

A Report on Meeting VHS Testing Needs

Required by Laws of 2008, Chapt. 297, Art. 1, Sec. 71

Minnesota Department of Natural Resources

January 5, 2009

Executive Summary

The Department of Natural Resources (DNR) formed a work group that included representatives from the Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the University of Minnesota's Veterinary Diagnostic Laboratory, and the Minnesota Veterinary Medical Association to examine current plans for detecting and responding to the presence of the fish virus Viral Hemorrhagic Septicemia (VHS) in Minnesota and to determine how the DNR and the joint laboratory facility at the Departments of Agriculture and Health might work together to provide fish collection and testing needed to diagnose and respond to VHS.

Currently, the pathology laboratory located in the DNR's central office (500 Lafayette Road, St. Paul) is meeting the DNR's VHS-testing needs and a portion of the VHS-testing needs of Minnesota's private aquaculture industry. However, the VHS Response Plan that has been developed by the DNR (see Summary in Appendix I) outlines a significant expansion in testing requirements. Expanded VHS testing is also being required by regulators outside of Minnesota before Minnesota-grown fish can be exported. These expanded demands will tax DNR's ability to meet its own testing needs much less the needs of private aquaculture.

The work group provided input on VHS testing capacity that documented that:

- 1) the facilities and expertise available at the joint MDA-MDH laboratory currently would be of limited value in meeting VHS testing needs. The current authoritative test for VHS requires the use of cell-culture methods on specific cell lines. MDA does not use cell-culture methods in their laboratory; MDH uses cell-culture techniques but does not maintain the required cell lines needed for the VHS tests. MDH would need to be provided with the cell lines and given time to adjust lab space to accommodate VHS testing. However, disease outbreaks that affect human populations would take precedence and could limit the resources the MDH laboratory could focus on VHS testing.
- 2) the laboratory facilities of MDA and MDH would have greater capacity to help meet VHS testing needs when a PCR-based testing method is developed and established as an authoritative test. PCR-based testing methods would enhance the capacity of the joint MDA and MDH laboratory to contribute, e.g., when DNR needed to respond to a surge of VHS samples.
- 3) the Veterinary Diagnostic Laboratory at the University of Minnesota has the facilities and expertise to provide additional cell-culture testing to diagnose and respond to VHS. The DNR has already taken advantage of the capabilities available at the veterinary diagnostic laboratory and contracted for VHS-testing services.

The work group identified other key needs related to VHS testing. Those were:

- 1) that the timely collection of VHS samples is an essential for providing rapid, authoritative, VHS testing;
- 2) that the limited number of professionals with the necessary collection expertise is a potential bottleneck in Minnesota's capacity to diagnose and respond to VHS. Because Minnesota has so many waters/fish populations that will need to be tested and because the timing of when tests are completed is critical (both to meet DNR's testing needs and the needs of the aquaculture industry) a number of trained fish collectors will need to be located throughout the state to efficiently and reliably meet the demand for overseeing the collection and delivery of fish to a certified lab facility as is required by federal and state laws. The number and location of current fish collectors is not sufficient to meet existing needs, let alone if VHS should be found in the state.

The work group identified two key actions to that should pursued to expand the pool of professionals with the necessary collection expertise. Those actions are:

- 1) clarify the expertise necessary for fish collectors;
- 2) identify, recruit, and train groups of qualified professionals who are located close to waters that will need to be tested.

This reports recommends:

- 1) Language to certify "fish collectors" and clarify how they differ from fish health inspectors. The proposed changes in Minn. Stat., Sec 17.4982 are intended to facilitate efforts to recruit, train, and certify professionals to collect fish for VHS testing;
- 2) Groups of professional whose training and work experience would make them good candidates to carry out the fish collector role. The DNR is continuing to work with the professional organizations involved to explore their interest in fish collector training.

Charge:

The Laws of 2008, Chapt. 297, Art. 1, Sec. 71 required that the DNR work with Minnesota departments of agriculture and health to accomplish the following:

Sec. 71. VIRAL HEMORRHAGIC SEPTICEMIA TESTING.

The commissioner of natural resources **shall form a work group with the commissioners of agriculture and health** and develop a plan for detecting and responding to the presence of the fish virus Viral Hemorrhagic Septicemia (VHS) in Minnesota. The plan must cover **how the joint laboratory facility at the Departments of Agriculture and Health may be used to provide testing needed to diagnose and respond to VHS**. No later than January 5, 2009, the commissioner of natural resources shall present the plan to the chairs of the house and senate committees with jurisdiction over agriculture, health, and natural resources policy and finance.

Compliance with Minn. Stat., Sec. 3.197

Minn. Stat., Sec. 3.197 requires that *a report to the legislature must contain, at the beginning of the report, the cost of preparing the report, including any costs incurred by another agency or another level of government*. The estimated cost of completing the Viral Hemorrhagic Septicemia Testing Report required by the Laws of 2008, Chapt. 297, Art 1, Sec 71 was \$4,500. Those costs were almost entirely the salary costs of the staff involved and include the time of participating laboratory staff from the Department of Agriculture and the Department of Health.

Background

Viral Hemorrhagic Septicemia (VHS), an infectious virus, was first identified in Europe over forty years ago after rainbow trout that were imported there died in large numbers. VHS is a virus that only affects fish, and because of its newness to North American fish populations there is great concern related to impacts to fisheries resources. There is no risk to human beings from this virus. In the last twenty years VHS has been identified in North America both in the Pacific northwest and Maritime coastal waters in salt water species. In 2005, there were several fish kills in the Lower Great Lakes that have been associated with VHS. It is now known that the virus affecting Great Lakes fish populations is a different genetic strain of VHS which apparently affects primarily cool and warm water fish species.

