



VT Baitfish Regulations Review Update: Comprehensive Evaluation of Fish Pathogens & Aquatic Nuisance Species (ANS)

PRESENTATION TO THE VERMONT FISH & WILDLIFE BOARD

FEBRUARY 21ST, 2018

TEAM MEMBERS: ADAM MILLER, SHAWN GOOD, TOM JONES, CHERYL FRANK SULLIVAN, TIM BIEBEL

VT Baitfish Regulations Review Team

Goal Statement: "Review the current VT baitfish regulations with the strong likelihood of coming back to the VT Fish & Wildlife Board with a revised proposal in the future to regulate baitfish use in a manner that is in the best interest of the public and protects VT's fisheries resources."



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- ▶ Review research done to date regarding evaluation of fish pathogens (including VHS) in the Northeast and surrounding area
- ▶ Review research done to date regarding evaluation of ANS in the Northeast and surrounding area
- ▶ Discuss recent enforcement action that was taken regarding a mosquitofish detection in imported fathead minnows.
- ▶ Gather feedback from the Board regarding research on evaluation of pathogens (including VHS) and ANS in the Northeast and surrounding area

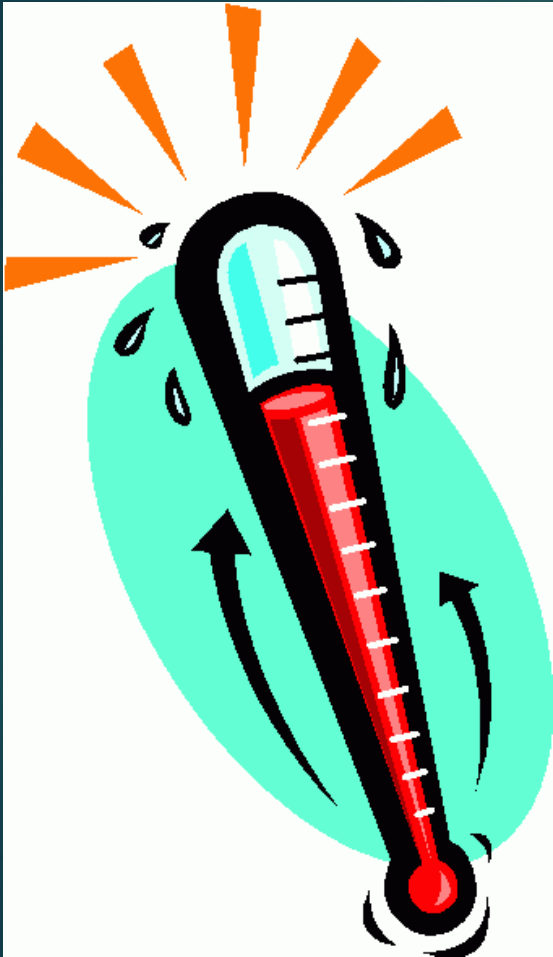


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Fish Pathogens of Concern



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- ▶ Emergency Pathogens
 - ▶ Not yet detected in Northeast. Can lead to high mortality of stock and large scale die-off of wild stocks.
- ▶ Limited A Pathogens
 - ▶ Detected in specific sub-basins in the Northeast. Can have adverse effects on cultured and wild stocks, including epizootic mortality causing events.
- ▶ Limited B Pathogens
 - ▶ Have been detected in wild and cultured fishes in specific areas of the Northeast, but whose geographic range is limited or undetermined. Action should be taken to restrict and further reduce pathogen transmission.
- ▶ Restricted Fish Pathogens
 - ▶ Have caused epizootics under very specific circumstances, within limited species and situations.

Fish Pathogens of Concern

Emergency Pathogens

Pathogen Code	Pathogen Name	Disease
IHNV	Infectious Hematopoietic Necrosis Virus ¹	Infectious Hematopoietic Necrosis
VHSV-NIVB	Viral Hemorrhagic Septicemia (non-IVb) ¹	Viral Hemorrhagic Septicemia
CS	<i>Ceratomyxa shasta</i> ²	Ceratomyxosis
SV	Spring Viremia of Carp Virus ¹	Spring Viremia of Carp
PKD	<i>Tetracapsuloides bryosalmonae</i> ²	Proliferative Kidney Disease

Limited B Pathogens

Pathogen Code	Pathogen	Disease
IPNV	Infectious Pancreatic Necrosis virus	Infectious Pancreatic Necrosis
LMBV	Largemouth Bass virus	Largemouth bass virus
RS	<i>Renibacterium salmoninarum</i>	Bacterial Kidney Disease
AS	<i>Aeromonas salmonicida</i>	Furunculosis
YR	<i>Yersinia ruckeri</i>	Enteric Redmouth Disease

Limited A Pathogens

Pathogen Code	Pathogen	Disease
MC	<i>Myxobolus cerebralis</i>	Whirling Disease
ISAV	Infectious Salmon Anemia virus ^{3,4}	Infectious Salmon Anemia
KHV	Koi Herpesvirus ^{3,4}	Koi Herpesvirus
VHSV-IVB	Viral Hemorrhagic Septicemia virus (IVb only) ⁴	Viral Hemorrhagic Septicemia

Table I-4. List of Restricted pathogens and associated disease.

Pathogen Code	Pathogen	Disease (Acronym)
EEDV	Lake trout herpesvirus	Epizootic epitheliotrophic disease
NS	<i>Nucleospora salmonis</i>	Nucleospora
WSHV	White Sturgeon Herpesvirus	White Sturgeon Herpesvirus
WSIV	White Sturgeon Iridovirus	White Sturgeon Iridovirus
CCV	Channel Catfish Virus	Channel Catfish Virus
ESC	<i>Edwardsiella ictaluri</i>	Enteric Septicemia of Catfish
BA	<i>Bothrioscephalus acheilognathi</i>	Asian Tapeworm
ELSV	Lymphosarcoma Virus	Esocid Lymphosarcoma Virus
PLO	<i>Piscerickettsia</i> -like organism	Muskie Pox
HSP	<i>Heterosporis</i>	Heterosporiosis

Is there a threat of moving fish pathogens by moving fish?

- ▶ Enteric Redmouth (ERM) in Idaho in the 1950's
 - ▶ Today ERM is worldwide.
 - ▶ Culprit in spreading of the disease – artificial movement of cultured fish.
- ▶ Whirling Disease in the Northeast
 - ▶ Believed to have originated from brown trout which came from Europe.
 - ▶ Detection of whirling disease in Connecticut was traced back to fish that were transferred from a source facility in Pennsylvania.
 - ▶ Detection of whirling disease in the Batten Kill is believed to have originated from a NY stocking of whirling disease positive fish.
- ▶ Movement of baitfish pathogens is just as risky, if not more risky given that scientific research hasn't fully grasped the impacts of disease on baitfish like we know about trout and salmon.

Progress to Date: Evaluation of Fish Pathogens (including VHS) & ANS

- ▶ Movement of water is a major concern
 - ▶ Many times fish pathogens (viruses, parasites, and bacteria) are microscopic
- ▶ VHS is still a concern
 - ▶ Cold water loving virus
 - ▶ Death from VHS occurs from hemorrhaging. So much hemorrhaging occurs that organs begin shutting down which leads to death.
 - ▶ No successful treatment once fish contract the disease
 - ▶ Over 60 fish species are known to be infected by VHS including some invertebrates like crayfish and leeches
 - ▶ Emerald shiners (a popular baitfish species) have been implicated as a major carrier of VHS.
 - ▶ Survivors of the virus can become carriers and spread the disease
 - ▶ Rod Getchell (Cornell University) research shows Round Goby are an especially susceptible species to VHS and are currently on the move invading different areas of NY's canal system.

