



U.S. Fish & Wildlife Service



La Crosse Fish Health Center



Fish Health Newsletter

WINTER 2008

VHS Found in Ohio

The Ohio Department of Natural Resources has confirmed that viral hemorrhagic septicemia virus (VHSv) was present in Clear Fork Reservoir muskellunge sampled during a routine egg collection in late April. The virus was found in the ovarian fluid samples collected from the muskellunge, but has not resulted in a fish kill.

The virus was initially isolated at the La Crosse Fish Health Center and then sent to the USDA National Veterinary Services Laboratory (Animal Plant Health Inspection Service) in Ames Iowa, for confirmation of the results. These results mark the first isolation of VHSv outside the Great Lakes basin.



Citizens are encouraged to report sick fish or fish kills by calling the LFHC at 1 (608) 783-8444.

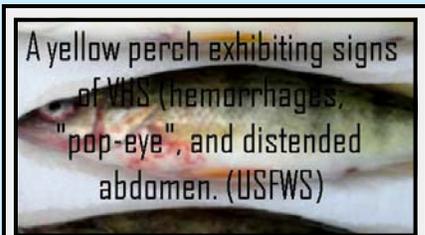
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Ken Phillips of the La Crosse Fish Health Center samples Lake Erie walleye with Ohio Division of Wildlife personnel. (USFWS)

Fisheries officials believe VHSv has been a factor in recent fish kills of several species of fish in the Great Lakes that correspond with the end of spring spawning.

"One likely possibility is that VHS will act like many other viruses in the environment. Typically, viruses or bacteria infect fish, which may lead to disease in the fish if they are susceptible. Once the disease is expressed in these fish, some percentage of the population will die," said Ray Petering, chief of the DNR Fisheries Division.



A yellow perch exhibiting signs of VHS (hemorrhages, "pop-eye", and distended abdomen). (USFWS)

VHSv was first isolated as a virus in 1963, and is presumed responsible for European fish kills as far back as 1938. In 1988, the virus was first detected in marine fishes in the Pacific Northwest. VHSv is a pathogen of international concern and is reportable to the World Organization for Animal Health (OIE).

"Those remaining will survive and will develop immunity to the viruses or bacteria that cause a disease. Since there are no large-scale treatments for VHS that can be applied to fish in the wild, the presence of this new virus may result in spring fish mortalities that are



VHS Cont.

abnormally high for a few years as more fish encounter the virus. These mortalities may abate as fish begin to build immunity to the virus." Anglers and boaters can help prevent the spread of VHS and other viruses or bacteria that cause disease in fish by not transferring fish between water bodies, and thoroughly cleaning boats, trailers, nets, and other equipment when traveling between different lakes and streams. The use of a contact disinfectant such as a solution of 200 ppm chlorine bleach (5.1 ounces per 10 gallons of water) to clean vessels and live wells is very effective against VHS and other viruses and bacteria that cause disease in fish. Soaking exposed items such as live wells, nets, anchors, and bait buckets in a light disinfectant of 20 ppm chlorine

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Largemouth bass, one of 28 species susceptible to the VHS virus. (USFWS)

During the Summer and Fall Seasons The LFHC Provided Laboratory Testing Services To:



