

research management

# findings

Number 2 • March 1987

"A lake is the landscape's most beautiful and expressive feature."

- Henry David Thoreau

## CONCEPTS IN LAKE MANAGEMENT: RESTRUCTURING LITTORAL ZONES

What can stop a motorboat, grab a swimmer's leg, and turn away hungry bass? If you thought of dense lake weeds, read on.

Some lakes in summer appear to have more weeds than water. A lake's potential for recreation can be limited by the plants it grows. Treating the vegetation with chemicals or harvester equipment can be costly, time consuming, and frustrating. Regrowth of treated areas can lead to a vicious cycle of retreatment.

Thinking like a landscape architect has led to more creative approaches to managing aquatic vegetation. Can an apparent liability (choking weed beds) be converted into an asset? Attractive lake environments, with minimal user conflicts, are possible through judicious lake-use planning and selective application of new and traditional techniques. Called "restructuring littoral zones," here is how it works.

Weedy bays and whole lakes are viewed as aquascapes, underwater real estate needing better design. Such areas are restructured by

selective removal and addition of plant species. The lake bed may even have to be altered to modify plant growth.

The technique begins with the preparation of a lake-use map (Fig. 1). The map delineates summer weed beds in relation to swimming, boating, angling, nature study, and other uses. Next, a blueprint is drawn to show a more desirable balance of vegetation and recreational activities.

The lake is then zoned into areas of similar use. Areas can be zoned for swimming, sailing, canoeing, water skiing, and other uses.

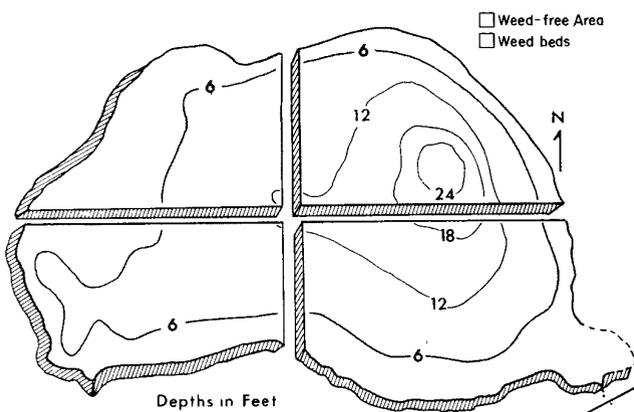


FIGURE 1. Different treatment strategies become apparent when 165-acre Potter's Lake, in Walworth County, is divided into 4 treatment areas.

Swimming and boating zones are separated to avoid accidents. Quiet areas are reserved for waterfowl use. Motor boating is restricted to certain hours or days near such areas. Lakes with multiple-use can appear on paper as a quilt work of user zones. Other lakes are suited for only a few activities or specialized for a single function, such as hunting.

A management strategy is tailored to each type of zone. Priority zones are treated first. Intensive plant management is practiced in swimming or boating zones, leaving more vegetated areas as fish and waterfowl habitat. Angling zones are channelized by harvesting or bottom screening to create access lanes for cruising fishes and anglers in boats (Figs. 2, 3). Shoreline cover of cattails and bulrushes is planted for waterfowl and situated near selected underwater plants having high food value. Some zones are left unmanaged, until they are needed or funds become available.

A plan to restructure weedy areas of lakes can avoid needless treatments in little used areas. The approach encourages novel techniques. For example, cedar trees planted on high southern banks may cast enough afternoon shade to suppress underwater plants

along shore. Spot dredging and selective rip-rapping with boulders can provide more permanent plant-free strips along or perpendicular to shore. Removing surface foliage of a noxious plant can stimulate growth of a more desirable underwater plant (Fig. 4).