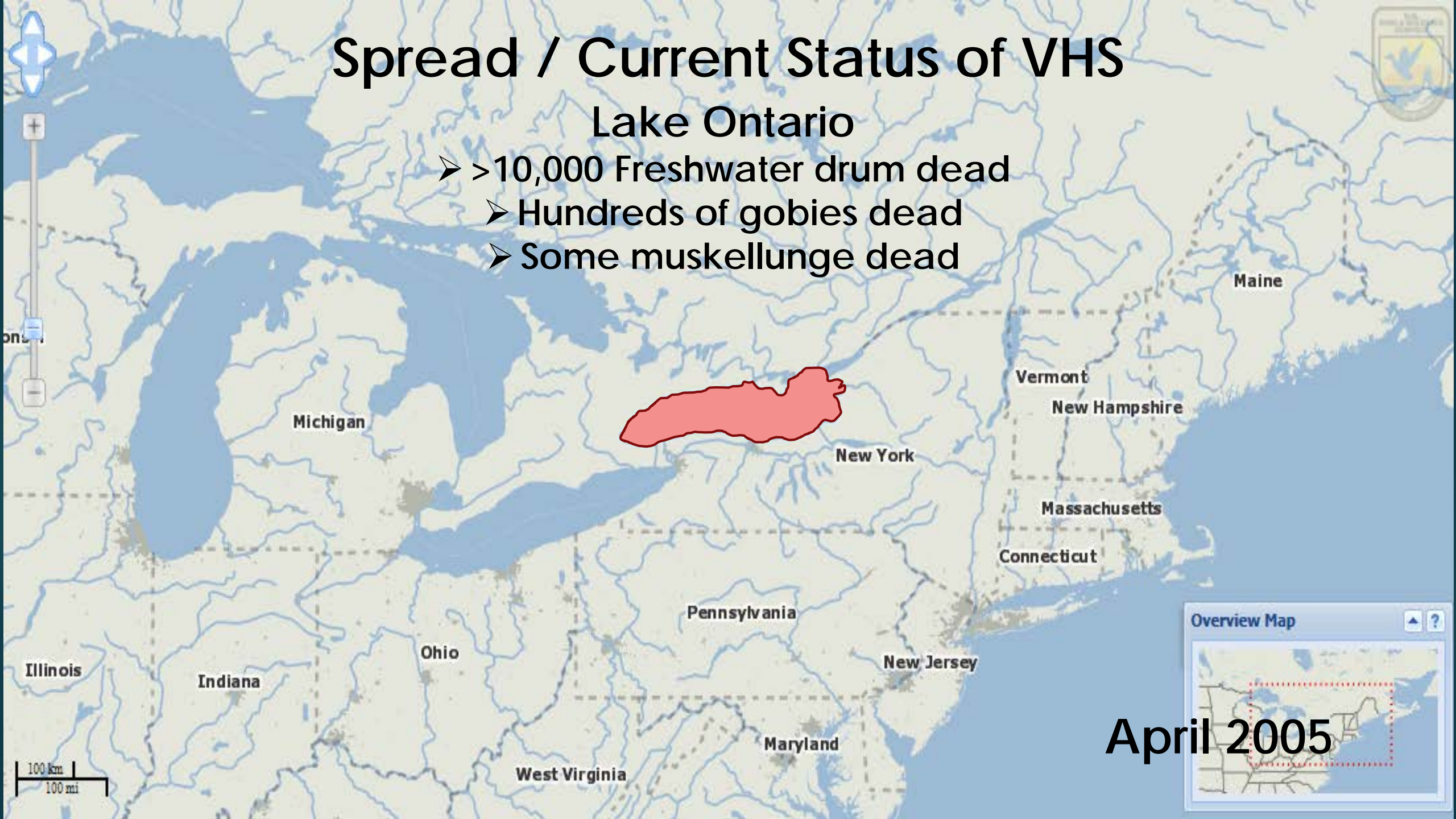
Spread / Current Status of VHS



Spread / Current Status of VHS

Lake Ontario

- >10,000 Freshwater drum dead
- Hundreds of gobies dead
- Some muskellunge dead

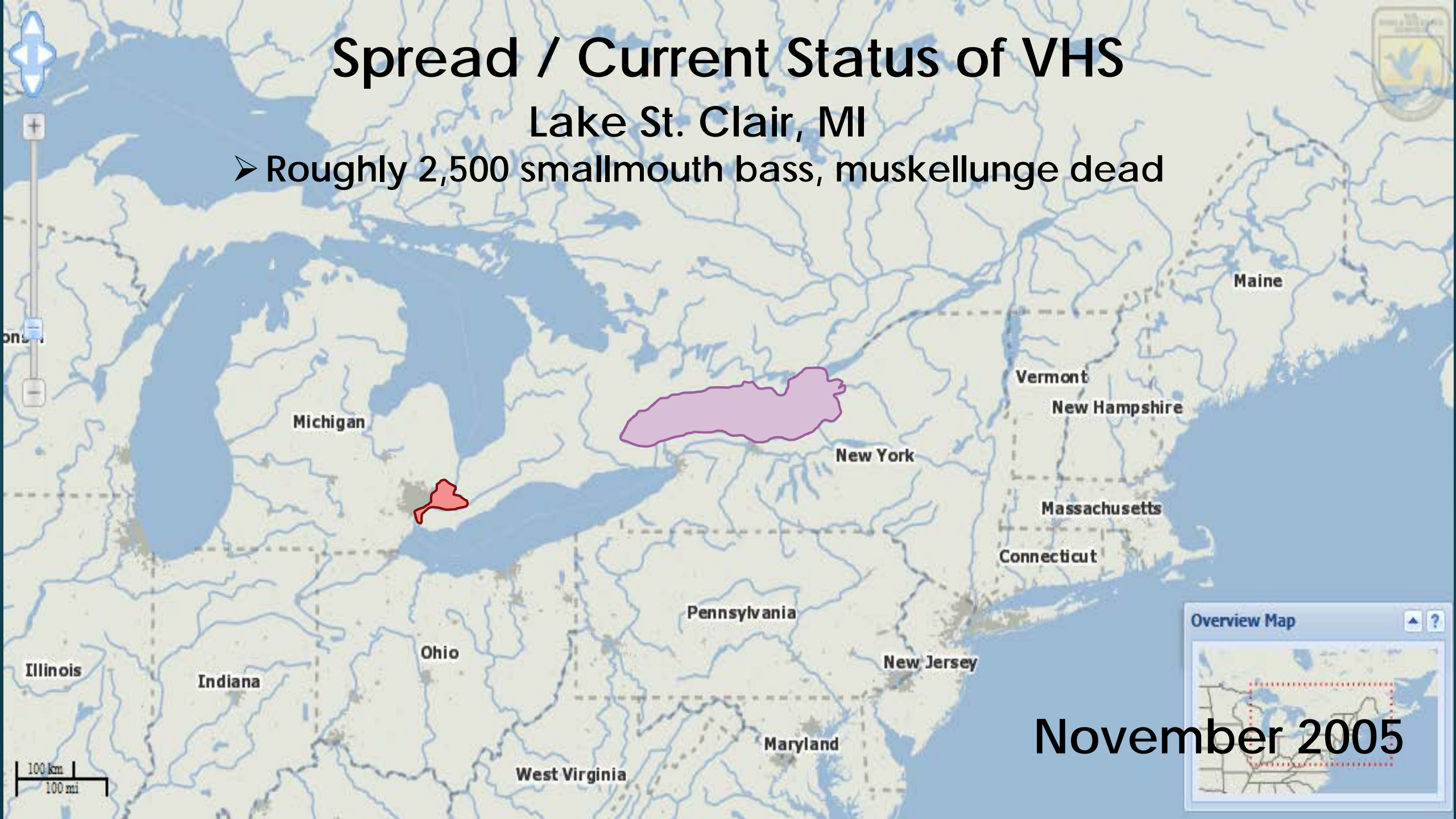


April 2005

Spread / Current Status of VHS

Lake St. Clair, MI

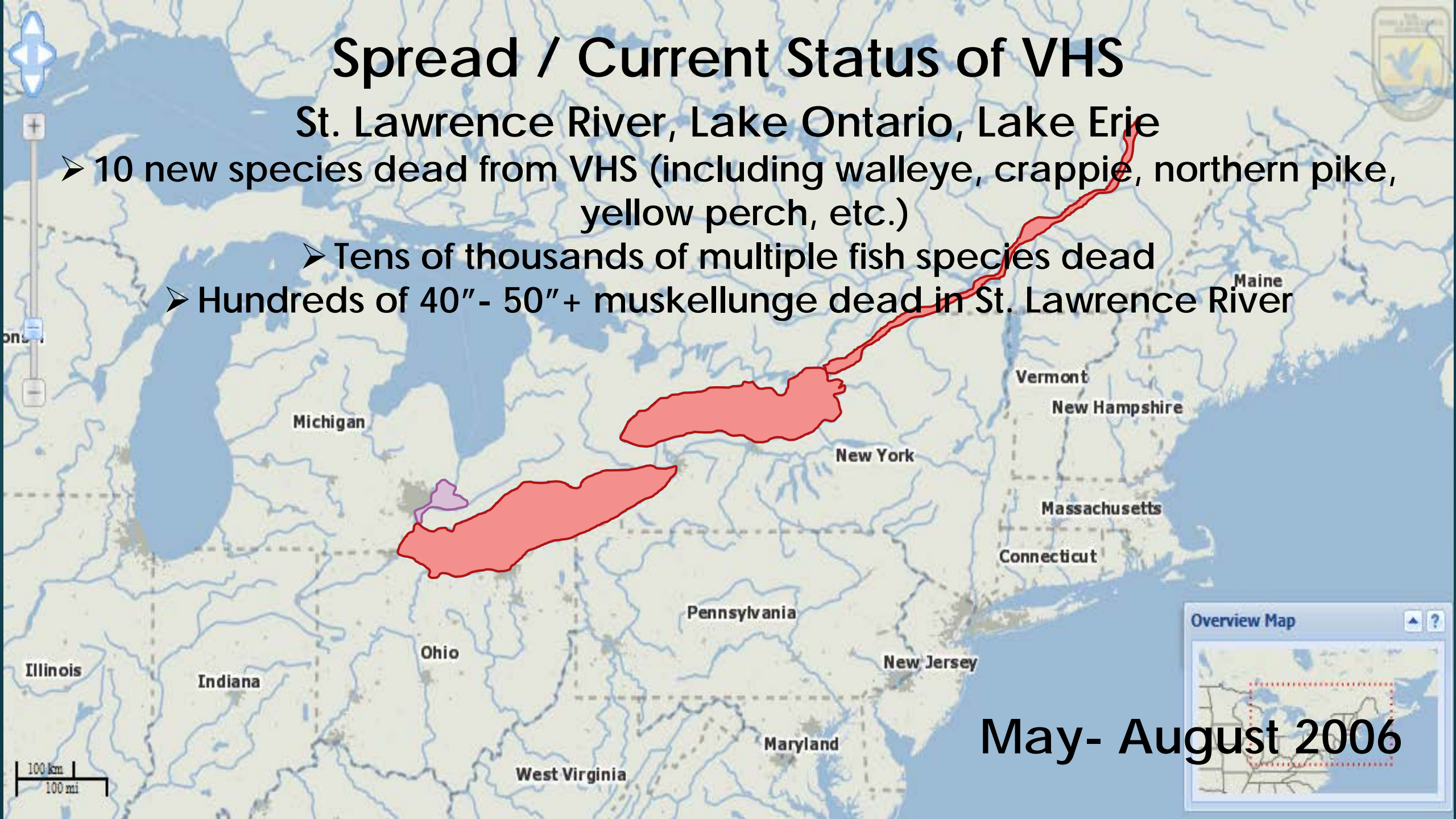
➤ Roughly 2,500 smallmouth bass, muskellunge dead



