

GREAT LAKES FISH HEALTH COMMITTEE

Annual Agency Reports 2012

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Agency update from DFO, Canada

Diagnostic Lab

As part of Canada's National aquatic Animal Health Program (NAAHP), DFO labs are participating in the surveillance plan led by Canadian Food Inspection Agency (CFIA) for ISAV, IPNV and IHNV in Anadromous Salmonids in British Columbia. The surveillance program was initiated in 2012 for two years (2012 and 2013) and approximately 5000 samples of different life stages will be collected each year. Depending upon the life stage of the samples, samples are/will be tested for ISAV, IPNV and IHNV. Most of the samples for this year have been collected by CFIA and all three DFO labs are analysing these samples using RTqPCR assays. If GLFHC or members are interested in results, they are encouraged to contact CFIA directly and/or subscribe to the Email Notification Services/ Animal Information at <http://www.inspection.gc.ca/english/util/listserv/listasube.shtml> , as new information (including reports on surveillance) is posted, subscribers will be notified.

Winnipeg lab investigated a carp kill in Manitoba but no link was established with any of the pathogen. IPNV was also detected in Rainbow trout and Splake trout in a Manitoba hatchery during routine testing.

Research lab

Research programs are underway to develop and validate diagnostic assays for IPNV, KHV and Lake Sturgeon virus.

**Illinois Department of Natural Resources
Fish Health Report
Production Year 2012**

This report is a summary of all diagnostic cases carried out by the fish pathology lab on salmonids for production year 2012. This includes routine casework, health check evaluations, and fluorescent antibody testing (FAT). Salmonids inspected include Chinook salmon (FCS), Coho salmon (COS), rainbow trout (RBT), steelhead trout (STT), and brown trout (BNT). A summary of importation and health check details are found in the following table:

Species	Source	Date of collection	# Eggs collected	Date of Health Check*/Virology Results/Bacterial isolates	Date of FAT testing for BKD**/Results
FCS	Little Manistee Weir, MI	11 Oct. 2011	867,900	5 Mar. 2012/ NEG/None	19 April 2012/NEG
COS	Platte River Weir, MI	20 Oct. 2011	817,555	27 Feb. 2012/ NEG/None	20 April 2012/NEG
RBT	Erwin NFH, TN	10 Nov. 2011	150,480	19 Mar. 2012/ NEG/None	23 April 2012/NEG
BNT	Saratoga NFH, WY	29 Nov. 2012	189,905	6 Feb. 2012/ NEG/None	30 March 2012/NEG
STT	Bodine SFH, IN	27 Jan. 2012	176,498	21 May 2012/ NEG/None	20 June 2012/NEG

*Health check evaluations were comprised of 60 randomly sampled individuals from the population. These fish were necropsied and evaluated for bacterial pathogens. A portion of pooled tissues were sent to the USFWS LaCrosse Fish Health Center (LFHC) for virology.

**Testing for bacterial kidney disease (BKD) using fluorescent antibody testing (FAT) was performed on 60 randomly sampled individuals from each salmonid lot. These tests were done in accordance with the AFS Fish Health Section Bluebook *Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens*.

SALMONID IMPORTATION REPORT

Agency: Illinois Department of Natural Resources

Reporting Period 10/1/11 – 09/30/12

I. A. Known importation since last report.

Source	Species (Strain)/Number	Fish/Eggs – Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin
Erwin NFH, TN	RBT (Arlee)/150,480	Eggs	A	04/16/11	Heil	Lake Michigan
Bodine SFH, IN	STT (Skamania)/176,498	Eggs	B-BF	01/4/12	Lenz	Lake Michigan
Saratoga NFH, WY	BNT (Plymouth Rock)/189,905	Eggs	A	10/10/11	Hudson	Lake Michigan
Platte River, MI Michigan DNR	COS (Michigan)/817,555	Eggs	B-BK, BF			Lake Michigan
Little Manistee, MI Michigan DNR	FCS (Michigan)/867,900	Eggs	B-BK, BF			Lake Michigan

B. Proposed importations.

II. Lab Findings

III. Other

HATCHERY CLASSIFICATION REPORT

Report Period: 1 Oct. 2011 – 30 Sept. 2012

Report Date: 11 Dec. 2012

Hatchery Name	Location	Pathogen Acronym
Jake Wolf Memorial Fish Hatchery	Topeka, IL	B-BK (2010)

Report Prepared by: Lynnette Mick
 Natural Resources Adv. Specialist
 Phone (309) 968-7531
 FAX (309)968-6017
Lynnette.mick@illinois.gov

EMERGENCY FISH DISEASES

Disease	Disease Pathogen
Viral hemorrhagic septicemia (VHS)	Virus (VE)
Infectious hemopoietic necrosis (IHN)	Virus (VH)
Ceratomyxosis (CS)	<i>Ceratomyxa Shasta</i> (SC)
Proliferative kidney disease (PKD)	Sporozoan (SP)

RESTRICTED FISH DISEASES

Whirling disease (WD)	<i>Myxobolus cerebralis</i> (SW)
Infectious pancreatic necrosis virus (IPN)	Virus (VP)
Bacterial kidney disease (BKD)	<i>Renibacterium salmoninarum</i> (BK)
Furunculosis (BF)	<i>Aeromonas salmonicida</i> (BF)
Enteric redmouth (ERM)	<i>Yersinia ruckeria</i> (BR)
Epizootic epitheliotropic disease (EED)	Virus (VL)



**2012
Indiana Fish Health Report
To The
Great Lakes Fish Health Committee**

One program pathogen was detected in production fish in 2012 among Indiana's cold-water production facilities. This pathogen was *Aeromonas salmonicida*. It was also found in wild summer-run steelhead broodstock. One lot of summer-run steelhead and one lot of Coho salmon tested positive for *Nucleospora salmonis* at one cold-water hatchery. Warm weather and low flow from an open water supply contributed to repeat infections of bacterial gill disease and *A. hydrophila* at a trout rearing station. No viral infections were detected in any of Indiana's cool or warm-water hatcheries. One lot of channel catfish was stricken with *A. sobria* and *Flexibacter columnaris*. Surveillance of wild populations for VHSV detected no VHSV but three pools were positive for LMBv. Six bodies of water were inspected using APHIS grant money. One of these water bodies was Webster Lake; broodstock source for Muskie. Two other water bodies serve as water source for two hatcheries. Investigation of one carp kill event yielded the presence of Koi Herpes virus.

Aeromonas salmonicida was detected at three hatcheries. Yearling rainbow trout at Fawn River SFH tested positive at a prevalence of 4 of 30. Young-of-year Chinook at Mixsawbah SFH tested positive at a prevalence of 1 of 30. Young-of-year summer-run steelhead at Bodine SFH tested positive at a prevalence of 1 of 30. These lots did not display clinical signs of disease and were later stocked without incident. Wild caught summer-run steelhead trout broodstock at Bodine SFH also tested positive during routine screening. Prevalence was 1 of 30. A spike in mortality with male summer-run steelhead broodstock near the end of the spawning season led to a spot check of 10 males and 5 females. *A. salmonicida* was found in one male and two females. All remaining males and any females exhibiting external signs of furunculosis were destroyed prior to post-spawn release of surviving adults.

Two unusual mortality events occurred at the Bodine SFH. The first was with summer-run steelhead in June and the other with Coho in September. Mortality had increased in both cases but leveled off at <0.5% per week. This is not a typical mortality curve for a pathogen. Samples were submitted to Purdue for pathogen screening and necropsy. Bacterial involvement was detected but no specific pathogen could be cultured. Tissue was submitted to MSU for *Nucleospora salmonis* screening and it was found. Mortality returned to normal for the steelhead. Mortality came down in the Coho.

Multiple bacterial infections occurred in two strains of rainbow at the Curtis Creek TRS from late spring through early fall. The strains were Trout Lodge and Arlee. Bacterial gill disease and *A. hydrophila* infection were the primary pathogens. Salt treatments, medicated feed and Chloramine-T were used at various times to minimize mortality. Stressors involved were low flow from an open water supply, the warmest summer on record and failing wells unable to supply sufficient make-up water. Well water is also high in iron and dissolved nitrogen.

This was the sixth year for viral testing in Indiana's cool and warm-water. All tested negative for viral agents. Wild broodstock for Muskie and walleye were not tested this year. Instead, Indiana's Board of Animal Health, using APHIS funding, inspected susceptible species in the water body that holds Muskie broodstock. Results were negative.

One pond of channel catfish became stricken with lesions late September at Cikana SFH. Small frogs and fathead minnows were also stricken. *A. sobria* and *F. columnaris* were cultured. The pond had a high density of algae and was experiencing low DO's at night.

Surveillance efforts examined 1,028 fish representing 18 species from 7 cases. Six of these cases were funded with an APHIS grant. No VHSV was found but Largemouth Bass virus was detected in two impoundments. The first was Dogwood Lake, water supply for the East Fork SFH. It was found in one 5-fish pool of bluegill. The second was Starve Hollow, water supply for Driftwood SFH. It was found in two 5-fish pools of largemouth bass. The seventh case was a carp kill in Brookville Reservoir, broodstock source for Indiana's walleye program. Koi herpes virus was confirmed by NVSL.

