

Michigan Department of Natural Resources

**Guide for Certification of Status of a Facility
and Status of Fish Health**



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**Fisheries Division
P.O. Box 30446
Lansing, MI 48909**

Guide for Certification of Status of a Facility and Status of Fish Health

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Introduction

On June 28, 2007, the Michigan Department of Natural Resources (DNR) Fisheries Order 245 (FO-245) was implemented to help address the issue of disease transmission throughout the State's waters. Titled, "Fisheries Disease Control Order", the spirit and intent of this order is to educate boaters, anglers, and bait dealers about activities they can conduct to be protective of the states aquatic resources and to enlist their help in enacting procedures to reduce the risk of disease transmission through some of the most common vectors such as baitfish or fish products used for bait. The order can be viewed at <http://www.michigan.gov/dnrfishing>.

Viral Hemorrhagic Septicemia

The disease called Viral Hemorrhagic Septicemia (VHS) is an imminent threat to Michigan's Great Lakes and inland fishery resources. This viral fish disease has caused large-scale mortalities in rainbow trout aquaculture operations in Europe and in herring populations along the Pacific Coast of North America. This virus (VHSV) has four unique genetic types; three from Europe and one from North America. The type found in the Great Lakes Basin is most similar to the VHSV strain previously isolated from the Atlantic Coast in Eastern North America.

When VHSV is found in a new wild or captive population, its presence must be reported to the Department of Agriculture (USDA), the USDA Animal and Plant Health Inspection Service (USDA-APHIS), appropriate Canadian Agencies, and the International Organization for Animal Health (OIE). It is also listed as an emergency disease by the Great Lakes Fishery Commission Great Lakes Model Fish Health Program. If this disease infects the fish in a production facility or hatchery, the facility must be de-populated and all fish destroyed under the current Great Lakes Model Fish Health Program.

As of September 2007, VHSV has been confirmed from Great Lakes waters of Lake Michigan – Green Bay, Lake Winnebago (WI), Lake Huron, Budd Lake (MI), the St. Clair River, Lake St. Clair, the Detroit River, Lake Erie, Lake Ontario, Niagara River, St. Lawrence River, and a number of inland waters in the State of New York. It is not known exactly how this virus arrived in the Great Lakes nor is it known how long the virus has been here. Ballast water discharge is considered the most probable vector given the distribution of VHS in the Great Lakes and the likely origin of the virus, which was the Maritime Provinces of Canada. The virus was likely spread to inland waters by the introduction of infected fish, either game or baitfish, by anglers, or from the discharge of infected water from live wells or bilges by anglers or boaters. The earliest confirmed report is 2003 in a Great Lakes muskellunge from Lake St. Clair, so it is likely to have been introduced here in 2002 or 2003.

In the eastern part of the Great Lakes Basin, a large-scale mortality of freshwater drum occurred in 2005 in the Bay of Quinte, Lake Ontario in Ontario. In the spring of 2006, large-scale fish mortalities were observed in Lake St. Clair (Great Lakes muskellunge and yellow perch), St. Clair River (gizzard shad), Detroit River (Great Lakes muskellunge and gizzard shad), Lake Erie (freshwater drum, white bass, and yellow perch), Lake Ontario (round goby), Conesus Lake NY (walleye), and St. Lawrence River (Great Lakes muskellunge). In the spring of 2007, large mortalities were seen in Lake Winnebago WI (freshwater drum), Budd Lake MI (black crappie and bluegills), and Lake Erie (gizzard shad).

It is possible that VHSV infections will initially result in increased natural mortality and fish kills for the stocks involved but may not result in any appreciable long-term changes in population abundance levels. Fish that have recovered from the infection are likely to serve as reservoirs to maintain the virus for future outbreaks which will have fish management implications for the use of fish from infected waters. It is also possible that fish that have recovered from an infection caused by VHS may convey some level of immunity to future year classes. Since this virus can clearly cause large-scale mortalities of valuable adult fish, and due to the wide range of potential carriers, it is critical to make every attempt to contain the

pathogen and prevent a rapid spread of the disease to all Great Lakes and inland waters. Once the virus is established in a wild fish community, it is impossible to eliminate, and control is highly unlikely.

