VIRAL HEMORRHAGIC SEPTICEMIA

External lesions of VHS (gizzard shad). Photo credit: Paul Bowser, Aquatic Animal Health Program, Cornell University

This "response packet" was developed to aid fish producers in preventing the introduction and spread of VHS to aquaculture facilities.

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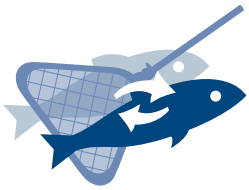
Viral Hemorrhagic Septicemia (VHS

Potential Routes of Disease Transmission:

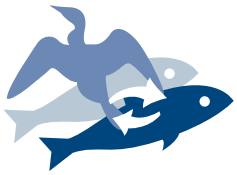
☑ direct contact

☑ water sources

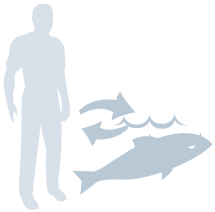


☑ fomites

☑ oral



☑ vector



☐ zoonotic

Table of Contents

The following pages contain information about VHS and prevention measures you can take to protect your farm.

Viral hemorrhagic septicemia, or VHS, is a severe, often fatal disease of freshwater and marine fish. VHS does not affect humans. Considered a serious viral disease of rainbow trout reared in freshwater, the disease was first reported in the Western Hemisphere in healthy looking Chinook and coho salmon in 1988. Initially considered a disease of salmonids, a new strain of VHS was detected in large fish die offs in Lake Ontario and Lake St. Clair in May 2005. Several freshwater fish species have now been found susceptible to this new strain of the virus. Since 2005, reports of VHS infected fish have occurred in all of the Great Lakes -- except for Lake Superior -- as well as several inland lakes in New York, Michigan, Wisconsin and Ohio.

The US Department of Agriculture and many state fish health agencies have implemented movement restrictions and transport requirements for VHS susceptible fish species in efforts to prevent the further spread of VHS.

Signs of VHS in infected fish include:

- Hemorrhages on the body, around fin bases, eyes, head or internal organs
- Bulging eyes
- Darkened coloration
- Pale gills
- Distended (fluid-filled) abdomen
- Erratic swimming behavior

Some infected fish may show no signs of illness, but can still spread the virus to new locations or other fish.

Monitor your fish daily for any signs of illness or large scale deaths. If noted, contact your fish health professional or aquatic veterinarian.

Risk factors for the introduction of VHS to aquaculture facilities include:

- Fish movement
- Contaminated water sources
- Factors impacting fish health
- Contaminated equipment or vehicles
- Wildlife vectors

FAST FACTS

Viral Hemorrhagic Septicemia

Egtved Disease

What is VHS and what causes it?

Viral hemorrhagic septicemia (VHS) is a serious, highly contagious and fatal disease of fish. It affects a large number of fresh and marine fish species. The disease has occurred in farmed rainbow trout in Japan and Europe and in wild marine fish in the Atlantic and Pacific Ocean and the Baltic Sea. The virus was first reported the Great Lakes region of North America in 2005. State and federal governments are currently involved in disease education and control efforts.

What fish get VHS?

VHS affects over 40 different species of fish. This includes a number of important recreational, sport and commercial fish species such as salmon, trout, yellow perch, sunfish, muskellunge, walleye, northern pike and a number of minnow species.

How do fish get VHS?

VHS is highly contagious. The greatest risk for transfer of the virus is the movement of infected fish or contaminated water.

The VHS virus is shed in the urine and reproductive fluids (ovarian fluids, sperm) of infected fish. Fish can be exposed by **direct contact** with infected fish or contaminated water. Objects (**fomites**) in contact with infected fish, such as nets, buckets, footwear and vehicles can also serve to spread the virus to additional locations. Fish can also be exposed by ingesting (**oral**) infected fish (e.g., predation or cannibalism). Fish-preying birds or mammals (**vectors**) may carry infected fish to other locations.

How does VHS affect fish?

Fish infected with VHS may have hemorrhages on the body, eyes, gills, or at the base of the fins, bulging eyes ("pop-eye"), swollen (fluid-filled) abdomens, and darkened coloration. Affected fish may have abnormal swimming behavior. Hemorrhages may also be seen in the muscle and organ tissues.

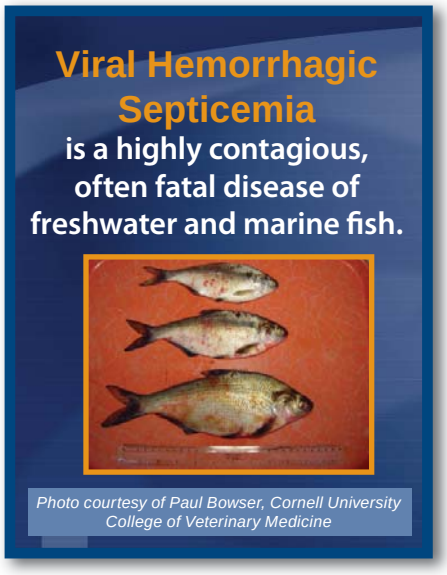
Some fish infected with VHS may show no signs of illness, but can still spread the virus and infect other fish.