Hatchery Classification Report Indiana Department of Natural Resources

Report Period: January – December, 2012 **Report Date:** 2/4/2013

Hatchery Name	Location	Pathogen Acronym
Bodine SFH	Mishawaka, IN	B-BF(8/12), BK(8/11)
Curtis Creek TRS	Howe, IN	B-BF(6/12),BK(6/10)
Fawn River SFH	Orland, IN	B-BF(1/12)
Mixsawbah SFH	Walkerton, IN	B-BF(2/12), BK(9/11)

Skamania Steelhead Broodstock (wild)	Mishawaka, IN	B-BF (1/12), B-BK (1/11)
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Report Prepared By: Dave Meuninck

Title: Hatchery Manager/Fish Health Coordinator

Phone Number: 574-255-4199

EMERGENCY FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
Viral hemorrhagic septicemia	Virus	VHS	VE
Infectious hematopoietic necrosis	Virus	IHN	VH
Ceratomyxosis	Ceratomyxa Shasta protozoan	CS	SC*
Proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

Whirling disease	<i>Myxobolus cerebralis</i> protozoan	WD	SW
Infectious pancreatic necrosis	Virus	IPN	VP
Bacterial kidney disease	<i>Renibacterium salmoninarum</i> bacterium	BKD	BK
Furunculosis	<i>Aeromonas salmonicida</i> bacterium	BF	BF
Enteric redmouth	<i>Yersinia ruckeri</i> bacterium	ERM	BR
Epizootic epitheliotropic disease	virus	EED	VL**

* Inspectors within the Great Lakes basin do not need to include these pathogens unless importations of fish from enzootic areas are know to have been made.

** Field diagnostic test not available.

SALMONID IMPORTATION REPORT

Agency Indiana Department of Natural Resources

Reporting Period January – December, 2012

I. A. Known importations since last report.

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>
1.	Troutlodge, WA	RBT/100,000 Eyed-Eggs	9,000/L	A			Erie/Michigan/ Ohio River
2.	Wolf Creek NFH, KY	RBT/17,000	3.87"	BF	12/12/11	Brian Hickson	Erie/Michigan
3.	Jake Wolf SFH, IL	BNT/71,125	2.87"	BK	3/15/12	Terrence Ott	Michigan
4.							
5.							

B. Proposed importations.

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>
1.	Troutlodge	RBT/110,000 Eyed-Eggs	10,000/L	A	Nov '13	Jim Thompson	Erie/Michigan Ohio River
2.	Jake Wolf SFH, IL	BNT/30-50,000	3"	BK	Mar '12	Ott/Phillips	Michigan
3.							
4.							

II. Lab Findings

III. Other



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING



KEITH CREAGH
DIRECTOR

January 14, 2013

TO: Great Lakes Fishery Commission - Great Lakes Fish Health Committee
FROM: Michigan Department of Natural Resources, Fisheries Division (MDNR)
SUBJECT: 2012 Fish Health Report

In 2012, MDNR continued the partnership with MSU Aquatic Animal Health Laboratory at the Colleges of Veterinary Medicine and Agriculture and Natural Resources. All fish lots to be stocked in Michigan public waters were examined and tested for reportable diseases following the guidelines in the Great Lakes Fishery Commission – Great Lakes Fish Health Committee (GLFHC) Model Fish Health Program guided by the laboratory protocols of the American Fishery Society – Blue Book.

A. Spring 2012 Inspections

Pre-Stocking Fingerlings

Twenty-two lots of salmonid species (60 fish per lot) from six State of Michigan Fish Production Facilities and the Lake Superior State University Aquatic Research Laboratory (LSSU-ARL) were tested prior to stocking in spring 2012. This included six lots of brown trout, four lots of rainbow trout, three lots of Chinook salmon, two lots of Atlantic salmon, one lot of coho salmon, three lots of lake trout, two lots of brook trout, and one lot of splake.

Renibacterium salmoninarum, the causative agent of Bacterial Kidney Disease (BKD) was detected using quantitative ELISA assay (Q-ELISA) in six lots of fish at low antigen levels, with prevalence of 1.7% in all six lots. Neither *Yersinia ruckeri*, the causative agent of enteric redmouth disease, nor *Aeromonas salmonicida salmonicida*, the causative agent of furunculosis, were isolated during spring production inspections in 2012, despite the isolation of *A. salmonicida salmonicida* in 2011 for the first time in a Michigan State Fish Hatchery since 2005. In addition, seven representative lots from these hatcheries were examined and found negative for *Myxobolus cerebralis*, the causative agent of whirling disease. Skin and gill scrapings revealed parasites including monogeneans, ciliates, and protozoans. No viruses were detected in fish sampled from these lots.

Captive Salmonid Broodstock

Gamete samples from captive broodstock lots at Oden State Fish Hatchery (OSFH) and Marquette State Fish Hatchery (MSFH) were collected and tested for BKD (using Q-ELISA) and viruses in January and February 2012 after spawning was completed. This includes samples from 60 each of Sturgeon River, Gilchrist, and Wild Rose strains of brown trout, 60 Lake Superior strain lake trout, and 290 Eagle Lake strain rainbow trout broodstock. *R. salmoninarum* was detected at low and medium antigen levels at a prevalence of 1.7% in the lake trout; 2.1% in the Eagle Lake rainbow trout; and 8.3% in the Wild Rose brown trout. *R.*

salmoninarum was not detected in the Sturgeon River or Gilchrist brown trout. No viruses were detected in any of the lots listed above.

Feral Broodstock

Thirty pairs of returning steelhead spawners from the Little Manistee River Weir (LMRW) were examined. *R. salmoninarum* was detected at low antigen levels in one milt sample and in three kidney/spleen/heart samples tested. *A. salmonicida* was detected in nine of the 60 fish examined. No *Y. ruckeri* was detected. Other non-reportable *Aeromonas* spp. and *Flavobacterium* spp. were often detected in kidneys. No viruses were detected.

B. Fall 2012 Inspections

Pre-Stocking Fingerlings (salmonid, muskellunge, sturgeon, and catfish)

Fifteen lots of production fish (60 fish per lot) from MDNR fish production facilities were inspected prior to stocking in Summer/Fall 2012. These included steelhead trout and muskellunge at Wolf Lake State Fish Hatchery (WLSFH); Assinica brook trout at MSFH; steelhead trout and Gilchrist brown trout at Thompson State Fish Hatchery (TSFH); Wild Rose brown trout, Sturgeon River brown trout, and Eagle Lake rainbow trout at OSFH, Wild Rose brown trout, Sturgeon River brown trout, and Gilchrist brown trout at Harrietta State Fish Hatchery (HSFH); Atlantic salmon at LSSU-ARL; lake sturgeon from Black River lake sturgeon stream-side rearing facility; and channel catfish from St. Mary's State Fish Hatchery, Ohio. All lots were examined for reportable diseases following the guidelines in the GLFHC Model Program. *R. salmoninarum* was found at OSFH in two lots of fish, at 1.7% prevalence in Eagle Lake rainbow trout and 3.3% prevalence in Sturgeon River brown trout. No other reportable diseases were found. Skin and gill scrapings revealed monogeneans and ciliates. *Nucleospora salmonis* was detected in kidney and gill samples from the LSSU Atlantic salmon. A giant cell-forming virus, consistent with fathead minnow Aquareovirus group virus, was observed in muskellunge from WLSFH.

Captive Broodstock

Inspections. Prior to spawning, the FDA approved vaccine Furogen® (Aqua Health, LTD) was administered to broodstock lots at OSFH and MSFH. This treatment and vaccination regime was used to effectively reduce *A. salmonicida*. Fifteen lots of captive broodstock were inspected in fall 2012. From MSFH, two lots of Assinica strain brook trout and three lots of Lake Superior strain lean lake trout were inspected in August. From OSFH, two lots of Gilchrist Creek strain brown trout, three lots of Sturgeon River strain brown trout, three lots of Wild Rose strain brown trout, and two lots of Eagle Lake strain rainbow trout were inspected in November. *R. salmoninarum* was not detected in any of the broodstock examined. No other reportable pathogens were detected. Skin and gill scrapings revealed monogeneans, ciliates, and presumptive *Saprolegnia* spp. Formalin treatment was recommend in those lots that exhibited heavy parasitic and fungal loads.

Preventative measures to minimize the vertical transmission of BKD. Gametes were collected in the fall 2012 from seven lots of salmonid broodstock at OSFH and MSFH. Post-spawn gametes were held in isolation for 24-hours pending laboratory results while milt or ovarian

fluid samples from each fish were tested for the presence of *R. salmoninarum* using Q-ELISA in order to minimize vertical transmission and incidence of BKD in hatchery stocks. This screening is done in addition to water hardening eggs in erythromycin, which is standard for all salmonid eggs in MDNR fish hatcheries. Gametes were collected from 1,084 broodstock, including two lots (120 fish) of Sturgeon River brown trout at OSFH and three lots (474 fish) of Lake Superior lake trout and two lots (490 fish) of Assinica brook trout at MSFH. *R. salmoninarum* was detected in the brook trout gametes at prevalence of 4.3% (high, medium, and low antigen levels), and was not detected in gametes from the lake trout or brown trout. Eggs from individual pairings were kept separate until Q-ELISA testing was completed. Only those fertilized eggs that tested negative for *R. salmoninarum* antigen were kept for development of future broodstock and production fish.

Feral Broodstock

Chinook and coho salmon. Examinations were conducted on returning Chinook salmon spawners from LMRW and Swan River Weir (SRW), and on returning coho salmon spawners from the Platte River Weir (PRW). *R. salmoninarum* was detected in two of thirty females examined at SRW, but was not detected in males from SRW, or in any fish examined at LMRW, PRW, or LSSU. Prevalence for *A. salmonicida* was 50% for LMRW, and was not detected at SRW or PRW. *Y. ruckeri* was not detected. Other bacteria isolated include *F. columnare*, *F. psychrophilum*, and motile *Aeromonas* spp. at LMRW, SRW, and PRW. No viruses were detected. Skin and gill scrapings revealed few protozoans.

Atlantic salmon. Returning Atlantic salmon spawners were examined from St. Mary's River, LSSU-ARL. No reportable bacterial or viral pathogens were detected in the thirty pairs of fish examined. However, in 2011, *R. salmoninarum* was found in approximately 50% prevalence and *A. salmonicida* was isolated at 2% prevalence in returning Atlantic salmon spawners at this site. Pathogens found in 2012 include *F. psychrophilum*, and motile *Aeromonas* spp. Skin and gill scrapings revealed few ciliates.

