

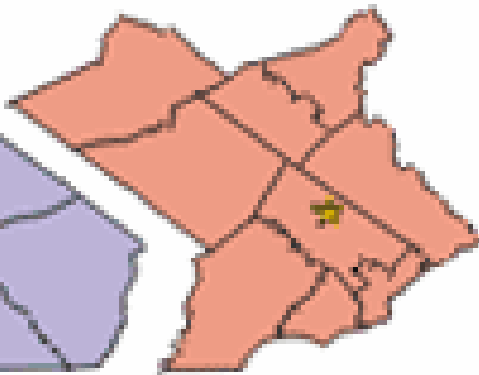
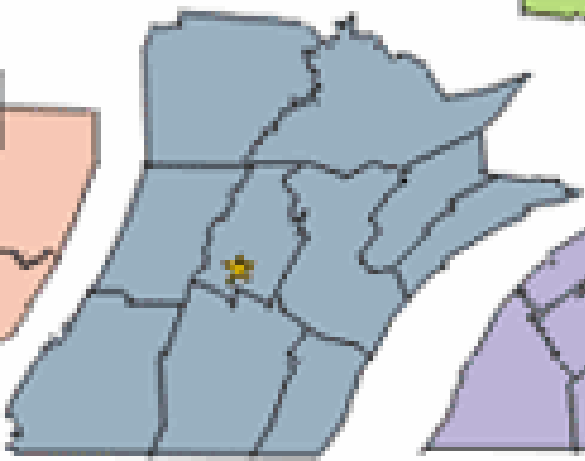
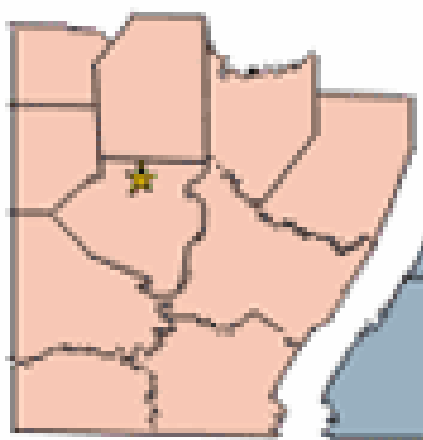
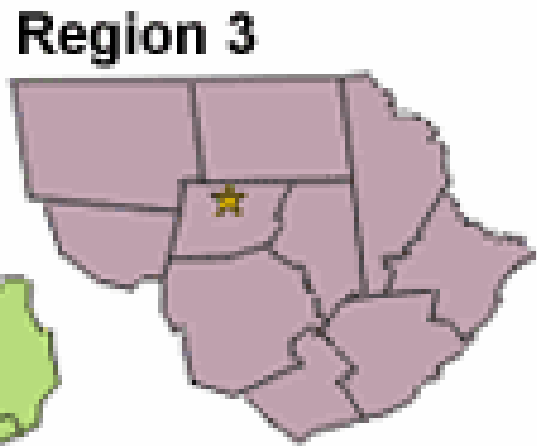
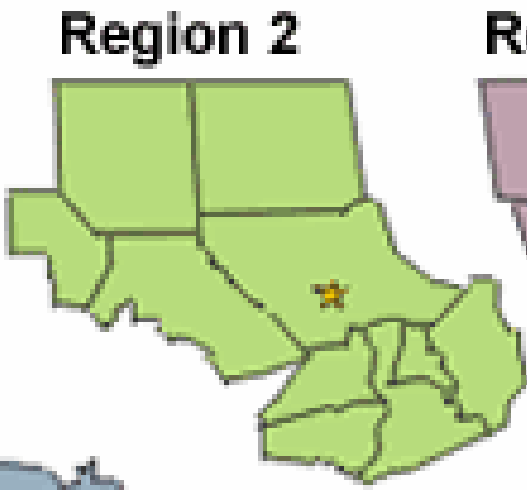
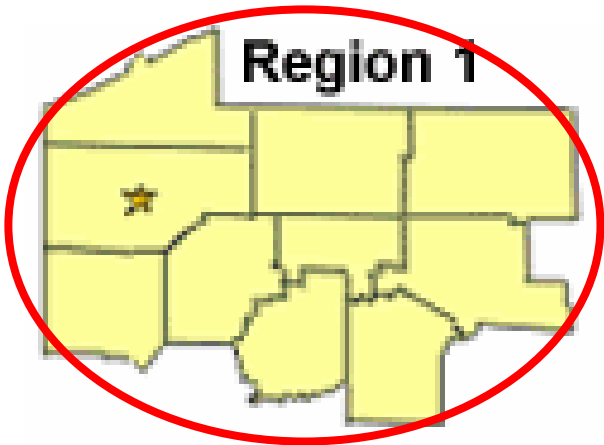
**VHS**