Most VHS outbreaks occur in the spring when water temperatures are less than 5°C (59°F). Deaths from VHS rarely occur at temperatures above 18°C (64°F).

VHS has caused large scale fish die offs. Reported death rates in some species of fish have been as high as 80-100%.

Can I get viral hemorrhagic septicemia?

No. VHS has not been reported to affect people. Fish carrying the virus are safe to eat and handle.



Who should I contact if I suspect VHS?

Contact your state department of natural resources or state aquaculture coordinator if you suspect VHS.

How can I protect my fish from VHS?

Aquaculture facilities should use biosecurity procedures to protect fish from exposure to infected fish or contaminated water or equipment. This includes quarantining incoming fish, cleaning and disinfecting equipment, vehicles, and footwear.

When fishing or boating, boats, nets and other equipment should be drained and cleaned before moving to another location. Do not move fish, including baitfish from one body of water to another.

VHS is susceptible to a number of disinfectants including sodium hypochlorite (bleach) and iodophor (iodine solutions).

Federal and state regulations on the trade and transport of VHS susceptible species have been made in efforts to control the further spread of the disease.

For More Information

USDA APHIS Viral Hemorrhagic Septicemia Website at www.aphis.usda.gov/news-room/hot_issues/vhs/ vhs.shtml

Species Affected by the VHS Federal Order at www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/downloads/vhs_fed_order.pdf

Focus on Fish Health: Viral Hemorrhagic Septicemia at www.focusonfishhealth.org

CFSPH Technical Fact Sheets. Viral hemorrhagic septicemia at www.cfsph.iastate.edu/DiseaseInfo/

the Center for Food Security & Public Health
Iowa State University®

USDA VHS SUSCEPTIBLE SPECIES LIST

SEPTEMBER 9, 2008

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (USDA APHIS VS) has listed the following fish as VHS-susceptible species.

The interstate movement of these species is also regulated by USDA APHIS. Many states also have transport regulations.

This species list is based on those that have been:

1) found in freshwater locations in the U.S. and/or Canada,

2) have been found to be infected by VHS virus under natural (i.e., non-experimental) conditions of exposure, and

3) have had VHS virus isolated by cell culture and molecular diagnostic confirmation.

This list has been updated from a previous list issued in October 2006.

For more information on the USDA APHIS Federal Order, go to http://www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/