C. Coolwater Broodstock Inspections

Both full and non-lethal inspections were conducted on coolwater broodstock populations in the spring of 2012 (232 fish). These included walleye from the Tittabawasee River, Muskegon River, and Little Bay de Noc; and muskellunge from the Detroit River. No reportable pathogens or *Heterosporis* sp. were detected.

D. Private Aquaculture Farms and Bait Fish

A total of 2,550 fish (12 species) from Michigan's private aquaculture farms and bait collection facilities were inspected for health certifications, including viral and whirling disease screenings. *M. cerebralis* was detected in samples from one private aquaculture facility that has a history of this pathogen.

E. Response to 2011 Fish Kills Reports

No fish kills were reported in 2012. One rock bass observed with VHSV-like lesions was submitted and no virus was detected. One walleye suspected of having *Heterosporis* sp. was submitted for testing; however, this parasite was not detected.

F. VHSV Surveillance

The Michigan DNR VHSV surveillance initiated in 2006 continued, with 104 cases (10,551 fish) submitted to the MSU-AAHL for testing in 2012, including 11 cases of walleye (5,045 fry) and 13 cases of WLSFH muskellunge (780 fry). No VHSV was detected. However, samples from several sites were also tested for antibodies against VHSV; these antibodies were detected in Saginaw Bay bluegill and Au Sable River smallmouth bass.

G. Diagnosis of Clinical Cases

Eighteen cases of production lots were submitted by MDNR production facilities for clinical diagnoses following episodes of elevated mortalities and/or morbidity. Pathogens associated with these disease episodes included *F. psychrophilum* and other *Flavobacterium* spp., *Carnobacterium* spp., *A. salmonicida* and other motile *Aeromonas* spp., and *Pseudomonas* spp. *A. salmonicida* was isolated in Atlantic salmon from PRFSH. Antibiotic sensitivity testing was performed as appropriate, and Investigational New Animal Drugs (INAD), Veterinary Feed Directives (VFD), or other approved FDA treatments were recommended. *R. salmoninarum* was not detected in any diagnostic cases. Skin and gill scrapings revealed monogeneans, ciliates, and/or fungal hyphae. *N. salmonis* was detected in kidney and gill samples from WLSFH Chinook and PRSFH Atlantic salmon. Epizootic epitheliotropic disease virus (EEDV) was detected and confirmed in lake trout from MSFH. Additional testing is underway to determine the prevalence and intensity of EEDV in the hatchery which will be reported in next year's report.

H. Wild Inspections

Fourteen cases (571 fish) were submitted for examination from waters supplying PRSFH, and MSFH, one creek adjacent to HSFH, and from the HSFH effluent pond. All submitted salmonids were tested for the presence of *R. salmoninarum*. *R. salmoninarum* was not detected in trout samples from waters supplying HSFH or the HSFH effluent pond. For waters supplying PRSFH, *R. salmoninarum* was detected in 11.9% of brown and brook trout from Brundage Creek but was not detected in fish from Brundage Spring Pond. Brook trout tested from Cherry Creek supplying MSFH were found to have an *R. salmoninarum* prevalence of 10%, while the pathogen was not detected in brown trout from the same site. Whirling disease screening was performed on salmonids submitted from these locations; *M. cerebralis* was not detected. Non-reportable bacterial pathogens detected from fish submitted from these sites include motile *Aeromonas* spp.

Frozen largemouth bass, smallmouth bass, bluegill, and pumpkinseed were submitted from four inland lakes (270 fish) and examined for pre-transfer inspections; no viruses were detected. Gametes from Black River lake sturgeon broodstock were tested for viruses; no viruses were detected. Common carp from Belleville Lake were submitted for KHV testing;



HATCHERY CLASSIFICATION REPORT

Report Period: 01-01-11 to 12-31-12 **Report Date:** 01-7-13

FERAL STOCKS	Location	Pathogen Acronym
Coho salmon (MI)	Platte River Weir, Beulah	B-BK, BF
Chinook salmon	Little Manistee River Weir	B-BK, BF
Chinook salmon	Swan River Weir, Rogers City	B-BK
Steelhead trout	Little Manistee River Weir	B-BK, BF
Lake trout (lean)	Lake Superior	B-BK, BF
Atlantic salmon	Lake Superior State University	B-BK

Report Prepared by: Martha Wolgamood
 Title: Hatchery Manager
 Phone Number: 269-668-2696

EMERGENCY FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
viral hemorrhagic septicemia	virus	VHS	VE
infectious hematopoietic necrosis	virus	IHN	VH
ceratomyxosis	<i>Ceratomyxa shasta</i> protozoan	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
whirling disease	<i>Myxobolus cerebralis</i> protozoan	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	<i>Renibacterium salmoninarum</i> bacterium	BKD	BK
furunculosis	<i>Aeromonas salmonicida</i> bacterium	BF	BF
enteric redmouth	<i>Yersinia ruckeri</i> bacterium	ERM	BR
epizootic epitheliotropic disease	virus	EED	VL**

* Inspectors within the Great Lakes basin do not need to include these pathogens unless importations of fish from enzootic areas are known to have been made.

** Field diagnostic test not available.

SALMONID IMPORTATION REPORT

Agency State of Michigan

Reporting Period 01/01/12 – 12/31/12

I. A. Known importations since last report.

	Source	Species/Number	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	Lake Basin	Imported to:
1.	Sullivan NFH Brimley, MI	Lake trout Seneca 450,000	10,714/L	A	05/08/2012	Terrance Ott	Lake Superior	MSFH

B. Proposed importations:

	Source	Species/Number	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>	Imported to:
1.	Sullivan NFH Brimley, MI	Lake trout Seneca 450,000		A			Lake Superior	MSFH

II. Lab Findings

III. Other



Minnesota Department of Natural Resources

Division of Fish and Wildlife
Box 25, 500 Lafayette Road
St. Paul, Minnesota 55155-4025

Agency Fish Health Annual Report to Great Lakes Fish Health Committee for 2012 01-11-13

State Coldwater Hatchery health inspection

Annual inspections were performed at all state coldwater fish hatcheries. The inspection program includes lethal sampling of all lots of fish at the time of inspection and ovarian fluid sampling during spawning. A total of 1,775 fish and 1,772 ovarian fluid samples were inspected. *Renibacterium salmoninarium*, was identified at a low level from three hatcheries, using bacterial culture. No other certifiable pathogens were detected. During ovarian fluid screening this fall, *R. salmoninarium* was detected in our last A-1 hatchery. The hatchery was subsequently downgraded to a B-BK classification. Since the fish are not showing any symptoms associated with the disease, they will be stocked into water that have previously been stocked with fish infected with this pathogen. No additional management actions will be taken.

Wild Egg Takes

Kamloop, Steelhead rainbow trout eggs were taken from Lake Superior. In an effort to avoid propagating fish infected with *Renibacterium salmoninarum*, pair spawning was performed. Ovarian fluid was tested for *R. salmoninarum*, VHS, IPN, and IHN. In all, we tested 173 kamloop, 52 French River wild steelhead, and four French River fin clipped steelhead. One kamloop tested positive for *R. salmoninarum* using ELISA. All other samples were negative. No viruses were detected in any of the ovarian fluid samples. *R. salmoninarum* positive eggs were discarded. Lethal samples were also taken from thirty adult kamloops to be tested for certifiable pathogens. No pathogens were detected.

Captive Broodstock

Ovarian fluid from captive steelhead broodstock was screened for *R. salmoninarum*, VHS, IPN, and IHN during the spawning season. *R. salmoninarum* was found in 5 (1.9 %) of 257 fish spawned. No viruses were found.

Cool Water Fish Testing for VHS:

Minnesota law requires the species on the VHS susceptible list to be tested for VHS before they are allowed to move from one body of water to another. A total of 1,315 ovarian fluid samples from muskellunge, northern pike and walleye were tested for VHS. No virus was detected. Eggs from these fish were water hardened and disinfected prior to movement. A total of 218 walleye and muskie fingerling ponds were also tested for VHS this year. Again, no virus was detected.

USDA-APHIS cooperative VHS surveillance grant:

This is the final year we are as part of the USDA-APHIS cooperative grant, twenty-one waterbodies tested negative for VHS. A total of 3,127 fish were tested using viral isolation.

Fish Kill

A small fish kill occurred at Mayhew Lake, involved with a culvert repair project, last November. The project used material that released a high amount of styrene into the nearby waters at the time of repair. The fish kill was reported about a week later. A water sample was obtained, and the test revealed the styrene level at 13,100 ug/L. The DNR path lab received a frozen fish sample that included 1 largemouth bass, 1 bowfin, 1 northern pike, 5 black bullheads, 3 sunfish, and 1 white sucker. Necropsy on the fish sample did not reveal distinct symptoms. Fish appeared normal both externally and internally. No parasites or bacterial pathogens were observed on the histo-tissue slides. Because of the artifact of the frozen tissue, histopathology was not able to distinguish any changes caused by the chemical. Since the measure of styrene in the water was relatively high at the time of the fish kill, based on the literature review (96 hr LC₅₀ for RBT and Fathead minnow are 2500ug/L and 10,000 ug/L respectively), we reasonably concluded that the fish kill was likely caused by an elevated styrene level in the water. It is possible that the level of styrene was even higher during and right after the culvert project completed. The water sample was obtained on Nov. 22 and the project was completed on Nov. 14 or 15.