Spread / Current Status of VHS

St. Lawrence River, Lake Ontario, Lake Erie

- 10 new species dead from VHS (including walleye, crappie, northern pike, yellow perch, etc.)
 - Tens of thousands of multiple fish species dead
 - Hundreds of 40" - 50"+ muskellunge dead in St. Lawrence River



May- August 2006

Spread / Current Status of VHS

Conesus Lake, NY

➤ Several hundred walleye dead from VHS



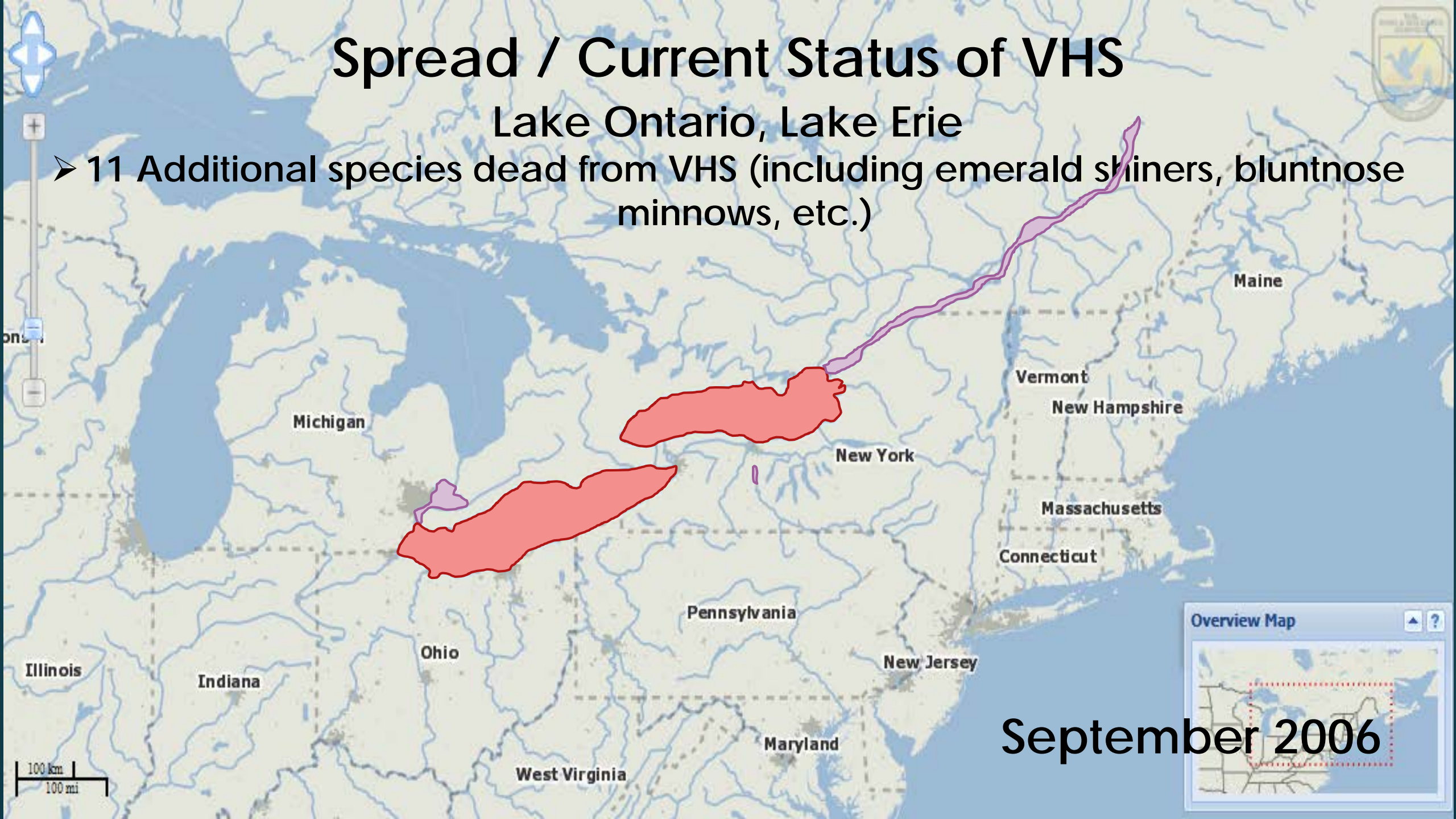
Particularly alarming in that in only one year the virus was able to travel inland from the Great Lakes

August 2006

Spread / Current Status of VHS

Lake Ontario, Lake Erie

- 11 Additional species dead from VHS (including emerald shiners, bluntnose minnows, etc.)