# **Viral Hemorrhagic Septicemia**

**Karen F. Martin, VMD  
Pennsylvania Department of Agriculture  
Bureau of Animal Health**

# PENNSYLVANIA DEPARTMENT OF AGRICULTURE

- Erie
- Crawford
- Mercer
- Warren
- Venango
- Clarion
- McKean
- Elk
- Forest
- Jefferson

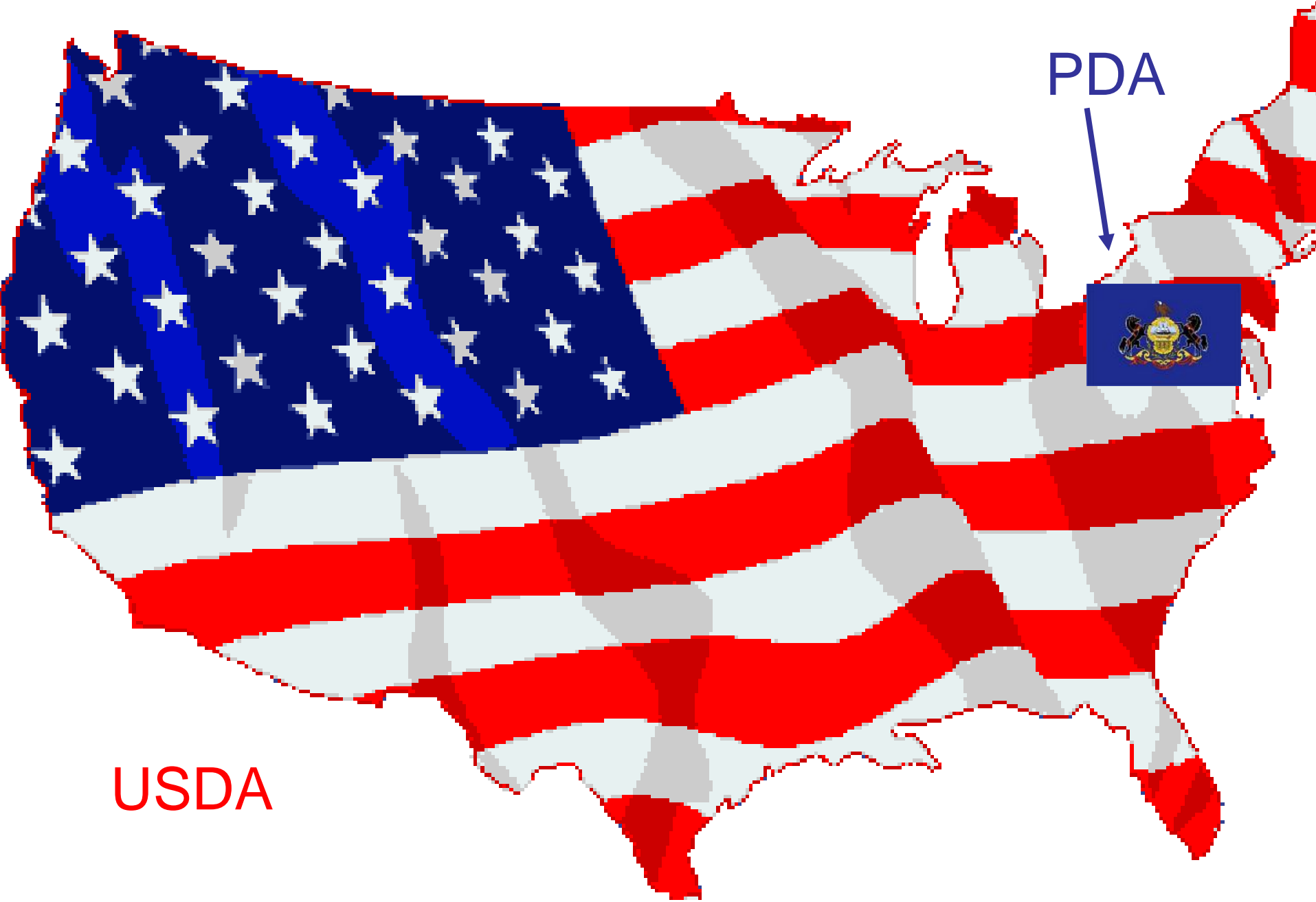


Region 4

Region 5

Region 6

Region 7



PDA



USDA

# Contact Information

## **United States Department of Agriculture**

2301 N. Cameron St., Rm. 412  
Harrisburg, PA 17110  
(717) 782-3442  
Fax (717) 782-4098

<http://www.aphis.usda.gov/vs/aqua>



## **Pennsylvania Department of Agriculture**

2301 N. Cameron St., Rm. 409  
Harrisburg, PA 17110  
(717) 783-9550

<http://www.agriculture.state.pa.us>



# State and Federal Government

- **State Laws**
- PDA = Pennsylvania Department of Agriculture
- Intrastate  
Inside the state







- **Federal Laws**
- USDA = United States Department of Agriculture
- Interstate  
Between states
- International  
Between countries



# Actions of the USDA



- 
- 
- 
- July 2006 Emerging Disease Notice VHS
  - October 24, 2006 Emergency Order
    - comprehensive ban on live import/exports of certain fish species throughout the Great Lakes region to control the spread of Viral Hemorrhagic Septicemia (VHS).
  - November 16, 2006 Amended Federal Order detailed permissible movements:
    - To slaughter for food
    - Movement to research facility or diagnostic laboratory
    - Provided for shipments if tested negative for VHS





Lake Huron

St. Lawrence River

Ontario

Toronto

Lake Ontario

Michigan

St. Clair River

Lake St. Clair

New York

Detroit

Niagara River

Buffalo

Lake Erie

Ohio River

Pennsylvania

Cleveland

Ohio

# Viral Hemorrhagic Septicemia

- Caused by a virus
- A rod-shaped RHABDOVIRUS
- Causes bleeding and death of the fish
- No known cure
- Some fish can be carriers of the virus = infected but not sick
- No cure, no treatment
- Once a disease only in Europe, appeared in NW USA, now in eastern United States
- Live virus can be found in dead fish and in frozen fish, in water, effluent, fish body fluids





