

Comprehensive study looks at pier impacts on fish and aquatic life

Pier shading linked to reduced fish, plant, insect numbers

CAMBRIDGE- Fish may seek shelter under piers if nothing else is available, but they're most likely found along vegetated shorelines unbroken by piers or few piers where they'll find the diverse aquatic plants they need for spawning, feeding and other needs, according to a recently completed research on two lakes in Jefferson County in south central Wisconsin. The study will be presented April 29 at the Wisconsin Lakes Convention in Green Bay.

"You hear from some anglers that they find larger bass under piers, so there's the perception the piers must provide some sort of exceptional habitat value," says Paul Dearlove, one of the researchers and manager of the Lake Ripley Management District's priority watershed project.

"Our findings show that while piers may provide some refuge from the sun, they actually detract from the natural habitat fish prefer for spawning, foraging and other needs, and that the diversity and quantity of fish is greater in undisturbed areas."

Dearlove and Patricia Cicero, a resource conservationist with the Jefferson County Land and Conservation Department, teamed up with Department of Natural Resources researchers and fish managers to fill a gap in understanding how piers affect lakes' aquatic plants, fish and invertebrates such as aquatic insects, snails and scuds.

Piers are growing in size and number in Wisconsin, a trend reflected on Rock Lake and Lake Ripley. The number of piers on Rock Lake, for instance, has tripled from the 96 piers present in 1950 to 276 piers in 1996 to about 300 today, Cicero says.

New England studies have linked piers to declines in aquatic plants and shellfish habitat, and research in Minnesota linked piers and shoreline development with declining aquatic plant habitat and reduced fish growth rates.

The Wisconsin study is the most comprehensive one yet on Midwestern inland lakes to investigate how piers, by reducing light penetrating the water beneath them, affect aquatic life, according to Dave Marshall, a DNR water resources biologist and lead investigator.

The research team, which also included Laura Stremick-Thompson, the DNR fish manager for Jefferson County, and Paul Garrison, a DNR water quality researcher, used snorkeling gear and a light meter to measure light intensity underwater in unshaded areas, and in those areas beneath piers representing a variety of widths and configurations.

They sampled plants, fish and invertebrate populations under the piers, in adjacent areas with a variety of aquatic plants, and in designated "Sensitive Areas," which are identified through DNR surveys as critical to fish and wildlife and water quality, designated as such in state administrative rules, and often protected by local ordinances, Marshall says. On Lake Ripley, for instance, a Town of Oakland ordinance requires people wanting to expand or place a new pier in the "Sensitive Area" to get a DNR permit and review to ensure the pier's sited, designed and built to minimize damage.

The researchers' findings documented significant shading under piers, with average light intensity readings in open areas 10 times as great as the readings under piers. Plant growth was 20 times greater away from the piers, and insect numbers under the piers were three times lower than found on the open sites away from piers.

Where plants were present under piers, the plant community's composition shifted to one dominated by shade tolerant species, Marshall says. "Dead" areas devoid of plants were also routinely found under larger deck sections where sunlight was most limited.

Piers with the greatest numbers of juvenile fish – overwhelmingly from the fish family that includes bass, bluegill and other sunfish – were located in areas of the lakes with fewer piers and near designated Sensitive Areas.

"The most important lesson of the study is that what really matters is the sensitive areas," Cicero says. "Whether they have piers or not, it's important to protect them because that's where we found the best diversity of fish."

The problem with piers, Marshall says, is that they are not usually small, inconspicuous structures found along the shore, but are often several feet wide with lateral extensions and wide decks. The average size of the study piers on Lake Ripley was 546.4 square feet and 370.2 square feet on Rock Lake.

Add in the area of the boats docked at the pier and the boats' scouring of lake bottom materials that aquatic plants need, and multiply that by the growing number of piers, and "you've taken a great big chunk out of the lake," Marshall says.

Cicero and Dearlove say the study results are timely and will help inform education efforts as well as current lake initiatives. The Lake Ripley Management District and the Town of Oakland, for instance, are evaluating local ordinances with an eye toward better protecting the lake, and the Rock Lake Improvement Association and the Joint Rock Lake Committee have a lake planning grant from DNR to develop a long-range lake management plan.

Stremick-Thompson will use the results to help educate prospective and current property owners about vital fish habitat on lakes, and to help protect those sensitive areas.

"The study shows that there are very sensitive and critical habitats," she says. "I would hope people, if they're wanting to buy property on a lake, look with an eye toward enjoying what's there's naturally instead of, "How can I manipulate the lake to fit what I like? The lake is what it is."

The [Effects Of Pier Shading On Littoral Zone Habitat And Communities In Lakes Ripley And Rock, Jefferson County, Wisconsin](#) [PDF 171KB].

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