Great Lakes Fish Health Committee
(GLFHC)

Member Agencies 2013 Annual Reports

NYSDEC Agency Report to the Great Lakes Fish Health Committee for 2013
January 14, 2014

Wild Fish Pathogen Surveillance 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 in 2013, a wide range of fish species were collected from 27 locations (1,558 fish) and clinical testing was done at the USFWS fish health center in Lamar, PA. EEDv was discovered Lake Trout from two locations, Lake Ontario near Rochester, and Seneca Lake. Although Seneca Lake is connected to the Great Lakes via the Erie Canal system, this is the first inland detection of EEDv in New York. EEDv has been detected in Lake Ontario waters previously, including two locations in 2012. In all cases, fish appeared healthy and no clinical disease was evident. This does raise some concern since the NYSDEC uses Lake Trout from nearby Cayuga Lake (Seneca strain) for egg production. Cayuga previously tested negative. The other egg source for Lake Trout (Adirondack strain) is Raquette Lake which also tested negative for all pathogens, including EEDv. *Nucleospora salmonis* was detected in previous years in Lake Ontario and Long Island, but we had no *N. salmonis* detections in 2013.

Cornell conducted six fish disease investigations in 2013. In March, a fairly large Gizzard Shad Kill (thousands) occurred in the Niagara River, although VHS was not detected. The event was attributed to environmental conditions. In May, a noticeable fish kill (hundreds) occurred in Irondequoit Bay, Lake Ontario and included Gizzard Shad, Yellow Perch and Freshwater Drum. VHS was isolated from these Gizzard Shad. VHS was also detected in a small white perch kill in Lake Erie at the mouth of Chautauqua Creek.

Hatchery Fish Health and INAD Projects

Progress of Furunculosis Abatement at Rome SFH- In the summer of 2012, a serious epizootic of furunculosis occurred at the Rome hatchery and was linked to the importation of very susceptible Brown Trout lot from Virginia. By September, an abatement plan was developed that included (1) destroying 800,000 still infected fish, (2) bi-annual inspections of all lots at 2% prevalence interval for two years, and (3) only Rome strain trout could be cultured on site. Rome strain Brook and Brown Trout on site during the event were spared because they were largely unharmed during the epizootic. *Aeromonas salmonicida* was not detected in spring and fall inspections, and two more are planned in 2014.

Flavobacterial Diseases- In 2013, various flavobacterial diseases comprised the vast majority of our case work in our hatchery system. The usual epizootics of bacterial gill disease, bacterial cold water disease, and columnaris occurred at locations they were found previously. In most cases, epizootics were aggravated by rain events that lead to changes in water temperature and turbidity. These were effectively handled therapeutically, however recurrence was likely. In addition, a novel flavobacterial epizootic originated in YOY Rainbow Trout at our Van Hornesville hatchery and then spread by fish transfer to three other hatcheries. Infected fish had caudal, bilateral melanosis, much like Whirling Disease, however WD assays were negative. Bacteria (long rods) were isolated on skin and in muscle at site of melanosis and later sequenced as an undescribed *Flavobacteria* or *Chryseobacteria* species. It is interesting to note that the eggs originated at the Randolph hatchery and the bacteria was no isolated there, so the source appears to be Van Hornesville.

Expanded Perox-Aid Use- Salt (NaCl) was previously our treatment-of-choice for *Saprolegnia* and *Ichthyophthirius multifiliis* epizootics. In 2013, we assessed the efficacy of Perox-Aid in these situations and had comparable results when severity was still moderate at onset. The goal was twofold: (1) identify a treatment alternative when salt isn't available and (2) improve our understanding of Perox-Aid application and efficacy.

INAD Projects- INAD projects included Chloramine T (INAD 9321) and Oxytetracycline (INAD 10-321) to treat an assortment of flavobacterial diseases and Aqui-S (11-741) for anesthesia. Use of all drugs was successful.

Chloramine T was the most widely used of the three and was used at 9 of our 12 hatcheries in 2013. Oxytetracycline use was limited to our cool water program to treat columnaris and results were favorable. Antibiotic sensitivity was closely monitored and we luckily didn't face resistance issues. Aqui-S is an extremely effective anesthetic and our trials went smoothly. With the improved withdrawal period compared to MS-222, I see our entire department soon using Aqui-S exclusively.

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 2013, 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 55 inspections in 2013 totaling 4,100 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- S*tarting in 10/12, the hatchery inspections at the Rome were conducted in 6-month intervals and at 2% infection prevalence until the hatchery tests clean of program pathogens for 2 full years. We have completed three inspections since the initiation of our mitigation plan and all resident fish lots have been free of *A.salmonicida.* 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.

NYSDEC Agency Report to the Great Lakes Fish Health Committee for 2013
January 14, 2014

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
Chautauqua	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 (11/13)**
South Otselic	South Otselic, NY	A-2
Van Hornesville	Van Hornesville, NY	A-1
Wild Broodstock		
Coho Salmon - Lake Ontario	Altmar, NY	**As-2 (11/13)**
Chinook Salmon - Lake Ontario	Altmar, NY	**As-2 (10/13)**
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, 2014

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, parenthetic 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.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

RICK SNYDER
GOVERNOR

KEITH CREAGH
DIRECTOR

January 13, 2014

TO: Great Lakes Fishery Commission - Great Lakes Fish Health Committee

FROM: Michigan Department of Natural Resources, Fisheries Division (MDNR)

SUBJECT: 2013 Fish Health Report

In 2013, 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 by MDNR 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 – Fish Health Section (AFS-FHS) Blue Book.

A. Spring 2013 Inspections

Pre-Stocking Fingerlings

Twenty-four 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 according to the guidelines set forth in the GLFHC Model Program and AFS-FHS Bluebook prior to stocking in spring 2013. This included seven lots of brown trout (*Salmo trutta*), four lots of rainbow trout (*Oncorhynchus mykiss*), three lots of Chinook salmon (*O. tshawytscha*), two lots of Atlantic salmon (*Salmo salar*), one lot of coho salmon (*O. kisutch*), four lots of lake trout (*Salvelinus namaycush*), two lots of brook trout (*Salvelinus fontinalis*), and one lot of splake (*Salvelinus namaycush* X *Salvelinus fontinalis*).

Renibacterium salmoninarum, the causative agent of Bacterial Kidney Disease (BKD), was detected using quantitative enzyme linked immunosorbent assay (Q-ELISA) in two lots of fish at varying antigen levels. Rainbow trout (steelhead) from Wolf Lake State Fish Hatchery (WLSFH) tested positive with a prevalence of 3.6% out of the 55 fish tested, including one with high and one with medium antigen levels. Brown trout from Oden State Fish Hatchery (OSFH) tested positive with a prevalence of 8.3%, including one with high, three with medium, and one with low antigen levels. Additionally, 60 Chinook salmon per rearing unit from two hatcheries were tested and found to be negative for *R. salmoninarum* by Q-ELISA, including 360 Chinook salmon from six rearing units at Platte River State Fish Hatchery (PRSFH) and 420 Chinook salmon from seven rearing units at WLSFH.

