives to focus management efforts on common problems. It emphasizes coordination among government units and citizen and business participation. One formal research project (Rice Lake restoration) is presently being

conducted through the Shallow Lakes Initiative. This and other restoration efforts are summarized below.

Rice Lake Restoration. Urban and rural runoff converted this natural, 125-acre marsh into an algal bowl. Located upstream from Balsam Lake in Polk County, Rice Lake now grows blue-green algae and a border of rushes and water lilies (Fig. 1). Flat land and waist-deep water permit winds to scour the sediments and recycle nutrients. Past winterkills have left a fish fauna dominated by yellow perch (*Perca flavescens*), white suckers (*Catostomus commersoni*), and black bullheads (*Ictalurus melas*). Researchers are using local accounts and paleolimnology to reconstruct the original marsh composition and develop a restoration plan. Segregated gasoline tax money, designated for comprehensive lake management, demonstration, and research, is partly funding the project. (Co-investigators: S. Engel, DNR; S. A. Nichols, Wis. Geol. and Nat. Hist. Surv.; Paleolimnology: P. J. Garrison, DNR)

Elk Creek Lake Plantings. Elk Creek Lake, a 54-acre impoundment in Dunn and Eau Claire counties, experienced degraded water quality and sedimentation. The lake was deepened by dredging, and 2 islands were formed as fish habitat. The islands and areas of lakeshore were planted in June 1988 with 15,900 tubers of 9 emergent and 2 submergent species (Fig. 2). This "underwater gardening" is meant to stabilize slopes, improve water clarity, and attract waterfowl. Nest boxes for wood ducks (*Aix sponsa*) were erected on the islands, and the lake was stocked with sport fishes. The lake association helped plant the nursery stock, purchased with funds from the U.S. Environmental Protection Agency and the DNR. (Project Coordinator: P. W. Sorge, DNR; Project Leader: S. Borman, Elk Creek Lake Association)

Lac la Belle and Okauchee Lake Competition Studies. Lac la Belle and Okauchee Lake are deepwater lakes with extensive shallows for plants to colonize. These Waukesha County lakes each cover

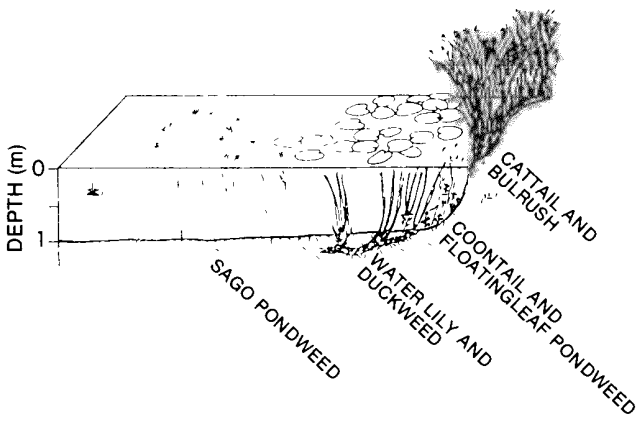

FIGURE 1. Turbidity-tolerant flora growing in Rice Lake, August 1987. Secchi disk transparencies stay below 75 cm; rooted plants that lack floating or emergent leaves cannot grow.

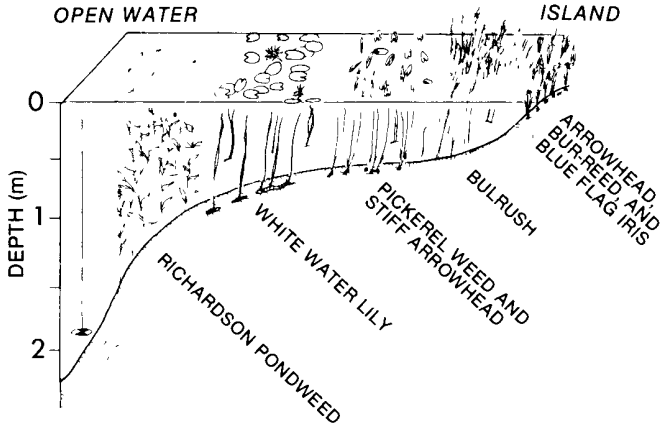

FIGURE 2. Aquascaping plan for an island shore in Elk Creek Lake, showing zonation of plants with water depth (based on diagrams by Susan Borman, April 1988).