Photos courtesy of M. Faisal, Michigan State University



**Dark Color**

**Bloated abdomens**

**Bulging eyes**

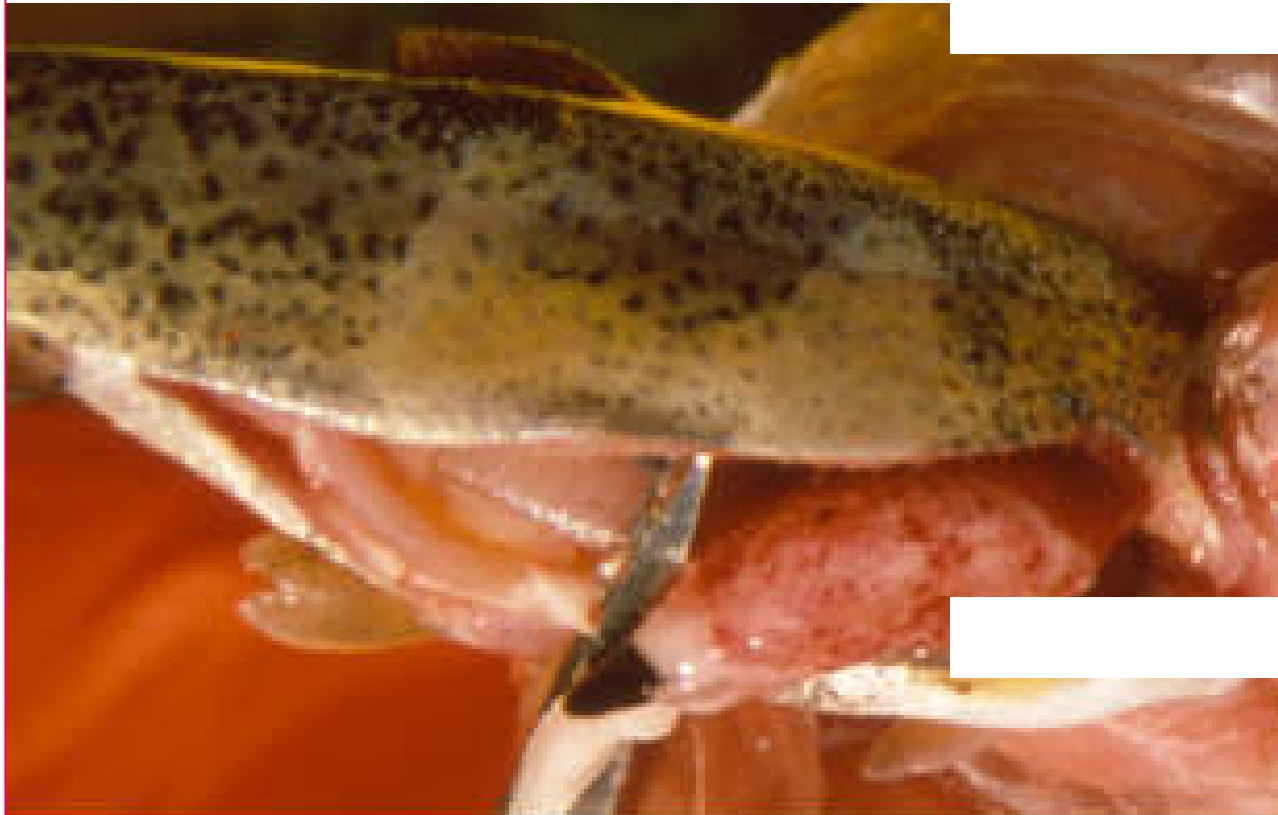




Dark Color

Bloated fluid-filled abdomens

*Darkened colour and distended fluid filled abdomen*



Hemorrhages on skin and internal organs

*Petechial haemorrhage in fat body surrounding the pancreas.*