Neither *Yersinia ruckeri*, the causative agent of enteric redmouth disease, nor *Aeromonas salmonicida* subsp. *salmonicida*, the causative agent of furunculosis, were isolated during spring production inspections in 2013, 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. *Nucleospora salmonis* was detected in kidney and gill samples from Lake Superior strain lake trout at Marquette State Fish Hatchery (MSFH). Skin and gill scrapings revealed parasites that included monogeneans, ciliates, and protozoans. Epizootic epitheliotropic disease virus (EEDV) was detected by quantitative polymerase chain reaction (qPCR) assay in two strains of lake trout from MSFH. No other viruses were detected in fish sampled from these lots.

Captive Salmonid Broodstock

Gamete samples from captive broodstock lots at OSFH were collected during spawning and tested for *R. salmoninarum* using Q-ELISA and viruses using cell culture in January 2013. This includes samples from 60 fish each from two year classes of Eagle Lake strain rainbow trout broodstock. No *R. salmoninarum* or viruses were detected in these fish.

Feral Broodstock

Thirty pairs of returning steelhead spawners from the Little Manistee River Weir (LMRW) were examined. *R. salmoninarum* was detected at a medium antigen level in one milt sample. No *A. salmonicida* was detected, despite being found in nine of the 60 fish examined from the returning steelhead spawners in 2012. No *Y. ruckeri* was detected. Non-reportable *Flavobacterium psychrophilum* was detected in kidney and fin cultures. No viruses were detected. Skin and gill scrapings revealed the presence of monogeneans.

B. Fall 2013 Inspections

Pre-Stocking Fingerlings (salmonids and muskellunge)

Nine lots of production fish (60 fish per lot) from MDNR fish production facilities were inspected prior to stocking in Summer/Fall 2013. These included steelhead trout and muskellunge at WLSFH; Assinica strain brook trout at MSFH; steelhead trout and Gilchrist strain brown trout at Thompson State Fish Hatchery (TSFH); Eagle Lake strain rainbow trout at OSFH; coho salmon and Atlantic salmon at PRSFH; and Atlantic salmon at LSSU-ARL. All lots were examined for reportable diseases following the guidelines set forth in the GLFHC Model Program and AFS-FHS Bluebook. *R. salmoninarum* was not detected in any of the fish examined, despite its presence in OSFH rainbow and brown trout in 2012. No reportable diseases were found. An unidentified intracellular bacterium was detected in the white blood cells of one lot of muskellunge from WLSFH but was not linked to disease signs or mortality in the affected group. Further ongoing studies to identify this bacterium are continuing.

Captive Broodstock

Inspections. The FDA approved vaccine Furogen® was administered to fish to prevent infections caused by *A. salmonicida* subsp. *salmonicida*. Thirteen lots of captive broodstock

were inspected in fall 2013. From MSFH broodstocks, two lots of Assinica strain brook trout and three lots of Lake Superior strain lean lake trout were inspected in August. From OSFH captive broodstocks, one lot of Gilchrist Creek strain brown trout, two 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 broodstocks examined, nor were any reportable pathogens. Skin and gill scrapings revealed monogeneans in some lots.

Preventative measures to minimize the vertical transmission of R. salmoninarum. Gametes were collected in the fall of 2013 from seven lots of salmonid broodstocks at OSFH and MSFH. Gametes from sixty fish each were collected from five lots of brown trout at OSFH and were tested for the presence of *R. salmoninarum*, Viral Hemorrhagic Septicemia Virus (VHSV), Infectious Pancreatic Necrosis Virus (IPNV), and Infectious Hematopoetic Necrosis Virus (IHNV). All test results were negative. Additionally, post-spawn gametes from 418 Assinica strain brook trout at MSFH 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 *R. salmoninarum* 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, as well as iodophor disinfection of eggs. Eggs from individual pairings were kept separate until Q-ELISA testing was completed, so that only those fertilized eggs that tested negative for *R. salmoninarum* antigen were kept for development of future broodstock and production fish. *R. salmoninarum* was not detected in any of the tested gametes.

Feral Broodstock

Chinook and coho salmon. Examinations were conducted on thirty pairs of returning Chinook salmon spawners from each of the Little Manistee River (LMRW) and Swan River Weirs (SRW), and on thirty pairs of returning coho salmon spawners from the Platte River Weir (PRW). *R. salmoninarum* was not detected in any of the tested samples. Prevalence for *A. salmonicida* was 33% in the LMRW, 12% in the PRW, and was not detected at the SRW. *Y. ruckeri* was not detected. Other isolated bacteria included *F. psychrophilum* (prevalence ranging from 43% to 77%) and motile *Aeromonas* spp. (prevalence ranging from 12% to 33%) in fish from all three weirs and *F. columnare* in SRW (prevalence of 33%) and PRW (prevalence of 27%). 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. *R. salmoninarum* was found in 10% of the examined females but in 0% of the males. No other reportable bacterial or viral pathogens were detected in the thirty pairs of fish examined. Other bacteria isolated includes *F. psychrophilum* (prevalence of 43%), motile *Aeromonas* spp., *Serratia* sp., *Morganella* sp., *Providencia* sp., and *Enterobacter* sp. Skin and

gill scrapings revealed a few ciliates.

C. Coolwater Broodstock Inspections

Both full and non-lethal inspections were conducted on coolwater broodstock populations in the spring of 2013 (220 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 2,130 fish (9 species) from Michigan's private aquaculture farms and bait collection facilities were inspected for health certifications, including viral (IPNv, VHSv and IHNv) and whirling disease screenings. Only IPNV was detected in samples from two private aquaculture facilities.

E. Response to 2013 Fish Kills Reports

In June 2013, fish kills were reported in several species from Morrison Lake. *F. columnare* infections and harmful algal blooms were associated with the cause of the die offs. Additionally, smallmouth bass (*Micropterus dolomieui*) collected during a Lake St. Clair fishing tournament were submitted to the laboratory in September for testing due to concerns that the fish appeared emaciated. Largemouth Bass Virus (LMBV) was isolated and its presence confirmed in these fish.

F. VHSV Surveillance

The Michigan DNR VHSV surveillance was initiated in 2006. During 2013, 4 species (121 fish) were submitted to the MSU-AAHL from Steusser and Sanford Lakes. Additionally, 24 cases of walleye fry and muskellunge fry were submitted for VHSV testing. No VHSV was detected.

G. Diagnosis of Clinical Cases

Fourteen cases of production lots were submitted by MDNR hatcheries for clinical diagnoses following episodes of elevated mortalities and/or morbidity. Pathogens associated with these disease episodes included *F. psychrophilum* and other *Flavobacterium* spp. in a majority of cases. 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 detected in one diagnostic case of Eagle Lake strain rainbow trout broodstock from OSFH at 50% prevalence. Skin and gill scrapings revealed monogeneans, ciliates, and/or fungal hyphae.

Additionally, 2305 wild and MSFH fish were tested for EEDV. The virus was detected and confirmed in several different year classes of production and broodstock lake trout within MSFH of both the Lake Superior and Seneca strains through January 2013 but not in surviving production fish that were subsequently stocked in all requested locations except for Lake Huron. EEDV was detected in mottled sculpin (*Cottus bairdii*) collected from Cherry Creek during the routine August 2013 surveillance collections from that water.

