VHS Surveillance Planning Under Way

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A surveillance plan for viral hemorrhagic septicemia (VHS), an infectious disease of fish, is currently being developed. VHS is emerging in severity and extent in the Great Lakes region of Canada and the United States. VHS has ranged in morbidity and mortality from minimal to extreme in different species and environments.

Perhaps best known for its impacts on farmed populations of rainbow trout in Europe, VHS virus (VHSV) only recently achieved recognized consequence in the United States in the late 1980s, with discovery of a North American strain of VHSV (VHSV IV). Initially found in returning Pacific salmon, this particular strain is now considered enzootic in certain wild fish (e.g., herring and cod) populations along the west coast. This strain was originally considered less significant compared to European strains of VHSV due to its lesser pathogenicity in salmonids, its endemic status in the marine environment, and its limited detection in freshwater (other than sporadic detections in fish moving from salt to freshwater).

Recently, however, a much more pathogenic variant of this North American strain, tentatively termed VHSV IVb, has emerged in freshwater fish of the Great Lakes region. A series of morbidity and mortality events in 2005-2006 in the lower Great Lakes (and also in a hydrologically distinct lake in New York), affected wild fish populations ranging from predator to prey. These events raised concerns over the potential risks to the food, bait and recreational fish industries across the United States and Canada (www.aphis.usda.gov/vs/ceah/cei/taf/emergingdiseasenotice_files/vhsgreatlakes.htm).

U.S. freshwater fish production is extremely diverse and interconnected. Fish farmed for food, bait, research, stock enhancement or sport in the Great Lakes region include, among others, a number of salmonid species,

muskellunge, walleye, perch, striped bass, minnows and shiners. Species currently included in the VHS-susceptible list have a similarly diverse makeup.

Freshwater fish are frequently interchanged between wild environments and farmed; wild stocks are harvested for broodfish or grow-out. Farmed fish are often distributed back to public waters for bait or stock enhancement. Federal and State fish hatcheries conduct a substantial portion of these stock enhancement activities. Fish are also moved live for human consumption to ethnic fish markets or for processing or grow-out in neighboring States and facilities. Aquaculture facilities vary by species and producer, but can range from open-water pens to ponds, tanks and raceways. Baitfish farms are among the most transient type of fish culture operation, with wild harvested fish often held on "farms" for only hours to weeks prior to distribution to bait shops or to hatcheries (for use as feeder fish) across the States.

Federal Order restricts movement

Farmed salmonids are routinely tested for a variety of pathogens, including VHSV, prior to shipment or release. However, before the detection of VHS IVb in U.S. freshwater systems, few States imposed regulations or restrictions on the movements of non-salmonid species. Consequently, though States sharing waters with the Great Lakes are probably at highest risk of ongoing exposure to VHSV IVb, all States, until recently, had the potential for VHSV introduction through interstate or international import of live fish for bait, sport or food.   In the fall of 2006, responding to the 2005-06 VHS IVb outbreaks, USDA issued a Federal Order restricting movement of all live susceptible species from the eight States bordering the lower Great Lakes (www.aphis.usda.gov/vs/aqua/pdf/vhs-fed-order_ogc-changes.pdf).

In response to growing concerns about the dissemination of VHS throughout the United States and into farmed fish, and consideration of regulatory options to mitigate those risks, Veterinary Services' National Surveillance Unit (NSU) has been asked to develop a surveillance plan for VHSV in U.S. freshwaters. The scope of this effort naturally extends beyond traditional

farm and national borders because affected fish have, to date, been found in the wild, and because the United States and Canada share many affected watersheds. Consequently, the NSU has recently entered into a multi-agency/national collaboration with fish health experts from the U.S. Fish and Wildlife Service (USFWS) and Canadian Food Inspection Agency (CFIA) to devise coordinated plans for VHSV surveillance in wild and caged freshwater fish in the United States and adjoining provinces in Canada.

These bilateral and interagency collaborations aim to achieve a cohesive surveillance system that is unified and standard throughout the known and potential ranges of the pathogen. Watersheds, rather than geopolitical boundaries, may be the most appropriate units for evaluating virus distribution. However, regulation at the watershed level could pose additional challenges.

Furthermore, because of the broad scope of this effort, minimizing costs of surveillance will be a challenge. To make best use of available data, the working group aims to juxtapose surveillance needs with the movement testing already required by Federal Order and any testing or certification required by an Interim Rule succeeding the Federal Order to minimize further spread of the disease.

The NSU will also consider extending surveillance beyond a diagnostic-test base, to include an enhanced observational framework for the early recognition of clinical signs and targeted selection of sites for VHSV investigation. Though VHSV is our current focus, the resulting infrastructure should improve monitoring and response to a variety of emerging and existing freshwater fish diseases both now and in the future. U.S. States and Canadian provinces will likely resume intensified testing for VHSV IVb as the waters begin to warm in the spring. One goal is to have guiding surveillance principles in place in time for those efforts.