Cold Water Hatchery Classification

Hatchery Classification Report Minnesota

Report Period: January 1 to December 31, 2012

Report Date: January 10, 2013

Hatchery Name	Location	Pathogen Acronym
Crystal Springs	Altura	B-BK(3/12)
Lanesboro	Lanesboro	B-BK(10/11)
French River	Duluth	B-BK(5/12)
Peterson	Peterson	B-BK(9/12)
Spire Valley	Remer	B-BK(3/12)

Report prepared by: Ling Shen Title: Fish Pathology Lab Supervisor
Phone Number: 651-259-5138

EMERGENCY FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
viral hemorrhagic septicemia	virus	VHS	VE
infectious hematopoietic necrosis	virus	IHN	VH
ceratomyxosis	<i>Ceratomyxa Shasta</i>	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
whirling disease	<i>Myxobolus cerebralis</i>	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	<i>Renibacterium salmoninarum</i>	BKD	BK
furunculosis	<i>Aeromonas salmonicida</i>	BF	BF
enteric redmouth	<i>Yersinia ruckeri</i>	ERM	BR
epizootic epitheliomatous disease	virus	EED	VL**

* Inspectors within the Great Lakes basin do not need to include these pathogens unless importations of fish from enzootic areas are known to have been made.

** Field diagnostic test not available.

New York State Department Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Rome Field Station, Fish Disease Control Unit
8314 Fish Hatchery Rd, Rome, New York 13440-7530
Phone: (315) 337-0910 • **Fax:** (315) 337-0988
Website: www.dec.ny.gov

January 11, 2013

Agency Report to the Great Lakes Fish Health Committee for 2012

Wild Fish Pathogen Inspection Program

Two separate pathogen surveillance programs are conducted annually in New York. The first is an ongoing statewide survey to identify waters where regulated pathogens may be present in fish populations. Cornell University performs the second survey through a program to investigate diseases in wild fish populations.

For the statewide survey, a wide range of fish species were collected from 27 locations (1,510 fish) and clinical testing was done at the USFWS fish health center in Lamar, PA. EEDv was discovered in lake trout from two collections on Lake Ontario, one collection in the eastern basin near Oswego and the other from the western end near Olcott. *Nucleospora salmonis* was isolated from fish in two different locations. The first was from brown trout in the Connetquot River on Long Island, a 5-mile stream filled with sea-run salmonids. Steelhead from Chautauqua Creek on Lake Erie also turned up positive for *N. salmonis*. Lake Erie steelhead have a history of *N. salmonis* detections.

Cornell conducted eleven fish disease investigations in 2012. There were not any significant large-scale fish kills during the year and most cases resulted from environmental or other non-infectious causes.

Hatchery Fish Health and INAD Projects

Sestonosis and Furunculosis at Rome SFH- In December 2011, 600,000 early-feeding brown trout fry died due to an acute case of sestonosis. The cause of the epizootic remains unknown, however other issues may have contributed to the problem, including the use of poor-quality diet leading to unusually small eggs and poor initiation of first feeding. In February 2012, 175,000 brown trout fingerlings (Crawford strain) were imported from the Paint Bank SFH in Virginia to augment the depleted inventory at Rome. Furunculosis devastated this lot in June and the disease eventually spread throughout the hatchery by August, impacting all lots except the Rome strain brown and brook trout which are extremely resistant to furunculosis. In July, terramycin resistance made therapy problematic as well as Romet unavailability due to a manufacturing dilemma. In September, all heavily-affected lots were destroyed (~800,000 fish) and only the Rome strain fish remained. The remaining Rome strain fish can't be stocked unless tested free of *A. sal*. Prevalence of infection had dropped in the group and an additional test (@ 2% pathogen prevalence level) will be conducted in March 2013. No other significant disease issues

arose in the hatchery system in 2012. Starting in 2010, many of our salmonid stations dealt with elevated epizootics of common diseases such as BCWD and BGD, coinciding with a diet contract the NYSDEC had for a company that continually produced a diet which routinely did not comply with diet formulation specifications. Thankfully, we have a new fish food vendor.

INAD Work- INAD projects included Chloramine T (INAD 9321) and Oxytetracycline (INAD 10-321) to treat an assortment of flavobacterial diseases. Both drugs were largely successful. However, the Chloramine T INAD sponsor now requires three alternative or consecutive-day treatments rather than one, which triples the cost of use. So we're evaluating other approaches to treatment, including Perox-Aid to compare efficacy and cost versus Chloramine T.

Fish Food- In June, 2012, the DEC changed diet vendors. The former feed contract was problematic and our hatchery system dealt with many more disease issues during this contract than any period prior. Not only were we plagued with diet palatability issues, hatcheries and fish lots that historically had few/no disease issues were now having many. Also, egg quality and size dropped in egg takes from captive fish. After the changeover, we did note an immediate improvement in palatability, especially among yearling salmonid lots. Although egg quality and size was still subpar, and we think this may be a lingering problem from the 2.5 years of poor-quality diet use.

Hatchery Inspection Program

The DEC's Fish Disease Control Unit (FDCU) annually inspects all lots of fish in DEC culture programs, both domestic and from wild sources. In 2012, our inspections included domestic trout cultured in our hatcheries, plus various species of wild fish used in egg collections intended for hatchery propagation. In all, we conducted 61 inspections in 2012 totaling 4,610 fish.

Aeromonas salmonicida was isolated from chinook and coho adults during egg collections at the Salmon River and production fish at the Rome State Fish Hatchery in 2012 but no other program pathogens were detected in our hatcheries.

Rome Hatchery Surveillance- Starting in 10/12, the hatchery inspections at the Rome will be conducted in 6-month intervals and at 2% infection prevalence until the hatchery tests clean of program pathogens for 2 full years. Our regulation prohibits the stocking of fish infected with any of 8 program pathogens, and any lot targeted for stocking must test free of pathogens in advance.

Andrew D. Noyes
Pathologist 2 (Aquatic)

New York State Fish Hatchery Disease Classification Report

Report Period: Jan 1, 2012 to Dec 31, 2012

Hatchery	Location	Classification
Adirondack	Saranac Lake, NY	A-2
Bath	Bath, NY	A-2
Caledonia	Caledonia, NY	A-2
Catskill	Livingston Manor, NY	A-2
Cedar Springs	Caledonia, NY	A-2
Chateaugay	Chateaugay, NY	A-2
Chatauqua	Mayville, NY	A-2
Oneida	Constantia, NY	A-2
Randolph	East Randolph, NY	A-2
Rome	Rome, NY	As-2 (10/12)
Salmon River Culture Facility	Altmar, NY	A-2
Salmon River Spawning Station	Altmar, NY	As-2 (10/12)
South Otselic	South Otselic, NY	A-2
Van Hornesville	Van Hornesville, NY	A-1
Wild Broodstock		
Coho Salmon - Lake Ontario	Altmar, NY	As-2 (10/12)
Chinook Salmon - Lake Ontario	Altmar, NY	As-2 (10/12)
Steelhead Salmon- Lake Ontario	Altmar, NY	A-2
Walleye-Oneida Lake	Constantia, NY	A-2
LLS - Little Clear Lake	Saranac Inn	A-2
Lake Trout - Cayuga Lake	Cayuga Lake	A-2
Lake Trout – Raquette Lake	Raquette Lake	A-2
Rainbow Trout	Cayuga Lake	A-2
Round Whitefish	Little Moose Pond	A-2
Brook Trout	Twin Ponds	A-2
Brook Trout	Boot Tree Pond	A-2
Brook Trout	Big Hill Pond	A-2
Brook Trout	Mountain Pond	A-2
Brook Trout	Deer Pond	A-2
Brook Trout	Fish Brook	A-2
Cisco	Lake Ontario	A-2
Sturgeon	St. Lawrence River	A-2

Report Prepared by: Andrew D. Noyes, Pathologist 2 (Aquatic)

Phone: 315-337-0910

Report Date: Jan 11, 2013

Classification Designation:

- A-1 Closed water supply, free of fish, no serious infectious disease
- A-2 Open water supply, fish present, no serious infectious disease
- B One or more serious infectious diseases present
- C No inspection or clinical disease data available for the last twelve months

Disease Identification (acronym):

- VP Viral infectious pancreatic necrosis (IPN)
- VH Viral hemorrhagic septicemia (VHS)
- WD Whirling Disease
- BF Bacterial furunculosis
- BK Bacterial kidney disease (BKD)
- BR Bacterial redmouth disease (ERM)

Example:

As-2 (11/01): Furunculosis detected within the last 12 months and date of isolation in parentheses. Above example applies to classifications in 2002 when BF was isolated in most recent inspection.

A-2 (BF)(11/01): Furunculosis not present during previous inspection, but present within last three inspections. Above example applies to 2003 and 2004 classifications **IF** BF was not detected . If no BF was isolated in 2005, parenthetical disease acronyms and dates are dropped and hatchery is upgraded to A-2.

As-2-T: A hatchery with an 'A' classification is downgraded to **B-BF-T** if it receives fish from a hatchery classified as B-BF. Note that a B-BF facility may transfer disinfected eggs to an 'A' facility without downgrading the receiving hatchery classification.

**Ontario Ministry of Natural Resources 2012 Annual Report
to the Great Lakes Fish Health Committee**

Submitted January 2013

Ontario’s Fish Culture Program

Testing of wild adult fish used for spawn collections and fish health monitoring and disease diagnosis of fish reared at the Ontario Ministry of Natural Resources’ (OMNR) 10 Fish Culture Stations (FCS) is completed by the University of Guelph Fish Health Laboratory under the supervision of Dr. R.M. Stevenson. The location of these stations is shown in Figure 1.