over 1,000 acres. Lac la Belle's fishery has been dominated by carp (*Cyprinus carpio*), limiting growth of macrophytes; Okauchee Lake has dense stands of Eurasian water milfoil and wild celery. UW-Milwaukee scientists are studying competition between water milfoil and transplanted large-leaf pondweed (*Potamogeton amplifolius*) in the lakes. The pondweed is growing well on marly sediments in Lac la Belle, but doing poorly on organic ones in Okauchee Lake. Another large-leaf pondweed (*P. illinoensis*) was spotted in Okauchee Lake and is under observation. The 2-year study began in 1986 and is supported by DNR and lake district funds. Findings from this study will be applicable to shallow lakes with similar problems. (Co-investigators: D. Les, J. Keough, G. Guntenspergen, and F. Stearns, UW-Milwaukee; DNR Project Coordinator R. S. Wakeman)

Winnebago Pool Comprehensive Management Plan. Wisconsin's largest chain of lakes, the Winnebago Pool (Lakes Butte des Morts, Poygan, Winnebago, and Winneconne) was once a series of riverine marshes supporting lush vegetation and abundant fish and wildlife. Dams built in the 1800s raised water levels by nearly 1 m to create the 167,000-acre navigation pool. Water level fluctuations, wave and ice action, boat traffic, and runoff from farms and cities further degraded habitat and water quality. A long-range plan has been written to guide restoration and integrate diverse management efforts. The plan aims to improve ecological diversity and water quality. Its many recommendations include improving water transparency; controlling rough fishes, water levels, and nonpoint source pollution; purchasing and developing critical habitat; increasing abundance of native flowering species; and monitoring lake, plant, fish, and wildlife changes. The planning work was funded by Pittman-Robertson and Dingell-Johnson funds. (Project Coordinator: R. Bruch, DNR)

Canvasback Restoration. Lake Koshkonong and lakes of the Winnebago Pool once attracted large numbers of migrating canvasback ducks. Now migrational populations have shifted to pools of the Upper Mississippi River (UMR) where habitat is not well dispersed. One management approach on these lakes and pools has been to plant tubers of wild celery and sago pondweed (*P. pectinatus*). The tubers are weighted with a nail attached by rubber band or sunk in mesh bags containing stones. The plants usually sprout well, but growth has been restricted by poor water clarity. Carp, winds, ice, and water level changes have affected growth also. This research is supported by Pittman-Robertson funds and the U.S. Corps of Engineers. (Lake work: R. B. Kahl, DNR; River work: UMR National Wildlife and Fish Refuge staff)

Lake Puckaway Restoration. Lake Puckaway, a 5,430-acre widespread of the Upper Fox River in Green Lake County, became overrun with carp and lost plant habitat. Wild celery has been planted for the past 5 years to establish habitat for sport fishes. Plants now cover over 20 acres of lake shallows. This cooperative project between the lake district and DNR receives Dingell-Johnson funding. (Project Leader: D. A. Brege, DNR)

Lake Classification

Which habitats should be restored first? Which ones left alone? Lake classification can help managers set priorities, focus restoration efforts where most needed, and avoid conflicts and inappropriate treatments. It can

guide regulatory authority in protecting sensitive habitats. Classifying lakes can help managers decide which lakes to treat and how to treat them. Bays or entire lakes can be set aside as fish or wildlife habitat; others, managed for recreation.

Wisconsin needs a lake classification system. The DNR has identified lakes sensitive to acid or phosphorus loading. It now wants to identify sensitive areas on lakes, as part of an expanded Aquatic Nuisance Control program (NR 107). This would protect habitat from weed control. The DNR Lake Management Program will help citizens identify such areas and develop lake management plans. Lake classification, expanded to include shallow lakes with potential fish and wildlife habitat, can help focus such efforts and become a useful tool for habitat restoration.

Suggested Readings

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Sandy Engel is coordinator of the Shallow Lakes Initiative and a limnologist for the Bureau of Research, Wisconsin Department of Natural Resources. He is trained in limnology and fishery biology. His recent publications deal with aquatic plant management and lake use planning. *Address*: 3911 Fish Hatchery Road, Madison, WI 53711. *Telephone:* (608)275-3219.

Edited by Betty Les

Bureau of Research
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707