

EcoMapper maps lake bottom, measures water quality

By **CAROLYN HANDROCK**
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In 2009 at an Illinois Lake Management Association conference, Wonder Lake Manager Randy Stowe saw an interesting new technology – the United States Geological Survey's new EcoMapper, a torpedo-shaped instrument that measures water quality in large bodies of water.

Stowe approached USGS officials and asked if they would be interested in mapping Wonder Lake. They agreed to use the EcoMapper to analyze the lake.

"Knowing that we were moving toward the dredging process, it seemed like a great idea," said Stowe.

"They were familiar with our area, and they thought it would be cool to come out here and do pre- and post-dredging surveys," added Master Property Owner's Association President Dick Hilton.

The EcoMapper is an AUV – autonomous underwater vehicle – designed to map water quality, currents and the depth of a lake's bottom. It can be fitted with a number of water quality sensors and is programmed with GPS coordinates. The USGS has one of only a handful of the units. Other EcoMappers are owned by the Navy and Purdue University.

The EcoMapper is based on similar units used in oceanography. These machines cost upward of \$500,000. The company YSI, Yellow Springs, Ohio, decided to make a more affordable AUV to use in lakes. The EcoMapper came out in 2008 with a base price of \$60,000, and the USGS was the first to purchase one. Its model cost about \$120,000, because it came fitted with extra features.

The USGS's EcoMapper has side-scan sonar, which creates an image of the lake bottom, and it uses an acoustic pulse to measure the bottom's topography. It can stay on the surface in more shallow water, as it did in Wonder Lake,

or it can dive up to 200 feet, useful in bigger lakes such as Lake Michigan. Water quality sensors take a reading once a second.

The USGS spent three days, Aug. 11 to 13, mapping all of Wonder Lake. The plan is to return for a second scan after the dredging is completed.

"We would like to see if the dredging had any overall effect in the water quality,"

said Ryan Jackson, a hydrologist with the USGS.

Although it will be a while before all the data has been analyzed, Jackson said Wonder Lake was very still.

"I was pretty amazed at the level and concentration of algae," he said.

Jackson also was surprised how warm the water was. The USGS had previously studied Clinton Lake in Central Illinois, which receives water runoff from the Clinton Nuclear Generating Station. At Clinton Lake, the USGS studied thermal pollution. The USGS staff was surprised to find water temperatures in Wonder Lake were higher than in Clinton Lake. According to Jackson, Wonder Lake's warm water is at least partly due to its shallowness.

The USGS also examined lake currents, particularly at the entrance points of Nippersink Creek and two other small streams. The USGS is interested in how sediment enters the lake and whether there is a way to keep as much as possible out of the lake.

Under the current dredging plan, 1 million cubic yards of sediment will be removed. Stowe said hopefully the sale of that sediment will fund future dredging, as an additional 2 million cubic yards should be removed as well.

Now that the USGS has data, it will begin analyzing Wonder Lake. In addi-

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— Randy Stowe,
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Manager

tion to the data collected by the Eco- Mapper, the USGS will use water data collected throughout the year by Stowe and several trained volunteers as well as the McHenry County Health Department's data from testing the beaches for E. coli.

"It wasn't just us out there," said Jackson. "It took fantastic organization to bring all these people together."

"There is a lot of different testing going on during the year," said Stowe. "We are doing more intensive monitoring than most of the rest of the state."

The M.P.O.A. is currently obtaining

various permits required before actual dredging can begin. The USGS data, as well as information on sediment, will be used in the process.

"This will be of great significance to our consultants," said Hilton.

Depending on how long the actual dredging takes, the USGS will return in August 2011 to ensure data are comparable.

"The main thing we are trying to do is get a baseline," said Stowe. "We expect to be able to show scientifically the improvement in the water quality after the dredging."