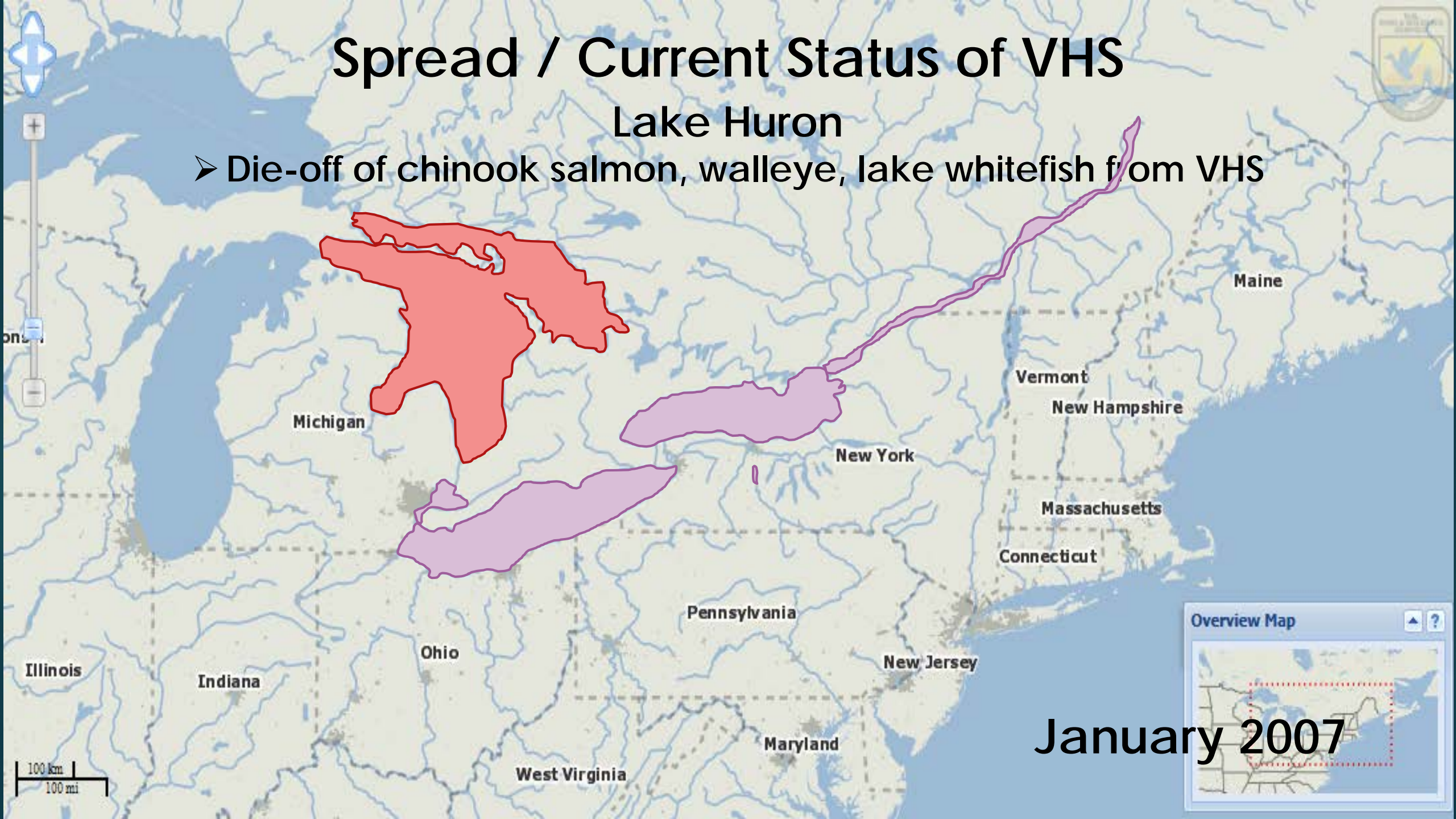


September 2006

Spread / Current Status of VHS

Lake Huron

- Die-off of chinook salmon, walleye, lake whitefish from VHS



January 2007

Spread / Current Status of VHS Lake Michigan

➤ Die-off of brown trout, chinook salmon from VHS

➤ Thousands of smallmouth bass, muskellunge, black crappie, and bluegill dead from VHS

Budd Lake, MI

Lake Butte des Morts, Lake Winnebago, WI

➤ Hundreds of freshwater drum, bass, and panfish dead from VHS

Budd Lake was the first detection of VHS in a water that was hydrologically disconnected from the great Lakes. Baitfish movement was implicated in this movement of the disease

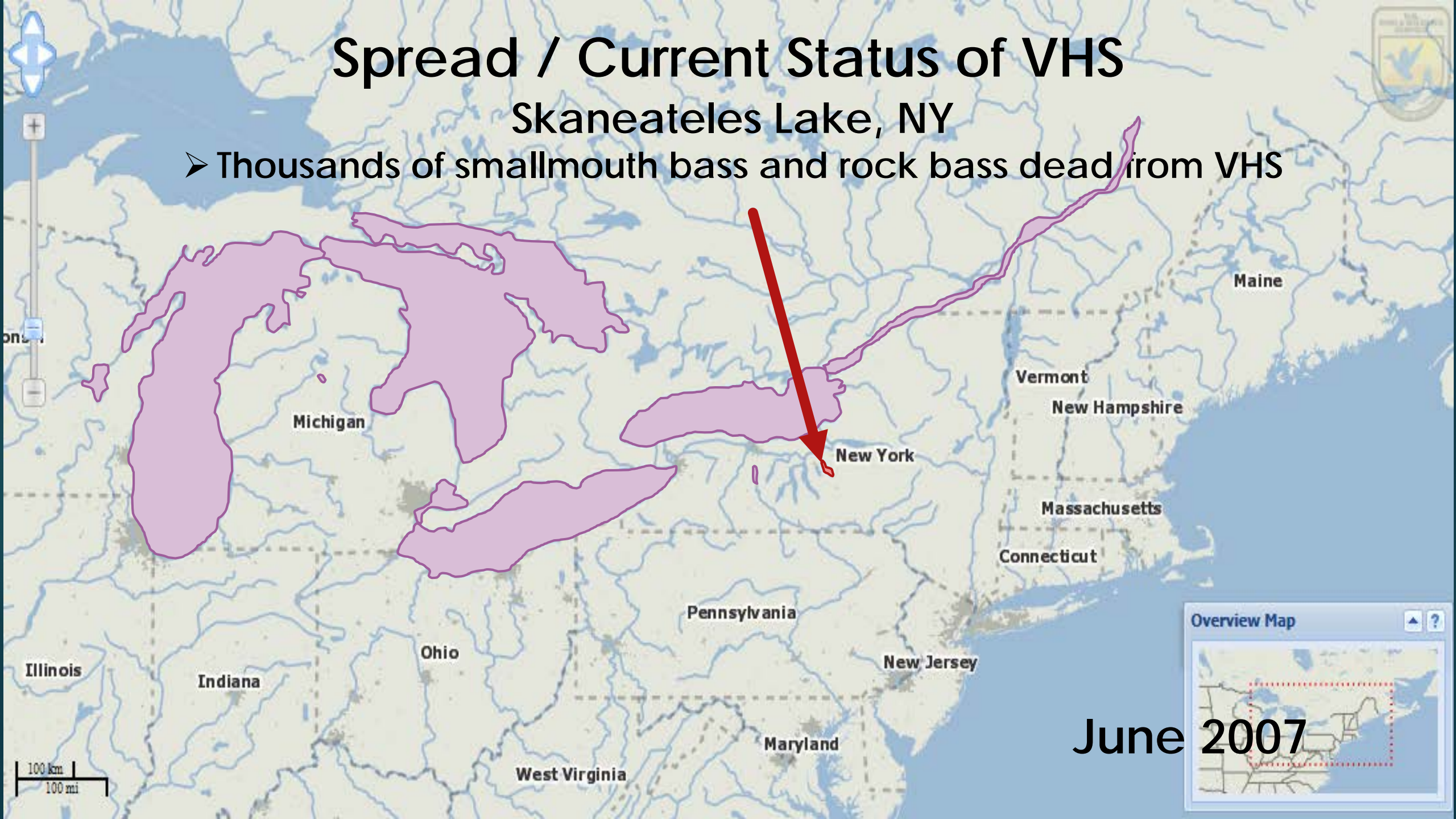
May 2007



Spread / Current Status of VHS

Skaneateles Lake, NY

➤ Thousands of smallmouth bass and rock bass dead from VHS



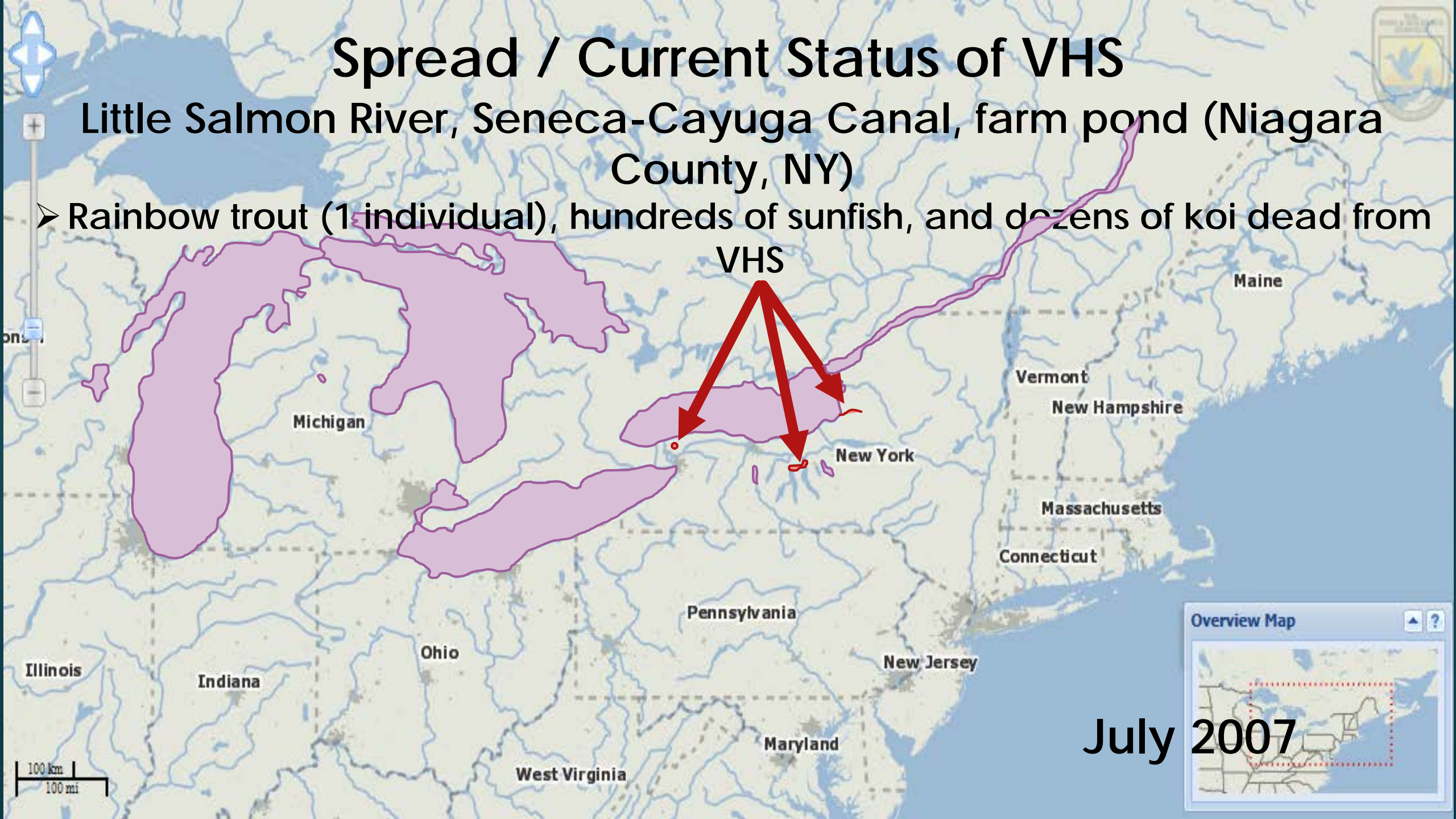
June 2007

Spread / Current Status of VHS

Little Salmon River, Seneca-Cayuga Canal, farm pond (Niagara County, NY)