VHS spreads from one fish in close contact with another, much like the human flu virus spreads rapidly from one human to another. How the virus spreads from one waterbody to another is unknown. Experts have indicated the virus remains virulent when shed outside its host fish for six to fourteen days. It is likely that uninfected fish become infected when they consume fish that have been exposed to or are carriers of the virus. It is also likely that transmission of this virus occurs via urine or sexual products.

Also unknown is the long-term impact of this disease on North American stocks of fresh water fish. The best case would be that survivors of an epidemic develop a resistance to the virus and pass this resistance on to their progeny. Under this scenario predictions of impact would be short term to any fishery or fish community with the exception of an occasional outbreak of the disease when fish are under stressful conditions. This would

be a similar situation to other prevalent fish diseases such as the bacterial diseases, columnaris or bacterial kidney disease. A much worse prediction would arise if survivor VHS resistance is not passed on to progeny or if there are differences in resistance among fish species. In this case it may take many generations for fish to develop resistance or immunity to VHS. Under this scenario predictions of impact would be long term to any fishery or fish community. An annual epidemic in juvenile fish would severely impact recruitment and even subtle differences in VHS resistance among fish species could result in disruption of fish communities.

Resources at Risk in Minnesota

Minnesota is generously endowed with fish, wildlife and native plant resources, all contributing to the unique quality of life that Minnesotans enjoy. The U.S. Department of the Interior, Fish and Wildlife Service, and the U.S. Department of Commerce, U.S. Census Bureau, periodically conduct surveys to determine how many individuals use those resources for recreation and the value of those recreational activities. The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation summarizes the most recent survey effort (US FWS, 2006). The 2006 survey estimated that Minnesota's fish resources support about 1,427,000 resident and non-resident anglers, that approximately 30% of Minnesotans fish, and that the total value of fishing-related expenditures in Minnesota is about \$2.7 billion per year. Likewise, private aquaculture is a multi-million dollar business in Minnesota that involves the rearing of game and minnow species, the harvest of minnows, and the harvest of under-used fish species. In summary, the value of the state's fisheries resource is nearly immeasurable.

VHS poses a large risk to Minnesota's fishing and aquaculture industries. Many of the state's prize game fish are susceptible to VHS, including walleyes, muskellunge, northern pike, bluegills, and black crappies (the official list of species susceptible to VHS is available at http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture). Risk factors to the resource include direct mortality to VHS-susceptible fish species, the additional costs associated with VHS testing, the restriction on use of VHS-infected or potentially infected populations to reduce the risk of infesting other waters, and the uncertainty associated with the status of VHS in the state which can impact our fisheries resource and commercial business decisions.

VHS Response Plan

Given the presence of VHS in the Great Lakes, its potential to be introduced in Minnesota, and the threats it posed to Minnesota fish populations, the DNR formed a work group in 2007 to develop a response plan. That planning effort was completed in late summer of 2007 and included recommended changes to Minnesota statutes to increase the DNR's response capacity. A summary of the VHS Response Plan's principle actions is included in this report as Appendix I. The recommended changes to various MN Statutes that deal with movement of fish for aquatic farms, private fish hatcheries, and anglers were adopted by the 2008 Legislature

The plan developed by the DNR included sections that describe actions to prevent the introduction of VHS to Minnesota, to monitor waters in Minnesota determined to be at higher risk for VHS introduction, to monitor fish raised by both state and private entities

to insure they are VHS-free before they are moved/stocked, to respond rapidly when VHS is detected, and guidelines for conducting fish management and fish rearing activities if VHS becomes established in one or more locations in Minnesota.

VHS surveillance testing is a key activity described in many aspects of that plan. The plan acknowledges that VHS is likely to become established in Minnesota but places a high priority on delaying that introduction as long as possible and restricting the spread of the disease once it arrives while minimizing affects to fishing and fish-raising activities. Knowledge on the VHS status of waters and the fish populations they contain is a critical backbone of the plan. Rapid, reliable, and up-to-date information on VHS status will be essential for the plan's implementation. Key components in the plan involve testing/sampling where the outcome of sampling drives key management decisions. Excerpted sections from DNR's VHS response plan that reflect the pivotal role of VHS testing, both before the disease has become established in the State as well as after it is present, are listed below:

PRIOR TO VHS BEING CONFIRMED IN MINNEOSTA

Key Recommendations:

- Implement VHS surveillance on highest risk waters and DNR operations.

Risk Assessment of Minnesota Waters:

- Prepare a list that consists of all waters used for DNR fish production operations.

VHS Surveillance and Investigation:

- Maintain annual statistically based sampling and surveillance work on the *highest* risk waters during early spring and summer.
- Annually sample (statistically based) all wild brood stock source populations for VHS that are used in DNR operations.

Infrastructure Preparation:

- Implement the PCR test for VHS when it becomes approved and available.

DNR Fish Management Operations:

- Test non-infected waters that DNR uses as brood stock sources annually.
- Develop a surveillance plan to annually test 10-15% of rearing ponds used for rearing. After a PCR based test becomes available, develop annual surveillance plans with the goal of testing as many rearing ponds used for rearing as is logistically possible.

DNR Fish Purchase from the Private Sector:

- In 2008, all fish purchased from the private sector will require VHS testing.

Transporting and Stocking Fish:

DNR

- Annually test all waterbodies used as brood sources.
- Annually test all source waters used for fish reintroductions and kids fishing ponds.

Private Sector

- Require VHS free certification for all importation, intrastate transportation, and stocking of fish into public
- Require annual VHS free certification of all brood stock sources used by licensed aquatic farms or private fish hatcheries for upcoming fish exchanges with DNR.

