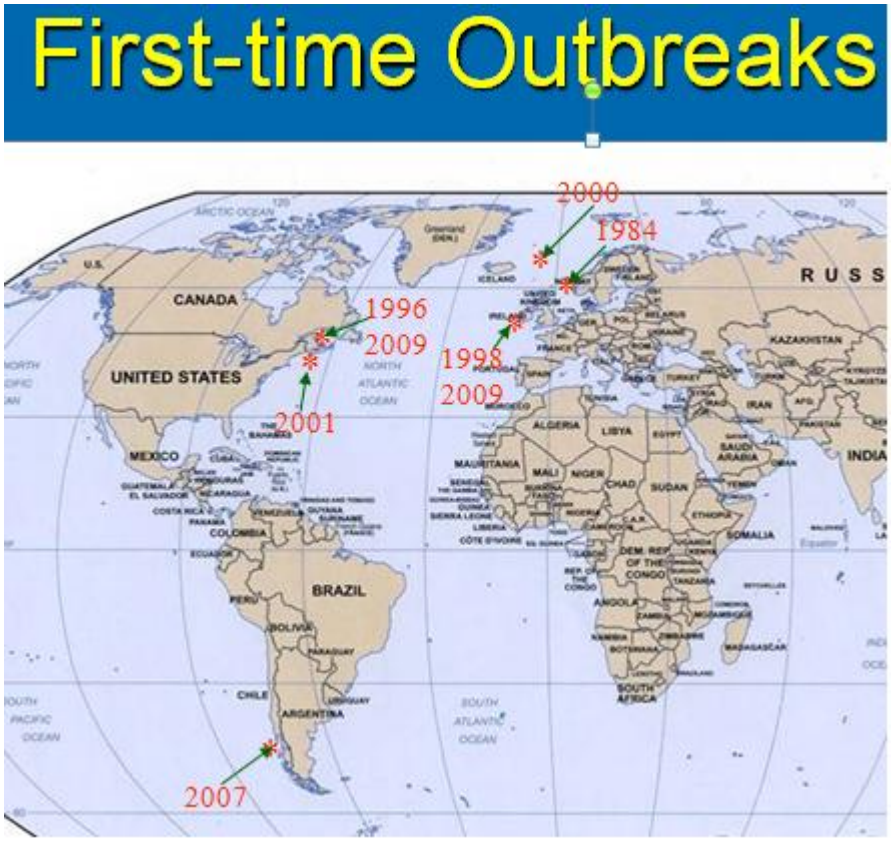
Infectious Salmon Anaemia - Diary of disease dISAster

Infectious Salmon Anaemia (ISA) has spread around the world but until October 2011 it had never been officially reported in the North Pacific. Since first being reported in Norway in 1984, the global spread of ISA has affected every major salmon farming producing region in the world including New Brunswick in Canada (1996), Scotland (1998), Faroe Islands (2000), United States (2001), Ireland (2002), Chile (2001 for Coho salmon; 2007 for Atlantic salmon), Prince Edward Island in Canada (2009) – and now British Columbia.

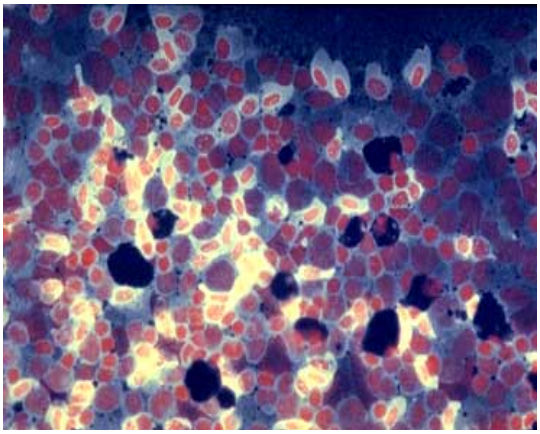


[Graphic: Kibenge et al, 2011 – abstract online here and download Powerpoint in full here]

ISA is a deadly disease and is classified as a 'Listed' disease by the World Organization for Animal Health (OIE) – alongside diseases such as Anthrax, Bovine spongiform encephalopathy (BSE), Foot and mouth disease, rabies, sheep pox, swine fever, avian influenza, West Nile fever, scrapie, fowl cholera, bovine tuberculosis and myxomatosis. The OIE's criteria for listing specific diseases includes: "The disease has been shown to or scientific evidence indicates that it is likely to negatively affect wild aquatic animal populations that are an asset worth protecting for economic or ecological reasons."