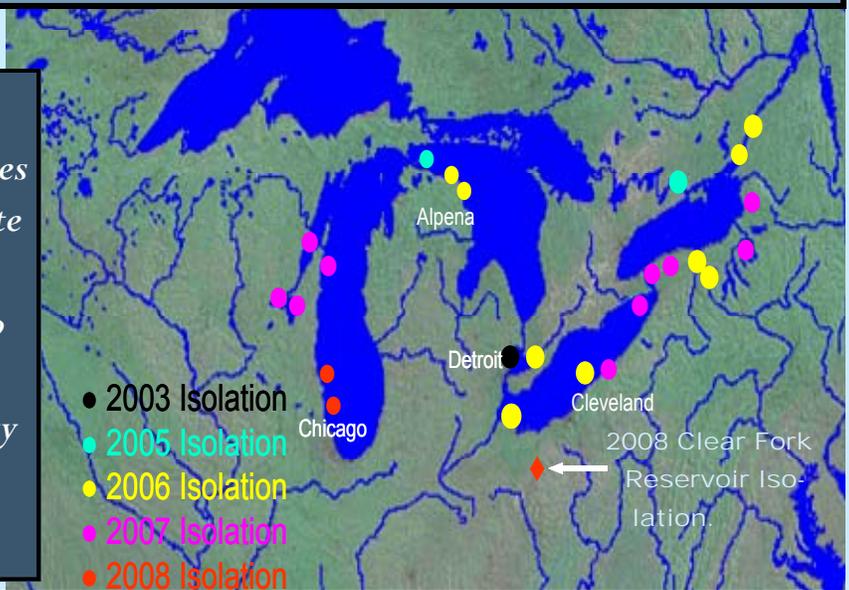
Keweenaw Bay Tribal Fish Hatchery (MI), La Courte Orielles Tribal Fish Hatchery (WI), Lac Du Flambeau Tribal Fish Hatchery (WI), the University of Wisconsin Stevens Point, the Illinois Natural History Survey, the Columbia National Fish and Wildlife Conservation Office (MO), Case Western Reserve University (OH), Hammond Bay Research Center (MI), Genoa National Fish Hatchery, (WI) the Great Lakes Indian Fish and Wildlife Commission, the Upper Mississippi Environmental Sciences Center (WI), the Ohio Department of Natural Resources, the Illinois Department of Natural Resources, the Wisconsin Department of Natural Resources, Senecaville State Fish Hatchery (OH), Hebron State Fish Hatchery (OH), Kincaid State Fish Hatchery (OH), London State Fish Hatchery (OH), Castalia State Fish Hatchery (OH), Ohio State University, Ohio Division of Wildlife Resources, the Illinois Ship and Sanitary Canal, Jordan River National Fish Hatchery (MI), Jake Wolf Memorial State Fish Hatchery (IL), Little Grassy State Fish Hatchery (IL), Governor T. Thompson State Fish Hatchery (WI), the Minnesota Department of Natural Resources, the Iowa Department of Natural Resources, Sullivans Creek National Fish Hatchery, Pendills Creek National Fish Hatchery, Iron River National Fish Hatchery, and the United States Geological Survey. (Compiled by Julie Teskie)

The LFHC's VHS Surveillance Program

The U.S. Fish & Wildlife Service's La Crosse Fish Health Center has completed their annual testing of wild fish for Viral Hemorrhagic Septicemia (VHS) in the Great Lakes/Big River's region. Genotype IVb of VHS is a strain specific to freshwater fish and was first detected in the Great Lakes in 2005. To date, over 28 different fish species in the Great Lakes have been affected, with large kills reported in populations of yellow perch, drum, muskies and round gobies. VHS IVb is an extremely virulent and highly infectious disease that requires constant monitoring in order to slow its spread. The Fish Health Center has relied on assistance from numerous federal (La Crosse and Columbia National Wildlife and Fish Conservation Offices) and state agencies (Wisconsin DNR, Ohio Division of Wildlife and Illinois DNR) for fish collections

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"These mortalities may abate as fish begin to build immunity to the virus."



In 2005, VHSv was first reported in the Great Lakes, but may have been responsible for fish kills since 2003. VHSv has been responsible for numerous fish kills in lakes Erie, Huron, Michigan, and Ontario. The virus has also been the cause of fish mortality in several inland lakes in the states of Michigan, New York, and Wisconsin, all within the Great Lakes Basin. As a result, APHIS issued an emergency order in 2006 restricting the interstate movement of live fish of susceptible species from the States and Provinces of the Great Lakes. Many States around the Great Lakes, including Ohio, developed their own emergency orders restricting intrastate movement to protect other watersheds within their states. For a list of susceptible species, visit APHIS's website at <http://www.aphis.usda.gov/>.



VHS Cont.

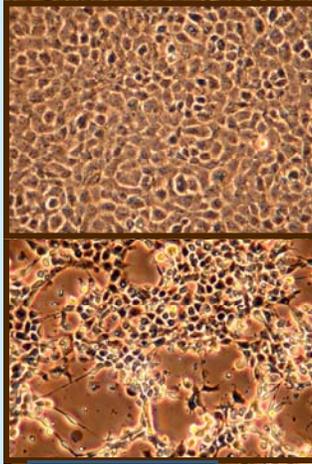
Anglers in Ohio should contact the ODNR if they observe large numbers of fish exhibiting any of the following: hemorrhaging in the skin, including large red patches particularly on the sides and on the head; multiple hemorrhages on the liver, spleen, or intestines; or hemorrhages on the swim bladder that give the otherwise transparent organ a mottled appearance.

solution (5.1 of liquid household bleach per 100 gallons of water) for 30 minutes is also an effective method to prevent the spread of a wide range of aquatic nuisance species.

Routine surveillance, disinfection of eggs used in fish production, public education, and additional VHS research will continue by the ODNR, Ohio Department of Agriculture, and the U.S. Fish & Wildlife Service in an effort to minimize the spread of VHS and protect fish hatcheries.