Bait:

- Set up standards to “certify bait” for sale.

AFTER VHS HAS BEEN CONFIRMED IN MINNESOTA

DNR Fish Management Operations:

- Discontinue spawn-taking operations in any VHS infected waters or disinfect the eggs during water hardening according to Great Lakes Fish Health Committee (GLFHC) recommendations.
- Depopulate and disinfect any hatchery that becomes infected with VHS after a consultation with the GLFHC.
- Depopulate any natural rearing ponds that may become infected with VHS.

DNR Transporting and Stocking Fish:

- Restrict movement of fish from VHS infected waters to non-VHS waters.
- Fish from VHS infected waters should be used for stocking back to VHS infested waters only if sources of non-infected fish are not available and the task force authorizes the transfer.
- Fish from VHS sources may be used for waters that are subject to frequent winterkills or kid’s fishing ponds that do not contain any connections to other water bodies.

Private Sector:

- Require VHS disease free certification for all sales, importation, stocking, and transfer between licensed.

Bait:

- Prohibit minnow harvest in VHS infected waters.
- Require testing for all minnows harvested in VHS infected zone.
- Restrict harvest of other bait species such as crayfish, frogs, salamanders, or other types of aquatic life used for bait purposes within declared VHS infected zone.

Tournaments:

- Restrict movement of water from VHS infested waters without a permit.
- All watercraft should be disinfected upon leaving the VHS infected waterbody.

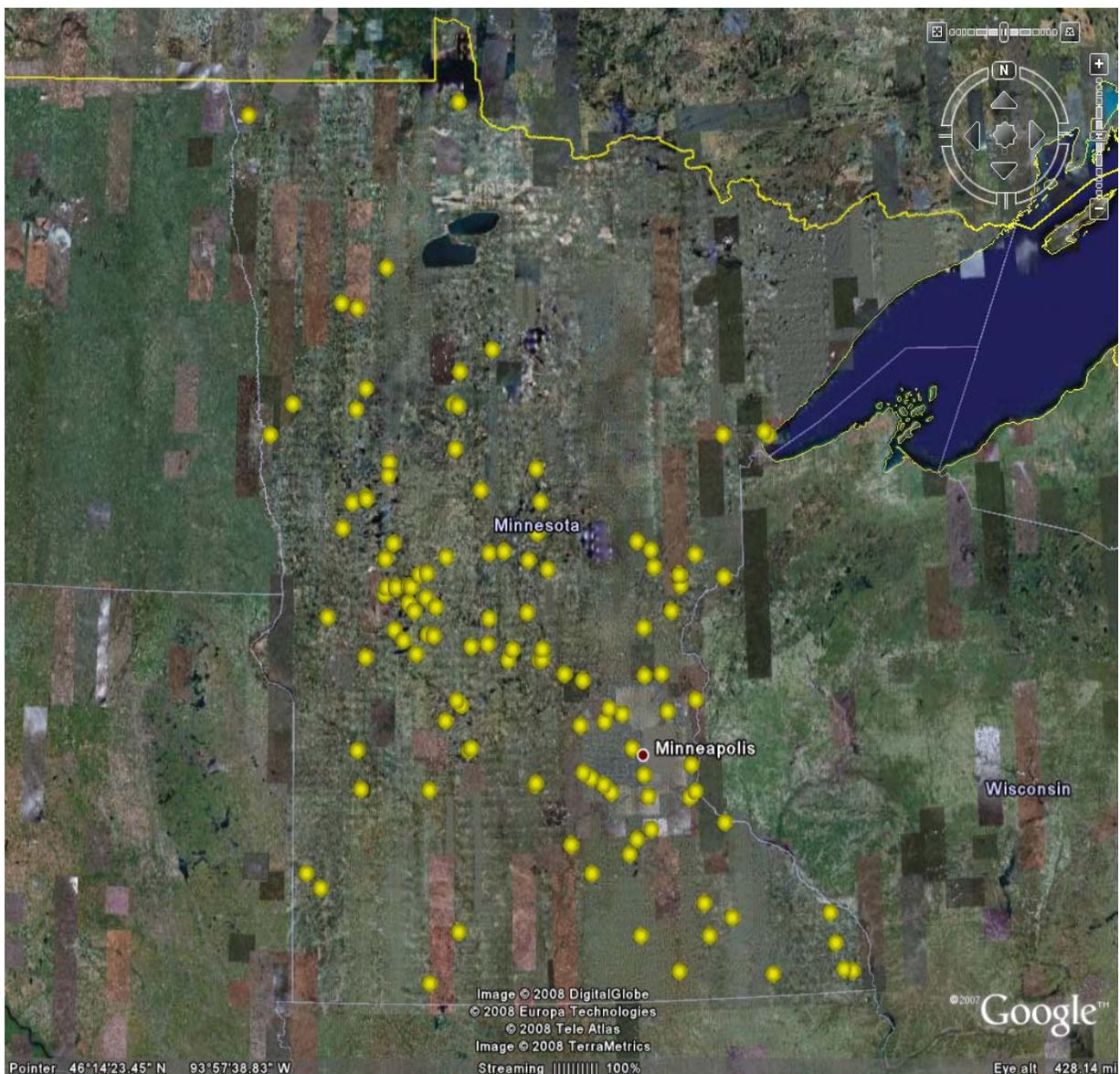
Other VHS Response Plans

Although not directly referenced in the plan for detecting and responding to the presence of the fish virus Viral Hemorrhagic Septicemia (VHS) in Minnesota addressed in the Laws of 2008, Chapt. 297, Art. 1, Sec. 71, VHS response plans and requirements of other states and the US Department of Agriculture – APHIS (USDA – APHIS) rules also need to be considered. Those plans, which impact the movement of VHS susceptible fish into or out of Minnesota, often contain testing requirements to establish the VHS status of live fish prior to shipment. For fish samples being exported from Minnesota, testing requirements established by other states and/or USDA - APHIS add to the testing capacity that needs to be available in Minnesota. These testing needs will put pressure on the same resources used to meet the testing needs identified in DNR’s plan to diagnose and respond to VHS.

