Surveillance and awareness activities are under way to prevent the spread of a devastating fish disease.

Viral Hemorrhagic Septicemia

Story By Teresa L. Dudis, DVM
Photos courtesy Paul Hitchens, SIU-C

Viral Hemorrhagic Septicemia is a serious and contagious disease of fresh and saltwater fish, and is considered one of the most devastating fish diseases on a worldwide basis. It has been found in all of the Great Lakes, the Saint Lawrence River in New York and several inland lakes in New York, Michigan, Wisconsin and Ohio. This disease can cause large-scale fish kills with severe economic consequences. VHS is not known to have any negative impact on human health, either through direct contact or fish consumption.

The virus that causes this disease is known to affect 28 species of fish, including many common to Illinois, such as bluegill, smallmouth bass, channel catfish, largemouth bass, muskellunge, walleye and rainbow trout. The most frequently observed symptoms include listlessness, swimming in circles or at the surface of the water, bulging eyes, bloated abdomens, and widespread bleeding within the internal organs and throughout the body surface (e.g., eyes, skin and fins). Some VHS-positive fish may, however, show no outward symptoms of the disease.

Surveillance

Since 1981, the Department of Natural Resources has been testing salmonids within the Illinois hatchery system and Illinois salmonid brood stock in Lake Michigan for a variety of viruses, including VHS. In 2000, testing for VHS began in conjunction with surveillance for largemouth bass virus within the hatchery system, as well as

Fisheries biologists with Southern Illinois University are conducting intensive VHS surveillance activities throughout Illinois.

(Photo courtesy Greg Whitledge, SIU-C.)

As part of a study on fish movements, anglers are asked to report catch locations of fish bearing an SIU color-coded tag.

in wild fish in selected bodies of water statewide. For the past four years, DNR also has been testing for VHS in every known susceptible species within the Illinois hatchery system. To date, all results have been negative for VHS.

In October of 2008, the Southern Illinois University Carbondale Fisheries and Aquaculture Center began conducting intensive VHS surveillance in wild fish throughout Illinois under a cooperative agreement with the USDA Animal and Plant Health Inspection Service Veterinary Services. Since then, 12,500 susceptible fish from watersheds throughout Illinois have been sampled. In addition to the statewide surveillance program, nearly 6,000 fish also have been tested as part of a targeted surveillance for VHS in wild fish in the Chicago metropolitan area, for a total of more than 18,000 fish tested over the past three years.

Additionally, SIU performs VHS testing for commercial aquaculturists and reports all surveillance data to both DNR and the USDA Veterinary Services. VHS has been detected in a few fish samples collected from Winthrop and Waukegan harbors along the Illinois shoreline of Lake Michigan, a known VHS-positive body of water. However, all fish samples collected to date from other Lake Michigan harbors in the Chicago area, and from all fish collected from Illinois lakes, rivers and canals outside of Lake Michigan, have tested negative for VHS.

Since Illinois is a potential corridor between the Great Lakes and the Mississippi River basin (via the waterways in the Chicago metropolitan area), information on fish movement from Lake Michigan into the Chicago waterways is critical to assessing the risk of VHS spreading into inland waters from Lake Michigan. To aid in evaluating that risk, SIU has undertaken a study funded by USDA to determine rates of natural movement by VHS-susceptible fish species from Lake Michigan into the Chicago waterway system. This information is being obtained using two approaches.

In the first approach, larger fish collected along the Illinois shoreline of Lake Michigan are marked with color-coded, printed tags bearing an individual identification number, and then released. Subsequent sampling in the spring of 2011 will monitor the location of tagged fish. Anglers who capture tagged fish are asked to contact SIU via the phone number displayed on the tags (see photo) to report the location where the fish was caught.

The second approach to assessing movement of VHS-susceptible fish involves analysis of natural chemical "fingerprints" in fish otoliths (earstones) that record information about the environments in which an individual fish has lived. This technique is being used for fish that are too small to carry an artificial tag. Using this technique, it is possible to determine whether a fish collected in the inland rivers and waterways in the Chicago area is a lifetime resident of those rivers and waterways, or is an immigrant from Lake Michigan.