Ken Phillips and Becky Lasee

Top: a layer of healthy cultured fish cells as seen under microscope. **Bottom:** cells infected with VHSV showing areas of cell death. (Sarah Bauer USFWS)



Surveillance cont.

Because of these partnerships, over 17,209 fish have been tested since 2005. In 2008, over 8,000 fish were tested,

with most sampling in Ohio (2,571), Wisconsin (3,560) and Illinois (1,006). Significant findings by the La Crosse Fish Health Center in 2008 include: detection of the virus in ovarian fluids of spawning muskie from Clear Fork Reservoir in Ohio-the first isolation outside the Great Lake's basin, the first report in ovarian fluids (a nonlethal sample), and first detection of the virus in sea lamprey-a new host record for the virus.



A Sea Lamprey (USGS)

Becky Lasee

Fish Health Inspection on The Shores of Lake Gichigami



It was a cold, clear morning on September 10, 2008. I was on my way to do a fish health inspection at the Ke-weenaw Bay Tribal Fish

During the seventeenth century the French called the lake "Le Lac Superieur" or "Upper Lake," because it was located above Lake Huron. By the time the English arrived and began colonizing the region the lake was already well-known as Lake Superior, so called on account of its magnitude to any of the other lakes on the vast continent.

Hatchery near L'Anse, Michigan. For those of you who don't know where L'Anse is located, it is found in the western half of the Upper Peninsula, about an hour south of Copper Harbor.

I found myself driving north along beautiful Pequaming Bay on the shores of Lake Superior. In the Ojibwe language the lake is called Gichigami, which means "Big Water". It is also written "Gitche Gumee" as recorded by Henry Wadsworth Longfellow in his poem *The Song of Hiawatha*.



Indian communities have traditionally depended on a healthy and abundant fishery in the Great Lakes for their subsistence. Lake Superior fisheries have always been critical to the survival of the Ojibwe.

Fish (giigoonh) are still an important part of the Native American diet and they are also used in ceremonies, cultural stories, and tribal feasts. Today the impor-

Great Lakes and inland fisheries to tribes is

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Inspection Cont.

in the growth of tribal hatcheries throughout the Great Lakes region. The Keweenaw Bay Tribal Hatchery was established in 1989 and is located on ten acres of tribal land on Pequaming Bay. It is funded through the Keweenaw Bay Indian Community.



The main objective of the Keweenaw Bay hatchery is to rear native stocks of fish for stocking into the bays of Lake Superior and adjacent streams. The hatchery uses approximately 900 gallons of artesian water from two deep wells to raise over 95,000 fish annually. Eighty vertical incubation trays with the potential of 10,000 eggs per tray are used for incubating lake and brook trout eggs received from Iron River National Fish Hatchery in Iron River, Wisconsin.



The lake trout eggs are from a captive lot of brood fish collected as eggs years ago from the Traverse Island area. The brook trout are a Lake Superior strain collected as eggs from adult fish over Klondike Reef.

The hatchery also has its own captive brood stock of native brook trout collected from the Jumbo River in Baraga County. The goal is to increase brook trout production and extend stocking efforts in the western Upper Peninsula. This will be done by producing over 40,000 brook trout fingerlings each year to stock back into the Jumbo River and other streams in Baraga County which flow into Lake Superior.

The hatchery has maintained a "Class A" classification since April 2005. This classification represents a disease-free hatchery where all lots of fish have been inspected annually and have received negative inspections for at least a 2 year period.

The classification system is an important communications tool used to summarize the results of regular monitoring of hatcheries by fish health biologists.

The federal fish health inspection report contains a list of nine certifiable fish pathogens that are screened for during an inspection. If these pathogens are not detected for a period of two years, the hatchery will attain a "Class A" designation.



Kidney tissue samples are placed on a special slide for BKD screening. (USFWS)

Terry Ott



Terrence Ott began his career as a fish health biologist with the U. S. Fish & Wildlife Service, La Crosse Fish Health Center in 1989. He attended the last fish health "Long Course" program by the Service at the National Fisheries Academy in Kearneysville, West Virginia. Terry is a designated certifying official qualified to conduct inspections, perform diagnostic services, and approve shipments of salmonid eggs into the United States under Federal regulations, Title 50. He is also a certified Fish Health Official for Fisheries and Oceans, Canada. At the Center Terry has the responsibility of performing bacteriology, virology, histology, ELISA, PCR and diagnostic services to all federal, tribal and state hatcheries in Region 3. He also instructs a one week course in fish health, "Introduction to Fish Health" to Federal, State, Tribal, and private fish growers. Terry has taken courses at the National Conservation Training Center in Sheperdstown, West Virginia in Fish Genetics and Broodstock Management; Pharmacology for Fish Health Biologists; Aquatic Epidemiology and Fish Histopathology. He is recognized by the Fish Health Section of the American Fisheries Society as a fish health inspector, and has recently been appointed Assistant Project Leader at the LFHC.