Waters Where VHS testing will be needed

As outlined in the VHS Response Plan prepared by the DNR, the waters where VHS testing should be focused are not static but change depending on the status of the disease in Minnesota. Prior to when VHS is confirmed in Minnesota, the plan calls for focusing testing on Minnesota's highest risk recreational waters. Those high risk waters include Lake of the Woods, Upper Red Lake, Cass Lake, Leech Lake, Rainy Lake, Lake Kabetogama, Lake Vermilion, Lake Winnibigoshish, Lake Mille Lacs, Lake Pepin, Lake Superior, Lake Minnetonka, St. Louis River, and the Mississippi River. The plan also focuses testing on waters DNR is using for fish rearing purposes as well as those used by private aquaculture interests (see Figure 1 for the location of aquaculture businesses in Minnesota). If VHS is confirmed in Minnesota, the scope of VHS testing will markedly increase. At that point, there will be value in knowing the VHS status of all waters used for fishing or fish production in Minnesota. While collecting data on all waters may not be possible, the scope of the sampling will be statewide and immense.

Figure 1. Location of aquaculture businesses in Minnesota (yellow dots)



VHS Testing

Because of the risks VHS poses to fish populations and similar to other “certifiable diseases” of fish, requirements have been developed to insure that testing efforts produce results that meet the necessary standards of accuracy and reliability. The standards and procedures to meet those standards are outlined in MN Statutes, Sec. 17.4982. The portions of Subdivisions 11 – 13 that are particularly relevant to VHS testing are highlighted below:

Subd. 11.Fish Health Blue Book.

"Fish Health Blue Book" means the standardized set of procedures and guidelines established and published by the American Fisheries Society Fish Health Section for the detection and isolation of fish pathogens.

Subd. 12.Fish health inspection.

"Fish health inspection" means an on-site, statistically based sampling in accordance with processes in the Fish Health Blue Book for all lots of fish in a facility. The inspection must include at least viral testing of ovarian fluids at the 95 percent confidence level of detecting two percent incidence of disease (ovarian fluids must be sampled for certification of viral hemorrhagic septicemia and infectious hematopoietic necrosis). Bacterial diseases must be sampled at the 95 percent confidence level with a five percent incidence of disease. **The inspection must be performed by a fish health inspector in cooperation with the producer** with subsequent examination of the collected tissues and fluids for the detection of certifiable diseases.

Subd. 13.Fish health inspector.

"Fish health inspector" means an individual certified as a fish health inspector by the American Fisheries Society or state, federal, or provincial resource management agency, except that a certification may not be made by an inspector who has a conflict of interest in connection with the outcome of the certification.

In summary, what this section requires is that:

- 1) When fish are screened for diseases, a fish health inspector must be involved
- 2) When fish are analyzed, procedures and guidelines establish by the American Fisheries Society (AFS) must be followed
- 3) Specific organizations have the capacity to certify fish health inspectors.

The American Fisheries Society (AFS) Fish Health Section publishes and periodically updates the procedures and guidelines used to verify the disease status of finfish and shellfish. Their official publication is referred to as the “Blue Book” and is now provided

electronically. This report references AFS procedures and guidelines for VHS testing published in 2007 (Blue Book 2007)

The “Blue Book” provides specific recommendations (see below) for screening samples for the presence of VHS and, when screening results are positive, confirming the presence of VHS. Those methods include the use of specific cell culture lines and PCR (polymerase chain reaction) methods. They also stipulate how many fish per lot need to be sampled to achieve acceptable levels of scientific certainty.

G. Viral Hemorrhagic Septicemia Virus (VHSV) (from the Blue Book 2007)

1. Screening Method
 - a. Cell culture on EPC, FHM or BF-2 cell lines
2. Confirmation Methods for VHSV
 - a. Polymerase Chain Reaction (PCR) Method for Confirmation of VHSV (Modified from Einer-Jensen 1995)

Other types of testing

It should be noted that all testing for VHS may not need to meet the same standards or rigor or scientific certainty. For example, if one wanted to screen many water bodies or fish populations to assess whether they remain VHS-free, the state could choose to use testing methods which are more rapid than established cell culture methods or included fewer fish. However, for the VHS Response Plan developed by the DNR and the certifiable standards outlined in MN statute, AFS-testing procedures and standards must be met.

APHIS Surveillance Testing

The DNR is currently conducting additional VHS testing using guidelines developed by the World Organization for Animal Health (OIE). The DNR received a grant in FY08 from USDA - APHIS to conduct VHS surveillance testing of Minnesota waters. A second grant was received in FY09 to continue this surveillance work and to provide aquaculture businesses funding to help meet VHS-testing requirements. In both cases, those grants required use of VHS testing procedures adopted by OIE. Those protocols require that larger groups of fish be tested (150 fish/facility vs. 60 fish/lot for the AFS method), but use the same cell culture methods. To meet the laboratory testing needs for these grants, the University of Minnesota Veterinary Diagnostic Laboratory was contracted to do some cell culture work during peak testing times

Work Group Process and Outcomes

The Laws of 2008, Chapt. 297, Art 1, Sec 71 specifically requires that the DNR shall form a work group with the commissioners of agriculture and health to determine how

the joint laboratory facility at the Departments of Agriculture and Health may be used to provide testing needed to diagnose and respond to VHS.