H. Wild Inspections

Fourteen cases (539 fish) were submitted for examination from waters supplying PRSFH and MSFH, Slagle Creek which is adjacent to Harrietta State Fish Hatchery (HSFH), and from the HSFH effluent pond. All submitted fish were tested for the presence of viruses. Additionally, submitted salmonids were tested for the presence of *R. salmoninarum* and *M. cerebralis*; and fish from Cherry Creek were tested for the presence of EEDV. *R. salmoninarum* was detected in all sites at varying prevalence as high as 48%. *M. cerebralis* was not detected in any of these sites tested in 2013. Brook trout tested from Cherry Creek supplying MSFH were found to have IPNV, while mottled sculpin from the same water tested positive for EEDV.

Eight species were inspected from multiple sites in seven inland lakes and rivers (782 fish) and examined for viruses, *R. salmoninarum*, *M. cerebralis*, and/or *Heterosporis* sp. No viruses were detected at 15°C or 25°C. *R. salmoninarum* and *M. cerebralis* were detected in multiple sites and species in the Au Sable River. *Heterosporis* sp. was not detected. Gametes from Black River lake sturgeon broodstock in Michigan and from Peshtigo River lake sturgeon broodstock in Wisconsin were tested for viruses and none were detected.

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

2013 Annual Report to the Great Lakes Fish Health Committee from Fish and Wildlife Service Northeast Region; Region 5

January 17, 2014

A fish health inspection was conducted at the Allegheny NFH in Warren, Pennsylvania on October 20, 2012. This inspection, including the testing of ovarian fluids at spawning (October 16 and October 21, 2013) marks the third consecutive annual fish health inspection without the isolation of a listed pathogen, thereby obtaining the hatchery classification of A-1.

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, and lake trout) took place on May 3, 2013 and as indicated by the A-2 classification, all results were negative for listed pathogens.

The Dwight D. Eisenhower (formerly Pittsford) NFH also continues to contribute to the Great Lakes program and possesses a long history of disease free status. The annual fish health inspection, including the lake trout fingerlings and yearlings occurred on May2, 2013 and all lots were also negative for listed pathogens, giving the station the A (Great Lakes A-1) 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 2013, 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.

In 2013, using the 2012 Great Lakes Restoration Initiative (GLRI) funds, 22 sites were sampled. Over 1,250 fish, from 21 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. The Lamar Fish Health Center did not isolate VHS virus from fish collected in the Lower Great Lakes Basin in 2013. Likewise, *Nucleospora salmonis* was not identified from any tests this past year. Lake trout herpesvirus, (salmonid herpesvirus 3) also known as epizootic epitheliotropic disease virus or EEDv, was found by molecular techniques (PCR) from a lake trout population in Otsego Lake. A newly identified and similar virus, salmonid herpesvirus 5, was found by molecular techniques in that same Otsego Lake population as well as two lake trout populations in Lake Erie and one in Lake Ontario. These findings indicate the need for further, continued surveillance, which is planned to continue in 2014.

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.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

2013 HATCHERY CLASSIFICATION REPORT

Report Period **Jan. 1, 2013– Dec 31, 2013** Report Date: **Jan 17 , 2013**

Hatchery Name	Location	Pathogen Acronym
Allegheny NFH	**Warren, PA**	**A-1 11/20/2013**
D.D. Eisenhower NFH	**Bethal, VT**	**A-1 04/02/2013 U-V treated**
Berkshire NFH	**Great Barrington, MA**	**A-2 04/03/20132**

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	*Ceratomyxa shasta* protozoan	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

whirling disease	*Myxobolus cerebralis* protozoan	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	*Renibacterium salmoninarum* bacteria	BKD	BK
furunculosis	*Aeromonas salmonicida* bacterium	BF	BF
enteric redmouth	*Yersinia ruckeri* 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.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

SALMONID IMPORTATION REPORT

Agency U.S. Fish and Wildlife Service Region5, Lamar, PA Reporting Period 01/01/13 – 12/31/13

I. A. Known importations since last report.

	Source	Species/Number	Fish/Eggs Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin	Imported to:
1.	Eisenhower NFH N. Chittendon, VT	Lake trout - Seneca 39,816	yearling	A-1	04/02/2013	Coll	Ontario	Stony Point, NY Lake Ontario
2.	Eisenhower NFH N. Chittendon, VT	Lake trout - Seneca 40,848	yearling	A-1	04/02/2013	Coll	Ontario	Osego, NY Lake Ontario
3.								

B. Proposed importations:

	Source	Species/Number	Fish/Eggs Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin	Imported to:
1.	Eisenhower NFH N. Chittendon, VT	Lake trout Seneca 195,000	Fingerling & yearling	A-1	04/02/2013	Coll/Barbash	Ontario	Lake Ontario

II. Lab Findings

III. Other

Pennsylvania Fish & Boat Commission

established 1866

Pennsylvania Fish and Boat Commission
Annual Hatchery Disease Classification and Importation Report
January 1, 2013 – June 31, 2013

Restricted Pathogens

Aeromonas salmonicida with varying antibiotic resistance has been confirmed at several PFBC hatcheries in 2013. Detections were made while conducting diagnostic examinations and fish health inspections. The only notable detection occurred at the Pleasant Mount State Fish Hatchery(SFH), *Aeromonas salmonicida* was isolated from both muskellunge and tiger muskellunge in 2013, this was the first detection at the facility in over a decade and resulted in a change in its classification. Vaccination programs have been implemented at most PFBC salmonid facilities and 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 6 PFBC hatcheries during 2013 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. The virus was not detected at the Tylersville SFH. This is the first time in recent history that the virus was not detected at this hatchery . 2013 marks the 3rd consecutive year that IPNv was not detected at the Benner Spring Hatchery. As a result, the virus has been removed from the facilities' disease classification. IPNv was detected in one lot at the Corry SFH. The infected fish were stocked out this year and the rearing unit has been disinfected. The virus should not be detected at the facility next year.

Myxobolus cerebralis was detected at the Bellefonte Hatchery in 2012 (12/28/2012). This was the only detection in 2012. No detections have occurred in 2013.

Renibacterium salmoninarum was detected at three PFBC hatcheries in 2013. Mortality was associated with the pathogen at the Oswayo SFH.

Viral Hemorrhagic Septicemia (VHSv) No detections were documented in the PFBC hatchery system or by the PFBC in 2013**.**

Cutthroat Trout Virus (CTV)

Cutthroat Trout Virus was detected at the Bellefonte SFH and Pleasant Gap SFHs in 2012 and in early 2013. All detections were in fingerling brown trout. The virus has been detected once since the initial detections (2013 Pleasant Gap SFH Fish Health Inspection). The virus was recently detected in a single lot of fingerling brown trout; however it was not detected in a lot of adult brown trout that tested positive in 2012. SOP's have been changed to allow for the detection of CTV during routine Fish Health Inspections and diagnostic workups. Currently, the PFBC is monitoring for the virus, however no management plan will be developed until all of the 2013 Fish Health Inspections have been completed.

The initial detection occurred during a routine diagnostic workup, the cause of the mortality was thought to be nutritional, however, samples were submitted for virology at the USFWS Northeast Fisheries Center. The feed manufacturer was switched and the mortalities declined to normal levels. Following the decline in mortalities, the PFBC was

notified that CTV was detected. The virus was isolated several times from the affected lots after the initial detection. To date, no brood fish have tested positive for the virus.