## Gizzard Shad: Notice widespread hemorrhages



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University



**Gizzard shad:  
Notice  
subcapsular  
hemorrhage in the  
liver**

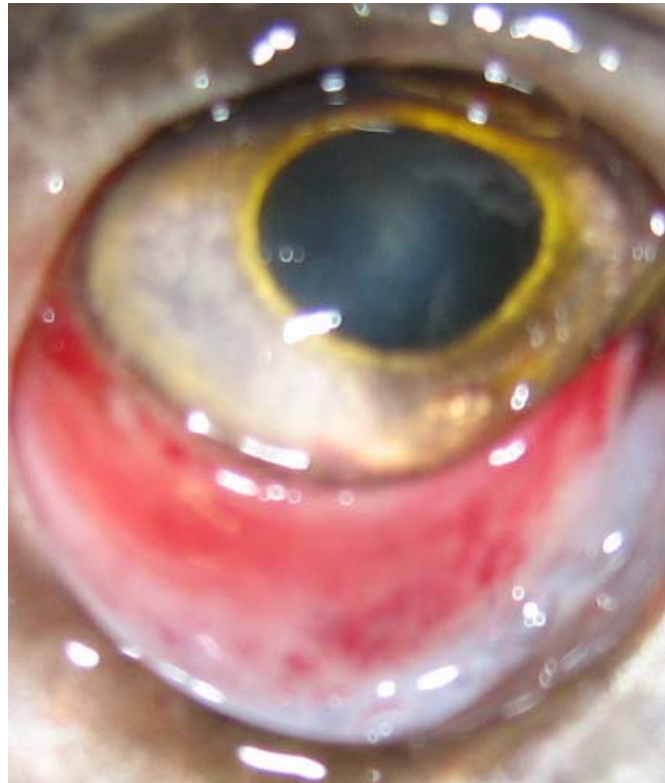
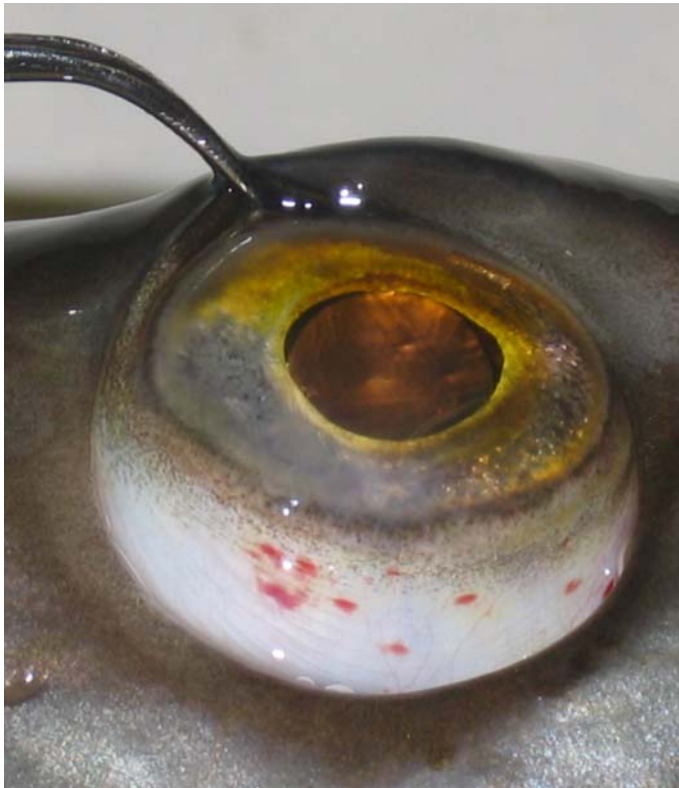
Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