Black crappie
Pomoxis nigromaculatus

Bluegill
Lepomis macrochirus

Bluntnose minnow
Pimephales notatus

Brown bullhead
Ictalurus nebulosus

Brown trout
Salmo trutta

Burbot
Lota lota

Channel catfish
Ictalurus punctatus

Chinook salmon
Oncorhynchus tshawytscha

Emerald shiner
Notropis atherinoides

Freshwater drum
Aplodinotus grunniens

Gizzard shad
Dorosoma cepedianum

Lake whitefish
Coregonus clupeaformis

Largemouth bass
Micropterus salmoides

Muskellunge
Esox masquinongy

Northern pike
Esox lucius

Pumpkinseed
Lepomis gibbosus

Rainbow trout
Onchorhynchus mykiss

Rock bass
Ambloplites rupestris

Round goby
Neogobius melanostomus

Shorthead redhorse
Moxostoma macrolepidotum

Silver redhorse
Moxostoma anisurum

Smallmouth bass
Micropterus dolomieu

Spottail shiner
Notropis hudsonius

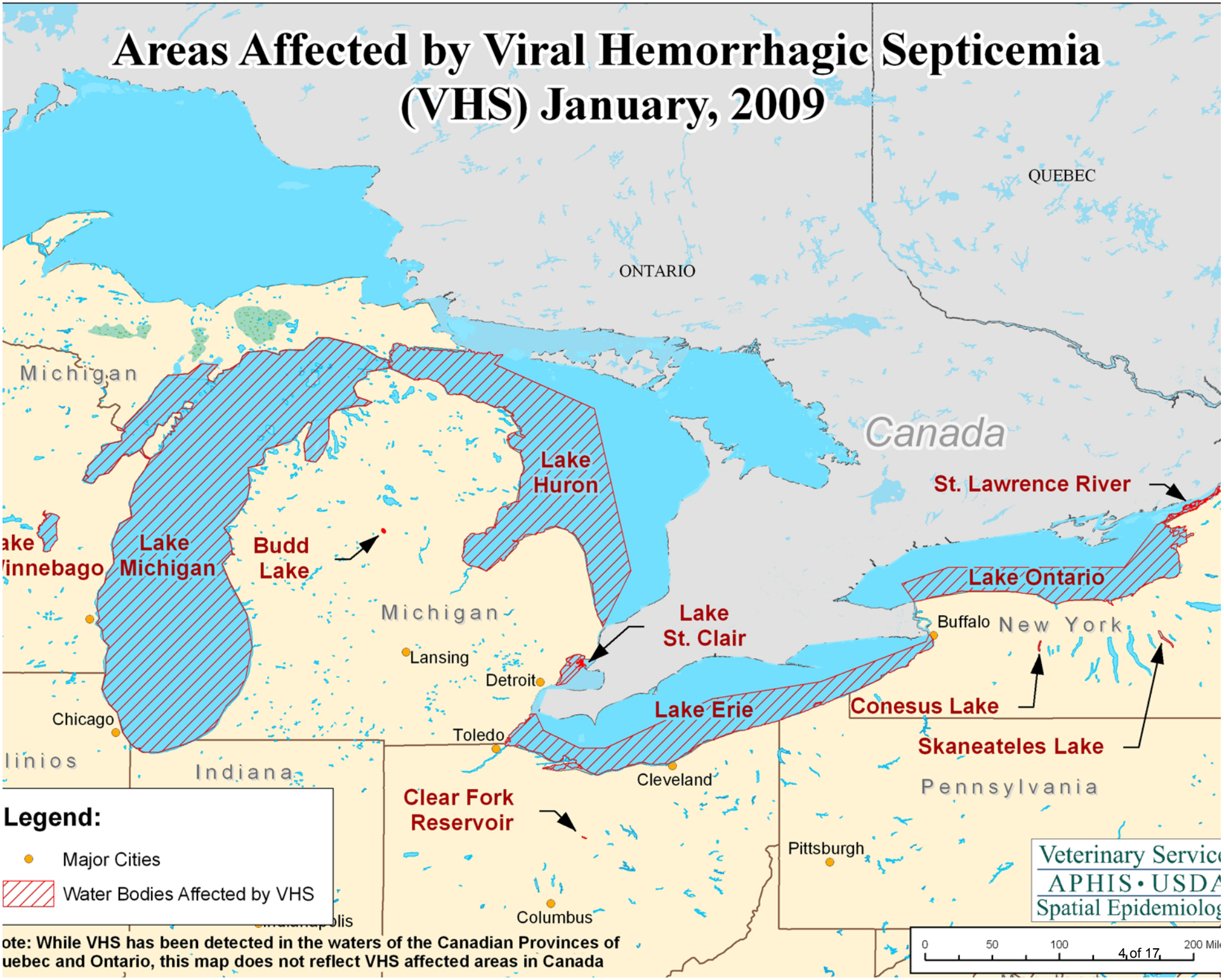
Trout-Perch
Percopsis omiscomaycus

Walleye
Sander vitreus

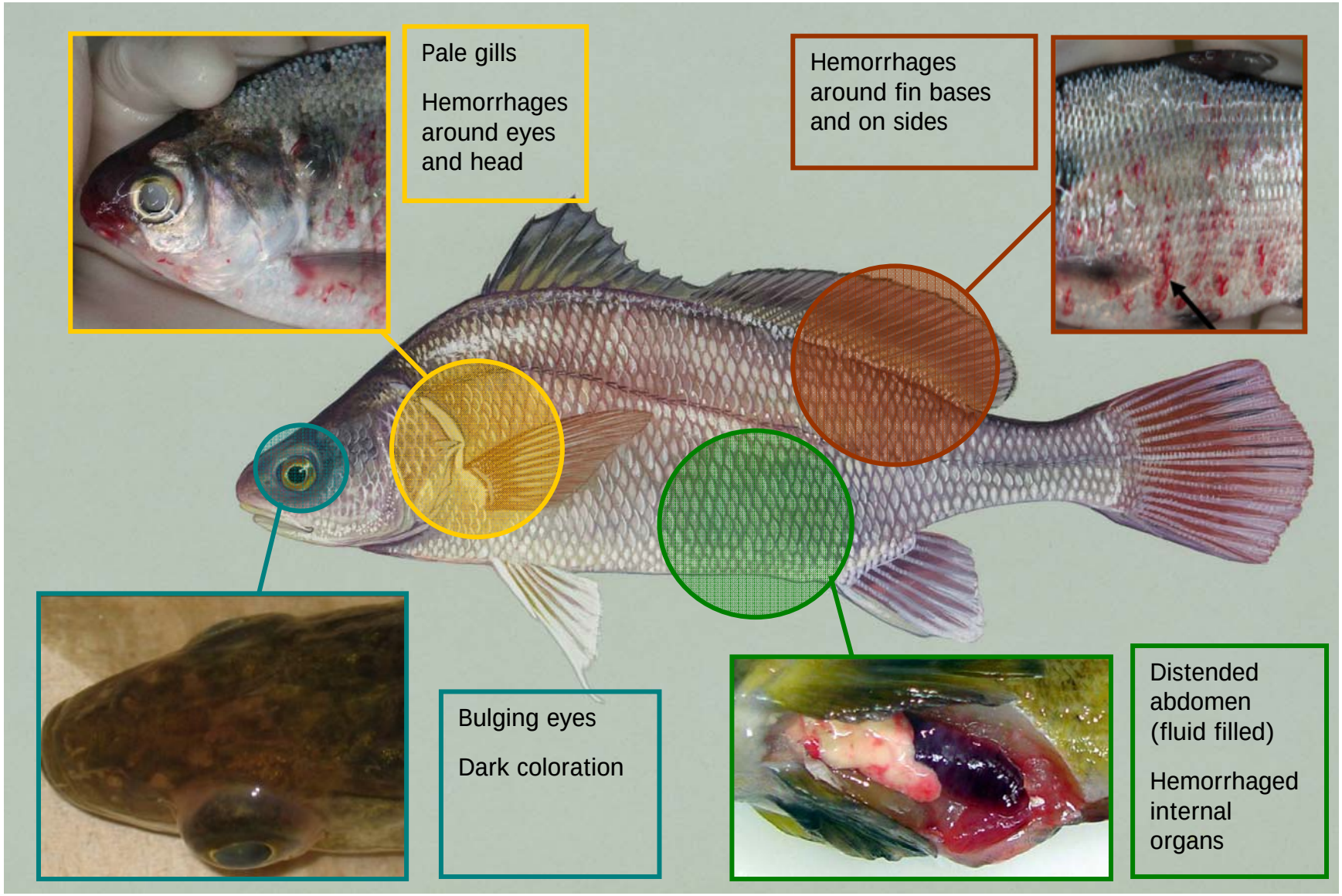
White bass
Morone chrysops

White perch
Morone americana

Yellow perch
Perca flavescens


Areas Affected by Viral Hemorrhagic Septicemia (VHS) January, 2009
QUEBEC
ONTARIO
Michigan
Canada
Lake Huron
St. Lawrence River
Lake Michigan
Budd Lake
Lake Ontario
Michigan
Lake St. Clair
Buffalo
New York
Lansing
Detroit
Lake Erie
Conesus Lake
Chicago
Toledo
Skaneateles Lake
Indiana
Cleveland
Pennsylvania
Clear Fork Reservoir
Pittsburgh
Columbus
Legend:
Major Cities
Water Bodies Affected by VHS
Veterinary Servic
APHIS • USDA
Spatial Epidemiolog
0
50
100
200 Mil
ote: While VHS has been detected in the waters of the Canadian Provinces of
uebec and Ontario, this map does not reflect VHS affected areas in Canada

SIGNS OF DISEASE FOR VIRAL HEMORRHAGIC SEPTICEMIA IN FISH



Photos from Mohamed Faisal, Michigan State University, US FWS Digital Library

PREVENTION PRACTICES FOR VIRAL HEMORRHAGIC SEPTICEMIA

the Center for Food Security & Public Health