According to the OIE, ISA is "a lethal condition characterised by severe anaemia and variable haemorrhages and necrosis in several organs". The OIE also reported that: "Mortality during an outbreak of ISA is variable but the disease can kill up to 90% of fish in a pen." ISA, as well as other fish diseases, are governed by the OIE's 'Aquatic Animal Health Code' which includes sections on 'import risk analysis', 'fallowing', 'disinfection' and 'ISA'.

A report – "Infectious Salmon Anaemia: literature review and implications for wild salmon" - published by the International Council for the Exploration of the Sea in 2000 stated that: "the disease is 'highly contagious and lethal'". According to the Norwegian Veterinary Institute: "ISA is caused by a virus which infects and damages blood cells and cells lining the wall of blood vessels. This often results in haemorrhage in inner organs and the fish develops anaemia."

Photos: ISA symptoms and virus

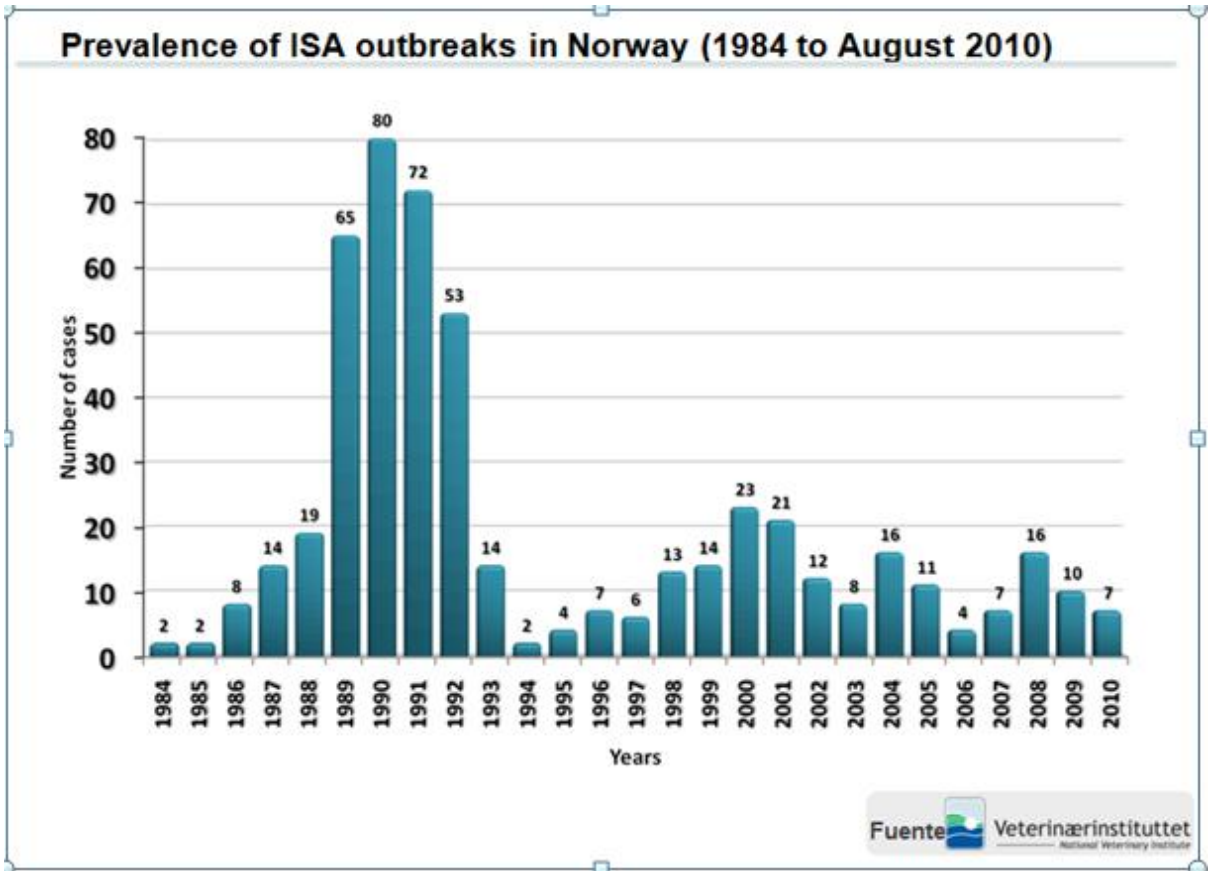
A scientific paper in the *Virology Journal* in 2007 reported that: "Infectious salmon anemia (ISA) virus (ISAV) is a fish orthomyxovirus that has recently been assigned to the new genus *Isavirus* within the family *Orthomyxoviridae*. The virus causes a fatal clinical disease in Atlantic salmon with signs of exophthalmia, pale gills, ascites, congestion of gut, enlargement of liver and spleen, petechial hemorrhages in the visceral organs, and severe anemia."