➤ Rainbow trout (1 individual), hundreds of sunfish, and dozens of koi dead from

VHS

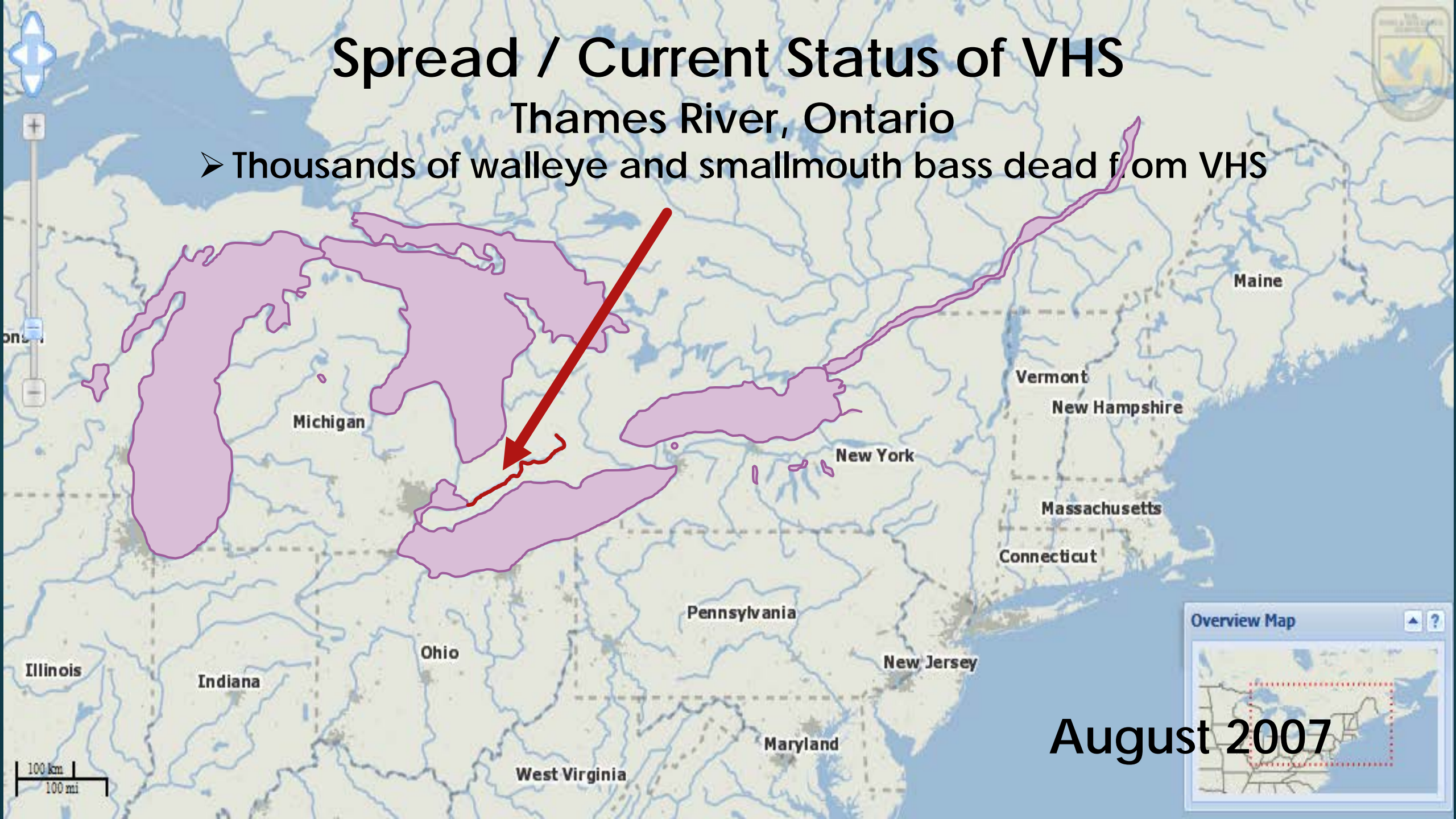


July 2007

Spread / Current Status of VHS

Thames River, Ontario

➤ Thousands of walleye and smallmouth bass dead from VHS

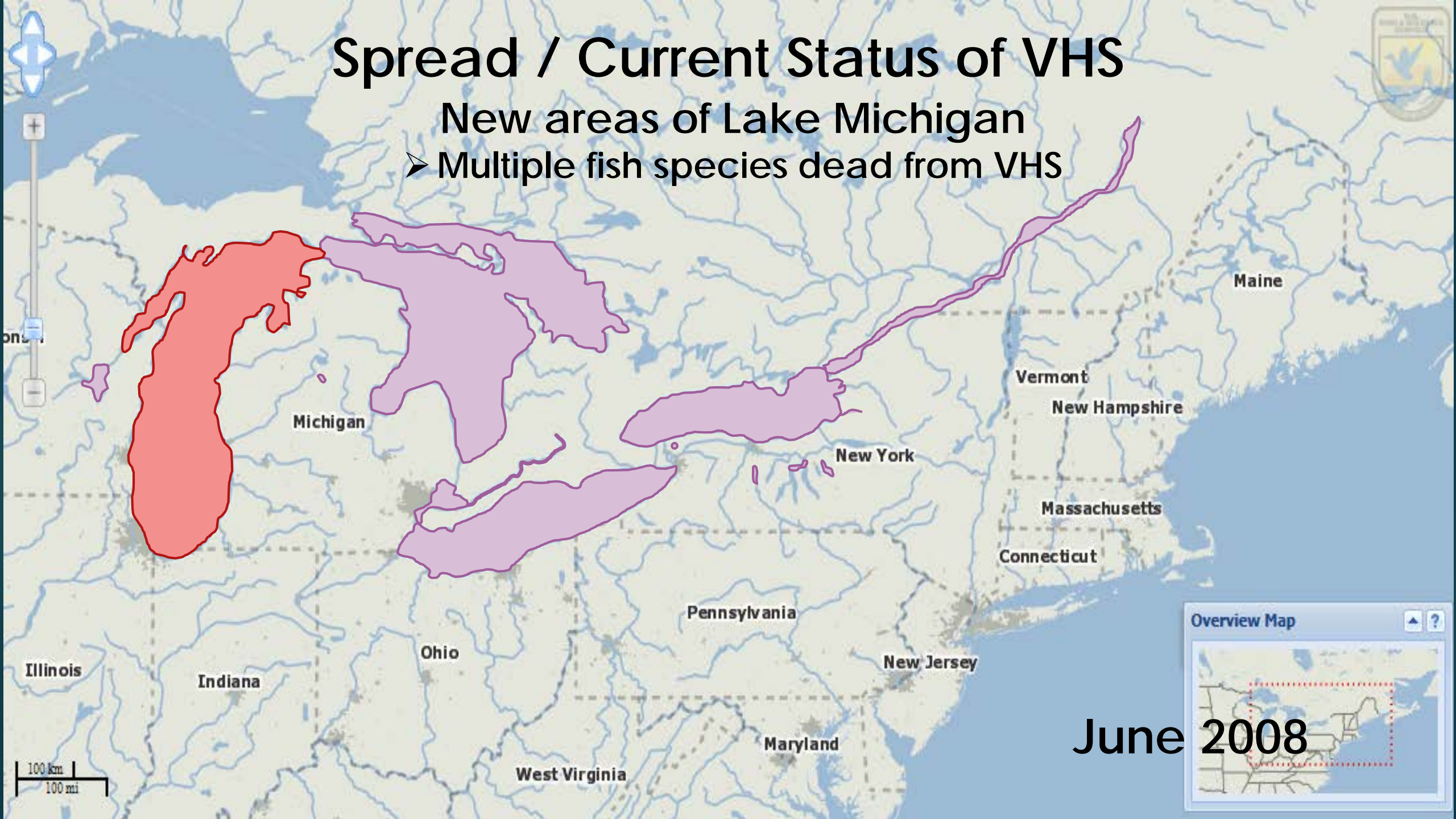


August 2007

Spread / Current Status of VHS

New areas of Lake Michigan

➤ Multiple fish species dead from VHS