This virus is not a human disease and therefore does not infect humans. There is no risk to human health if fish infected with the virus are consumed. It is always advisable, however, to not eat fish that are clearly sick and to appropriately cook fish prior to eating them.

The regulations in FO-245 will impact recreational anglers, wholesale and retail bait collectors and dealers, as well as the commercial fishing industry. Fisheries Division worked with representatives from these user groups to develop the Order, to minimize negative impacts to boaters, anglers, and the baitfish industry, and to provide appropriate protection for the aquatic resources of the State. Information has and will continue to be posted on the Department web site so the public has access to the latest information and regulations regarding VHS.

The information in this document is necessary to implement the certification process outlined in FO-245 and it provides the guidance to baitfish wholesalers and retailers for certification of their facilities and for certification of fish, frozen bait, or eggs held in those facilities or sold as bait. Within FO-245, there is a Prohibited Fish Species List that documents the fish species known to carry VHSv. This species list will be periodically updated as new information is obtained and the official list can be found at the website www.michigan.gov/dnrfishing.

Overview of the Certification Process

The Certification Process will be conducted through the DNR Fisheries Division. Applications that provide thorough and detailed information will help to expedite the certification process. **There is no application fee associated with this process.**

Duration of an Approved Facility Certification

Certification of facilities under Part A. Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List will remain valid as long as the physical layout and water input, output, or flow direction in the facility are not changed. Any physical changes to the layout of the facility or to water flow through the tanks or ponds will require a new certification.

Duration of an Approved Fish Health Certification

Certification of fish under Part B. Certification for Status of Fish Health are valid only for the individual groups of baitfish within a facility until untested fish are added to the lot, or until untested fish are added to the facility that are on the same water source as the tested fish.

Certification of preserved or disinfected baits under Part B. Certification for Status of Fish Health is valid for 1 year or until the preservation or disinfection process is changed.

Certification Process

The following briefly describes the entire process for Certification of facilities and fish. Detailed steps for each certification follow in later sections.

All baitfish or roe that will be offered for sale as free of VHS and that are on the Prohibited Fish Species List must be certified using the procedures specified in this document.

Individuals who desire to stock fish in public waters of the State of Michigan must fill out a “Public Waters Stocking Permit” application, available on the DNR Fisheries Division website (www.michigan.gov/dnrfishing). In addition, all fish that are to be stocked in public waters of the State of Michigan must be certified free of diseases using the procedures specified in this document.

Certification of a Facility

Step 1: Apply to the DNR to have a facility certified to hold species on the Prohibited Fish Species List using the process outlined in Part A. Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List. ***Please note that this step does not apply to:***

- an owner of an aquaculture facility regulated and permitted by the Michigan Department of Agriculture;
- an owner of a State-licensed Baitfish retail operation; or
- an owner of a State-licensed commercial fishing operation specifically for that part of the operation related to the sale for human consumption of Roe taken from fish that are listed as Prohibited Fish Species.

Step 2: The DNR will issue a letter that either grants Certification of a Facility, which allows fish species on the Prohibited Fish Species List to be held at the facility, or denies certification with an explanation for the denial.

Certification of Fish Health

Step 1: Apply to the DNR to have fish (live or frozen) and eggs (Roe) certified that are on the Prohibited Fish Species List using the process outlined in Part B. Certification for Status of Fish Health. ***Please note that this step does not apply to:***

- an owner of an aquaculture facility regulated and permitted by the Michigan Department of Agriculture;
- an owner of a State-licensed Baitfish retail operation; or
- an owner of a State-licensed commercial fishing operation specifically for that part of the operation related to the sale for human consumption of Roe taken from fish that are listed as Prohibited Fish Species.