The La Crosse Fish Health Center's New Website



The La Crosse Fish Health Center's website has received a much needed facelift recently. Previously, the website consisted of only one page and lacked details of the fish diagnostics done at the laboratory. There are now 67 pages which highlight the many aspects of fish health operations in Region 3.

Julie Teskie has been working on the site using Dreamweaver software in order to increase public awareness on the issues of fish health, and improve the intra-agency flow of information.

A major addition to the website is the section on fish bacterial, viral, fungal and parasitic diseases. It includes descriptions of the disease signs and pathology of significant fish diseases, as well as species affected and commonly applied treatments. Another new feature is the National Wild Fish Health Survey section that highlights the history and statistics of the survey and includes links that detail the species surveyed and the agencies involved.

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Website cont.

Other sections include pages with information on our staff, current news, and the short course. There is also a photo album and a "contact us" page. Most pages are illustrated with photos of employees engaged in fish health activities. I encourage everyone to view the new website at: <http://www.fws.gov/midwest/LaCrosseFishHealthCenter/Index.htm>.



Pathogen Spotlight

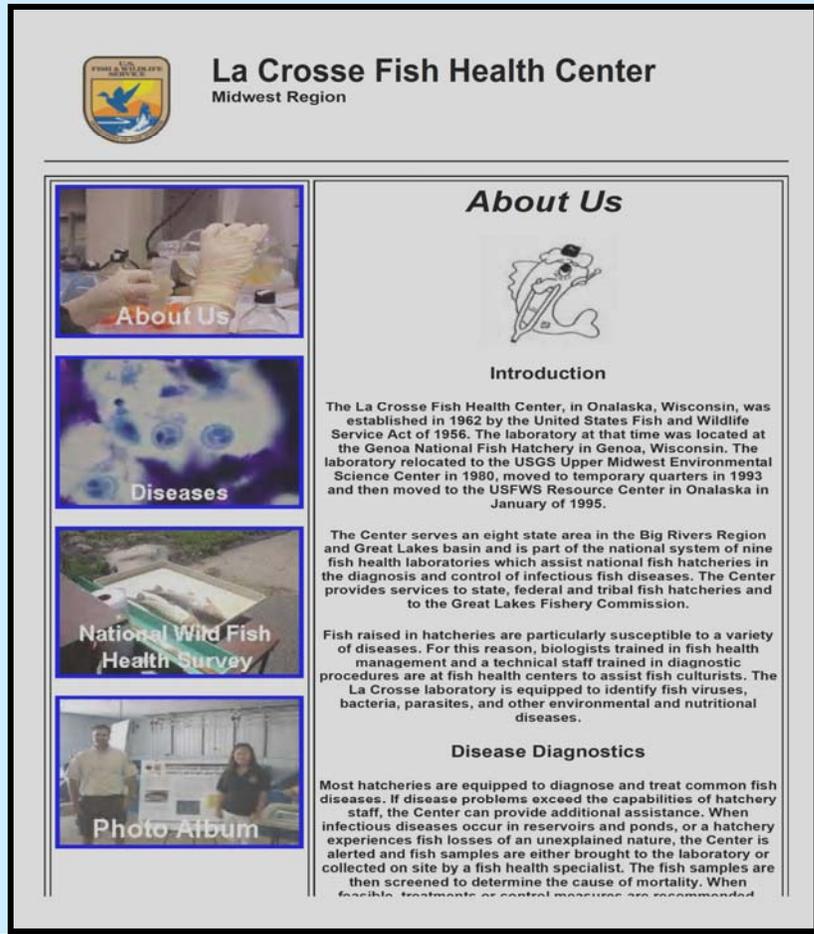
Bacterial Kidney Disease

(BKD) is also known as corynebacterial disease, salmonid kidney disease, white boil disease and Dee disease. It produces a chronic systemic infection in salmonid fish. The disease is characterized by lesions in the kidney and other organs of infected fish. Signs of the disease include swollen kidneys with white, pus-forming lesions (lesions may also appear in the liver, heart and spleen), exopthalmia ("pop-eye"),