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Viral Hemorrhagic Septicemia (VHS) is a severe, often fatal disease of freshwater and marine fish, including a number of commercially important species. The detection of VHS at an aquaculture facility will require rapid action to contain the disease and prevent it from spreading to additional locations. This may involve quarantines or possibly depopulation of affected and exposed fish.

The biosecurity practices outlined here should be put into place immediately if VHS is confirmed in an aquaculture facility and will help you prevent the virus from entering your farm. While most of these practices should be used routinely on your farm, it is especially important to use them in the event of a VHS outbreak in your area.

Risk Factors for VHS Introduction

1. Movement of infected fish
2. Water sources
3. Fomites (contaminated objects such as equipment or vehicles)
4. Vectors (living things that can spread the virus)

Outbreak Precautionary Measures

Prevention measures to minimize the introduction and spread of VHS onto your farm fall into three general categories:

1. Restrict or stop all fish movement on your farm to prevent entry or spread of the disease.
2. Use strict biosecurity measures for fish, eggs, water sources, equipment, vehicles, vectors and people on your farm.
3. Detect and report any disease or unusual signs to your aquatic veterinarian or fish health specialist as quickly as possible.

Fish Movement

The movement of fish is one of the greatest risk factor for VHS introduction and spread in aquaculture. This includes new fish brought to the farm for breeding, grow out or restocking or those returned the farm, as well as contact with wild fish. Some fish species can be infected with VHS without showing signs of illness, these "carriers" fish can still spread the virus.