## **Gizzard shad swimbladder membrane: Notice congestion and hemorrhages**



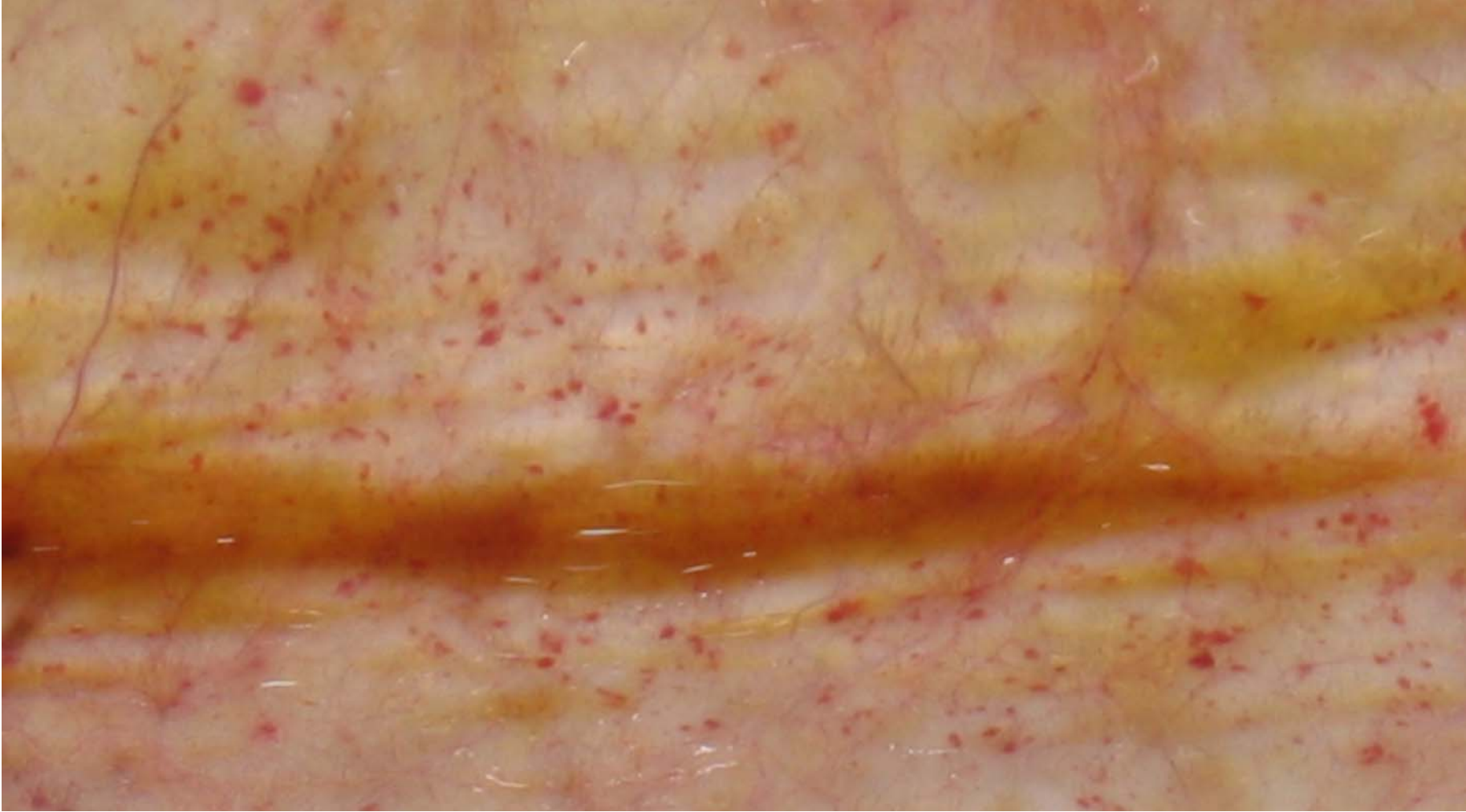
Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