Another scientific paper in 2008 stated that: "Infectious salmon anemia virus (ISAV) causes a multisystemic disease responsible for severe losses in salmon aquaculture..... Infectious salmon anemia has since the early 1990's been one of the most dangerous viral diseases threatening Atlantic salmon aquaculture industry. The infectious salmon anemia virus (ISAV) is a negative single-stranded RNA virus assigned to the genus *Isavirus* within the family *Orthomyxoviridae*. It mainly infects endothelial cells and leukocytes and causes a multisystemic disease characterized by high mortality with exophthalmia, pale gills, ascites, hemorrhagic liver necrosis, renal interstitial hemorrhage and tubular nephrosis."

"Consider ISA the hoof and mouth disease of the global salmon farming industry," reported Stephen Hume in *The Vancouver Sun* in 2008. "According to an information leaflet from the U.S. government's National Fish Health Research Laboratory, infected blood, feces, urine and mucus, animal wastes, contaminated slaughter facilities, transport vessels and workers all easily transmit it from fish to fish and from site to site. As with hoof and mouth, the standard treatment is to kill all infected or exposed stocks within designated containment zones, disinfect all equipment and facilities and then keep fingers crossed."

This report – available online - provides a time-line detailing the spread of ISA around the world from the first diagnosis in Norway in 1984 to the first report of ISA in Pacific salmon in British Columbia in October 2011. For more background read the report – 'Fish Farmageddon: The Infectious Salmon Aquaculture' – published in August 2011 by the Global Alliance Against Industrial Aquaculture.

1984 – December: Infectious Salmon Anaemia (ISA) was reported in Norway for the first time. A report in 2007 by the Norwegian Veterinary Institute stated that: "A total of 438 outbreaks have been reported in Norway during the time period 1984 and 2005. The yearly number of outbreaks peaked in 1990 with a total of 80 cases."



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1996 – December: ISA was reported in Canada for the first time – in New Brunswick. It was not until September of 1997 that scientists managed to isolate the ISA virus and confirm its identity with the Central Veterinary Laboratory in Oslo, Norway.

1997 – December: ISA in Canada was initially found in three bays in Charlotte County - Lime Kiln Bay, Bliss Harbour, and Seal Cove. The New Brunswick Fisheries and Aquaculture Department ordered all fish in infected cages to be slaughtered. By March 1998, 280,000 fish had been slaughtered in 33 infected cages on nine sites.

1998 – January: ISA was reported in Nova Scotia, Canada.

1998 – May: ISA was reported in Scotland for the first time at Norwegian-owned Hydro Seafoods GSP in Loch Nevis – subsequently spreading to 11 farms with a further 36 suspected of being infected (including farms owned by Marine Harvest). The cost was reported by the Scottish Government as "over £20m" and "£30 million" - and at "£100million" in other reports.

1999 – May: *The Canadian Veterinary Journal* reported that: "As of November 2008, 22 salmon farms in New Brunswick have been depopulated and other farms are also scheduled for depopulation to try and control the spread of this infection."

1999 – December: According to a report by the Conservation Council of New Brunswick: "Between 1997 and 1999 nearly 4.5 million fish were slaughtered on 65 sites". The cost to the industry was $50 million.

2000 – March: A report – "Infectious Salmon Anaemia: literature review and implications for wild salmon" - published by the International Council for the Exploration of the Sea in 2000 stated that: "the disease is 'highly contagious and lethal'". The report stated that: "In North America, the ISA epidemic could not have occurred in a worse place or at a worse time. In the area where aquaculture is practiced wild salmon stocks are severely depressed and in many cases on the brink of biological extinction (Anon 1999, DFO 2000). There are no positive scenarios that can be attributed to the presence of this disease."

2000 – December: ISA was reported in the Faroe Islands (one case) with 5 outbreaks in 2001 and 2002; 10 in 2003; 11 in 2004 and 1 in 2005. The Scottish Government reported that "The Faroe Islands' salmon farming industry was destroyed by ISA in 2000".

2001 - February: ISA was reported in the United States for the first time – in Maine. By June there were 8 cases of ISA.

2001 – March: A report – "Infectious Salmon Anemia (ISA): Update on the situation in North America" – by ICES stated that: "Escaped farmed fish in Canada also tested positive for ISA for the first time in 2000".

2001 – November: ISA was reported in 12 sites in Maine.