Awareness

DNR, the USDA and SIU are engaged in a number of efforts to increase awareness of VHS, and compliance with prevention measures to control the spread

VHS awareness activities include installation of informational signs at high-traffic boat launches in Illinois.

of this disease and aquatic invasive species. These activities include:

- Developing a model biosecurity plan for Illinois aquafarms (see the Aquaculture Biosecurity Manual at http://fishdata.siu.edu/secure/bioman.pdf);
- Coordinating a biosecurity workshop for aquaculturists;
- Distributing 20,000 synthetic chamois-style towels imprinted with prevention strategies, hotline numbers and Web sites to recreational boaters and commercial fishermen throughout Illinois;
- Installing 200 informational signs at high-traffic boat launches in Illinois.

The goal of the first two strategies is to reduce VHS-related risk to wild fish populations and the economic viability of Illinois aquaculture. The goal of the latter two strategies is to remind boaters and fishers of what is at risk and what they can do to protect aquatic resources while they are on the water.

Additionally, SIU is gathering data on the relative risk of VHS-transfer posed by individuals involved in recreational activities in Illinois waters. SIU surveyed recreational boaters and fishers throughout Illinois to determine their current understanding and awareness of controlling and containing VHS and aquatic, invasive species. These studies have provided important information about typical boating practices; how, where, why and to what extent recreationists use their boats; and their past and future engagement in conservation behaviors.

The study found that boating practices in Illinois may be contributing to the spread of aquatic invasive species and fish diseases in the region. While, on average, respondents reported almost always draining water from their boats and bait buckets, they only sometimes engaged in other seemingly "low effort" practices, such as removing aquatic plants and animals from boats or conducting visual inspections of their boats. Higher-effort activities, such as rinsing boats with high pressure water or flushing motor cooling systems, were the least-practiced actions.

A critical finding of these studies is that boaters lack knowledge about aquatic, invasive species and fish diseases and are unfamiliar with the threat they pose to ecosystems, recreation and economies. However, it also was noted that, given the knowledge that the waters they boat on are infested with aquatic invasive species and diseases such as VHS, the likelihood that respondents will engage in these preventative practices in the future increases dramatically. These results are encouraging, and indicate that the cooperative education and outreach efforts are having a positive impact on the public and their willingness to protect Illinois aquatic resources from VHS and aquatic invasive species.

All fish collected from Illinois waters to date have tested negative for VHS.

How the Disease is Spread

The most likely means of spreading aquatic invasive species and pathogens such as VHS from Lake Michigan into other water bodies in Illinois is through:

- **Moving infected fish from one body of water to another**—e.g., live game fish caught in an infected body of water or live baitfish caught or used in an infected body of water and transported to another location.
- **Moving infected water from one body of water to another**—e.g., discharging infected water and fish from ships, live wells on fishing boats, and bilge water from recreational and fishing boats.
- **Stocking or releasing infected fish or water from infected fish hatcheries.**
- **The natural movement of infected fish from one body of water to another,** such as that which occurs through flooding or normal fish movement.

Do Your Part

The public can assist by reporting information about a fish kill to the DNR Aquaculture and Aquatic Nuisance Species Program at (217) 785-8772. If you observe a fish kill, record the body of water, species of fish and the number of dead or dying fish. **Do not collect samples of dead or dying fish.**

See Administrative Rule 875 at www.dnr.state.il.us/legal/adopted/875.pdf for more information regarding VHS regulation.

More information on VHS may be found at www.focusonfishhealth.org and www.protectyourwaters.net.

Prevention

Recreational boaters and fishermen can help avoid the spread of VHS and aquatic invasive species by following these guidelines:

- **Do not move fish or plants between bodies of water.** Dispose of unwanted baitfish and fish parts in the trash.
- **Do not move any water between bodies of water.** Drain water from boat, motor, bilge, live wells and bait containers before leaving the water access.
- **Spray, dry boat trailer and recreational equipment—especially after leaving known VHS-infected waters.** Power wash boat hulls and gear with hot water (preferably 140 degrees Fahrenheit) or rinse and then dry the boat and gear completely for 12 hours.
- **Do not introduce fish of unknown health status into populations of farmed fish.**

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