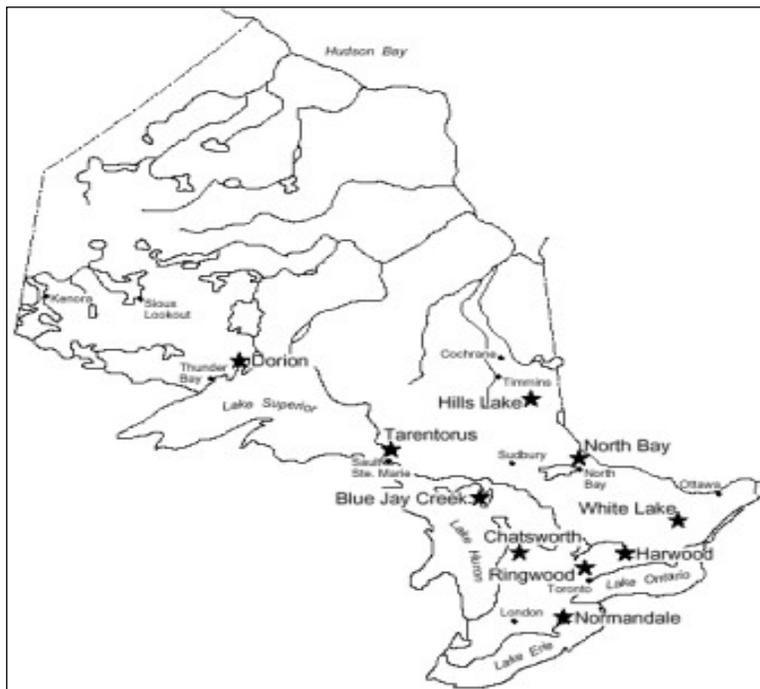


Figure 1. Location of OMNR’s 10 Fish Culture Stations. Ringwood Fish Culture Station is currently being operated by a partner.

Wild Fish Monitoring and Disease Diagnostics

In 2007, the OMNR established a direct phone line for public reporting of wild fish die-offs in response to an increase in the number of wild fish die-offs primarily associated with Koi Herpes Virus and Viral Hemorrhagic Septicemia. At that time, the OMNR established a relationship with Dr. John Lumsden’s Fish Pathology Laboratory at the University of Guelph under which samples collected from wild fish die-offs or wild fish monitoring programs could be sent to the lab for diagnosis. The relationship with Dr. Lumsden’s lab remains in effect today. The OMNR continues to

respond to wild fish die-off reports as required and conducts site visits and collects samples for analysis by Dr. Lumsden's lab when warranted.

In 2012, the primary focus OMNR's wild fish monitoring and disease diagnostics program, as had been the case in the previous few years, was on monitoring the spread of VHS, and wild fish samples were collected by the OMNR from 11 water bodies in the southern part of the province (Figure 2) for analysis at Dr. Lumsden's lab. An additional sample was collected from Indian Lake in north-western Ontario by a member of the public. Any samples that were subsequently identified as positive for VHS at Dr. Lumsden's lab were forwarded to one of the Canadian Food Inspection Agency's (CFIA) labs for confirmatory testing. Findings are described in the following section.

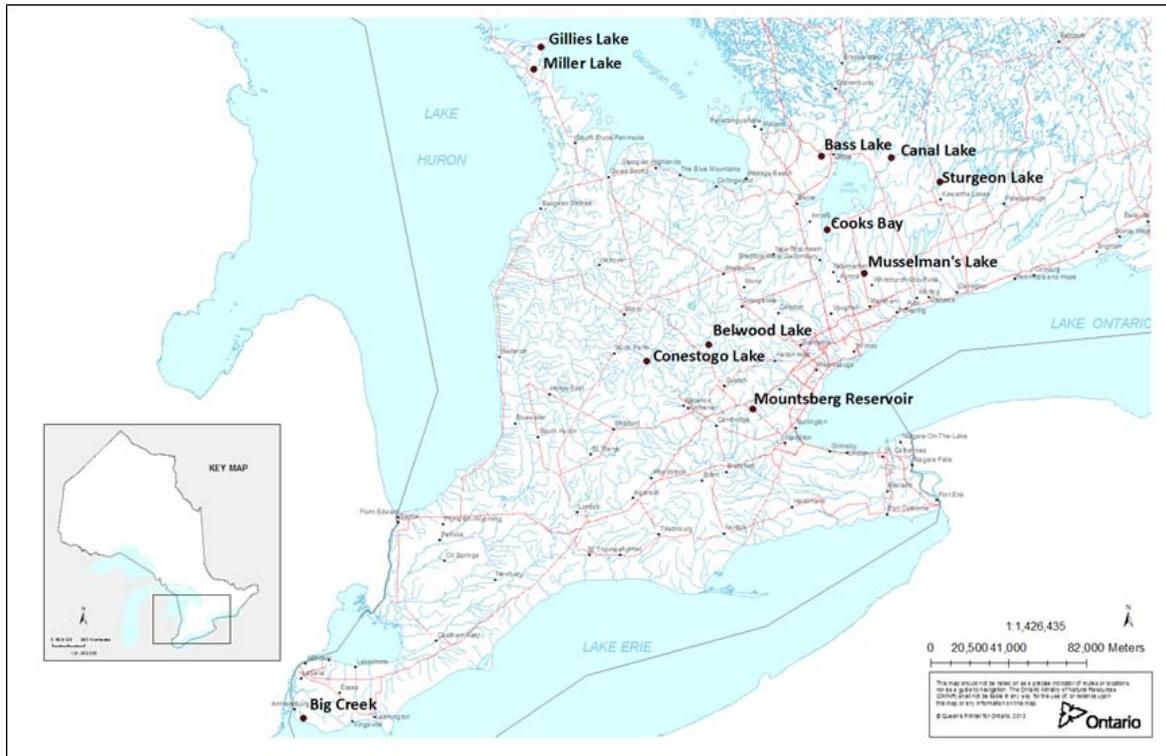


Figure 2. Location of 11 water bodies sampled in southern Ontario by the OMNR as part of an effort to track the spread of VHS.

Emergency Fish Pathogens

Viral Hemorrhagic Septicemia (VHS)

The Canadian Food Inspection Agency confirmed the presence of VHS in Lake Simcoe in 2011. This finding led to the addition of a new VHS management area, the Lake Simcoe Management Zone (LSMZ). This new management zone prohibits the movement of commercial baitfish into or out of the LSMZ Zone (Figure 3). In addition, the existing management actions that were being applied to other activities (e.g. wild spawn collections and fish stocking etc.) were applied to include the new area (LSMZ).

In 2012, VHS was confirmed by the CFIA in fish collected from Musselman's Lake. Because this lake is inside the current Lake Simcoe Management Zone, no additional control measures were implemented. The Guelph Fish Pathology Laboratory had a positive test result in Canal Lake which is outside of both management zones but CFIA was unable to confirm this result. No additional management actions have been implemented in response to that finding.

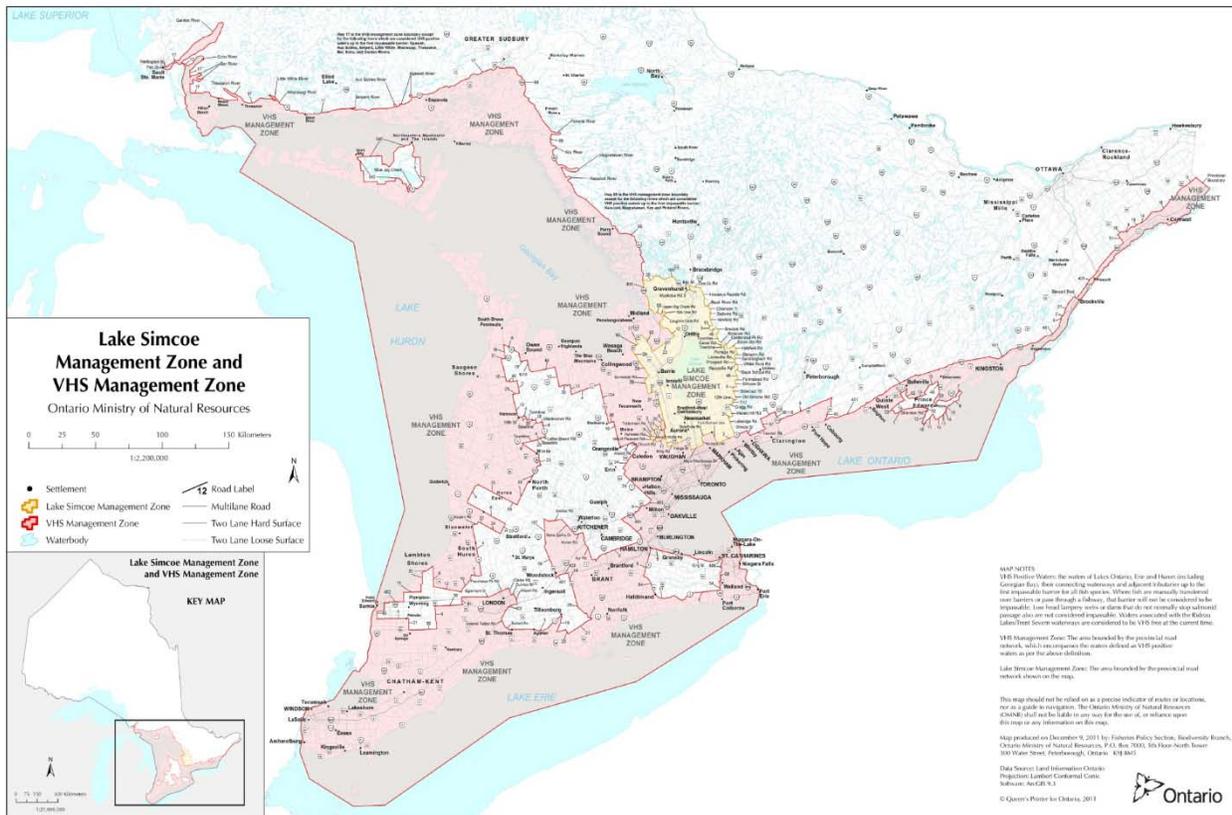


Figure 3. Lake Simcoe Management Zone and VHS Management Zone.

Restricted Fish Pathogens

Aeromonas salmonicida

Furunculosis, caused by *Aeromonas salmonicida*, was detected in only one (1) of 60 adult Chinook salmon and 14 of 66 Coho salmon collected from the Credit River during the fall 2012 wild egg collection. Furunculosis was also detected at the Blue Jay Creek FCS in three lots of fish. One lot of Splake (Lake Manitou * Hill's Lake strain) and two lots of lake trout (Iroquois Bay and Lake Manitou strains) were confirmed and treated in 2012.