PFBC Cooperative Nurseries

2013 Fish Health Inspections have not been completed at the eight 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 have been negative for IPNv and other Emergency and Restricted pathogens since 2012.

Lake Erie Winter Steelhead

Ovarian fluid and milt samples were collected from Lake Erie winter steelhead broodstock spawned at the Fairview SFH in February 2013. Samples were analyzed at the Penn State University Animal Diagnostic Laboratory (PSUADL). All samples were negative for IPNv and other viral fish pathogens. Analysis is ongoing for the current 2013-2014 spawn.

Wild Brood Monitoring

Depending on the species and the 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 brood stock 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 neither these fish nor 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 Basin Wide Coolwater Egg Disinfection Protocol.

Pennsylvania Fish & Boat Commission

established 1866

Pennsylvania Fish and Boat Commission
Annual Salmonid Importations

Salmonid Importations 2013

Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification		Lake Basin
				Date	Official	
Tout Lodge	RBT 240,000	Eggs	A	5/2013	S. Nepper	Inland
NY Randolph Hatchery	BNT 200,000	Eggs	A-2	2013	A. Noyes	Erie
Paint Brook NFH	BKT 150,000	Eggs	A	7/16/2013	J. Coll	Inland
White sulfur Springs	RBT 275,000	Eggs	A	7/17/2013	J. Coll	Inland
Allegehny NFH	LAT 265,000	Eggs	A	11/2012	J. Coll	Inland

Proposed Salmonid Importations 2014

Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification		Lake Basin
				Date	Official	
NY Randolph Hatchery	BNT 200,000	Eggs	A-2	2013	A. Noyes	Erie
Paint Brook NFH	BKT 150,000	Eggs	A	7/16/2013	J. Coll	Inland
White sulfur Spring NFH	RBT 275,000	Eggs	A	7/17/2013	J. Coll	Inland
Allegehny NFH	LAT 175,000	Eggs	A	11/2012	J. Coll	Inland

Pennsylvania Fish and Boat Commission
2013 GLFHC Hatchery Classification report

Hatchery	Location	Disease Classification	Date (*Results Pending)
Bellefonte SFH	Bellefonte	C- BF13^{ROR},BK13, SW12, VP13, CTV13	12/27/2013*
Benner Spring SFH	State College	B- BF13,	3/25/2013
Corry SFH	Corry	B- BF14^{TMR},BK13, VP13	2/25/2013
Fairview SFH	Fairview	B- BK12	4/25/2013
Huntsdale SFH	Huntsdale	C- BK08, VP14	11/4/2013
Linesville SFH	Linesville	A-2	6/26/2013
Oswayo SFH	Oswayo	C- BF14, BK13, VP12	1/13/14*
Pleasant Gap SFH	Pleasant Gap	B- BF13(ror,tmr), BK13, VP14, CTV13	5/22/2013
Pleasant Mount SFH	Pleasant Mount	B- BF 13 (ror)	6/20/2013
Reynoldsdale SFH	Reynoldsdale	C- BF12^{TMR}, VP14	9/11/2013
Tionesta SFH	Tionesta	A-	6/19/2013
Tylersville SFH	Tylersville	B- BF13,BK10,VP12,	6/12/2013
Union City SFH	Union City	A-2	6/26/2013
Van Dyke SFH	Van Dyke	A-2	9/25/2013
Lake Erie Drainage Cooperative Nurseries			
Albion	Fairview	C – (VP11) (3/12)	1/16/2013
Mitchel 3CU	Girard	C	8/16/2013
Ro-Ze 3CU	Girard	C – (VP11) (3/12)	8/16/2013
Mission 3CU	Girard	C – (VP11) (3/12)	8/16/2013
Peck 3CU	Fairview	C –	1/22/14*
Kendra	Girard	C – (VP11) (3/12)	8/16/2013
Tom Ridge Environmental Center	Erie	C	10/23/2012
Wesleyville	Wesleyville	C – (VP11) (3/12)	1/22/14*
Wild Brood			
Steelhead	Lake Erie	C -	2/1/2013

Disease	Pathogen	Abbreviation
Whirling disease	*Myxobolus cerebralis*	SW
Infectious Pancreatic Necrosis	IPN virus	VP
Bacterial Kidney Disease	*Renibacterium salmonarum*	BK
Epizootic Epitheliotropic Disease	*EED virus*	VL
Furunculosis	*Aeromonas salmonicida*	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

21 January 2014

Annual Report to the GLFHC for the year 2013

In 2012, cutthroat trout virus was isolated from the ovarian fluids from two strains of domestic brown trout at the Nevin and St Croix Falls hatcheries and ovarian fluids and kidney/spleen homogenates from one strain of feral Seeforellen brown trout that matures in Lake Michigan. In 2013, CTV was isolated from ovarian fluids from our remaining strain of domestic brown trout at the Wild Rose hatchery. It is still a great puzzle as to how the virus arrived at our hatcheries. Dr Tom Waltzek at U Florida has completed genetic comparisons of the Nevin, St Croix Falls and Seeforellen brown trout isolates. The Nevin and St Croix Falls isolates are not identical to each other, but are similar to isolates from western states. The Seeforellen brown trout isolate is different, and is more similar to isolates from Atlantic salmon from the US East Coast. Tom has received the newest isolate from the Wild Rose hatchery and we hope to sequence that virus and compare the sequence to the other isolates. We rear the Seeforellen BNT at the Wild Rose hatchery, but the domestic brown trout broodfish are kept inside a different building, on first use water their entire life (no outside rearing). If the Wild Rose domestic BNT strain of CTV is similar to the Seeforellen BNT isolate, we have a biosecurity problem. If the isolate is more similar to those from the western states, one thing to consider is the possibility that contaminated feed (poor fish meal pasteurization) is the source of the virus for the domestic strains of brown trout. Ron Hedrick's early work on CTV showed that the RNA virus is very heat tolerant (50-60 C) for short periods. There is no exchange of equipment, eggs, or fish between the Wild Rose hatchery and the Nevin/St Croix Falls hatcheries.

In the 2012 annual report, I mentioned that 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.

In 2013 WDNR set up a contract with Dr Waltzek to develop a qPCR for CTV, and then use that tool to evaluate the reduction of virus when several different egg handling treatments were use during spawning. WDNR collected ovarian fluids from 30 females, gave each fish a unique floy tag and UFL tested the fluids using the new qPCR method. Females with the highest virus load were spawned separately and eggs were treated per the table below. All groups received a ten minute surface disinfection in 100 ppm iodophor before placement in the incubators. Eggs within the same treatment groups were pooled for incubation. Sixty fry per treatment group were collected within a week of 100% hatch; yolk was removed using separate scalpel blades for each fish; fry were snap frozen on dry ice and shipped to UFL where they will be tested for CTV using the qPCR.

Table 1. Experimental egg handling practices to reduce CTV levels during spawning of CTV positive broodstocks.

practice	**A***	**B***	**C***	**D***	**E***	**F***
Drain ov fl	+	+	+	+	+	-
Rinse eggs with saline	+	-	+	+	-	-
Water harden in 100 ppm iodophor	+	+	-	-	-	-
Incubator type	upwelling jar	upwelling jar	upwelling jar	heath tray	upwelling jar	upwelling jar

***** Eggs from all treatment groups were surface disinfected in 100 ppm iodophor after the eggs were pooled, just prior to being placed in the incubators.