Prevention measures to reduce the risk of VHS spread by fish movement include:

- **Restrict or stop movement of fish or eggs on and off your farm.**
  - If VHS is confirmed in the U.S., movement restrictions may be put into place locally, regionally and possibly nationally.
  - Restrictions will depend on the scope of the outbreak.
  - Stopping movement of fish or eggs onto your farm until disease free assurances can be made helps to prevent the introduction of VHS on your farm or to other areas.
- **Do not allow contact of your fish with wild fish or fish from other farms.**
  - The VHS virus can be spread by direct contact with infected fish or contaminated water sources.
- **If fish must be brought onto the farm:**
  - Limit the frequency and number of new introductions.
  - Limit purchases to a few sources with known and trusted fish health programs.
  - When possible, purchase eggs or fish from certified disease-free broodstock.
  - Fish should be inspected and found free of VHS prior to purchase.
- **Quarantine any fish that have recently been purchased or returned to the farm for a minimum of 3 weeks.**
  - New or returning animals (e.g. sales, broodstock) can be infected with a disease without showing signs right away.
  - Quarantine allows time for a disease to develop and be detected without exposing your stock to the disease agent.
  - Quarantine areas should have separate water sources, equipment and ideally facilities.
  - Care and handling of these fish should be done after

Farm Entrance

- **Limit access to your farm.**
  - The entrance to your farm is a major control point.
  - Have only one gated entrance to fish production areas on your farm. This will help control and monitor visitors and vehicles arriving at your farm.
  - Keep the gate locked when not in use to prevent unwanted entry.
- **Post signs at the farm entrance to inform visitors of procedures to follow on your farm. (See Appendix A).**

PREVENTION PRACTICES FOR VIRAL HEMORRHAGIC SEPTICEMIA

Water Sources

- **Ensure pathogen-free water sources are being used on your farm.**
  - Well water, springs and other groundwater sources should be used when possible.
  - Surface water sources should be avoided as they have a greater potential for carrying fish pathogens.
  - If this is not possible, disinfection of the water supply by ozonation or ultraviolet sources can help exclude unwanted aquatic species and pathogens.

Fish Health

Optimum health is essential for disease prevention in fish and greatly improves the ability of your fish to fight off infection.

- **Minimize stress**
  - Maintain optimum stocking densities.
  - Limit transfers of fish between units or locations.
  - Use gentle crowding and fish handling methods.
- **Maintain optimum water quality**
  - Fluctuations or improper maintenance of water quality parameters can predispose fish to disease; this incudes temperature.
- **Provide proper nutrition**
  - Store feed in a cool, dry place
  - Use within 3 to 6 months
- **Maintain thorough and accurate health records**
  - Document all animal movements, including the dates of introduction, sources and movements on or off the farm.
  - Document fish deaths, illnesses as well as production parameters growth and feed conversion ratios.
  - Review records frequently to identify subtle signs of fish disease (e.g., decreased production).
- **Educate yourself (and train your employees) about VHS and the signs of illness.**
  - Signs of VHS infection include:
    - Hemorrhages on the body, around fin bases, eyes, head or internal organs
    - Bulging eyes
    - Darkened coloration
    - Pale gills
    - Distended (fluid-filled) abdomen
    - Erratic swimming behavior
    - Death
  - Some infected fish may show no or few signs of illness.
  - These signs of illness are not specific for VHS. Confirmation requires diagnostic testing.
- **Monitor animals closely and frequently for any developing illness or signs of disease.**
- **Promptly remove dead fish and euthanize dying fish.**
  - These fish can serve as a reservoir of disease organisms.
  - Dispose of dead fish so predators, wild birds or other animals will not have access and spread disease.
- **Isolate ill fish.**
  - Use separate facilities, water sources, equipment, and staff to handle isolated fish OR handle or visit the isolated animals LAST.
  - Clean and disinfect all equipment, clothing, boots, etc. that come into contact with sick fish.
  - Keep effluent from this area away from stocking areas of the farm.
  - Change clothing and wash or sanitize hands after working with these fish to avoid cross-contamination.
- **Contact your aquatic veterinarian or fish health specialist immediately if unusual illness or signs are noticed.**
- **Have ill fish tested or necropsied to determine the cause of illness.**
  - Many fish diseases can have similar signs of illness.
  - Diagnostic testing is the only way to confirm VHS.
  - Prompt detection can help reduce further spread of the disease.

Equipment and Vehicles

Any equipment (e.g., nets, buckets, hoses, footwear) or even vehicles used to work with or move fish can serve as a potential source of disease transfer between facilities or units. These items should be cleaned and thoroughly dried (preferably in direct sunlight) or chemically disinfected before use in another location.