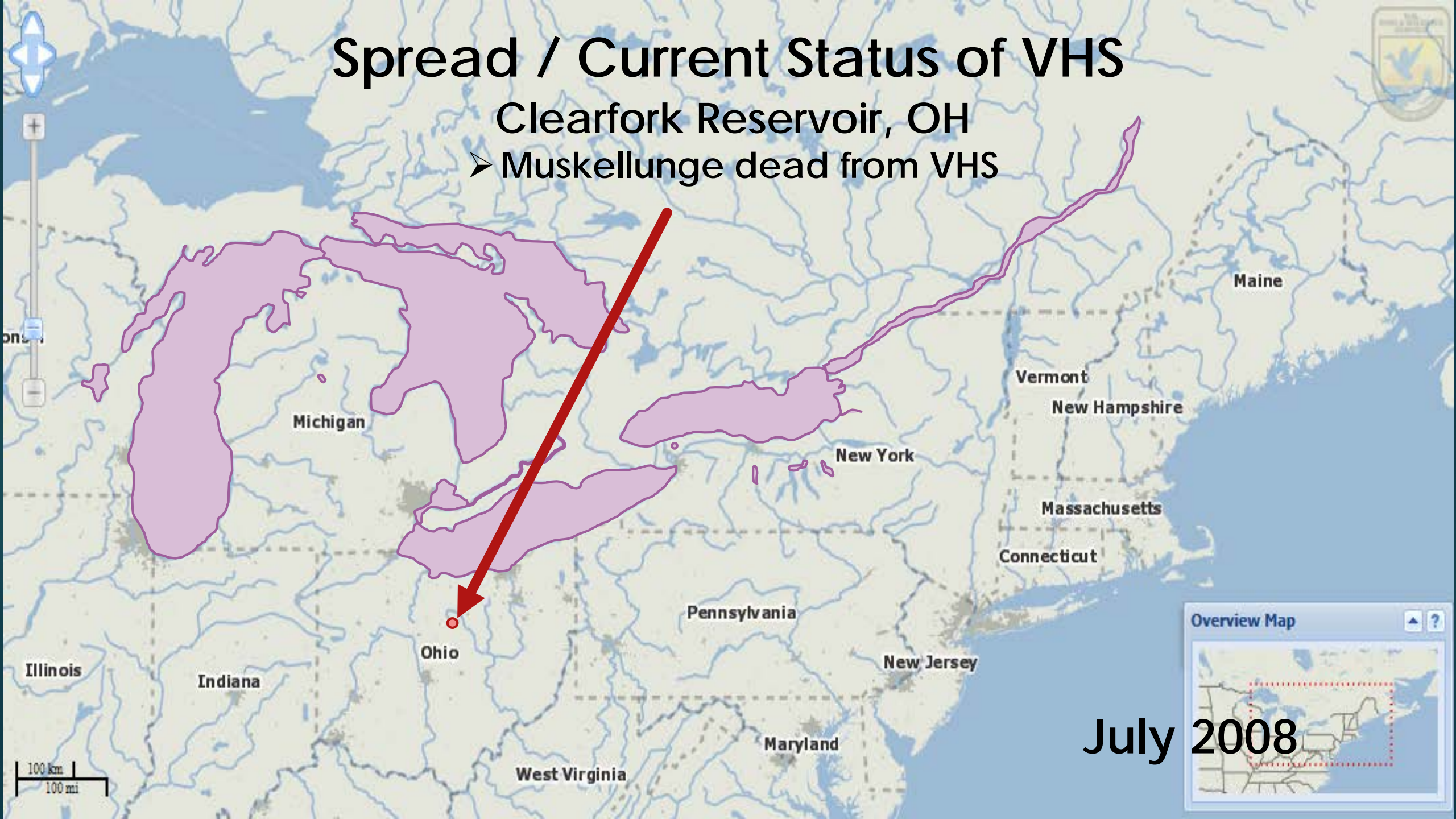


June 2008

Spread / Current Status of VHS

Clearfork Reservoir, OH

➤ Muskellunge dead from VHS

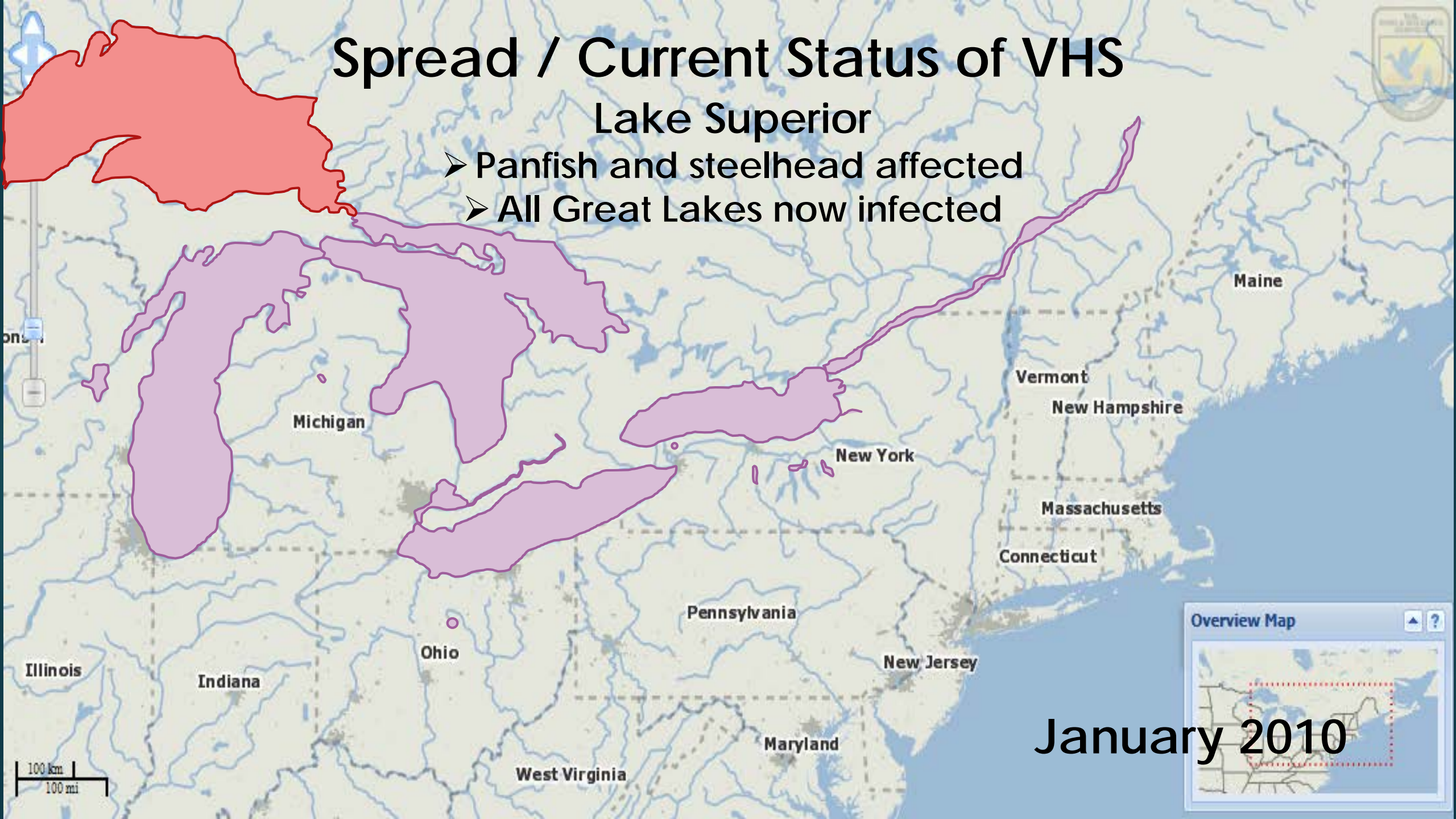


July 2008

Spread / Current Status of VHS

Lake Superior

- Panfish and steelhead affected
- All Great Lakes now infected

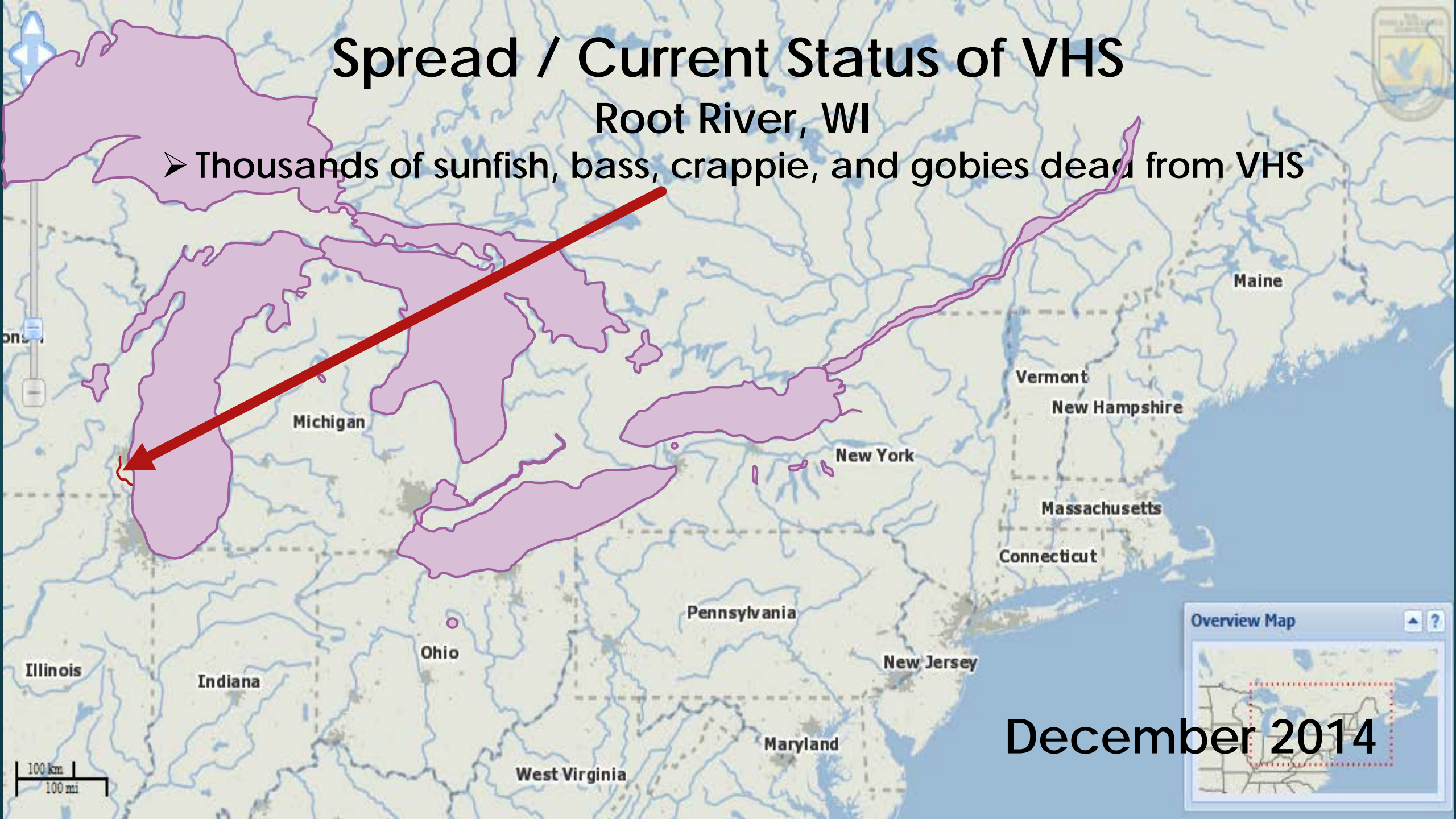


January 2010

Spread / Current Status of VHS

Root River, WI