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 submitted a pre-proposal to the GLFC that included both research ideas, but we were not asked to provide a full proposal. These ideas are still worth pursuing.

WDNR has reduced its active surveillance for VHSv; we continue to test resident wild fish in the water supplies of our hatcheries that use surface water and we respond to major 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 17 years and in most years, we do not isolate *A. salmonicida* at all, despite vigilant testing of the few freshly dead morts 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 2013 we did not isolate A. sal. from the Thunder River hatchery or the Brule hatchery. We did isolate a low to moderate prevalence of A. sal. from Lake Michigan feral broodstocks: 6/60 Coho from the Root River (Racine), 1/60 Coho and 13/60 Seeforellen BNT from the Besadny Facility (Kewaunee). We are not sure where the fish pick up the infection-they test negative at the hatcheries before they are stocked. This year the A sal colonies were quite large on the TSA agar- not sure why- just an observation.

For the sixth 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, the bacterium can still be detected in the Coho broodstocks- 4/60 at the Besadny Facility and 0/60 at the Root River Facility. The intensity of infection was only one or two colonies per fish (culture on SKDM2 agar). R.s. was not isolated from Chinook salmon (60 fish

sampled) nor Seeforellen brown trout (60 fish sampled). In general, Chinook, Coho and Seeforellen spawners were noticeably larger in 2013 than in 2012.

For the past 6-7 years, we have observed variable intensities of Ich infections in the spawning Coho and Seeforellen BNT. Ich was not observed on Chinook in 2013. The exit holes left by departing Ich may be a portal of entry for *A salmonicida, R.s.*, and other waterborne pathogens.

We continue to monitor fathead minnows purchased from vendors for viruses. We feed the FHM to our muskellunge and walleye for stocking as fall fingerlings. In 2013, we reduced the number of fish sampled due to workload to one sample per month (the same vendor provided all the FHM in 2013). Virology testing was done by the La Crosse Fish Health Center. No viruses were isolated from five, 60 fish samples tested throughout the summer. One thing that differed from 2012 (when many viruses were detected) and 2013 is that 2012 was a drought year in the upper Midwest, where the majority of FHM come from. It is likely that wild, shallow lakes/ponds (often the source of the minnows) had less water in them in 2012 and water temps would have been higher and more stressful. These conditions could have enhanced transmission of viruses and could be a factor to consider when tracking virus prevalence in FHM from year to year.

I am planning to retire June 30 2014 and raise hops at my farm (and maybe brew a little beer too). It has been a great pleasure to work with the GLFHC over the years and I am very thankful for the mentoring I received as a newbie fish health specialist from John Schachte, John Hnath, Rod Horner, Ken Stark, Tim Carey, Brian Souter, Cam Mac, Al Sippel, and Marg Dochoda. They were excellent role models not only for their knowledge of fish health, but also for their professionalism and courtesy discussing difficult issues. I count the other members as my peers and learned a lot from you all, too. It is a fact that Mohamed never sleeps-there are too many interesting ideas and collaborations to pursue. It is a fast changing world now, and I wish you all the best as you continue to address regional fish health issues. One thing for sure, a career in fish health will never be boring!

Respectfully submitted,

Susan Marcquenski

HATCHERY CLASSIFICATION REPORT
Wisconsin

Report Period: January 1 to December 31 2013 **Report Date:** January 21, 2014

Hatchery Name	Location	Pathogen Acronym
Art Oehmcke	Woodruff	A-2 (Bluegill virus in water supply)
Les Voigt (formerly Bayfield)	Bayfield	B-(VL)
Brule	Brule	A-2
Gov Thompson	Spooner	A-2 (Bluegill virus in water supply)
Kettle Moraine Springs	Adell	B-(BK)
Lake Mills	Lake Mills	A-2
Lakewood	Lakewood	Not in operation in 2013
Langlade	White Lake	Not in operation 2013
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) (CTV isolated 08/2013)
Wild Rose Inland	Wild Rose	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	*Ceratomyxa shasta*	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

whirling disease	*Myxobolus cerebralis*	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	*Renibacterium salmoninarum*	BKD	BK
furunculosis	*Aeromonas salmonicida*	BF	BF
enteric redmouth	*Yersinia ruckeri*	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

HATCHERY CLASSIFICATION REPORT
Wisconsin Wild Broodfish

Report Period: January 1 to December 31 2013 **Report Date:** January 21, 2014

Hatchery Name	Location	Pathogen Acronym
Besadny Fisheries Facility	Kewaunee	B-BF, BK (CTV isolated 12/2012 and 12/2013)
Root River	Racine	B-BF (BK)
Strawberry Creek	Sturgeon Bay	A-2
Lake Superior	Apostle Islands	B- (VL) (EEDv testing pending, but historically present)

[1]Negative by culture, low prevalence by ELISA

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	*Ceratomyxa shasta*	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

whirling disease	*Myxobolus cerebralis*	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	*Renibacterium salmoninarum*	BKD	BK
furunculosis	*Aeromonas salmonicida*	BF	BF
enteric redmouth	*Yersinia ruckeri*	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 2013

I A.. **Known importations since last report**.

	Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin
1.	Erwin NFH TN	Arlee RBT ~176,000	eggs	Class A	12-9-2013	Norm Heil	Michigan
2.	Sullivan Creek NFH	Seneca Lake LAT	eggs	Class A	11-14-2013	Terry Ott	Superior
3.							
4.							
5.							

B. **Proposed importations for 2014**

	Source	Species/Number	Fish/Egg Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin
1.	Erwin NFH TN	Arlee RBT ~176,000	eggs				Michigan
2.	Sullivan Creek NFH	Seneca Lake LAT	eggs				Superior

3

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 2013
01-11-14

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 2,235 fish were inspected. *Renibacterium salmoninarium*, was identified at low level from French River hatchery. No other certifiable pathogens were detected. During ovarian fluid screening (total of 2,159 samples) this fall, *R. salmoninarium* was detected in first year brook trout broodstock lot at Crystal Springs hatchery and French River Hatchery.

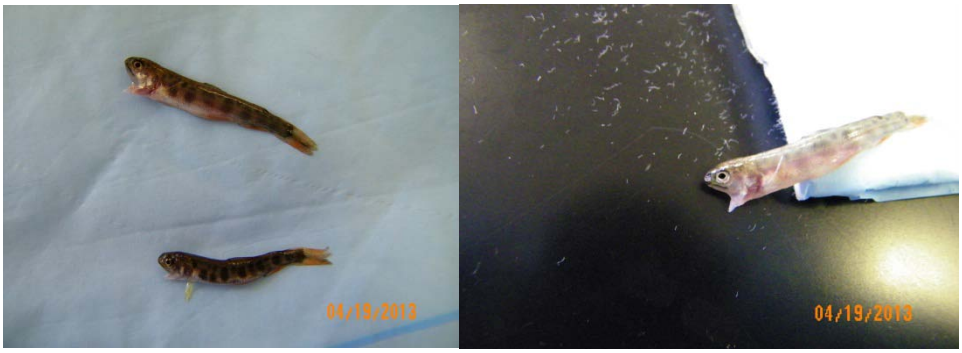
Wild Egg Takes

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 170 kamloop, and 80 French River wild steelhead. About 5.29% of kamloop and 1.25% steelhead tested positive for *R.salmoninarium* using ELISA. 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.