Yersinia ruckeri

Enteric redmouth disease (ERM) is caused by the bacterial pathogen *Yersinia ruckeri*. A serotype (serotype I) of *Y. ruckeri* not considered to be endemic was found in two (2) of seven (7) rainbow trout (Ganaraska River strain) broodstock fish submitted for testing from the Tarentorus FCS.

Renibacterium salmoninarum and Bacterial Kidney Disease (BKD)

Renibacterium salmoninarum is considered to be endemic in Ontario and in OMNR fish culture facilities at low levels. Routine facility level monitoring is conducted annually using IFAT. 2012 detections are reported in Table 1. There were no signs of bacterial kidney disease in fish with *R. salmoninarum* in 2012. Low numbers of bacteria were detected in fish from Tarentorus, Dorion, North Bay, Hill's Lake, Blue Jay Creek and Normandale Fish Culture Stations.

Table 1. *Renibacterium salmoninarum* detections by IFAT in 2012.

Fish Culture Station	Month	Species	Detection Details
Tarentorus	March	Brook trout	Low numbers in 1/11
Dorion	March	Brook trout	Low numbers in 1/15
North Bay	March	Rainbow trout	Low numbers in 1/84
Hill's Lake	July	Brook trout	Low numbers in 1/12
Blue Jay Creek	September	Splake	Low numbers in 1/32
Hill's Lake	October	Aurora trout	Low numbers in 1/16
Normandale	November	Atlantic salmon	Low numbers in 1/18

Miscellaneous Detections

Novel bacilliform virus - Chinook salmon

In 2008, an unidentified bacilliform virus was discovered in Chinook salmon adults sampled as part of the wild egg collection on the Credit River. The virus is a single-stranded RNA enveloped bacilliform rhabdovirus approximately 45nm X 128-140nm in size, eliminating identification as IPNV, aquareovirus or Koi herpes virus. PCR test results with primers for VHSV, IPNV and SVC were all negative. Several genome segments of the virus isolated in 2008 were amplified and sequenced with no significant homology to any published viral genome.

The virus was not detected in the 2009 and 2010 samples from the same river but was confirmed again in the 2011 samples. PCR primers based on sequences from the 2008 isolate demonstrated that the 2011 isolate was related to the previous isolate.

In 2012, this still unidentified bacilliform virus was found in:

- Carcasses - 16 of 30 pools (of mated pairs) representing a total of 60 carcasses; and
- Reproductive Fluids – 130 of 221 pools (with an average of 3.31 fluid samples/pool) representing a total of 732 fluids.

These findings suggest that the probability of an individual adult fish being positive for this virus is between 20% and 30%.

Novel bacilliform virus - Coho salmon

In 2012, the same virus that had been detected in Chinook salmon was found in Coho salmon for the first time. One (1) of 52 adult samples sent in tested positive from the Credit River fall wild egg collection.

Bacterial Gill Disease (BGD)

Flavobacterium branchiophilum was found in bacterial gill disease outbreaks at the following OMNR fish culture stations in 2012: Dorion, Hill's Lake, Harwood, Normandale and Blue Jay Creek.

Chlamydia-like Organisms (CLO)

Two lots of fingerling brook trout (Lake Nipigon * Hill's Lake and Lake Nipigon strains) were diagnosed with chlamydia-like organisms (CLO) in May at the Tarentorus FCS. There is no known treatment for CLO. Experimental work in collaboration with the University of Guelph Fish Pathology Lab to better identify and find an effective treatment for CLO continues as mortality is high in lots of fish with CLO.

Flavobacterium columnare

The causative agent of columnaris, *Flavobacterium columnare*, was not detected in any of the Fish Culture Stations in 2012.

Flavobacterium psychrophilum

The causative agent of Cold Water Disease, *Flavobacterium psychrophilum*, was detected in three (3) of three (3) rainbow trout (Ganaraska River strain) broodstock in May at the Tarentorus FCS. Cold water disease was also confirmed in three separate lots of fish at the Normandale FCS. In February, two (2) of 12 Atlantic salmon yearlings (Sebago Lake strain) tested positive. In July, three (3) of six (6) Atlantic salmon yearlings (Sebago Lake strain) tested positive. Finally, multiple tests conducted in October and November confirmed the presence of *F. psychrophilum* in another lot of Atlantic salmon fingerlings (Sebago Lake strain). Cold water disease treatment requires mixing an antibiotic (Aquaflor) into feed and feeding a minimum ration every day. This makes treating this disease difficult as fish typically stop feeding when they become sick.

External Parasites

Parasite outbreaks were identified at three different Fish Culture Stations in 2012 and were associated with high rainfall events that affected the source waters.

- In April the Dorion FCS treated one lot of brook trout (Lake Nipigon strain) for both *Costia* and *Chilodonella*. Later in September they had two separate lots of brook trout broodstock (Lake Nipigon strain) that were treated for *Gyrodactylus*.
- In May, Tarentorus FCS had one case of *Gyrodactylus* in a lot of rainbow trout broodstock (Ganaraska River strain).
- In July and August then again in October and November, Blue Jay Creek experienced persistent problems with *Trichodina* and *Chilodonella* in one lot of lake trout (Big Sound strain). They also had a case of *Trichodina* in a lot of Splake (Lake Manitou * Hill's Lake) in August and a case of *Costia* in a lot of lake trout (Lake Manitou) in November.

Updates

Aquareovirus detection – Chinook salmon

Wild Chinook salmon from the Credit River were used for a spawn collection in October, 2010. Due to the large number of fish used for this spawn collection samples were pooled for testing. Standard pool size was 5 fish, but in some cases pools contained as few as 2 fish. An aquareovirus was detected in one pool on each of four collection days. The eggs from these collections were water hardened in iodophor following standing procedure. Stress testing was used to determine that the virus was not present in the offspring and the fish were ultimately stocked.

Although this virus was confirmed in 2009 and 2010 it was not detected in parent fish used for spawn collection in 2011 or 2012.

Aquareovirus detection – Coho salmon

In early 2010, a replicating agent was reported from one wild male coho salmon from the Credit River used for a spawn collection in November of 2009. The virus was very slow growing and was identified as an Aquareovirus.

This virus was not detected during the 2011 or 2012 wild egg collections.

January 18, 2013

Prepared by Chris Wilson, Acting Production Planning Biologist, Fish Culture Section, with support from Dr. Brenda Koenig, Aquatic Ecologist, Fisheries Policy Section.

Fish Culture Section extends its thanks to Dr. R.M. Stevenson and S. Lord at the University of Guelph's Fish Health Laboratory for providing comment on drafts of this report.

Pennsylvania Fish and Boat Commission

Annual Hatchery Disease Classification and Importation Report

January 1, 2012 – December 31, 2012

Restricted Pathogens

Aeromonas salmonicida with varying antibiotic resistance has been confirmed at 7 PFBC hatcheries in 2012. Detections were made while conducting diagnostic examinations and fish health inspections. These findings however did not result in a change in hatchery disease classifications since the restricted pathogen was already known to be present. Vaccination programs have been implemented at most PFBC salmonid facilities results have been good to date. Additionally improved biosecurity, and changes in hatchery standard operation procedures (SOPs) have had positive results and are helping to control mortality due to *Aeromonas salmonicida*.

Infectious pancreatic necrosis (IPNV) has been detected at 7 PFBC hatcheries during 2012 while conducting fish health inspections and diagnostic examinations. Pair spawning, improved SOP's and an increased emphasis on biosecurity are being implemented at several hatcheries to reduce the incidences of IPNV.

Myxobolus cerebralis no spores were detected using the Pepsin-Trypsin digest procedure for the 2011 and 2012 hatchery inspections. Some results are still pending.

Renibacterium salmoninarum was detected at 3 PFBC hatcheries in 2012. Analysis is still ongoing for several hatcheries for both the 2011 and 2012 inspections. Most notably *Renibacterium salmoninarum* was detected using Florescent Antibody Test at the Fairview SFH and resulted in a change to the classification. A second round of sampling was conducted using the culture method and an independent laboratory; results from the second round of testing were negative for the restricted pathogen.

Viral Hemorrhagic Septicemia (VHSV) was detected in Presque Isle Bay by the USFWS; this marks the first detection in PA waters.

PFBC Cooperative Nurseries

Fish health inspections have been completed at 8 PFBC cooperative nurseries within the Lake Erie Basin. IPNV was detected at several Cooperative Nurseries in 2011. The nurseries were depopulated and disinfected. To date results from all nurseries were negative for IPNV and other Emergency and Restricted pathogens in 2012

Lake Erie Winter Steelhead

Ovarian fluid and milt samples were collected from Lake Erie winter steelhead broodstock spawned at the Fairview SFH. Samples were analyzed at the Penn State University Animal Diagnostic Laboratory (PSUADL). All samples were negative for IPNV and other viral fish pathogens.

In addition, kidney and spleen tissues were sampled from 60 adult Lake Erie winter steelhead brood fish as part of the Fairview SFH annual fish health inspection. Samples were analyzed for viral pathogens at the USFWS Northeast Fish Health Center. Whirling disease assay results are pending.

Wild Brood Monitoring

Depending on the species and availability of fish, lethal or non-lethal sampling techniques were employed to monitor for viral pathogens in all lots of wild brood fish used for production by the PFBC. To date, wild broodstock monitoring has taken place in seven bodies of water located in the Delaware River Basin, the Ohio River Basin and the Lake Erie Basin. Species sampled include steelhead trout, walleye, yellow perch, white crappie, bluegill, muskellunge, northern pike, fathead minnow, American shad, and golden shiner. Except for steelhead, all other species sampled were collected from waters outside of the Lake Erie Basin. However, since either these fish and/or their eggs are being brought into the PFBC production system, this preventative activity is applicable to this report. No viral pathogens have been detected.