- **Clean and disinfect equipment or vehicles before reusing them.**
  - This includes anything that has come in contact with the urine, feces, mucus or other body fluids of fish.
  - VHS is susceptible to drying, sunlight and most common disinfectants - See Appendix B.
  - Any visible debris (mud, aquatic plants) should be removed before applying a chemical disinfectant.
  - Most disinfectants are inactivated by organic. materials such as dirt, feces, and mucus - thereby preventing the killing action of these products.
- **Fish production tanks, raceways and ponds should be disinfected between each lot of fish.**

- **Use the proper concentration of any disinfectant (always mix according to the product label).**
- **Allow a disinfection solution to "sit" and work.**
  - To be effective, disinfectants need time to kill the microorganisms present.
  - Refer to the product label for the recommended contact time (usually at least 5 minutes).
- **Some chemical disinfectants require neutralization or are toxic to fish.**
  - See Appendix B.
- **Do not share equipment or vehicles with other farms.**
  - If this is not possible, ensure equipment and vehicles are properly cleaned and disinfected before having contact with your fish.
  - Any residual water or debris should be removed from vehicles, including bilge water from boats.
- **Delivery vehicles and personnel should follow your established farm biosecurity guidelines regarding parking and animal contact.**
  - Vehicles should be clean prior to entering your farm.
  - Have allowed visitors and vehicles park at the entrance to the farm or in established parking areas away from all fish production areas.
  - When possible, have deliveries left at the entrance to the farm.

Vectors

Wildlife

- **Prevent contact with free roaming animals (e.g. wildlife, cats, dogs, etc.).**
- **Implement predator management and rodent control programs.**
  - Living creatures, such as fish-preying birds, can transfer fish diseases between locations by carrying the pathogen on their body or feet, or by dropping fish or fish parts at other locations
  - Keep farm areas clean and tidy to avoid attraction of birds or rodents.
  - Contact USDA-APHIS or your local extension office for approved control methods in your area.
- **Do not allow contact of your fish with wild fish or fish from other farms.**
  - The VHS virus can be spread by direct contact with infected fish or contaminated water sources.

Employees

- **Employees that have contact with fish at other locations (including their own home), should use strict biosecurity measures while on your farm.**
  - VHS may be spread by contaminated clothing, boots, and equipment (fomites) if these items are recently contaminated with infected fish.
  - Provide clean boots and coveralls on site for employees to wear on your farm.
- **Foot dips should be placed near the entrance to animal areas**
  - Foot dip solutions should be changed daily or when visibly soiled.

Visitors

- **Minimize traffic and visitors to only those essential for the continued operation of the farm.**
- **Post warning signs telling visitors to keep out. (See Appendix A)**
- **Monitor and record traffic on or off your farm.**
  - Maintain a log sheet of all visitors and vehicles that enter your farm. This will help with disease surveillance and tracking if needed.
  - Do not rely on your ability to "recall" visitors and vehicles that were on your farm.
  - A daily visitor log form is available in Appendix C.
- **Provide clean coveralls and disposable or disinfected footwear.**
  - Post signs to direct visitors to a designated area where these are available.
  - Require that these items be worn by all visitors at all times while in animal areas.
  - Make sure boots are clean before entering animal areas; provide a well-maintained foot bath OR clean disposable boots and a receptacle near the entrance to the animal facility.
  - After exiting animal areas, wash and disinfect boots OR remove them and dispose of them properly.
  - When leaving your farm, visitors should remove all protective clothing and footwear provided by the farm and leave it in the designated area.
- **All visitors should be accompanied by someone from the farm at all times.**
- **Restrict close contact or handling of fish by visitors (unless necessary for the health of fish).**

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VIRAL HEMORRHAGIC SEPTICEMIA PREVENTION PRACTICES CHECKLIST

the Center for Food Security & Public Health
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Viral Hemorrhagic Septicemia, or VHS, is a severe, often fatal disease of freshwater and marine fish species. The greatest risk for introduction onto your farm is through the movement of infected fish or by contaminated water, equipment or vehicles; the virus may also be spread by contaminated clothing or footwear. Vectors, such as fish-eating birds or wildlife, may also transfer infected to fish to additional locations. This checklist is designed to help you identify risk areas for the introduction and/or spread of VHS on your farm.

Outbreak Precautionary Measures

Y N Have you restricted or stopped all fish movement on or off your farm to prevent entry or spread of VHS?

Y N Have you implemented strict biosecurity measures for fish, water sources, equipment, vehicles, wildlife vectors and people on your farm?

Y N Are you closely and frequently monitoring your fish for signs of VHS?

Fish Movement

Y N Do you limit contact between your fish stock and wild fish stocks?

Y N Do you limit the frequency and number of new introductions of fish onto your farm?

Y N Do you limit purchases to a few sources with known and trusted fish health programs?