Hatchery Diagnostic Cases

Crystal Springs State Fish Hatchery

- Heavy mortality occurred to brook trout fingerlings after a heavy rain event (4/9/13). The water from the spring turned into chocolate brown/foamy color. The mortality started at 100/day and climbed to 300-400/day out of 160,000. The fish had distinct “Jaw dropping” phenomenon (see attached photo) Fish also displayed eroded tail and hyperplasic gills. No parasites were found on these fish. Bacterial growth from gill and tail on shu-shotts media were identified as Chryseobacterium chaponense. The bacteria was found to be sensitive to several antibiotics including Oxytetracycline and Romet. Fish did not respond to salt bath and hydrogen peroxide treatment. Mortality dropped to zero after fish were put on terramycin medicated feed for 10 days.



Lanesboro State Fish Hatchery

- Moderate mortality was seen in rainbow trout fingerlings this summer. Fish displayed heavy mucus on skin, multiple lesions on peduncle area, eroded and frayed tail. Gills were hemorrhagic, necrotic and hyperplasic. Internal organs appeared normal. Flavobacterium spp.was isolated from the tails. Fish were treated with Florfenical medicated feed for 10 days.

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 1,200 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. More than 200 walleye and muskie fingerling ponds were also tested for VHS this year. Again, no virus was detected**.**

Fish Kill Investigation

Five kill cases were brought to the path lab this year. Three summer cases were due to parasite and columnaris infection. One case involved multiple species. The kill was due to extreme low O_2 level. The last case was occurred over the thanksgiving weekend on Lake Owasso in the Twin City metro area. Multiple species were involved including sunfish, walleye, northern pike and Muskies. Two large size muskies were sent to the path lab for analysis. One was more decomposed then the other. No virus and significant bacteria were isolated. Gas bubble disease was suspected. Newly formed ice on the lake may trap O_2 underneath when photosynthesis still going on by plants creating high gas saturation situation. We did not investigate the case soon enough to confirm this theory.

Cold Water Hatchery Classification

Hatchery Classification Report
Minnesota

Report Period: January 1 to December 31, 20013 Report Date: January 10, 2014

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	*Ceratomyxa Shasta*	CS	SC*
proliferative kidney disease	sporozoan	PKD	SP*

RESTRICTED FISH DISEASES

Disease	**Disease Pathogen**	**Disease Acronym**	**Pathogen Acronym**
whirling disease	*Myxobolus cerebralis*	WD	SW
infectious pancreatic necrosis	virus	IPN	VP
bacterial kidney disease	*Renibacterium salmoninarum*	BKD	BK
furunculosis	*Aeromonas salmonicida*	BF	BF
enteric redmouth	*Yersinia ruckeri*	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.

DFO Winnipeg Fish Health Report for GLFHC (Jan 2014)

For the fiscal year 2013-14, all three DFO laboratories continue to inspect participating aquaculture facilities under the authority of Fish health Protection Regulations. Due to change in Canada's import and export requirements, number of facilities under the FHPR testing program for Winnipeg lab has been reduced significantly. Additionally, labs are busy testing samples submitted by Canadian Food Inspection Agency (CFIA).

Winnipeg laboratory applied to Standard Council of Canada for ISO 17025 accreditation and expect our first audit in April of 2014

Diagnostics

1. FHPR Inspections (Winnipeg Lab only)

A total of 1057 samples have been tested so far and samples were negative for the regulated pathogens

2. NAAHP Testing (CFIA samples)

- **Summary of samples as of Jan 7, 2014 for all DFO laboratories**

	Response to Notification	Compartmentalization and Export	Surveillance	Total
Total submissions	30	16	97	143
Total samples submitted	260	2609	5457	8326
Total tests requested	423	5379	9346	15148

So far close to 85% of samples has been tested and except for response to notification all samples are negative for the requested pathogens.

- **VHS surveillance (All DFO Laboratories)**

A total of 545 samples were submitted from Quebec area to DFO labs but only 375 samples were tested and were found to be negative for VHSV. 170 samples were rejected as samples were deemed not suitable for the testing.

- **Summary of samples as of Jan 31, 2014 for Winnipeg Laboratory**

	Response to Notification	Compartmentalization / Export	Surveillance	Total
Total submissions	0	4	26	30
Total samples submitted	0	690	1529	2219
Total tests requested	0	1380	2654	4034

So far close to 95% of samples has been tested all tested samples are negative for the requested pathogens.

3. **Response to wild fish kills**
   No fish kills were reported to Winnipeg lab this year.

Research

1. Validation of a quantitative RT-PCR assay to detect infectious pancreatic necrosis virus (To be completed in March 2014)
2. Advancement, validation & harmonization of serological and genetic diagnostic assays for koi herpes virus (Completed)
3. Development and analytical characteristics of a reverse transcription quantitative polymerase chain reaction diagnostic assay for detection of spring viremia of carp virus (Initiated in 2013)
4. Addressing disease risks for Manitoba lake sturgeon (Ongoing)

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife
Scott Zody, Chief
2045 Morse Road, Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

January 31, 2014

TO: Great Lakes Fishery Commission – Great Lakes Fish Health Committee

FROM: Ohio Department of Natural Resources – Division of Wildlife (ODNR-DOW)

SUBJECT: 2013 Fish Health Report

In 2013, the ODNR-DOW cooperated with the Ohio State University to sub-contract Jim Brick, DVM to oversee fish health inspection procedures. Dr. Brick accompanied ODNR-DOW staff on all collections in 2013. Samples were examined and tested at the U.S. Fish and Wildlife Service's LaCrosse Fish Health Center. All fish lots to be stocked by the ODNR-DOW into Ohio waters were tested for reportable diseases following the guidelines in the Great Lakes Fishery Commission – Great Lakes Fish Health Committee (GLFHC) Model Fish Health Program. The ODNR-DOW is encouraging existing hatchery employees to pursue the AFS Aquatic Animal Health Inspector certification.

Pre-Stocking Fingerlings

Six salmonid bacterial lots, 6 salmonid DFAT lots, and 4 salmonid whirling lots (60 fish per lot) from three Ohio State Fish Hatcheries were tested prior to stocking in 2013. The species tested included one lot of brown trout (*Salmo trutta*) and five lots of rainbow trout (*Oncorhynchus mykiss*). No captive salmonid broodstock were tested in 2013. The ODNR-DOW acquires trout eggs from external partners and private aquaculture.

Thirty-four viral lots from six Ohio State Fish Hatcheries were tested prior to stocking in 2013. These included rainbow trout, steelhead trout, brown trout, muskellunge (*Esox masquinongy*), hybrid striped bass (*Morone chrysops x Morone saxatilis*), bluegill sunfish (*Lepomis machrochirus*), blue catfish (*Ictalurus furcatus*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), yellow perch (*Perca flavescens*), saugeye (*Sander vitreus* x *Sander canadensis*), walleye (*Sander vitreus*), and hybrid bluegill sunfish (*Lepomis machrochirus* x *Lepomis cyanellus*).