➤ Thousands of sunfish, bass, crappie, and gobies dead from VHS



December 2014

Spread / Current Status of VHS

Lake St. Clair, MI

- Tens of thousands of fish dead from VHS (gizzard shad, bluegill, black & white crappie)
- First fish kill from VHS in Lake St. Clair since 2006

Cayuga Lake

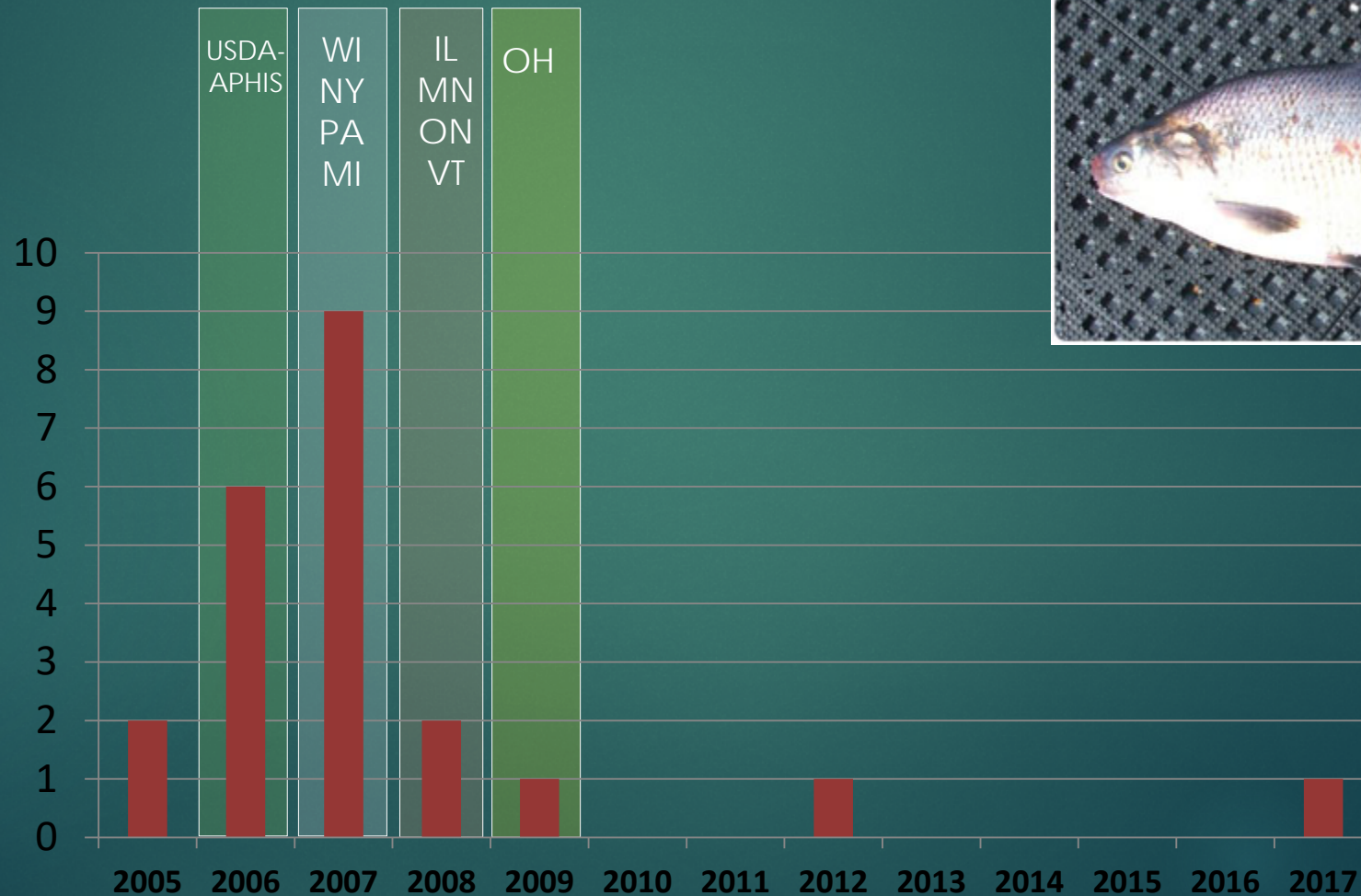
- Thousands of round gobies dead from VHS
- First new detection of VHS in finger lakes since 2007