## Eye of a muskellunge: Notice petechial hemorrhages



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

**Muskellature of an infected muskellunge: Notice petechial hemorrhages**



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

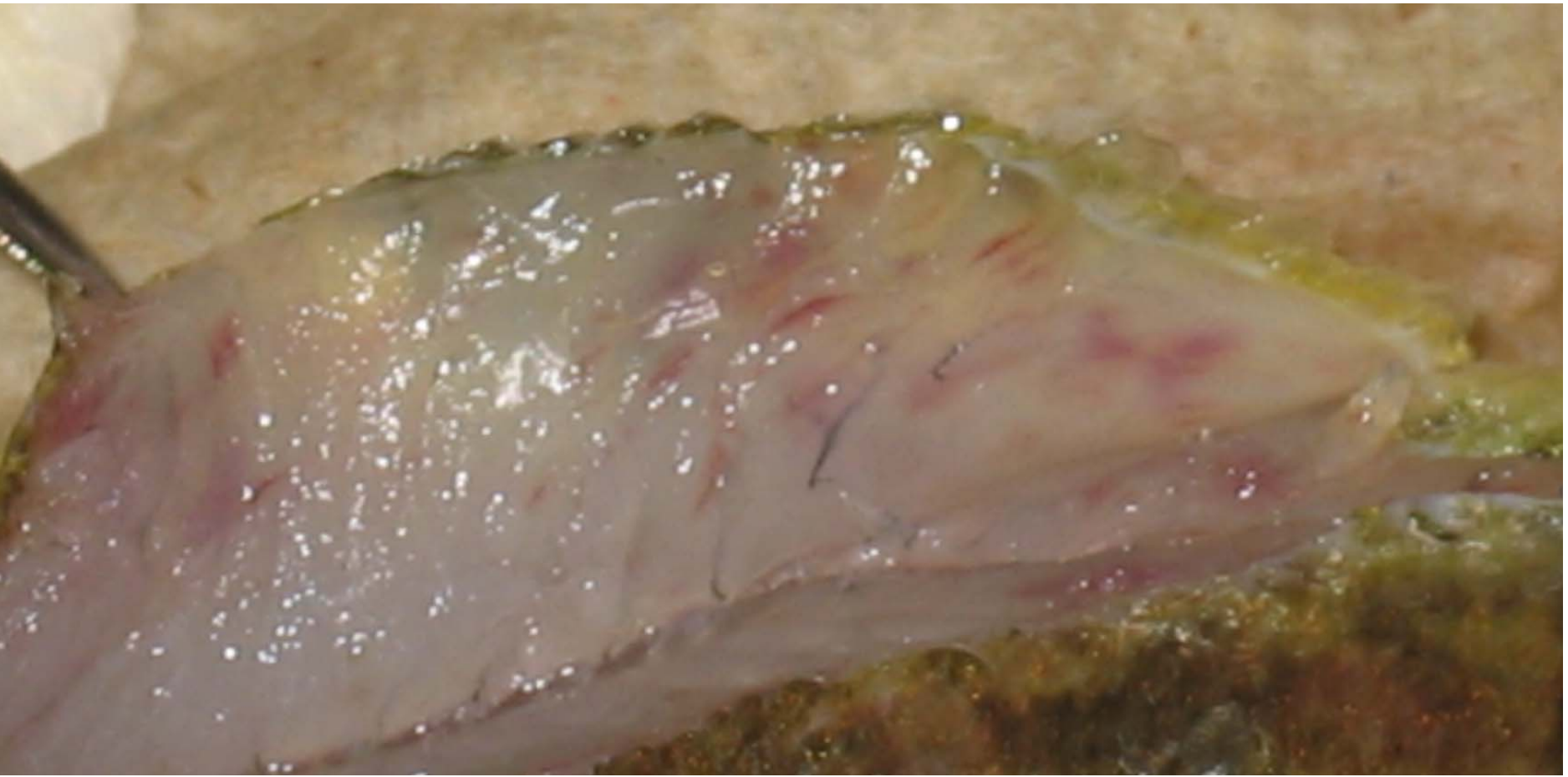


## Yellow Perch



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

# Yellow Perch



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

# Freshwater Drum



Photos of diseased fish from Lake St. Clair, Mohamed Faisal at Michigan State University

# USFWS confirms virus in Lake Erie drum kill

Thursday, June 22, 2006



# March 14, 2006: Gizzard Shad Mortalities



Photo: M. Faisal, Michigan State University



## Affected Water in Our Region

Lake Erie

Lake Ontario

St. Lawrence River

Lake St. Clair

Niagara River

Conesus Lake (Finger Lakes, NY)



# What about the Emerald Shiner?



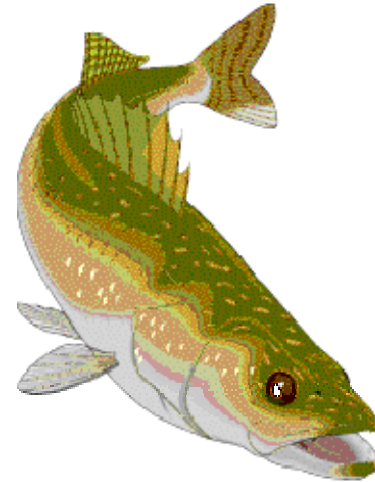
# Some of the Susceptible Species

- Atlantic cod
- Black Crappie
- Bluegill
- Bluntnose minnow
- Brown trout
- Burbot
- Channel catfish
- Chinook salmon
- Coho salmon
- Chum salmon
- **Emerald shiner**
- Freshwater drum
- Gizzard shad
- Grayling
- Haddock
- Herring
- Japanese flounder
- Largemouth bass
- Muskellunge
- Pacific cod
- Pike
- Pink salmon
- Pumpkinseed
- Rainbow trout
- Redhorse sucker
- Rock bass
- Rockling
- Round goby
- Smallmouth bass
- Sprat
- Turbot
- Walleye
- White bass
- White perch
- Whitefish
- Yellow perch



# USDA Permissible Movement of VHS Susceptible Live Fish

- Movement to slaughter (to eat or sell for food)
- Movement to research or diagnostic laboratories
- Other movement if tested negative



# Movement to New York from PA

- Regulated by the USDA and by New York
- A state must comply with the USDA requirements, but can make rules that are more strict.
- USDA says you can ship fish to NY if they test negative for VHS at an approved laboratory: Maine and Washington
- NY will only accept Certified Disease - Free Fish. Not only must fish test negative for VHS, but also...