Areas of noxious plants, with low food or cover value to fishes and waterfowl, can also be physically replaced with more desirable crops. Fragmenting a wall of

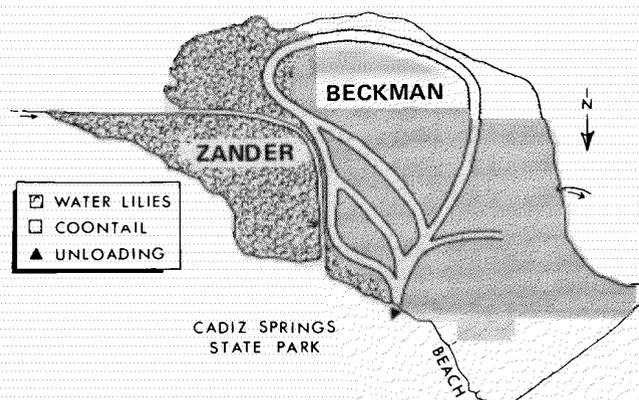


FIGURE 2. In 1985, a harvester cut 10-foot wide boating lanes in 75-acre Beckman Lake in Green County, but the unrooted coontail drifted in. A lake-use plan helped identify the problem and suggested improvements (50-75 foot lanes).

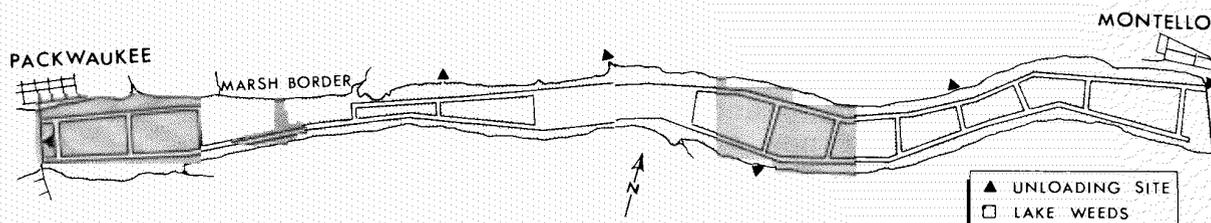


FIGURE 3. Harvesting by the U. S. Army Corps of Engineers opened 2,500-acre Buffalo Lake to boating, despite removing only 2% of the vegetation. The above plan shows a modification to include a central plant-free zone for water skiing and a marsh-bordered area for waterfowl.

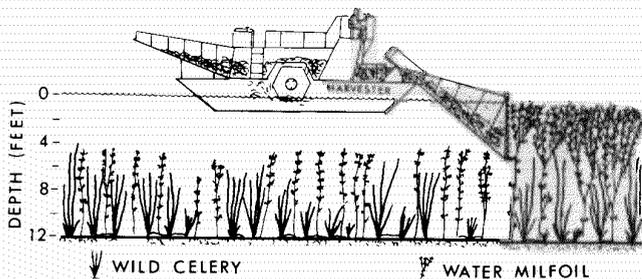


FIGURE 4. More sunlight can reach the lake bed when the dense canopy of water milfoil is selectively harvested. This can stimulate growth of underlying wild celery, a delectable plant to various ducks.

vegetation can permit anglers and game fishes freer access to inshore habitat.

Many broad-leaved pondweeds (*Potamogeton* spp.) have edible leaves and fruits attractive to ducks and coots. Propagating mainly vegetatively, these plants can be transplanted as fragments, weighted with six-penny nails attached by rubber bands. Such underwater gardening can create attractive settings for diverse aquatic life.

A view of lakes as aquascapes, and weed beds as potential assets, can provide a balanced approach to lake rehabilitation. Restructuring littoral zones can enhance lake recreation, without sacrificing biotic diversity. Here is an architectural approach to rehabilitating lakes that is limited mainly by our imaginations.

### Suggested Readings

Engel, S. 1984. Restructuring littoral zones: a different approach to an old problem. pp. 363-66 in North Am. Lake Manage. Soc., ed. Lake and reservoir management. U.S. Environ. Prot. Agency Rep. 440/5-84-001.

Engel, S. 1985. Aquatic community interactions of submerged macrophytes. Wis. Dep. Nat. Resour. Tech. Bull. 156. 79 pp.

Threinen, C. W. 1964. An analysis of space demands for water and shore. North Am. Wildl. Nat. Resour. Conf. 29:353-72.

---

Written by Sandy Engel, Water Resources Research Section, Bureau of Research. Trained in limnology and fish ecology, Sandy is known for his studies on the community ecology and management of underwater plant beds. He can be contacted at Wisconsin Department of Natural Resources, 3911 Fish Hatchery Road, Madison, Wisconsin 53711 (608/275-3219).

---

Edited by Betty Les

---

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

B  
L  
K  
R  
T

U S POSTAGE PAID MADISON, WI PERMIT 906
--