Step 2: The DNR will issue a letter that either grants Certification of Fish Health for “lots” or groups of fish or eggs on the Prohibited Fish Species List that can then be sold as certified disease free or denies certification with an explanation for the denial.

Contact Information for the Certification Processes

Applications and questions by regular mail should be sent to:

MI DNR Fisheries Division
ATTN: Fish Disease Certification
P.O. Box 30446, Lansing, MI 48909

Applications or questions by email should be sent to:

DNR-FishDiseaseCertification@michigan.gov

Applications or questions by fax should be sent to:

(517) 373-0381
ATTN: Fish Disease Certification, (517) 373-0381

Questions by Phone:
(517) 373-1280

Part A.

Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List

The following steps are required for certification of any wholesale facility at which baitfish species, frozen bait, or eggs (Roe) listed on the Prohibited Fish Species List are held. If a state-licensed retail bait dealer wishes to have their facility certified, the same procedure applies but is not mandatory for state-licensed retail bait dealers.

Step 1: Application Information

Wholesale Baitfish Dealers, Wholesale Frozen Bait Dealers, and Wholesale Egg (Roe) Dealers Licensed by the State of Michigan

- Applicant requests in writing by email, fax, or regular mail that the DNR certify a facility to hold a species whether live, frozen, or eggs (Roe) on the Prohibited Fish Species List. The application letter should include:
 - contact information: business name, manager's name, street address, email address, telephone number, and the number on license issued by the State of Michigan to wholesale fish;
 - a brief description of the location of the facility including directions from a major road or town, and latitude-longitude information is appreciated;
 - identification of the fish species on the Prohibited Fish Species List that will be held at the facility along with estimated numbers or volumes for a year;
 - a diagram of the facility that shows the pond or tank locations, water flow direction in the facility, identification of ponds that will be used for holding the fish Species on the Prohibited Species List and the water source for all ponds or tanks;
 - the water or location receiving the effluent water from the facility along with any effluent water treatment processes; and
 - a list or description of the measures taken by the owner of the facility to protect against the transfer of disease. Examples include assignment of nets and equipment to each tank, disinfectant foot baths, cleaning protocols, truck disinfection protocols, and HAACP (Hazard Analysis and Critical Control Point) training for staff.

Wholesale Baitfish Dealers, Wholesale Frozen Bait Dealers, and Wholesale Egg (Roe) Dealers Licensed Outside the State of Michigan

- Applicant provides in writing all information that is required for Michigan wholesalers in writing if they desire to export products to Michigan. Information may be sent to the DNR via email, fax, or regular mail.

Step 2: Within 10 business days of receiving the application, the DNR will review the application for completeness and contact the facility manager to arrange a phone interview to obtain any missing information and to develop background information to assist in developing appropriate fish health testing protocols for future testing of fish species on the Prohibited Species List. Additionally, a site visit may be required for Michigan wholesale bait fish facilities.

Step 3: The DNR will respond within 10 days after concluding the facility review with:

Wholesale Baitfish Dealers, Wholesale Frozen Bait Dealers, and Wholesale Egg (Roe) Dealers Licensed by the State of Michigan

- A letter of Certification for the Status of the Facility that approves the holding of fish on the Prohibited Fish Species List and that provides guidance for sampling for fish health testing.

OR

- A letter that denies certification of the facility for holding fish species on the Prohibited Fish Species List along with the rationale for the denial. In circumstances where deficiencies can be corrected, the applicant can notify DNR for reconsideration of certification without starting over from the beginning of this process.

All letters of Certification must include documentation for use in the Status of Fish Health Certification process.

Wholesale Baitfish Dealers, Wholesale Frozen Bait Dealers, and Wholesale Egg (Roe) Dealers Licensed Outside the State of Michigan

- A letter of confirmation that we have received the information and that provides guidance for sampling of fish for health testing.

Part B.

