Eddies

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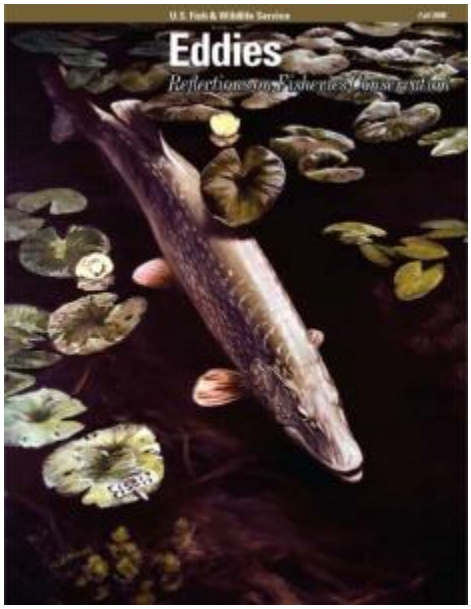

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Diagnosing Diseases

The National Wild Fish Health Survey plots the occurrence of disease.

By Ken Phillips

Set in Missoula, Montana during the 1920's and 30's the film "A River Runs Through It" brought the grace and art of fly fishing to the forefront. Well before the 1992 movie, western states like Colorado and Montana were considered the fly-fishing Mecca. Many of their streams were known to have rainbow and cutthroat trout populations that numbered in the thousands of fish per mile of stream.

By the mid-1990's, things took a downward turn. Trout populations in Montana's

Madison River plummeted. In other streams, young trout were virtually absent. Biologists traced the losses to whirling disease, a deadly fish disease caused by a microscopic parasite called only by its scientific name, *Myxobolus cerebralis*. Spores of the parasite target cartilage in the head, resulting in bone and nerve damage that cause infected fish to swim in a spiral, or “whirling” pattern that greatly reduces their ability to swim away from predators, or to capture prey of their own. Eventually, severely infected fish die.

Prior to the outbreak of whirling disease, little was known about the distribution of agents or pathogens of fish disease in the wild. While it is not possible to eliminate pathogens such as *Myxobolus cerebralis* from the wild, knowing where they exist is a valuable tool to limit the spread of deadly disease pathogens. Fishery biologists could use the information when making decisions on moving wild fish stocks, collection of fish tissues from wild fish, or stocking fish.

To address the need to gather this information, the U.S. Fish and Wildlife Service developed the National Wild Fish Health Survey (NWFHS), and naturally nested it in our nine Fish Health Centers across the nation. The Centers already performed fish health inspections at National Fish Hatcheries, giving it a national scope with internationally recognized expertise. The NWFHS launched in 1997.

The Fish Health Centers use standardized protocols to determine the distribution of 11 different viral, bacteriological, and parasitic pathogens on a national scale. They also look for additional pathogens of local importance, like infectious salmon anemia in the Northeast, or salmonid ceratmyxosis in the Pacific Northwest.

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

The Fish Health Centers partner with other federal, state, tribal and non-governmental organization biologists to determine areas to be sampled. Often the Fish Health Centers “piggy-back” sampling efforts with partners to make efficient use of time and money. Results from NWFHS have been used by biologists at all levels to make fishery management decisions.
What Robert Redford’s movie did for fly fishing, Steve McQueen’s B-movie “The Blob” might come close to portraying Viral Hemorrhagic Septicemia (VHS) in the Great Lakes. VHS does to fish flesh what Ebola viruses do to the human body. VHS causes internal hemorrhaging and fish bleed to death.

In the spring of 2005, a significant kill of freshwater drum occurred in Lake Ontario’s Bay of Quinte in Ontario, Canada. The Ontario Ministry of Natural Resources identified the cause as VHS, considered by many disease pathologists as the most feared fish pathogen in the world. This was the first report of VHS in the Great Lakes region. Later in 2005, VHS was found in muskellunge in Lake St. Clair, Michigan. First reported as a disease of European rainbow trout in 1938, it was not until 1963 that VHS was determined as the responsible pathogen.

The NWFHS has been an important tool in responding to emerging aquatic conservation issues such as the outbreak of VHS in the Great Lakes. In spring 2006 fish kills occurred throughout the lower Great Lakes, including Lake St.Clair, Lake Ontario, Lake Erie, and the St. Lawrence River. Freshwater drum

and yellow perch died in Lake Erie. The La Crosse Fish Health Center in Wisconsin, where I work, teamed with the Ohio Division of Wildlife and sampled numerous fish species from Lake Erie to determine the distribution of VHS.

In 2007, we expanded NWFHS efforts in the Midwest, and worked with state and tribal partners looking for agents of disease in the Ohio and Mississippi rivers, lakes Michigan and Superior, and numerous smaller inland lakes. Typically, partner agencies would collect and ship fish on ice to the La Crosse Fish Health Center, where we screened them for VHS and other pathogens.

The Ohio Division of Wildlife and La Crosse Fish Health Center isolated VHS as part of routine spawning of muskellunge from eastern Ohio's Clear Fork Reservoir in April, the first detection of VHS outside of the Great Lakes basin. We assisted the Ohio Division of Wildlife with follow-up work in the Mohican and Muskingum Rivers and found no VHS, but we did detect spring viremia of carp virus from bluegill and largemouth bass, the first detection in a non-minnow species in the U.S.
All living things can suffer from disease and fish are no exception. Diseases kill fish in hatcheries, and in the wild. With the nasty nature of VHS and debilitating whirling disease, knowing the location of your enemy is extremely valuable, and so is the NWFHS.

For more information visit www.fws.gov/wildfishsurvey.

Cornell University
Dr. Paul Bowser, professor of aquatic animal medicine at Cornell University, holds a trophy muskellunge killed by VHS.

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