2001 – December: The US Government's Department of Agriculture announced a "Declaration of Emergency Because of Infectious Salmon Anaemia" and estimated losses at $11 million. According to the Conservation Council for New Brunswick all 17 salmon farms in Cobscook Bay were either infected or exposed to the disease and one farm in Passamaquoddy Bay was infected. Two million farmed salmon were slaughtered. Two sites were infected in 2003 and six in 2004.

2001 – December: The US Government's Department of Agriculture reported that: "Canada has been seriously affected by ISA. Fish farmers in that country have lost $70 million as a result of the virus, and Canada's Federal and Provincial governments have contributed over $29.5 million to compensate salmon farmers. As a result of a comprehensive ISA program that includes indemnification, Canada has reduced the incidence of ISA from 18 infected sites in 1998 to 4 infected sites in 2001."

2002 – December: According to the Marine Institute in Ireland: "Ireland had its first case of Infectious Salmon Anaemia (ISA) in a trout farm in Mayo". The 2002 annual report stated that ISA Virus was "isolated from sub-clinically infected rainbow trout located on two sites in the west of Ireland". It stated that: "Members of the fish health team worked with the Department of Communications, Marine and Natural Resources (DCMNR), the North West Regional Fisheries Board, with international laboratories and with the Irish aquaculture sector to manage the outbreak, in accordance with the protocols laid down in the Irish Withdrawal

Plan for ISA". The report stated that: "Two Risk Analysis Reports were prepared for DCMNR, assessing the risks associated with the isolation of ISAV and outlining the risk management steps necessary to contain the virus and to prevent its spread either to wild fish or to other aquaculture facilities in the area."

Country	Date	Species	Comments
Norway	1984	Atlantic salmon	Demonstrated to be infectious in 1987
Canada	1996	Atlantic salmon	Initially identified as HKS*
Scotland	1998	Atlantic salmon	
Faeroe Islands	2000	Atlantic salmon	
Chile	2001	Coho salmon	Complex aetiology
United States of America	2001	Atlantic salmon	
Ireland	2002	Rainbow trout	Virus isolation

* HKS Haemorrhagic Kidney Syndrome

Table: Global Spread of ISA (courtesy of Professor Ron Stagg of the Marine Laboratory in Scotland)

2003 – April: Pan Fish (now named Marine Harvest) reported that ISA: "emerged as a severe threat to the salmon farming industry throughout Norway in 2001. Simultaneously, the disease also developed with increasing severity in the Faroe Islands".

2004 – January: *Boston College Environmental Affairs Law Review* reported that: "In 2001, an outbreak of the ISA virus in Cobscook Bay forced operators of net pen facilities to destroy approximately 2.6 million fish, costing the industry around $24 million. Prior to the outbreak, USPIRG included claims in its complaints that the ISA virus had infected fish at one of Atlantic's net pen facilities, as well as salmon at one of Stolt's Canadian sites in close proximity to Stolt's Cobscook Bay facilities" [In 2005, Norwegian-owned Stolt merged with Nutreco to become Marine Harvest].

2004 – November: A suspected outbreak of ISA was reported at one of Marine Harvest's farms in Scotland.

2004 – December: A report in 2007 by the Norwegian Veterinary Institute stated that: "the number of ISA outbreaks in Norway increased moderately; between 6 and 23 cases annually from 1997 to 2004".

2005 – December: A report by the Norwegian Food Safety Authority reported 11 cases of ISA in Norway in 2005.