Egg Disinfection

Currently, all PFBC hatcheries involved in the production of cool/warm water species are following the GLFHC Basinwide Coolwater Egg Disinfection Protocol.

Pennsylvania Fish and Boat Commission Annual Salmonid Importations

Salmonid Importation 2012

Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification		Lake Basin
				Date	Official	
USFWS NE Fisheries Center	BKT/ RBT 50,000	Yearling	BF, VP	2/27/2012	John Coll	Inland
NY Catskill State Hatchery	BNT 100,000	Eggs	A	10/25/2012	A. Noyes	Erie
NY Randolph State Hatchery	BNT 47,000	Eggs	B-BF12			
Vermont-Salisburg FCS	LAT 120,000	Eggs	B-BF	5/3/2011	T. Jones	Inland
Paint Brook NFH	BKT 150,000	Eggs	A			
Erwin NFH	RBT 275,000	Eggs	A	10/25/2011	Norman Hiel	Inland
Tout Lodge	RBT 240,000	Eggs	A			

Proposed Salmonid Importation 2013

Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification		Lake Basin
				Date	Official	
NY Catskill State Hatchery	BNT 100,000	Eggs	A	10/25/2012	A. Noyes	Erie
Vermont-Salisburg FCS	LAT 120,000	Eggs	B-BF	5/3/2011	T. Jones	Inland
Erwin NFH	RBT 275,000	Eggs	A	10/25/2011	Norman Hiel	Inland
Tout Lodge	RBT 240,000	Eggs	A			

**Pennsylvania Fish and Boat Commission
2011 GLFHC Hatchery Classification report**

Hatchery	Location	Disease Classification	Date (*Results Pending)
Bellefonte SFH	Bellefonte	C- BF12 ^{ROR} ,BK12, SW10, VP12	12/27/12*
Benner Spring SFH	State College	B- BF12, BK10, VP10	3/6/2012
Corry SFH	Corry	B- BF12 ^{TMR} ,BK10, VP12	4/10/2012
Fairview SFH	Fairview	B- BK12	5/20/2012
Huntsdale SFH	Huntsdale	C- BK08, VP12	11/5/2012*
Linesville SFH	Linesville	A-	6/12/2012
Oswayo SFH	Oswayo	C- BF12, BK12, VP12	12/4/2012*
Pleasant Gap SFH	Pleasant Gap	B- BF 12, BK10,VP12	4/24/2012
Pleasant Mount SFH	Pleasant Mount	B- VL10	6/20/2012
Reynoldsdale SFH	Reynoldsdale	C- BF12 ^{TMR} , SW06, VP12	9/11/12*
Tionesta SFH	Tionesta	A-	8/21/12
Tylersville SFH	Tylersville	B- BF12,BK10,VP12,	10/12/12*
Union City SFH	Union City	A-2	6/12/2012
Van Dyke SFH	Van Dyke	A-2	5/21/2012

Lake Erie Drainage Cooperative Nurseries

Albion	Fairview	C – (VP11) (3/12)	10/19/2011
Mitchel 3CU	Girard	C	10/23/2012
Ro-Ze 3CU	Girard	C – (VP11) (3/12)	10/23/2012
Mission 3CU	Girard	C – (VP11) (3/12)	9/18/2012
Peck 3CU	Fairview	C –	10/19/2011
Kendra	Girard	C – (VP11) (3/12)	10/23/2012
S.O.N.S. of Lake Erie	Erie	C -	3/22/2012
Tom Ridge Environmental Center	Erie	C	10/23/2012
Wesleyville	Wesleyville	C – (VP11) (3/12)	10/19/2011

Wild Brood

Steelhead	Lake Erie	C -	2/1/2012
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Disease	Pathogen	Abbreviation
Whirling disease	<i>Myxobolus cerebralis</i>	SW
Infectious Pancreatic Necrosis	IPN virus	VP
Bacterial Kidney Disease	<i>Renibacterium salmonarum</i>	BK
Epizootic Epitheliotropic Disease	<i>EED virus</i>	VL
Furunculosis	<i>Aeromonas salmonicida</i>	BF

TMR -Terramycin Resistant, ROR-Romet Resistant

Report Prepared By: Coja Yamashita
Title: Fisheries Biologist, Fish Health Unit Leader
Phone Number: (814) 355-4837



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
Telephone 608-266-2621
FAX 608-267-3579
TTY Access via relay - 711

17 January 2013

Annual Report to the GLFHC for the year 2012

The most significant news for 2012 was the isolation of cutthroat trout virus (CTV) from ovarian fluids from two captive strains of brown trout in Wisconsin DNR hatcheries and from ovarian fluids and k/s homogenates from Seeforellen brown trout, which is a feral strain that matures in Lake Michigan and spawns at our Besadny spawning facility. This is the first time CTV has been isolated east of the Mississippi River and is the first isolation from Lake Michigan. As stated in the 2008 GLFHC issue brief on CTV, several member agencies import fish eggs from CTV positive hatcheries in Western US, and that may be the likeliest explanation for finding the virus in the Seeforellen BNT. The CPE for CTV is very subtle and it is possible that CTV has hitchhiked with eggs imported from western hatcheries and has been unknowingly released into the GL basin via the stocking of carrier fish.

Our two hatcheries with CTV infected captive broodstocks are not in the GL basin, nor do they receive eggs or fish from hatcheries within the basin. We are unsure how the virus got past our biosecurity. The St Croix Falls hatchery is located “up cliff” from the St Croix River, which is upstream of the Mississippi River. There is a dam above the hatchery and we plan to test wild fish next spring upstream and downstream of the dam. The Nevin hatchery in Madison raises a feral inland strain of brown trout called Timber Coulee BNT. CTV has not been isolated from the feral broodfish used to develop the captive broodstock. Only the captive broodfish at the hatchery have tested positive (F1 generation from the feral brood). Egg transfers have been made between St Croix Falls and Nevin in both directions for many years, so finding the virus in both locations is not too surprising, but it does not help us identify the original source of the virus.

WDNR feels there is a need to develop a suite of best management practices for handling eggs from CTV infected broodstocks. The virus is known to be egg associated, but true vertical transmission has not been proven yet. It may be possible to reduce the viral load associated with eggs below the threshold needed for infection. With the detection of CTV in the Seeforellen BNT, it would not be surprising to find CTV in steelhead broodstocks in Lake Michigan this spring, and other agencies may detect the virus in their broodstocks.

As stated in the 2008 CTV issue brief, we do not know whether cool and warm water species of fish in the GL basin are susceptible to CTV or if it causes disease. Dr Tom Waltzek at U Florida is interested in CTV research to develop best management practices and study the susceptibility and virulence of CTV in cool and warm water species. He and I have submitted a pre-proposal to the GLFC that includes both research ideas.

Now that CTV is in the GL basin, we need to decide whether to add it to the Model Program and develop an acronym for it for reporting. I have attached an image from Corey Puzach (La Crosse FHC) showing the CPE for CTV.

We continued our USDA-APHIS VHS surveillance and the virus was not detected in 27 inland waters. No USDA APHIS sponsored VHS surveillance will be conducted in 2013, since funding was eliminated. WDNR will continue to conduct VHS surveillance by testing fish in hatchery water supplies and responding to fish kills.

Our furunculosis vaccination program continues to work very well to control this disease in brown trout at two of our hatcheries that have open water supplies. We have vaccinated fish for the past 16 years and in most years, we do not isolate *A. salmonicida* at all, despite vigilant testing of the few freshly dead morfs that occur. The vaccination uses a 30 second dip in an autogenous vaccine made for us by Kennebec River Biosciences (formerly Microtechnologies) in Richmond, Maine. The fish are vaccinated at the broodstock hatchery about one month before they are transferred to the at risk rearing stations. This allows adequate time for high antibody titers to develop before the fish are naturally challenged with the bacteria. Prior to vaccination, we feed the fish a “boosted” diet (Macroguard, made by Silver Cup) for two to three weeks. We feed the same diet for 2-3 weeks post vaccination and feel this enhances the immune response. As long as the skin and fins are not eroded or abraded at the time of challenge (*A. sal.* is present in the water supplies for the two hatcheries), we get excellent protection from infection by *A. sal.* in vaccinated fish. In 2012 we did not isolate *A. sal.* from the Thunder River hatchery or the Brule hatchery. We did isolate a moderate prevalence of *A. sal.* in spawning Coho and Seeforellen BNT this year: 31/120 Coho from the Root River (Racine), 20/120 Coho and 13/60 Seeforellen BNT from the Besadny Facility (Kewaunee). We are not sure where the fish pick up the infection.

For the fifth consecutive year, we have not isolated or detected *R. salmoninarum* in Coho reared at our new Wild Rose hatchery. I feel that this is related in part to rearing the fish under less crowded conditions during early rearing and having a very fast water velocity (short turnover times) during grow out, which may reduce the contact time between the bacteria and the fish, and thus impede successful transmission of the bacterium. However, for the first time since 2010, *R. s.* was isolated by kidney culture on SKDM2 agar from Coho broodstocks at our two spawning weirs: 5/120 Coho at the Root River and 9/120 Coho at the Besadny facility. *R.s.* was not isolated from Chinook salmon (180 fish sampled) nor Seeforellen brown trout (60 fish sampled).

For the past 5-6 years, we have observed variable intensities of Ich infections in the spawning Coho and Seeforellen BNT. In 2012, for the first time, we also saw a low prevalence of Ich in the Chinook salmon. This may be related to warm water temps extending into September, compared to previous years.

We continue to monitor fathead minnow purchased from vendors for viruses. We feed the FHM to our muskellunge and walleye for stocking as fall fingerlings. In 2012, with the help of the La Crosse Fish Health Center, we isolated Aquareovirus, FHM nidovirus, FHM picornavirus and one unknown virus from FHM purchased from vendors. We detected the FHM picornavirus in inland muskies that were fed the infected FHM. We do not know the long term consequences of stocking game species that carry these viruses.