The DNR organized a meeting with staff assigned from the departments of agriculture and health to participate in this review (see list below). As will be discussed later in this report, individuals from other organizations with an interest in and/or expertise in VHS testing were also invited. These individuals will be referred to as the Work Group through the remainder of this report

Table 1. Participants in VHS Work Group Meeting held on November 13, 2008.

Name	Organization	Responsibility
Gary Horvath	Dept of Agriculture	Laboratory Director
Leeann Johnson	Dept of Agriculture	Biology Floor Manager
Joanne Bartkus	Dept of Health	Director Public Health Laboratory Division
Jim Collins	Univ of Minnesota Vet Diagnostic Lab	Director
Nick Phelps	Univ of Minnesota Vet Diagnostic Lab	Aquaculture Specialist
Jeff Lukken	MN Veterinarian Medical Association	Veterinarian
Ling Shen	Dept of Natural Resources	Pathology Lab Leader
Luke Skinner	Dept of Natural Resources	Supervisor Invasive Species Unit
Roy Johannes	Dept of Natural Resources	Natural Resources Consultant - Aquaculture
Linda Erickson-Eastwood	Dept of Natural Resources	Fisheries Program Manager
David Wright	Dept of Natural Resources	Ecological Resources Supervisor

The work group met at the DNR on November 13, 2008. At that meeting DNR staff reviewed their concerns about VHS, the steps the agency had taken to develop a response plan, steps that DNR had taken to implement the response plan, the requirements of the Laws of 2008, Chapt. 297, Art 1, Sec 71, and our experiences to date. Members of the work group were asked to provide feedback on the role(s) their agency or organization might be able to play, concerns they had about current activities, potential solutions for bottlenecks in the collection of fish and testing process, and opportunities they saw for better coordination and collaboration.

Meeting AFS testing requirements

A key question addressed on November 13, 2008 was whether the joint laboratory facility at the Departments of Agriculture and Health may be used to provide testing needed to diagnose and respond to VHS. Did that facility have the staff

experience to meet the specific testing protocols outlined by AFS to provide the certifiable VHS testing results that are required? Table 2 summarizes the responses received.

Table 2. Capacity of Laboratories to Meet AFS testing requirements for VHS

Testing Method	MN Department of Agriculture	MN Department of Health ¹	University of MN Vet Diagnostic Lab
Cell Culture using EPC, FHM or BF-2 cell lines	No	No	Yes
PCR	Yes	Yes	Yes

¹The Minnesota Department of Health has the capacity and expertise to run the necessary cell culture tests. However, the specific cell lines used for VHS testing are not the cell lines maintained by that organization to meet their human health responsibilities. Cell lines to culture VHS could be provided to the laboratory in an emergency, but human health issues would still take precedence.

The feedback the DNR received at the work group meeting was that the joint laboratory facility of the departments of Agriculture and Health was not positioned to help with VHS testing needs as long as cell culture using the EPC, FHM or BF-2 cell lines are the required methodology. If new PCR techniques are certified by APHIS, the Department of Health and Agriculture have facilities and expertise that could help meet periods of high demand. The MDH laboratory currently conducts a limited number of PCR tests for VHS as a control for one of their other assays.

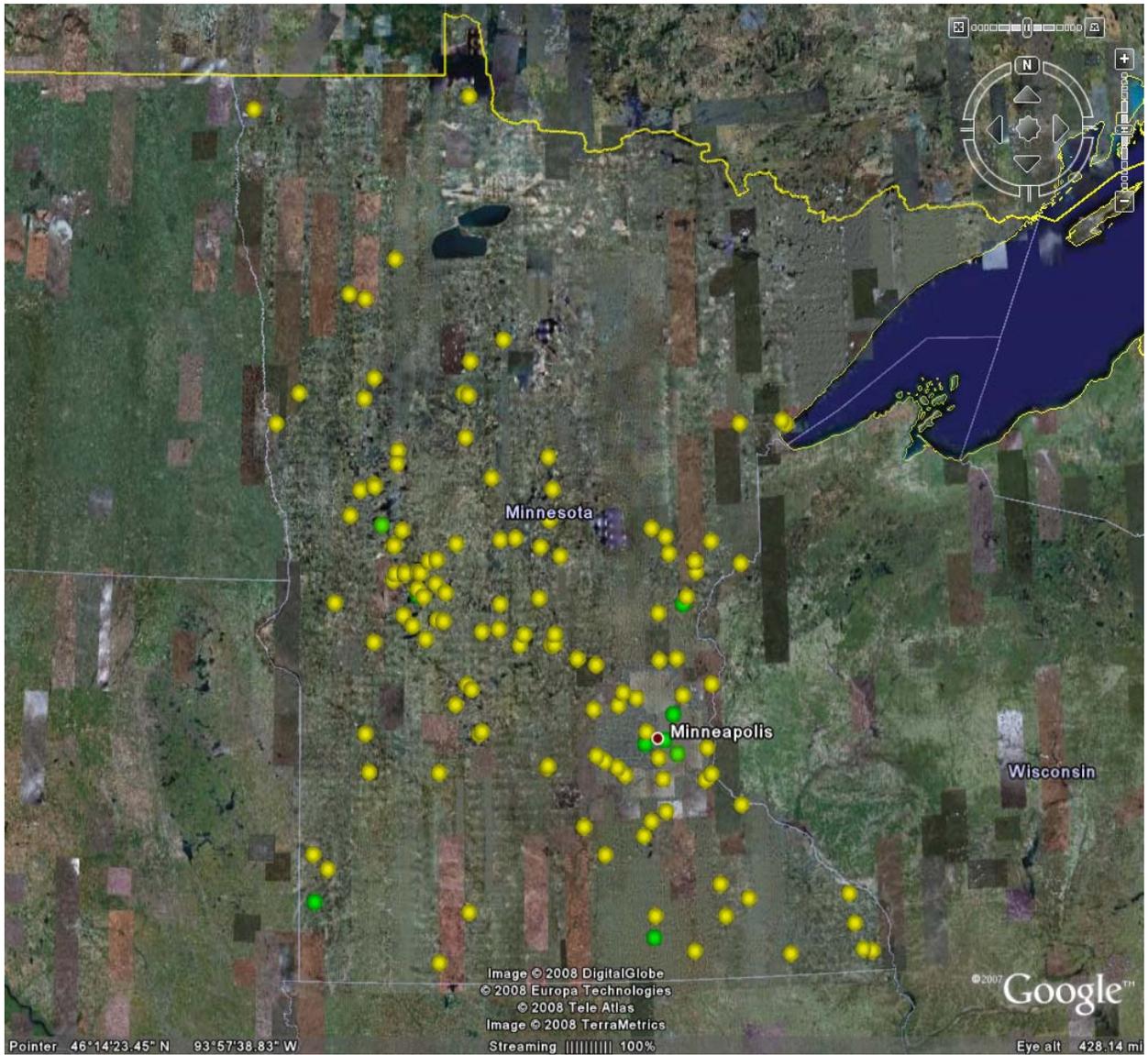
The University of Minnesota’s veterinary diagnostic laboratory already has the capacity to meet the AFS testing requirements. The DNR has recognized that capacity and has developed a contractual agreement with the University of Minnesota that allows the DNR to send fish samples to the veterinary diagnostic laboratory for analysis. As part of this agreement, a portion of the VHS surveillance samples that were analyzed as part of the FY08 APHIS grant were sent to the University. The DNR’s pathology laboratory handled the remainder of the samples.