In 2013, no pathogens were detected in the pre-stocking fish health testing.

Feral Broodstock

In 2013, seven brood fish lots (150 fish per lot) were tested from the following water bodies: Ohio River, Maumee River, Rocky Fork, Hoover Reservoir, Berlin Lake, Mosquito Reservoir, and Leesville Reservoir. The ODNR-DOW collected feral sauger, walleye, common carp, white bass, and muskellunge from the aforementioned water bodies. No pathogens were detected in 2013 feral broodstock testing. In 2014, Clear Fork Reservoir will be added to the broodstock testing lakes to examine the possibility of using muskellunge broodstock in state fish production.

2013 Fish Kills

In June 2013, the ODNR-DOW responded to a fish kill in central Ohio at Hoover Reservoir (Ohio River drainage). The fish kill was exclusive to common carp (*Cyprinus carpio*). Samples were collected and sent to the LaCrosse Fish Health Center for sampling; bacteriology and virology test results were negative.

VHSv Surveillance

In 2013, there were no detections of VHSv in Ohio. The last detection occurred in spring 2009 at Clear Fork Reservoir in north central Ohio.

SALMONID IMPORTATION REPORT

Agency State of Ohio Reporting Period 01/01/13 – 12/31/13

I. A. Known importations since last report.

	Source	Species/Number	Fish/Eggs Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin	Imported to:
1.	Trout Lodge, Inc. Sumner, WA	Rainbow trout 120,000	7,380/L	A	09/18/2012	Washington Animal DDL	Lake Erie	Castalia SFH
2.	Michigan DNR	Steelhead trout 627,000	6,532/L	A	04/10/13	MSU	Lake Erie	Castalia SFH

B. Proposed importations:

Source	Species/Number	Fish/Eggs Size	Fish Health Status	Certification Date	Certifying Official	Lake Basin	Imported to:

II. Lab Findings

III. Other

Ontario

Ministry of
Natural Resources

Ministère des
Richesses naturelles

Ontario Ministry of Natural Resources 2013 Annual Report to the Great Lakes Fish Health Committee

January 2014

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. This program has been in place for more than 30 years. The location of these stations is shown in Figure 1.

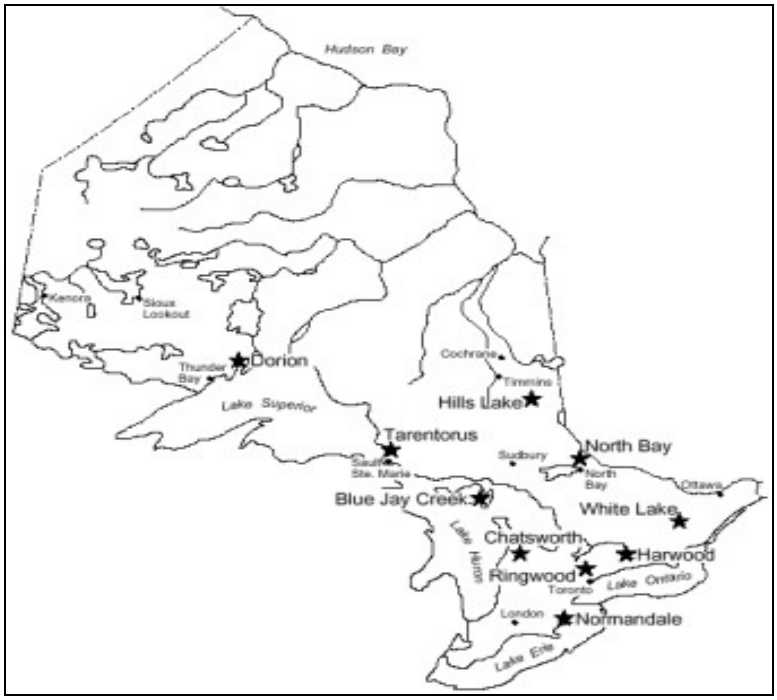


Figure 1. Location of OMNR's 10 Fish Culture Stations. Ringwood Fish Culture Station is currently being operated by a partner.

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 from regular wild fish community monitoring programs (e.g., the Broadscale Monitoring Program) 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 2013, the primary focus OMNR's wild fish monitoring and disease diagnostics program, as in previous years, was on monitoring the spread of VHS, and wild fish samples were collected by the OMNR from 11 water bodies, most of which were from southern Ontario, with a few from northeastern and northwestern Ontario (Table 1). Any samples identified as tentative positives for VHS at Dr. Lumsden's lab were to be forwarded to one of the Canadian Food Inspection Agency's labs for confirmatory testing. Findings are described below.

Table 1. Details for fish collected from 11 water bodies sampled across Ontario by the OMNR as part of an effort to track the spread of VHS.

Date Collected	Sample Type	Waterbody	Fish Collected	Results
March 27th	Disease Diagnosis	Lake St. Clair	2 Gizzard shad 3 Bluegill 1 White crappie	Not Positive
May 17th	Disease Diagnosis	Bighead River	2 Rainbow trout	Not Positive
July 19th	Broadscale Monitoring Program	Mazinaw Lake	34 Rock bass 19 Yellow perch 7 Smallmouth bass	Not Positive
August 2nd	Disease Diagnosis	Grenadier Pond	4 Bluegill	Not Positive
August 13th	Disease Diagnosis	Chemong Lake	1 Pumpkinseed	Not Positive
			1 American eel	Not Positive
August 13th	Broadscale Monitoring Program	Jack Lake	44 Yellow perch 1 Walleye 5 Lake herring 8 Black crappie 2 Bluegill 2 Pumpkinseed 1 Brown bullhead	Not Positive
August 20th	Broadscale Monitoring Program	Chemong Lake	10 Bluegill 33 Yellow perch 17 Pumpkinseed	Not Positive
August 28th	Broadscale Monitoring Program	Bernard Lake	20 Rainbow smelt 11 Rock bass 20 Yellow perch 9 Pumpkinseed	Not Positive
September 6th	Broadscale Monitoring Program	Mary Lake	78 Rock bass 65 Yellow perch	Not Positive
September 11th	Disease Diagnosis	Chemong Lake	3 Common carp 1 Sunfish 7 Bluegill	Not Positive
September 12th	Disease Diagnosis	small pond near Port Hope Lake	1 Common carp	Not Positive
October 28th	Broadscale Monitoring Program	Lake Nipissing	60 Yellow perch	Not Positive

In 2013, MNR also launched a number of initiatives to help control the spread of VHS through the movement of baitfish and to better understand the risks that baitfish pose. The need for these initiatives became increasingly important when VHS was discovered in Lake Simcoe just north of Toronto in 2011. Lake Simcoe is one of the most important baitfish harvest areas in the province, and baitfish harvested from Lake Simcoe have traditionally been distributed widely across the province.

The first initiative was to implement an interim fish health testing program for Lake Simcoe in winter of 2013/2014. This program allows operators to harvest baitfish from Lake Simcoe and have it tested for VHS, so it can be safely moved to market outside the Lake Simcoe (VHS) Management Zone. The second initiative was to implement a program to collect samples at a number of baitfish operations across the provinces to assess the occurrence of VHS in baitfish.