Certification for Status of Fish Health

The following guidance is for the Certification for Status of Fish Health for Wholesale Baitfish Dealers, Wholesale Frozen Bait Dealers, and Wholesale Egg (Roe) Dealers whether licensed by the State of Michigan or not. If a state-licensed retail bait dealer wishes to have their facility certified, the same procedure applies but is not mandatory for state-licensed retail bait dealers. Guidance on fish disease testing can be found in Appendix 1.

Wholesale Baitfish Dealers and Wholesale Frozen Bait Dealers

Step 1: Application Information

- Applicant requests in writing by email, fax, or regular mail that the DNR certify the fish health status of a species of baitfish on the Prohibited Fish Species List.
- The application letter should include:
 - the Dealer's wholesale license number;
 - species of baitfish, location and date(s) of collection, and ponds or tanks where these baitfish are held at the facility; and
 - a description of the proposed testing procedures to be used including, who will conduct the sampling, how many baitfish will be tested, and the laboratory to be used for analyses.

Step 2: Within 10 working days of receiving the application for Certification for Status of Fish Health and prior to any baitfish disease testing, DNR staff will confer with the applicant either by phone, mail, email or at the facility to ensure the appropriate testing protocols are being used by that facility.

Step 3: The applicant will provide the results of the disease testing to the DNR. Applicants can provide this information via email, fax, or mail.

Step 4: Within 10 working days of receipt of the disease testing results, the DNR will provide notification in writing back to the applicant of either:

- A letter that grants Certification for Status of Fish Health for species of baitfish on the Prohibited Fish Species List, including a certification transaction number. The letter must accompany all shipments of baitfish and frozen bait to and within Michigan and must be presented to all buyers of the baitfish and frozen bait.

OR

- A letter that denies Certification for Status of Fish Health for species of baitfish on the Prohibited Fish Species List, including the rationale for the denial. In circumstances where deficiencies can be corrected, the applicant can notify DNR for reconsideration of certification without starting over from the beginning of this process.

Wholesale Egg (Roe) Dealers – Testing Option

Eggs (Roe) from fish on the Prohibited Fish Species List must be tested and certified free of VHS when this option is selected. If you choose to have eggs (Roe) tested and certified free of VHS, then the following steps must be taken to complete the Certification for Status of Fish Health process.

All certifications will be done on “lots” or groups of the same species of fish eggs (Roe) collected from the same location, the same time period, and held at the certified facility. Lots will be determined on a site specific basis after consultation with DNR-Fisheries Division.

Step 1: Application Information

- Applicant requests in writing by email, fax, or regular mail that the DNR certify the fish health status of eggs (Roe) from a species of fish on the Prohibited Fish Species List.
- The application letter should include:
 - the Dealer's wholesale license number;
 - a copy of the letter of Certification for the Status of the Facility issued under Part A Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List;
 - species of fish from which the eggs (Roe) were taken, and the location and date(s) of collection; and
 - a description of the proposed testing procedures to be used, including who will conduct the sampling, how the eggs (Roe) will be sampled, and the laboratory to be used for analyses.

Step 2: Within 10 working days of receiving the application for the Certification for Status of Fish Health and prior to any egg (Roe) disease testing, DNR staff will confer with the applicant either by phone, mail, email or at the facility to ensure the appropriate testing protocols are being used by that facility.

Step 3: The applicant will provide the results of the disease testing to the DNR. Applicants can provide this information via email, fax, or mail.

Step 4: Within 10 working days of receipt of the disease testing results, the DNR will provide notification in writing back to the applicant of either:

- A letter that grants Certification for Status of Fish Health for the eggs (Roe) of species of fish on the Prohibited Fish Species List, including a certification transaction number. The letter must accompany all shipments of eggs (Roe) to and within Michigan and must be presented to all buyers of the eggs (Roe).

OR

- A letter that denies Certification for Status of Fish Health for the eggs (Roe) of species of fish on the Prohibited Fish Species List, including the rationale for the denial. In circumstances where deficiencies can be corrected, the applicant can notify DNR for reconsideration of certification without starting over from the beginning of this process.