Certifying sufficient fish health inspectors and fish collectors to meet anticipated demand

A key topic of discussion at the work group meeting as well as at other related meetings the DNR is participating in (e.g., the Minnesota Veterinarian Medical Association Task Force on Aquatic Livestock Commerce) is not how will the VHS samples be tested but who will collect the samples for testing and who can do “fish health inspections” as defined in Minn. Stat., Sec. 17.4982. This statute specifies that certified fish health inspectors must be used to do the inspections (Subd. 12) and that certification may be obtained from the American Fisheries Society or the state, federal, or provincial resource management agency (Subd. 13). The statute identifies other tasks that also must be done by a fish health inspector.

The work group discussion highlighted a critical distinction between a “fish health inspector”, who has met the certification standards of AFS and who conducts fish health inspections/testing, and the qualifications necessary to rigorously and objectively collect fish samples for VHS testing. Minnesota’s current statutes do not differentiate between these two groups/tasks. However, the comments of many work group members reflected a belief that a broader group of professionals familiar with fish and fish sampling could be used as “fish collectors”. Their role would solely be to collect fish for testing, not to conduct the testing itself. This distinction is also reflected in the current practice in Minnesota. Two of the DNR’s pathology laboratory professionals (located in St. Paul) have been certified by AFS as fish health inspectors as has Nicholas Phelps with the University of Minnesota’s veterinary diagnostic laboratory. There are also a number of veterinarians who have had training in fish assessment and sampling methods and who are collecting fish for aquaculture businesses when fish need to be tested prior to export to Wisconsin. Their offices are shown in Figure 2. as are the location of aquaculture businesses. Trained personnel are not currently well positioned around the state to efficiently meet VHS sampling needs.

Figure 2. Location of veterinarians who have received training and are conducting fish collections (green dots) in comparison to location of aquaculture businesses (yellow dots).



Based on input it received from the work group and others, it is recommended that statute be clarified to establish that the collection of fish and the inspection of fish/fish populations are two discrete tasks and to establish criteria for certifying professionals to oversee the collection of fish that will be sent to certified labs for testing, either for VHS or other certifiable diseases of fish. This change will help address the largest bottleneck in implementing current state laws and meeting the federal APHIS laws related to VHS testing.

Minn. Stat., Sec. 17.4982 Definitions

Subd. 12. Fish health inspection. "Fish health inspection" means an on-site, statistically based sampling-collection and testing of fish in accordance with processes in the Fish Health Blue Book for all lots of fish in a facility. The inspection must include at least viral testing of ovarian fluids at the 95 percent confidence level of detecting two percent incidence of disease (ovarian fluids must be sampled for certification of viral hemorrhagic septicemia and infectious hematopoietic necrosis). Bacterial diseases must be sampled at the 95 percent confidence level with a five percent incidence of disease. The collection portion of the inspection must may be performed by a fish collector or fish health inspector in cooperation with the producer. The with subsequent examination of the collected tissues and fluids for the detection of certifiable diseases must be conducted under the direction of a fish health inspector.

Subdivision 23. Fish collector. "Fish collector" means an individual who has successfully completed a Department of Natural Resources' approved class and practicum to oversee the collection of fish from either a facility or waterbody that will be sent to a certified lab for disease testing and provided documentation of that fact to the department. A fish collector may not oversee the collection of fish from a facility or waterbody that they have an interest in or are associated with.

Minn. Stat., Sec. 17.????