Emergency Fish Pathogens

Viral Hemorrhagic Septicemia (VHS)

The Canadian Food Inspection Agency first 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 prohibited the movement of commercial baitfish into or out of the LSMZ Zone (Figure 2). 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).

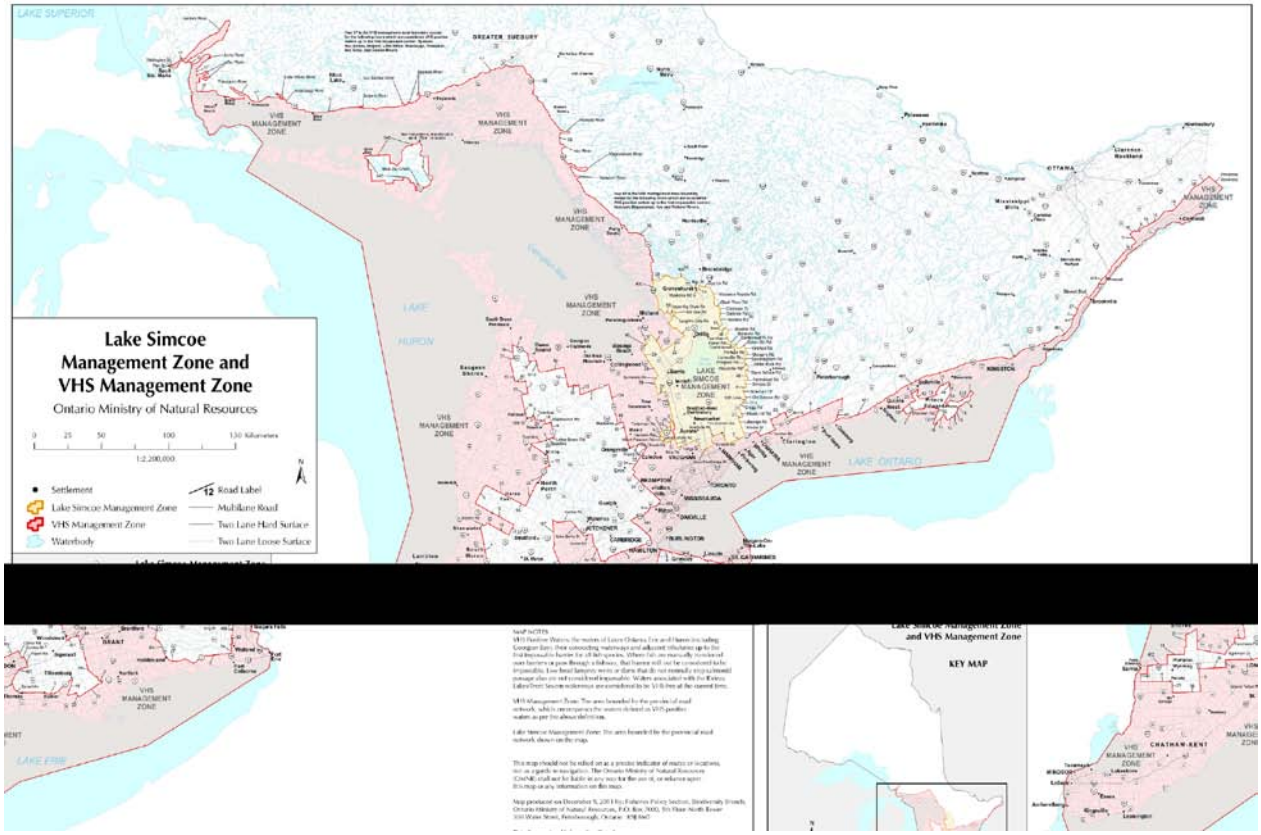


Figure 2. Lake Simcoe Management Zone and VHS Management Zone.

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 implanted in response to that finding.

In 2013, no evidence was detected of further spread of VHS across the province. None of the 472 fish examined under the Wild Fish Monitoring Program tested positive for VHS.

Restricted Fish Pathogens - 2013

Aeromonas salmonicida

Furunculosis, caused by *Aeromonas salmonicida*, was detected in 16 of 461 reproductive fluids and carcasses sampled from adult Chinook salmon and eight (8) of 71 Coho salmon carcasses collected on the Credit River during the fall 2013 wild egg collection.

Yersinia ruckeri

Enteric redmouth disease (ERM), caused by the bacterial pathogen *Yersinia ruckeri*, was found in one (1) of six (6) brown trout (Ganaraska River strain) broodstock fish submitted for testing from the Tarentorus FCS. The final report to confirm the serotype is pending.

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. Detections for 2013 are reported in Table 2. There were no signs of bacterial kidney disease in fish with *R. salmoninarum* in 2013. Low numbers of bacteria were detected in fish from Chatsworth, Dorion, Harwood, Tarentorus and Normandale Fish Culture Stations.

Table 2. *Renibacterium salmoninarum* detections by IFAT in 2013.

Fish Culture Station	Month	Species	Detection Details
Chatsworth Substation	January	Brown trout	Low numbers in 1/126
Chatsworth Substation	January	Lake trout	Low numbers in 1/64
Normandale Substation	February	Atlantic salmon	Low to moderate numbers in 1/20
Normandale	March	Chinook salmon	Low numbers in 1/60
Normandale Substation	May	Chinook salmon	Low numbers in 1/59
Chatsworth	July	Lake trout	Low numbers in 1/10
Chatsworth	July	Brown trout	Low numbers in 1/60
Tarentorus	October	Lake trout	Low numbers in 1/12
Harwood	November	Atlantic salmon	Low numbers in 2/6
Dorion	November	Lake trout	Low numbers in 1/3

Miscellaneous Detections

Novel bacilliform virus - Chinook salmon – No new cases in 2013

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%.

No new cases were detected from samples submitted during the 2013 wild egg collection.

Novel bacilliform virus - Coho salmon – Final Virology for 2013 Pending

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.

The final virology report is still pending for the samples sent during 2013 wild egg collection.

Bacterial Gill Disease (BGD)

Flavobacterium branchiophilum was found in bacterial gill disease outbreaks at the Dorion and Harwood Fish Culture Stations in 2013.

Chlamydia-like Organisms (CLO)

Two strains of fingerling lake trout (Lake Manitou and Iroquois Bay strains) were diagnosed with chlamydia-like organisms (CLO) in March and the Lake Manitou strain again in May at the Blue Jay Creek 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 2013.

Flavobacterium psychrophilum

The causative agent of Cold Water Disease, *Flavobacterium psychrophilum*, was not detected in any of the Fish Culture Stations in 2013.

External Parasites

Persistent parasite outbreaks of *Chilodonella* and *Costia* were identified at Blue Jay Creek Fish Culture Station in 201 and were associated with high rainfall events that affected the source waters. Options for treating incoming water to eliminate or minimize the program are being explored.

Other

Aquareovirus – Chinook salmon

Not detected in 2013.

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, 2012 or 2013.

Aquareovirus – Coho salmon

Not detected in 2013.

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, 2012 or 2013 wild egg collections.

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January 30, 2014

Prepared by Chris Wilson, Acting Production Planning Biologist, Fish Culture Section