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ISLE, MINN. -- Huge Lake Mille Lacs -- Minnesota's most popular fishing hot-spot -- rocked gently on Friday, but beneath the surface was bedlam. There, on the lake bottom, a population explosion of tiny zebra mussels is occurring that could change the great lake forever.

"It's a solid carpet of zebra mussels," shouted Tom Jones, bobbing in the lake in his scuba gear after surfacing from a dive Friday in the gray-green waters. Jones, a large lake specialist with the Department of Natural Resources, and coworkers dived this month in Mille Lacs to document the growth of the invasive mussels, first found in the 200-square-mile lake in 2005.

What they found stunned them. Last year they counted an average of 14 zebra mussels per square foot. This year, the average is a little more than 1,000 per square foot -- 73 times more than last year -- which is seven mussels per square inch. "It's phenomenal," Jones said. "Way more than we expected." They had expected perhaps a tenfold increase from last year.

But the fingernail-size invaders from Europe, first found in the Great Lakes in 1988, have flourished in Mille Lacs. The DNR divers lay a square-foot quadrant on the lake bottom, then count the mussels inside it. It used to be easy; now they almost need calculators. In one square foot at Three Mile Reef, where an average of 45 zebra mussels per square foot were found last year, Jones counted 4,500 of the invaders. "There was no visible rock at all," he said. The population growth is so explosive, it's hard to comprehend.

"In 2005, the first year, we did 60 dives and found four zebra mussels," Jones said. Total. Three years later, they counted an average of .4 zebra mussels per square foot, but they had spread from the north side, where they likely were accidentally introduced, to the rest of the lake. The number jumped to four in 2009, then 14 per square foot in 2010. "Now there's nowhere we go that has habitat that doesn't have zebra mussels," Jones said. "The coverage is complete." And Jones said the explosion isn't over. "Their peak densities [elsewhere] are 10,000 per square foot," he said. "They might get there next year, or the year after." They will become so numerous that they will compete against each other, likely causing their numbers to fall. They could stabilize at 5,000 per square foot, Jones said. No one really knows for sure.

Impact to the lake

Minnesota is in uncharted waters. No one knows how the invaders will affect Mille Lacs and its famed walleye fishery or the other 20 infected lakes, rivers and waterways. At Mille Lacs, docks, boats, buoys, boat lifts, rocks, water pipes and even native clams and snails are becoming encrusted with zebra mussels, which latch on and don't let go. "We heard a story of a boat that had so many zebra mussels on the hull it couldn't get up on plane until they scraped them off," Jones said. "That kind of thing will be more and more common." The native mussel species likely will be wiped out, Jones said. This summer, divers found some areas where virtually every native mussel had zebra mussels attached to it. "We've never seen that before," Jones said.

Zebra mussels live three to five years, then die, and their sharp shells wash up on beaches, posing hazards to swimmers. That hasn't happened yet, Jones said, but it could happen in the next year or two. The mussels filter up to a quart of water daily and consume algae, which is food for zooplankton, essential food for small fish. Water clarity usually increases. That might be starting to happen on Mille Lacs, Jones said. He plans to survey water clarity this week. Consider this: At a density of 500 zebra mussels per square foot, the mussels would filter the entire water column above them every day, "and we'll be at two or three times that number," Jones said. "That means the water will be filtered completely every day, possibly more than once. That's why clarity would improve." The water could be clearest in areas with the highest zebra mussel density, he said.

Clearer water likely won't be beneficial to walleyes, which generally don't like sunlight. And it could make catching them tougher. The coveted fish won't disappear from the lake, Jones said. But they might head for deeper, darker waters. "It might change their distribution, so anglers might not catch them where they usually do," Jones said. That's why the DNR is documenting the zebra mussel explosion, as well as water chemistry and clarity. Clearer water also could increase vegetation growth, including the growth of Eurasian watermilfoil, another invasive found in Mille Lacs. This summer, Jones found it in a place he had never seen it before. "If we get more vegetation in the lake, that could favor species like bass," he said. "We should see bass numbers increase."

The bottom line: The long-term impact to Mille Lacs, its fisheries, anglers and the businesses that depend on them is uncertain.