A fish collector class can be offered by any organization or agency that has had its class and practicum syllabus approved by the Department of Natural Resources. The class and practicum shall include the following components:

1. Identification of isolated water bodies
2. Ability to identify fish internal parts
3. Fish dissection and sample preparation as needed for testing
4. Reporting data
5. Proper preparation for shipping.
6. A field collection site test to demonstrate mastery of the necessary skills overseen by a certified fish health inspector.

Fish collectors will be required to submit collection data on forms as approved by the Department of Natural Resources at the conclusion of each field visit.

Groups that could be targeted for Fish Collector training

The work group provided a number of ideas re: groups that had the educational and/or experience necessary to be good candidates for fish collector training:

- A) Private veterinarians
- B) Board of Animal Health district veterinarians
- C) Students with fisheries/fish health training
- D) Retired DNR personnel

Private Veterinarians - a number of veterinarians in Minnesota have received training in fish collection and fish assessment methods and are working with the aquaculture industry. The training veterinarians obtained has been from the Wisconsin College of Veterinary Medicine or the University of Minnesota. Veterinarians who have had training in fish assessment and sampling methods and who are working with aquaculture interests are shown as green dots in Figure 2 (see page 13); aquaculture interests are shown as yellow dots. The number and location of trained veterinarians is not currently sufficient to efficiently meet VHS sampling needs but it is a model that should receive further consideration.

Board of Animal Health (BAH) district veterinarians – are located throughout Minnesota (see http://www.bah.state.mn.us/bah/board/district_vet_map.pdf for a map that shows the location of their thirteen districts). To date, BAH has not been involved in aquaculture issues. Discussions are underway under the auspices of the Minnesota Veterinary Medical Association’s Task Force on Aquatic Livestock Commerce to explore this and other options. Bill Hartman (BAH), the DNR, the University Minnesota’s Veterinary Diagnostic Laboratory, and MDA are part of that Task Force. Given the number of waters that will need to be sampled and the size of the area covered by each district veterinarian, this option is unlikely by itself to be sufficient.

Students in the fisheries field - Joanne Bartkus (MDH’s representative on the work group) provided information about how the Department of Health uses graduate students in the health field to collect information in times of disease outbreaks. While the flexibility and ability to rapidly mobilize students are valuable attributes when responding to new disease outbreaks, the work group’s initial assessment was that they do not provide the guaranteed consistent service necessary to meet Minnesota’s VHS testing needs.

Retired DNR employees – While the expertise and knowledge of local resources and business interests of retired DNR employees are valuable attributes, the initial assessment of the work group was that they do not provide the guaranteed consistent service necessary to meet Minnesota’s VHS testing needs.

References:

Minnesota Department of Natural Resources. 2007. Recommended Actions for Controlling the Spread of VHS in Minnesota

USFWS and AFS-FHS (U.S. Fish and Wildlife Service and American Fisheries Society-Fish Health Section). 2007. Standard procedures for aquatic animal health inspections. *In* AFS-FHS. FHS blue book: suggested procedures for the detection and identification of certain finfish and shellfish pathogens. AFS-FHS, Bethesda, Maryland.

US FWS (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau). 2006. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Appendix I. DNR's VHS Response Plan Summary (DNR 2007)

Summary of Actions Recommended to Control the Spread of VHS in MN

(Pre-VHS)

Key Recommendations:

- Implement VHS surveillance on highest risk waters and DNR operations.
- Establish a task force of staff to prepare a DNR infrastructure that can handle any VHS outbreak(s).
- Prepare Area VHS control plans for identified highest risk waters and operations.
- Prepare and distribute public information materials to inform and educate boaters and anglers in Minnesota.
- Decide on recommended statute changes and prepare them for 2008 legislative consideration.
-

Risk Assessment of Minnesota Waters:

- **Highest** risk waters include Lake Superior, St. Louis River estuary, Mississippi River from Coon Rapids to the Iowa border, St. Croix River below Taylor Falls, Pond 6 at the St. Paul hatchery, other tributaries of the Mississippi and lower St. Croix rivers to their first significant fish barrier, our large walleye lakes, waters with high use from anglers from other states that have VHS, Lake Minnetonka, Lac qui Parle, and Big Stone Lake.
- Area Fisheries Offices should prepare a list of 20 high-risk waters based on recreational use.
- Prepare a list that consists of all waters used for DNR fish production operations.

VHS Surveillance and Investigation:

- Maintain annual statistically based sampling and surveillance work on the **highest** risk waters during early spring and summer.
- Annually sample (statistically based) all wild brood stock source populations for VHS that are used in DNR operations.
- Each area should have one staff member trained to monitor fish kills and VHS sampling.
- Ecological Resources should provide refresher course training on fish kills by March 2008.

Task Force:

- Identify task force members that will deal with VHS.

Infrastructure Preparation:

- Order and the necessary signs, banners, post cards, and other items that are needed in the event of a VHS outbreak.

- Beginning in 2008, assign one pathology lab staff member to be on call during weekends and holidays from May 1 to July 15.
- Implement the PCR test for VHS when it becomes approved and available.
- Prepare a GIS layer for tracking VHS occurrence in Minnesota.
- Develop a DNR web page to provide information on VHS.
- Review and compare this VHS plan and the new DNR invasive species operational order. If there is strong relevance between the VHS plan and the new invasive species plan, expand the statutory definition and regulation of invasive species to include exotic pathogens.

DNR Fish Management Operations:

- Test non-infected waters that DNR uses as brood stock sources annually.
- Develop a plan for each fish hatchery to deal with VHS
- Develop a surveillance plan to annually test 10-15% of rearing ponds used for rearing. After a PCR based test becomes available, develop annual surveillance plans with the goal of testing as many rearing ponds used for rearing as is logistically possible.
- Area offices involved with pond harvest should develop biosecurity and VHS control plans for their operations.