The Wisconsin Veterinary Diagnostic Lab eliminated its fish health program as a fiscal decision and no longer accepts samples for fish testing. We now send our virology samples to the USFWS La Crosse Fish Health Center and the Kennebec River Biosciences Lab (Richmond ME). We do preliminary

bacteriology screening (which is nice for me to have this back in our lab) and WVDL does the identification for our significant isolates. KRB does our Mc testing.

I am looking forward to not finding something new in 2013.

Respectfully submitted,

Susan Marcquenski



HATCHERY CLASSIFICATION REPORT

Wisconsin

Report Period: January 1 to December 31 2012 **Report Date:** January 17, 2013

Hatchery Name	Location	Pathogen Acronym
Les Voigt (formerly Bayfield)	Bayfield	B-(VL)
Brule	Brule	A-2
Kettle Moraine Springs	Adell	B-(BK)
Lake Mills	Lake Mills	A-2
Lakewood	Lakewood	Not in operation in 2012
Langlade	White Lake	Not in operation 2012
Nevin	Fitchburg	A-1 (CTV isolated 11/2012)
Osceola	Osceola	A-1
St. Croix Falls	St.Croix Falls	A-1 (CTV isolated 10/2012)
Thunder River	Crivitz	A-2
Wild Rose Great Lakes	Wild Rose	B-(BK)
Wild Rose Inland	Wild Rose	C, A-1

Report Prepared by: Susan Marcquenski

Title: Fish Health Specialist

Phone Number: 608.266.2871

EMERGENCY FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
viral hemorrhagic septicemia	virus	VHS	VE
infectious hematopoietic necrosis	virus	IHN	VH
ceratomyxosis	<i>Ceratomyxa shasta</i>	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

whirling disease	<i>Myxobolus cerebralis</i>	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	<i>Renibacterium salmoninarum</i>	BKD	BK
furunculosis	<i>Aeromonas salmonicida</i>	BF	BF
enteric redmouth	<i>Yersinia ruckeri</i>	ERM	BR
epizootic epitheliotropic disease	virus	EED	VL**

* Inspectors within the Great Lakes basin do not need to include these pathogens unless importations of fish from enzootic areas are known to have been made.

** based on UC-Davis EEDv PCR assay

SALMONID IMPORTATION REPORT

WISCONSIN

Agency: WI Department of Natural Resources

Reporting Period: January 1 to December 31 2012

I A.. Known importations since last report.

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Egg Size</u>	<u>Fish Health_ Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>
1.	Erwin NFH TN	Arlee RBT ~176,000	eggs	SPF	Dec 2012	Norm Heil	Michigan
2.							
3.							
4.							
5.							

B. Proposed importations for 2013

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Egg Size</u>	<u>Fish Health_ Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>
1.	Erwin NFH TN	Arlee RBT ~176,000	eggs			Norm Heil	Michigan
2.							
3.							
4.							



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Lamar Fish Health Center
400 Washington Ave
P.O. Box 155
Lamar, PA 16848
(570) 726-6611
Fax: (570) 726-7379

Email: John_Coll@fws.gov

2012 Annual Report to the Great Lakes Fish Health Committee from Fish and Wildlife Service Northeast Region; Region 5

January 15, 2013

A fish health inspection was conducted at the Allegheny NFH in Warren, Pennsylvania on August 29, 2012. This inspection, followed by the testing of ovarian fluids at spawning (October 16, 2012) and lethal sampling of broodstock (November 5, 2012) consisted of all lots on station: 3 lots of lake trout production fingerlings (SLW, SAW, LCD) and one lot of lake trout broodstock (SKW). All tests were negative on this the second fish health inspection since the station renovation /disinfection (previous sentinel brook trout 7/18/2011). Hatchery will not yet achieve a facility fish health classification, pending another year to attain a three year history.

Both Berkshire NFH (MA) and Dwight D Eisenhower NFH (VT) are inspected in compliance with the Great Lakes Fish Disease Control Policy and Model Program, as they have taken up supplemental roles of the USFWS Region 5 lake trout program. Having transferred the Seneca stain future brood to Allegheny NFH, the station now rears Klondike strain lake trout future brood. The fish health inspection of all lots at Berkshire (Atlantic salmon, brook trout, rainbow trout, and lake trout) took place on March 7, 2012 and as indicated by the A-2 classification, all results were negative for listed pathogens.

The Dwight D. Eisenhower (formerly Pittsford) NFH also has a relatively short time in the Great Lakes program and a long history of disease free status. The annual fish health inspection, including the lake trout fingerlings and yearlings occurred on March 5, 2012 and all lots were also negative for listed pathogens, giving the station the A classification.

The U.S. Fish and Wildlife Service continues to perform pathogen surveillance on free ranging fish as part of the National Wild Fish Health Survey. In 2012, the Lamar Fish Health Center has performed many investigations on free ranging fish throughout the Northeast for listed fish pathogens, including largemouth bass virus, spring viremia of carp virus, infectious salmon anemia virus, and most applicable to the Great Lakes Basin, viral hemorrhagic septicemia virus (VHS). Screening for Great Lakes emerging fish pathogens (i.e. Nucleospora and EEDv) is also conducted where applicable.

The Great Lakes watershed proper for Region 5 consists of a small area in extreme northwest Pennsylvania and the northern border of New York. Since most of Pennsylvania's (and a great deal of New York's) waters do not flow into the basin, surveillance efforts have been directed to attempt to demonstrate VHS-free "zones", as well as track the movement of this pathogen in the Great Lakes.

Following the report of *Nucleospora salmonis* in USFWS facilities, the Lamar FHC conducted screening for this microsporidean at federal and state fish culture stations as well as from several feral stocks in the Northeast. This molecular test (polymerase chain reaction or PCR) continues to be refined and additional surveillance continues. Another PCR assay has been developed (also at University of Cal-Davis) for EEDv, the lake trout herpesvirus causing mortalities in many upper lake hatcheries in the 1980s. Surveillance of wild lake trout for this agent has been initiated on free ranging lake trout at the Lamar Fish health Center. Testing for these emerging fish pathogens has been enhanced through a Great Lakes Restoration Initiative (GLRI) project, funded by the US EPA.

In 2012, using the 2011 GLRI funds, 40 sites were sampled. 2688 fish, from 31 different taxonomic species were tested for VHS through cell culture (several cell lines) and molecular (DNA) assays for VHS as well as all applicable Great Lakes listed and emerging pathogens. VHS virus was isolated and confirmed from bluegill collected at Presque Isle Bay, Lake Erie (Pennsylvania). Although it has been several years since there was a VHS isolation in this area, this was neither a new site nor a new species for VHS. *Nucleospora salmonis* was identified from brown trout collected from the Connetquot River as well as steelhead trout from both the Cattaraugus Creek and Chautauqua Creek, in New York as well as in three Lake Erie steelhead trout populations in Pennsylvania. Lake trout herpesvirus, (salmonid herpesvirus 3) also known as epizootic epitheliotropic disease virus or EEDv, was similarly found by molecular techniques (PCR) from two lake trout populations (4/20 and 2/60) in Lake Ontario. These findings indicate the need for further, continued surveillance, which is planned in 2013.

Although coolwater fish have been added to the Model Program, no USFWS facility participating in the Great Lakes program in the Northeast, cultures these species. The Lamar Fish Health Center has been assisting the Pennsylvania Fish and Boat Commission with viral testing on wild warm and cool water broodstocks and their hatchery offspring. . Additionally, cold, cool, and warm water fish continue to be tested in the National Wild Fish Health survey.

2013 HATCHERY CLASSIFICATION REPORT

Report Period Jan. 1, 2012– Dec 31, 2012 Report Date: Jan 15, 2012

Hatchery Name Location Pathogen Acronym

Allegheny NFH Warren, PA C 8-29-2012

Newly renovated and disinfected
facility housed sentinel brook trout in 2011, now lake trout production and brood

D.D. Eisenhower NFH Bethal, VT A 3-05-2012 U-V treated

Berkshire NFH Great Barrington, MA A-2 3-07-2012

Report Prepared by: John A. Coll

Title: Project Leader, Lamar Fish Health Center

Phone Number: 570-726-6611 x 221

EMERGENCY FISH DISEASES

Disease	Disease Pathogen	Disease Acronym	Pathogen Acronym
viral hemorrhagic septicemia	virus	VHS	VE
infectious hematopoietic necrosis	virus	IHN	VH
ceratomyxosis	<i>Ceratomyxa shasta</i> protozoan	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

whirling disease	<i>Myxobolus cerebralis</i> protozoan	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	<i>Renibacterium salmoninarum</i> bacteria	BKD	BK
furunculosis	<i>Aeromonas salmonicida</i> bacterium	BF	BF
enteric redmouth	<i>Yersinia ruckeri</i> bacterium	ERM	BR
epizootic epitheliotropic disease	virus	EED	VL**

* Inspectors within the Great Lakes basin do not need to include these pathogens unless importations of fish from enzootic areas are known to have been made.

** Field diagnostic test not available.

SALMONID IMPORTATION REPORT

Agency U.S. Fish and Wildlife Service Region5, Lamar, PA

Reporting Period 01/01/12 – 12/31/12

I. A. Known importations since last report.

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>	<u>Imported to:</u>
1.								
2.								
3.								

B. Proposed importations:

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>	<u>Imported to:</u>
1.	Eisenhower NFH N. Chittendon, VT	Lake trout Seneca 110,000	yearling	A	3/05/2012	Coll/Barbash	Erie & Ontario	

II. Lab Findings

III. Other

Reporting Period 01/01/12 – 12/31/12

I. A. Known importations since last report.

	<u>Source</u>	<u>Species/Number</u>	<u>Fish/Eggs Size</u>	<u>Fish Health Status</u>	<u>Certification Date</u>	<u>Certifying Official</u>	<u>Lake Basin</u>	<u>Imported to:</u>
1.								