A young Chinook salmon with a swollen abdomen due to BKD. (USFWS)

hemorrhaging in the musculature, hemorrhaging and deep abscesses on the body, and swelling of the abdomen. In severe cases, the kidneys can be immensely swollen, decaying and grayish-white in appearance. The bacterium that causes BKD is *Renibacterium salmoninarum*. BKD has been detected in both free-ranging and hatchery-raised salmonids. All species of salmonids are susceptible to BKD in varying degrees. Pacific salmon are the least resistant, whereas, rainbow trout are the most resistant. The disease can be transmitted both through the ingestion of feces from infected fish and from parental fish to their young. Currently, there are no effective treatments for BKD infections. The disease can be controlled through the use of anti-microbial compounds, but cannot be eradicated this way. Some researchers propose that all fish are carriers of *R. salmoninarum* and the disease occurs only when the conditions are favorable to the bacterium. Therefore, a stressful environment plays a role in the development of the disease.



The "About Us" page in the new website, a good source of information on the LFHC.

Julie Teskie

Spring Viremia of Carp Surveillance

The La Crosse Fish health Center has ended its seasonal surveillance program for Spring Viremia of Carp virus (SVCv). SVCv is an exotic viral disease commonly found in Europe, Asia, and the Middle East. In 2002, SVCv was discovered in the United States when it was isolated from a Koi farm in North Carolina, and found in a wild carp population in Cedar Lake, Wisconsin. Since 2002, the LFHC has also isolated the virus from the Calumet Sag Channel (2003), and Pool 8 on the Mississippi River (2007). SVCv is caused by the virus *Rhabdovirus carpio*, which is a bullet shaped RNA virus. Signs of SVCv are darkening of the skin, pop-eye, excess fluid in the body cavity and/or organs (called ascites fluid), hemorrhages in the gills, skin, and eyes, tiny hemorrhages in the swim bladder, swollen spleen, and protruding vent. The virus enters fish through the gills and is spread through the feces and mucus of infected fish. The virus is active when water temperatures range between 12 to 22 degrees C. SVCv affects fish in both the spring and fall when waters are at the optimal temperature range. Corey Puzach



Outreach Highlights

Back in April 2008, Kristen Dziubinski of the La Crosse Fish Health Center volunteered with the La Crosse Boys and Girls Club. Kristen taught youngsters about basic fish anatomy and physiology using a rainbow trout (*Oncorhynchus mykiss*), and the students also learned about the procedures used to test fish for pathogens.

In order to learn about external anatomy, the students were asked to point out the eyes, fins, gills, skin, anus and notice the slime fish secrete when stressed. The trout was then opened and students were asked questions about what they observed. Many of the students were excited and anxious to see and touch the inside of the fish using gloves. For almost all of the students, it was their first time ever holding a fish.

Kristen discussed the basic internal anatomy such as the stomach, intestine, swim bladder, spleen and kidney. Next, the students were given the opportunity to mention any other anatomy they wanted to see. The eye, brain and heart were the most mentioned and then observed. The eye was viewed under a dissecting microscope to distinguish finer details.

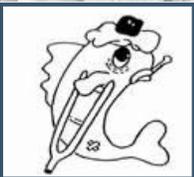
Kristen explained the procedures used to treat sick rainbow trout at the fish health center. The students were given loops and TSA slants to sample the fish. The slants were then streaked using the loops.

It was a fun time and the students at the Boys and Girls Club enjoyed learning about the anatomy and health of the Rainbow trout.

Kristen Dziubinski



The La Crosse Fish Health Center



is located in Onalaska, Wisconsin. It was established in 1962 by the United States Fish and Wildlife Service Act of 1956. The laboratory at that time was located at the Genoa National Fish Hatchery in Genoa, Wisconsin. The lab relocated to the USGS Upper Midwest Environmental Science Center in 1980, moved to temporary quarters in 1993 and then moved to the USFWS Resource Center in Onalaska in January of 1995. The Center serves an eight state area

in the Big Rivers Region and Great Lakes basin and is part of the national system of nine fish health laboratories which assist national fish hatcheries in the diagnosis and control of infectious fish diseases. The Center provides services to state, federal and tribal fish hatcheries and to the Great Lakes Fishery Commission. Fish raised in hatcheries are particularly susceptible to a variety of diseases. For this reason, biologists trained in fish health management and diagnostic procedures are at fish health centers to assist fish culturists and managers. The La Crosse laboratory is equipped to identify fish viruses, bacteria, parasites, and other environmental and nutritional diseases.

La Crosse Fish Health Center

<http://www.fws.gov/midwest/LaCrosseFishHealthCenter/>

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