DNR Fish Purchase from the Private Sector:

- Train one staff member at each area office on how to identify symptoms of VHS.
- Detain any loads of fish that have symptoms of VHS and cancel further loads until testing proves these fish are VHS negative.
- In 2008, all fish purchased from the private sector will require VHS testing.

Surveys, Assessments, and Other Netting Operations:

- Finalize the implementation of the “Fisheries Discipline Guidelines for Reducing the Spread of Unwanted Species and Pathogens Policy” document.
- Each area office should develop “control plans” as identified in the document.
- Equipment used to investigate fish kills should be quarantined until the cause of the fish kill is determined or until equipment has been properly disinfected.
- Each fisheries office should utilize weekly staff meeting to discuss schedules and workload demands to look at ways of reducing the risk of spreading VHS and other fish pathogens.
- All Fisheries Research projects and Study IV proposals should adopt the “Fisheries Discipline Guidelines for Reducing the Spread of Unwanted Species and Pathogens Policy” document as part of their work plans.

Transporting and Stocking Fish:

DNR

- Annually test all waterbodies used as brood sources.
- Annually test all source waters used for fish reintroductions and kids fishing ponds.
- Repeal statute that allows the transport of fish by anglers under 16 for use in home aquariums.

Private Sector

- Require VHS free certification for all importation, intrastate transportation, and stocking of fish into lic waters (statute change required). Being done.
- Require annual VHS free certification of all brood stock sources used by licensed aquatic farms or private fish hatcheries for upcoming fish exchanges with DNR.

Bait:

- Obtain authority to prohibit the movement of live minnows from waters that may become infected with VHS or other fish pathogens.
- Set up standards to “certify bait” for sale. Being done.
- Prohibit the use of minnows in the BWCA.
- Implement “road-checks” to check for the movement of live bait for both residents and nonresidents angling in Minnesota.
- Obtain authority to regulate frozen fish, preserved fish eggs, or other baits imported for use in Minnesota.
- Prohibit the use of frozen or preserved bait whose source was from waters infected with VHS.

Tournaments:

- Tournament permits should require that all participants implement methods to minimize the chance of moving invasive species and pathogens by draining livewells, discarding bait, etc, when leaving the permitted waterbodies.
- Tournament permits should require that all boats be inspected before and after the tournament.
- VHS awareness materials specifically developed for tournament users should be prepared, focusing on those who fish outside of Minnesota.
- Develop a tournament permit template that lists conditions and requirements that will deal with potential VHS outbreaks and letters that notify the tournament sponsor of potential cancellations or contingencies that may be required for tournaments if a VHS outbreak occurs.

Commercial Fisheries:

- Modifying authority to prohibit the harvest and transport of live fish from VHS infected waters.

Public Information:

- Prepare a communications blueprint that identifies needs, actions, urgency, point person, and task completion guidelines to prepare for the onset of VHS.
- Prepare a VHS fact sheet detailing the nature of VHS, how it spreads, implications of an infection, and how the public can control the spread of the virus.
- Develop outreach materials for fishing tournaments on how to deal with VHS.
- Develop a Minnesota VHS information web page.

Regulations Review:

- Seek authority to implement emergency one year fishing regulations on a case-by-case basis in the event of a VHS outbreak.
- Expand Minnesota live fish import regulations to include health testing for all species of fish and to synchronize transportation and stocking regulations with those by USDA-APHIS.
- Include exotic pathogens (including VHS) in the definition of invasive aquatic species.
- Require VHS certification for sales, stocking, and transfer of private aquatic life between licensed facilities.
- Prohibit the harvest and transport of live fish from VHS infected waters.
- Repeal statute that allows the transport of fish by anglers under 16 for home aquarium use.

(Post-VHS)

Risk Assessment of Minnesota Waters:

- VHS task force will assess any risks from all newly identified VHS infected waters and will declare an updated slate of highest risk waters.

DNR Fish Management Operations:

- Discontinue spawn-taking operations in any VHS infected waters or disinfect the eggs during water hardening according to Great Lakes Fish Health Committee (GLFHC) recommendations.
- Depopulate and disinfect any hatchery that becomes infected with VHS after a consultation with the GLFHC.
- Depopulate any natural rearing ponds that may become infected with VHS.

DNR Transporting and Stocking Fish:

- Restrict movement of fish from VHS infected waters to non-VHS waters.
- Fish from VHS infected waters should be used for stocking back to VHS infested waters only if sources of non-infected fish are not available and the task force authorizes the transfer.
- Fish from VHS sources may be used for waters that are subject to frequent winterkills or kid's fishing ponds that do not contain any connections to other water bodies.
- Any fair fish that exhibit symptoms of VHS should be destroyed.

Private Sector:

- Require VHS disease free certification for all sales, importation, stocking, and transfer between licensed.

Bait:

- Prohibit minnow harvest in VHS infected waters.

- Require testing for all minnows harvested in VHS infected zone.
- Require that all anglers possess a receipt of when and where they purchased live minnows, except on VHS infected waters.
- Increase enforcement activities to ensure compliance of bait harvest and sales.
- Restrict harvest of other bait species such as crayfish, frogs, salamanders, or other types of aquatic life used for bait purposes within declared VHS infected zone.

Tournaments:

- For live-release contests, only allow tournaments that utilize “on the water” weigh-ins that do not confine fish.
- Restrict movement of water from VHS infested waters without a permit.
- All watercraft should be disinfected upon leaving the VHS infected waterbody.
- The tournament may consider a reduced bag number and/or harvest only formats so that fish are not confined and the number of fish released is minimized.

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