If new lots or groups of eggs (Roe) are brought into a facility and their source has not been certified pathogen free, then facilities must certify the new lots of eggs (Roe). The only exception is where lots of eggs (Roe) can be certified independently because the holding locations are separate and no way connected to each other.

Wholesale Egg (Roe) Dealers – Disinfection Option

Eggs (Roe) from fish on the Prohibited Fish Species List must use an approved disinfection technique to be certified free of VHS when this option is selected. If you choose the disinfection option for eggs (Roe) of species of fish on the Prohibited Fish Species List, then the following steps must be taken to complete the Certification for Status of Fish Health.

Step 1: Application Information

- Applicant requests in writing by email, fax, or regular mail that the DNR certify the fish health status of disinfected eggs (Roe) from a species of fish on the Prohibited Fish Species List.
- The application letter should include:
 - the Dealer's wholesale license number;
 - a copy of the letter of Certification for the Status of the Facility issued under Part A Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List;

- species of fish from which the eggs (Roe) were taken, and the location and date(s) of collection; and
- a description of the proposed disinfection procedures to be used. The preferred DNR methodology is attached as Appendix 2.

Step 2: Within 10 working days of receiving the application for the Certification for Status of Fish Health, DNR staff will confer with the applicant either by phone, mail, email or at the facility to review application information to ensure the appropriate disinfection protocols are being used by that facility.

Step 3: Within 10 working days of conferring with the applicant on the disinfection process, the DNR will provide notification in writing back to the applicant of either:

- A letter that grants Certification for Status of Fish Health for the eggs (Roe) of species of fish on the Prohibited Fish Species List, including a certification transaction number. The letter must accompany all shipments of eggs (Roe) to and within Michigan and must be presented to all buyers of the eggs (Roe). The Certification will require maintenance of records on the disinfection of salmon eggs and that these records be available upon our request. Information in these records will include disinfection date, amount of eggs disinfected, chemicals used, amount used, exposure time, shipping date, and shipment tracking number. Any change in disinfection method of any kind requires consultation with our Department and failure to use this disinfection method will result in the revocation of this certification.

OR

- A letter that denies Certification for Status of Fish Health for the eggs (Roe) of species of fish on the Prohibited Fish Species List, including the rationale for the denial. In circumstances where deficiencies can be corrected, the applicant can notify DNR for reconsideration of certification without starting over from the beginning of this process.

Wholesale Preserved Bait Dealers

Preserved bait on the Prohibited Fish Species List must use an approved preservation technique to be certified free of VHS when this option is selected. If you choose this option for preserved bait of species of fish on the Prohibited Fish Species List, then the following steps must be taken to complete the Certification for Status of Fish Health.

Step 1: Application Information

- Applicant requests in writing by email, fax, or regular mail that the DNR certify the fish health status of preserved bait from a species of fish on the Prohibited Fish Species List.
- The application letter should include:
 - the Dealer's wholesale license number. Only applicable if whole minnows are being preserved;
 - a copy of the letter of Certification for the Status of the Facility issued under Part A Certification for Status of a Facility to Hold Fish Species on the Prohibited Fish Species List;
 - species of fish that will be preserved to include the location and date(s) of collection; and
 - a description of the proposed preservation procedures to be used. This last step of the application can be completed by phone.

Step 2: Within 10 working days of receiving the application for the Certification for Status of Fish Health, DNR staff will confer with the applicant either by phone, mail, email or at the facility to review application information to ensure the preservation methods will be effective at killing VHSv.