# The 6 and 8 rule

- To send non-salmonids to NY, they must test negative for 6 diseases:

Viral Hemorrhagic Septicemia (VHS)

*Aeromonas salmonicida* (Furunculosis)

*Yersinia ruckeri* (Enteric Red Mouth)

Infectious Pancreatic Necrosis Virus (IPN)

Spring Viremia of Carp Virus (Infectious carp dropsy)

Heterosporis

- To send salmonids to NY, they must test negative for 8 diseases. The above 6 plus:

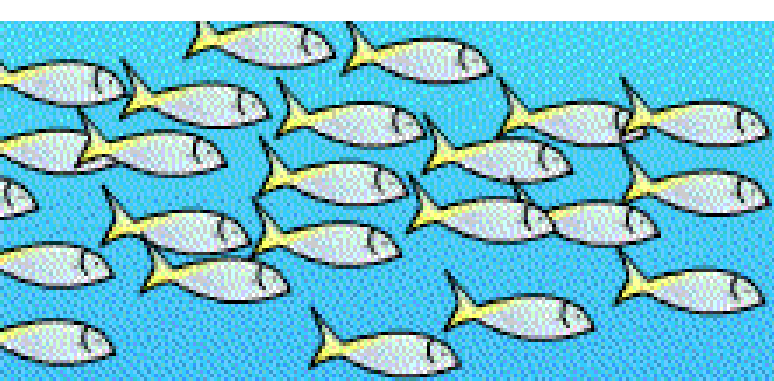
*Myxobolus cerebralis* (whirling disease);

*Renibacterium salmoninarum* (bacterial kidney disease);

Infectious Hematopoietic Necrosis Virus (IHN).

Fish can move into NY for food or  
for aquariums





**How is testing accomplished?**

**Dr. Lester Khoo, New Bolton Center,  
University of Pennsylvania, Philadelphia.**

**(610) 444-5800**

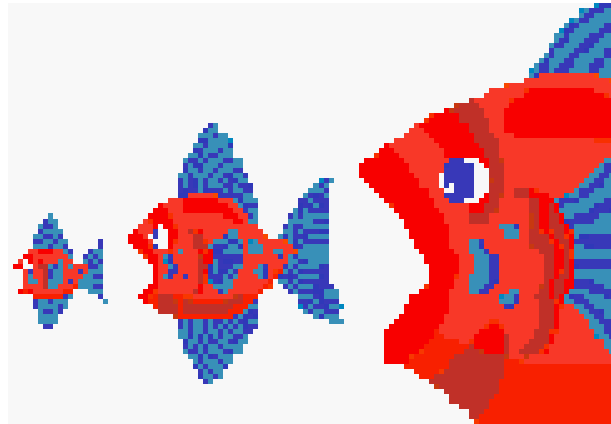
**Whole fish will be sent to the Laboratory  
in Maine.**



# Fish Laboratories

1. **Microtechnologies**, 41 Main Street, Richmond, Maine 04357 207-737-2637  
<http://www.microtechnologies.biz/default.aspx>
2. **Washington Animal Disease Diagnostic Laboratory**, College of Veterinary Medicine, PO Box 647010, Washington State University, Pullman, WA 99164-7010.  
(509) 335-6656. Ask for Jim Thompson.  
[http://www.vetmed.wsu.edu/depts\\_waddl/](http://www.vetmed.wsu.edu/depts_waddl/)

<http://www.aphis.usda.gov/vs/aqua>



Bear in mind that any of these requirements may change.



Jim Lavrakas / Anchorage Daily News