Y N Do you know the health status and the source of the fish brought onto your farm?

Y N Do you only bring animals that have been inspected onto your farm?

Y N Do you request copies of treatment records (and vaccinations, if applicable) for all purchased fish?

Y N Do you disinfect eggs upon arrival to the farm?

Y N Do you require that newly acquired or returned fish for your farm are quarantined for at least 3 weeks upon arrival?

Y N Are your quarantine facilities separate from all other fish areas?

Y N Do prevent the sharing of water, facilities or equipment between newly acquired or returned fish and your currently stocked fish?

Y N If equipment must be used elsewhere on the farm, do you clean andn disinfect the item before removing it from one location and moving it to another?

Farm Entrance

Y N Do you limit access to your farm?

VHS PREVENTION PRACTICES CHECKLIST (CONT'D)

Y N Do you have only one gated entrance to fish production areas on your farm to better control and monitor visitors and vehicles?

Y N Do you keep the gate locked when not in use?

Y N Have you posted signs at the farm entrance to inform visitors to stay off your farm unless they have received permission?

Y N Is traffic on or off your farm closely monitored and recorded?

Y N Do you maintain a log sheet to record any visitors or vehicles that come onto your farm?

Y N Do you require delivery vehicles and visitors follow your farm biosecurity guidelines regarding parking and fish contact?

Water Sources

Y N Do you use pathogen-free water sources on your farm (e.g., well water, springs)?

Y N Do you avoid surface water sources on your farm?

Y N If surface waters are used, do you filter and disinfect water prior to using it with your fish stock to exclude unwanted aquatic species and pathogens?

Y N Do you take measures to prevent effluent from other locations from entering your operation?

Fish Health

Y N Do you maintain optimum stocking densities in efforts to minimize stress to your fish?

Y N Do you limit transfers of fish between units or locations to only those that are necessary?

Y N Do you gentle crowding and fish handling methods when working with fish?

Y N Do you maintain optimum water quality for fish species reared on your farm?

Y N Do you obtain live feed from reliable sources?

Y N Do you secure all feed storage areas and clean up spilled feed to minimize access by rodents or birds?

Y N Have you educated yourself about VHS and the signs of infection?

Y N Have you educated your employees about VHS and the clinical signs of infection?

Y N Do you closely monitor fish daily for signs of illness?

Contact your aquatic veterinarian or fish health specialist immediately if any unusual signs of illness are observed.

VHS PREVENTION PRACTICES CHECKLIST (CONT'D)

Y N Do you promptly remove any dead or dying fish?

Y N Do you promptly euthanize animals that are not going to recover?

Y N Do you submit dead or dying fish for diagnostic testing or necropsy to determine the cause of death?

Y N Do you immediately remove and isolate sick fish to minimize disease spread?

Y N Do you prevent direct contact between isolated fish and other fish on the farm?

Y N Do you maintain separate water sources for isolation areas?

Y N Do you use separate facilities, equipment, and staff to handle isolated fish?

Y N If it is not possible to use separate facilities, equipment and staff, do you handle or visit the isolated animals LAST?

Y N Do you clean and disinfect all equipment, clothing, boots, etc. that come into contact with ill and isolated animals?

Y N Do you always wash or sanitize your hands after any contact with sick or dead fish to prevent disease spread to other animals?

Y N Do you require your employees to wash or sanitized their hands after contact with sick or dead fish to prevent disease spread?

Record Keeping

Y N Do you maintain a written biosecurity plan?

Y N Do you maintain thorough and accurate records of fish introductions onto or off of your farm?

Y N Do you maintain thorough and accurate records of fish movements on your farm?

Y N Do you maintain thorough and accurate records of fish health issues (e.g., mortalities, treatments, vaccinations) for your fish?

Y N Do you maintain thorough and accurate records of fish production parameters (e.g., feed conversion efficiency, growth, etc)?

Y N Do you monitor water quality parameters closely?

Y N Do you monitor water temperature parameters closely?

Y N Do you keep records on water quality, feeding, animal behavior, mortality?

Y N Has there been any history of disease on your farm?

Y N Has there been any history of disease on your fish stock source or suppliers farm?

VHS PREVENTION PRACTICES CHECKLIST (CONT'D)

Equipment and Vehicles

Y N Do you clean and disinfect any non-disposable items that come in contact with urine, feces, reproductive fluids, mucus or other body fluids of fish?

Y N Do you clean and disinfect equipment or vehicles before reusing them with different lots of fish?

Y N Do you know the common disinfectants that will kill the VHS virus (e.g. bleach, Virkon-Aquatic, sunlight)?

Y N Do you clean isolation and quarantine areas regularly?

Y N Do you clean tanks or raceways after fish are removed?

Y N Do you lime ponds after fish are removed?