Step 3: Within 10 working days of conferring with the applicant on the disinfection process, the DNR will provide notification in writing back to the applicant of either:

- A letter that grants Certification for Status of Fish Health for preserved bait of species of fish on the Prohibited Fish Species List, including a certification transaction number. The letter must accompany all shipments of the preserved bait to and within Michigan and must be presented to all buyers of the preserved bait. The Certification will require maintenance of records on the processing of bait that are shipped to Michigan and that these records be available upon our request. Information in these records should include processing date(s), chemicals used, amount used, exposure time, shipping date, and shipment tracking number. Any change in preservation technique of any kind requires consultation with our Department and the failure to use the agreed upon preservation method will result in the revocation of this certification.

OR

- A letter that denies Certification for Status of Fish Health for preserved bait of species of fish on the Prohibited Fish Species List, including the rationale for the denial. In circumstances where deficiencies can be corrected, the applicant can notify DNR for reconsideration of certification without starting over from the beginning of this process.

Appendix 1. DNR Fish Disease Testing Guidance

Background. The actual fish disease testing strategy for certification purposes will be determined for each facility. The strategy will be customized depending on the facility configuration and the species of fish to be tested. Guidance for a facility will be provided during Part A Certification for Status of a Facility to Hold Species on the Prohibited Fish Species List to help ensure the most efficient and effective approach for disease testing.

The diseases to be tested by species and purpose are listed in Tables 1 and 2. All fish species as noted in Table 1 regardless of source must be certified free of the diseases in Table 1 to be stocked in public waters. All baitfish on the Prohibited Species list in Fisheries Order 245 that are to be sold as “Certified Free of VHSV” must be tested using an approved process as detailed in this guide. All fish species as noted in Table 2 from out-of-the-state sources must be certified free of the diseases in Table 2 to be stocked in public waters. All in-state sources of fish in Table 2 must demonstrate that they have no history of these diseases at their facility or be tested and certified free of these diseases prior to them being stocked in public waters.

Fish testing results and fish health certifications from the original sources of fish may be accepted after review by DNR Fisheries Division staff.

Testing Strategy. The following process will be used by the DNR when providing guidance for the development of testing for an individual facility.

- Tests will be done on “lots” or groups of fish whenever possible assuming the facility configuration is acceptable for this type of testing. A “lot” is defined as fish from the same wild or hatchery source being held at the facility on the same water source. If the fish are from the same wild source then they must also be captured on the same date or brought to the facility within an agreed upon time period to be considered as the same lot.
- Facilities that have multiple lots of fish on a common water source may have to be tested using a modified process for certification.

Sample Sizes. The following information on sample sizes are guidelines and site specific sampling programs will be developed for each facility. Sample sizes will depend on whether individual lots of fish or all fish (farm or herd certification) must be certified at the facility and the configuration of the facility. Pooling of fish in 5 fish pools is acceptable for certification purposes. Sample sizes of fish will range between 60 and 150 fish or more depending on the facility and herd configuration. For aquaculture facilities that intend to stock state waters and have a long-term (at least 3 year) fish health histories, a sample size of 60 fish will likely be required from each lot for bacteriology, parasitology, and virology. These can be the same fish. For aquaculture facilities with unknown fish health histories and for wild fish to include baitfish, a sample size of 120 fish will likely be required from each lot for bacteriology and virology, and 60 fish sample for parasite analysis. These can be the same fish. For the modified farm process for certification, a minimum sample size of 150 fish from all lots on site will be analyzed for bacteriology, parasitology and virology although this will vary depending on the configuration of the facility.

Sample Collection. Sample collection must be conducted by a veterinarian who is licensed and USDA certified, approved DNR employee, or any other individual acceptable upon consultation with the DNR.

Testing Methodology. All fish must be tested using either the USFWS/AFS-FHS Standard Procedures for Aquatic Animal Health Inspections section as detailed in the Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens 2005 Edition, American Fisheries Society, Fish Health Section, Bethesda, Maryland (commonly referred to as the AFS Blue Book); or The World Organization for Animal Health (OIE) Manual of Diagnostic Tests for Aquatic Animals, Fifth Edition (2006), Chapter 2.1.5, OIE, Paris, France.