May 2017



New Waters VHS Infected Per Year

Implementation of Regulations



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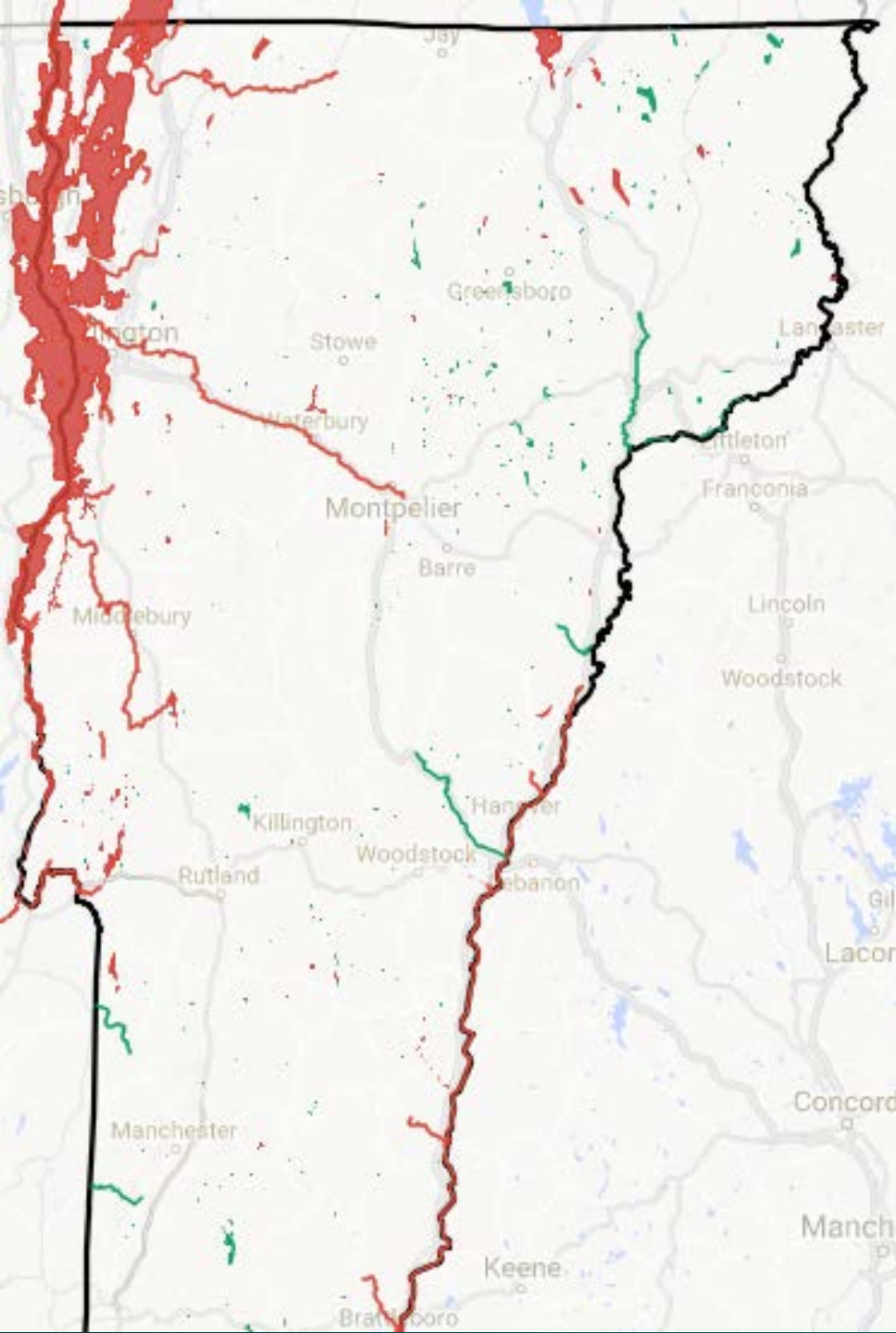
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Progress to Date: Evaluation of ANS

- ▶ ANS is a very real threat
 - ▶ Impacts to fisheries resources - Early mortality syndrome in Champlain landlocked Atlantic salmon, St. Lawrence River VHS muskellunge die-offs
 - ▶ Impacts to recreation - Decreased fish populations / opportunity
 - ▶ Diminished economic returns - Lake Erie yellow perch fishery
 - ▶ Human health concerns - Hospital admissions due to zebra mussels
- ▶ There are many fish pathogen / ANS threats to and within VT.
 - ▶ Outside of VT – Round goby, New Zealand Mud Snails
 - ▶ Within VT – Alewife, zebra mussels, Asian clam, Spiny Water Flea
- ▶ Risk vectors
 - ▶ Highest risk – Lake Champlain – approx. 50 aquatic invasive species present, hydrologic connection with more infected waters
 - ▶ Other risk vectors in VT – Lake Bomoseen (Asian Clams), Lake St. Catherine, Lake Carmi (Alewife), and others.





Vermont DEC ANS Map

▶ Key notes:

- ▶ Presence of Alewife: Lake Champlain, Lake Carmi (recent detection), Lake St. Catherine
- ▶ Presence of Zebra Mussels: Lake Champlain, Lake Bomoseen
- ▶ Presence of Asian Clams: Lake Bomoseen
- ▶ Presence of Spiny Water Flea: Lake Champlain

For a full listing of ANS in VT: go to http://dec.vermont.gov/sites/dec/files/wsm/lakes/ans/docs/lp_InfestedWaterBodiesList2015.pdf

Imminent Fish Pathogen / ANS threats outside of Vermont

▶ ANS

- ▶ Round goby – Probably the most imminent threat. Currently are spreading through the NY lock and canal system on their own volition. Well established in the Richelieu, Hudson, and Mohawk systems.
- ▶ Quagga mussels – close cousin to Zebra mussels
- ▶ New Zealand mud snails – very small species, a dozen can fit onto a dime
- ▶ Asian carp – not quite an immediate threat but when young they look almost identical to a gizzard shad.

▶ Fish Pathogens

- ▶ VHS has been and continues to be the most imminent threat of fish pathogen that has not been detected yet in VT.

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Enforcement Action: Mosquitofish

- ▶ An anonymous angler contacted VT Fish and Wildlife regarding a suspicious looking fish species mixed in with fathead minnows they received from a local bait shop.
- ▶ Upon confirming presence of a mosquitofish in the angler's bait, Department staff conducted an inspection of the shop where the bait was purchased.
 - ▶ Additional mosquitofish were confirmed in the bait tank that contained fathead minnows.
 - ▶ Bait shop received all bait from Hog Island Wholesale.
- ▶ Next day – Department staff inspected Hog Island Wholesale and confirmed the presence of mosquitofish mixed in with fathead minnows that were received from McCallie Fish Farm located in Carlisle, AR.
- ▶ Actions taken:
 - ▶ Hog Island was immediately restricted from selling baitfish from McCallie Fish Farm until further notice (still allowed to sell / distribute baitfish from another out-of-state source).
 - ▶ The following day Hog Island was issued a citation which included a \$233 fine and a 5 point license violation.
 - ▶ Additionally Hog Island Wholesale was required to destroy all bait received from McCallie Fish Farm and sterilize the tanks they were in at their own expense.
 - ▶ McCallie Fish Farm is no longer permitted to import fish into the State of Vermont.

Additional Actions Taken

- ▶ Vermont Fish and Wildlife Department issued a press release shortly after requiring the destruction of the McCallie baitfish at Hog Island Wholesale
- ▶ Vermont Fish and Wildlife Department staff individually contacted all 55 bait dealers to inform them of the incident.
 - ▶ Informed dealers of the incident – “if you received fathead minnows from Hog Island, you may have mosquitofish mixed in.”
 - ▶ Informed owners that it is not expected that mosquitofish will be able to survive in Vt’s cold waters this time of year however...
 - ▶ The Department urged dealers and anglers to inspect their bait to the best of their ability for the presence of mosquitofish. This is best accomplished by putting bait in a white or light colored bucket and looking for something different.
 - ▶ If mosquitofish are found, please remove and dispose of them.
 - ▶ Explained that the Department does not intend to write tickets or fine bait shops or anglers found with mosquitofish.



What went Wrong?

1.) McCallie Fish Farm shouldn't have had mosquitofish in their shipment.

-VT's importation permit prohibits the importation of fish species other than what's on the permit.

-The Arkansas Safe Bait program specifically calls out best management practices to prevent a farm in the program from possessing or exporting mosquitofish.

2.) Mosquitofish went unreported by the VT wholesaler.

-As part of Hog Island's importation permit, the business is specifically required to inspect every shipment to ensure that no other species are present and notify the Department if unauthorized species are found. This did not occur.



What went Right?

- 1.) Vermont's angling community contacted the Department when something suspicious appeared in their bait bucket.
- 2.) Vermont quickly confirmed and traced the source of the mosquitofish.
- 3.) Vermont's regulations were enforced, resulting in immediate stoppage, disinfection of baitfish, and the owners expressed their appreciation for the sale at the time of the incident.
- 4.) Vermont's regulations were enforced for the prohibition of importation from Massachusetts.
- 5.) Vermont's Department was able to quickly get the word out to Vermont's angling community, Vermont's baitfish dealers, and out of state fish and wildlife agencies.

Note: Even in the time of virtually unrestricted wild harvest / movement of baitfish in the state, importation of out of state baitfish was still done to meet Vermont's baitfish demand.



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What can you do as a VT Fish and Wildlife Board member to help?

- ▶ Learn more - Attend a public discussion session near you
- ▶ We need help - Facilitate a breakout group at the meetings
- ▶ Encourage participation – point folks who have questions or concerns about the baitfish regulations to one of the public discussion sessions
- ▶ Reach out – a lot of work is being put into the baitfish regulations review. If you have any questions or need any clarification reach out to a baitfish regulations review team member



Moving Forward: Now – Spring 2018

- ▶ Team will continue to meet regularly to continue its review.
- ▶ January / February Public discussion sessions
- ▶ 30 minute educational board “baitfish updates” on key review topics. (Geographic areas of risk, Comprehensive eval of VHS / fish pathogens / ANS spread and status, and bait preservation OR other states’ regs)
- ▶ Internal Department review process (Fisheries Division > F&W Law Enforcement > F&W Legal Counsel > F&W Management Team > Commissioner)
- ▶ Internally vetted concept baitfish regulation proposal will be presented to the VT Fish & Wildlife Board for their review and consideration for a Spring 2018 meeting.
- ▶ Team will compile feedback from the Board after the Spring 2018 meeting.



VT Fish & Wildlife Board Feedback

- ▶ Questions about information gathered thus far?
- ▶ Public discussion sessions questions?
- ▶ Timeline?
- ▶ Is the group missing something re: evaluating fish pathogens / ANS?

Thank You!