Y N Do you restrict the sharing of equipment or vehicles between farms?

Y N If equipment must be shared, do you clean and disinfect it before using it with animals from your farm?

Y N Do you place foot dips near the entrance of animal areas?

Y N Are foot dip solutions changed daily or when visibly soiled?

Y N Do you always wear clean clothes or coveralls when coming in contact with animals?

Y N Do you change or clean boots (e.g., foot dips) when switching between fish groups with different health status?

Y N Do you change clothes and disinfect boots when moving between farms?

Vectors - Wildlife

Y N Do you keep wildlife vectors (e.g., fish-eating birds or mammals) off of your farm?

Y N Do you have a predator management program on your farm?

Y N Do you have a rodent control program on your farm?

Y N Do you keep pets (e.g., dogs, cats) off of the farm?

Vectors - Employees

Y N Do you require that employees wear clean clothing/coveralls when working with fish?

VHS PREVENTION PRACTICES CHECKLIST (CONT'D)

Y N Do you require that employees wear clean boots when working with fish?

Y N Do you require employees to use foot dips when entering and leaving fish production areas?

Y N Do you require that employees wash or sanitized their hands before and after working with fish?

Vectors - Visitors

Y N Do you require visitors to check-in with farm personnel upon their arrival?

Y N Do you require visitors to follow your farm's biosecurity procedures?

Y N Have you minimized traffic and visitors to only those essential for the continued operation of the farm?

Y N Do you require all visitors and vehicles to park near the entrance to the farm in established parking areas away from all fish production areas?

Y N Are visitors accompanied by someone from the farm at all times?

Y N Do you require that visitors avoid fish production areas unless absolutely necessary?

Y N Do you restrict close contact or handling of fish by visitors (unless necessary for the health of the animal)?

Y N Do you prevent your vehicles or trailers from coming in contact with any other fish stock that are not from your operation?

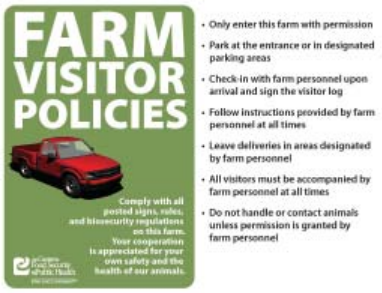
Conclusion

Total number of: **Yes responses** _____ **No responses** _____

If you have 1 or more No responses, you have identified areas for improvement on your farm. Not all questions are equal in their risk of disease transmission, so it is important to work with your aquatic veterinarian or fish health professional to develop a management plan addressing the biggest risks first. This will help minimize the chance of VHS entering your farm. Each farm will be unique in their ability to prevent disease transmission because production types, management styles, species and finances vary.

PREVENTION PRACTICES FOR VHS
APPENDIX A: FARM SIGNS

Sample signs to post at the facility entrance in the event of a VHS outbreak in the U.S.
(Available for free download from the CFSPH web site at www.cfsph.iastate.edu/DiseaseInfo/MoreInfo/VHS)



Additional signage available from private companies
(Those listed below are available from Gempler's).

SELECT CHEMICAL DISINFECTANTS USED IN AQUACULTURE
APPENDIX B

Note: Before disinfecting, all surfaces must be cleaned. This includes removing any visible organic material such as vegetation, mud, feces, feed or other debris.

Product	Dilution	Mixing Instructions
Virkon® Aquatic	1:100 (1%) to 1:200 (0.5%) for 1 minute	Equipment, pumps, protective clothing, foot dips, bilges, bins, buckets, harvesting equipment, vehicles
Sodium hypochlorite (bleach)	200-500 ppm	Nets, boots, clothing. Surfaces must be clean; easily inactivated by organic debris. May be corrosive. Highly toxic for aquatic animals; Allow to inactivate for several days or neutralize with sodium thiosulfate after 3 hours. Note: Bleach is 5.25% sodium hypochlorite solution.
Iodine (iodophors)	200 ppm for a few seconds	Nets, boots, clothing. Surfaces must be clean; product is easily inactivated by organic debris. Highly toxic for aquatic animals.
Benzalkonium chloride (e.g., Roccal)	250 ppm	Plastic surfaces *can be toxic to fish, so use with caution
Alcohol (ethanol)	70%	Hand sanitizing

VHSV is very sensitive to UVC (280-200 nm wavelength) irradiation.

Sources: Center for Food Security and Public Health. Viral Hemorrhagic Septicemia Technical Disease Fact Sheet. May 2007. Available at: http://www.cfsph.iastate.edu/Factsheets/pdfs/viral_hemorrhagic_septicemia.pdf; The World Organization for Animal Health (OIE). Aquatic Animal Health Code, 2008.

DAILY VISITOR LOG

Date	Name	Reason for Visit	Time In	Time Out