For VHS

Cell culture, followed by PCR testing to confirm VHSv, must be done for VHS. All virology tests must use the most sensitive cell lines and appropriate cell lines should be selected in consultation with the DNR.

Testing Costs. The testing and laboratory costs for certification will be the financial responsibility of facility owner.

Table 1. Emergency fish diseases and reportable fish diseases (Michigan Department of Agriculture Reportable Animal Diseases) in the State of Michigan.

Disease Agent	Disease Name	Approved Fish Species Affected
<i>Aeromonas salmonicida</i>	Furunculosis	Atlantic Salmon, brook trout, brown trout, rainbow trout
<i>Ceratomyxosis shastal</i>	Ceratomyxosis	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
EED Virus	Epizootic Epitheliotropic Disease	Lake trout
EHN Virus	Epizootic Hematopoietic Necrosis	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
IHN Virus*	Infectious Hematopoietic Necrosis	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
IPN Virus*	Infectious Pancreatic Necrosis Virus	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
<i>Myxobolus cerebralis</i> *	Whirling Disease	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
<i>Myxosporean agent</i> PKD	Proliferative Kidney Disease	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
<i>Onchorhynchus masou</i> Virus	Onchorhynchus masou Virus Disease	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
<i>Renibacterium salmoninarum</i>	Bacteria Kidney Disease	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout
Rhabdovirus – Spring Viremia of Carp Agent	Spring Viremia of Carp	Koi, common carp
VHS Virus*	Viral Hemorrhagic Septicaemia	All species
<i>Yersinia ruckeri</i>	Enteric Redmouth	Atlantic Salmon, brook trout, brown trout, lake trout, rainbow trout

* Fish must be certified free of these emergency fish diseases to be permitted for stocking in public waters.

Table 2. Emerging fish diseases of concern in the State of Michigan that are on the watch list for future action. Fish should be free of these diseases to be stocked in state waters.

Disease Agent	Disease Name	Fish Species Affected	Fish Species to be Tested
<i>Ranavirus</i>	Largemouth Bass Virus	Largemouth bass	All members of the sunfish family
<i>Heterosporis sp.</i>	Heterosporis	Yellow perch	Yellow perch, walleye, fathead minnows
<i>Herpesvirus</i>	Channel Catfish Virus	Channel Catfish	
<i>Iridovirus</i>	Sturgeon Virus	Lake sturgeon	

Appendix 2. Recommended DNR Egg Disinfection Methodology

Disinfecting Eggs with Iodophor:

Use pathogen-free water for all steps in egg disinfection

1. Mix up bucket of 50 ppm iodophor—7.5 ml (1 ½ teaspoon) iodophor (10% active) in 4 gallons of pathogen-free water
2. Pour any water off of eggs prior to adding disinfection solution
3. Use twice the volume of eggs to calculate the amount of disinfection solution needed. For example, for 1 cup of eggs, add 2 cups of disinfection solution to eggs
4. Add appropriate amount of 50 ppm iodophor solution (as described above in #1) to the eggs and leave for 30 minutes
5. After 30 minutes, drain iodophor solution off eggs and rinse 1 time with fresh, pathogen-free water
6. Pour any water off of eggs prior to adding disinfection solution
7. Mix up bucket of 100 ppm iodophor—15.1 ml (3 teaspoons) iodophor (10% active) in 4 gallons pathogen-free water
8. Add appropriate amount of 100 ppm iodophor solution (as described above in #7) to egg containers and leave for 10 minutes
9. After 10 minutes drain iodophor solution off eggs and rinse 2 times with fresh, pathogen-free water
10. Disinfection is complete

Source of Iodophor:

Argent Chemical Laboratories:

Argentyne (Argent brand iodophor)

1-800-426-6258

Wolf Lake Fish Hatchery Contact on Egg Disinfection Methodology:

Martha Wolgamood

34270 CR 652

Mattawan, MI 49071

Phone: 269-668-2696

E-mail: wolgamom@michigan.gov