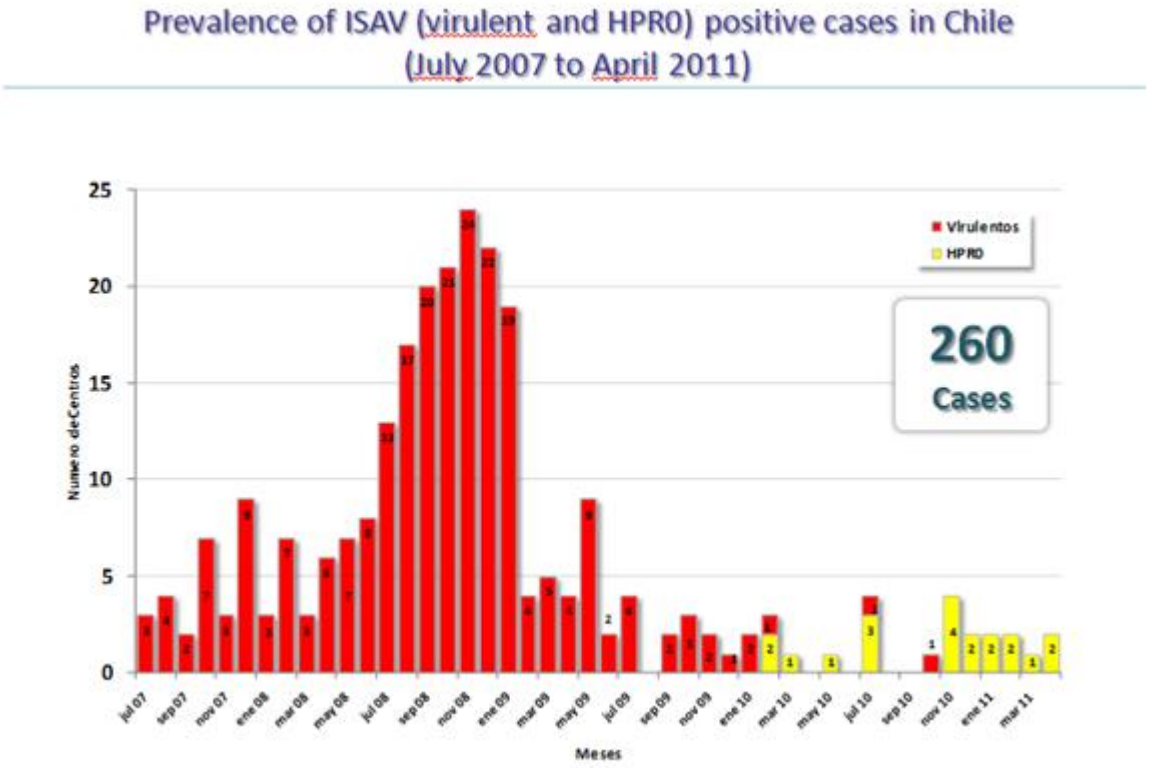
2006 – July: According to data supplied by the New Brunswick Department of Agriculture Fisheries and Aquaculture, 9.6 million farmed salmon were culled due to ISA: In 2000, nine fish farms were infected and 222,000 fish destroyed. Over the next two years, the numbers increased to 15 sites with 1.1 million fish destroyed in 2001. In 2002, 16 sites were infected with a record 2.4 million fish destroyed. In 2003, 10 sites destroyed 406,000 fish and in 2004 only one infected site was reported. From September 2005 to July 2006, 14 sites were positive for ISA and 950,000 fish were destroyed.

2006 – December: A report by the New Brunswick Salmon Growers Association stated that: "New Brunswick continues to struggle with ISA, with farms in the Grand Manan region currently experiencing ongoing losses....Losses in 2006 are estimated at $60 million for culled or early harvested fish, with an additional $2.5 million in lost income for employees in this sector".

2006 – December: A report by the New Brunswick Salmon Growers Association stated that ISA was "extremely virulent" leading to "massive mortalities" in Grand Manan.

2007 – July: Infectious Salmon Anaemia (ISA) is officially reported in Chile for the first time with Norwegian-owned Marine Harvest identified as the first company infected.

2007 – August: World Organization for Animal Health officially notified by Chile of the presence of ISA.



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2007 – August: By 29th August, ISA outbreaks were confirmed on 25 Chilean fish farms. A further 16 farms were suspected to have ISA, 35 were fish-free and temporarily closed for disinfection, and another 81 were in quarantine.

2007 – October: Norwegian-owned Cermaq reported that ISA had been confirmed at one of its farms in Chile.

2008 - January: *FIS* reported that 79% of ISA virus outbreaks reported by the Chilean Government and 80% of suspected cases solely involved Norwegian salmon farming company Marine Harvest.

2008 - January: FIS reported that Marine Harvest lost EUR 1.4 billion due to ISA in Chile.

2008 – February: Marine Harvest's Q4 2007 financial results reported "a huge write-down of NOK 466 million (EUR 58.8 million)" with FIS reporting "A Half Billion Written Off".

2008 – February: ISA spread to Region XI in Chile – at a farm owned by Cermaq. A total of 18 sites were reported as infected by ISA – including 13 from Marine Harvest and 3 from Cermaq – and a further 30 in quarantine.

2008 – March: *The New York Times* reported: "The new virus is spreading, but it has primarily affected the fish of Marine Harvest, a Norwegian company that is the world's biggest producer of farm-raised salmon...Since discovering the virus in Chile last July, Marine Harvest has closed 14 of its 60 centers and announced it would lay off 1,200 workers, or one-quarter of its Chilean operation."

2008 – April: A report – "ISA in Chile" – by SalmonChile concluded: "ISA is an agent the industry will have to keep living with".

2008 – April: Cermaq's 'Annual Report 2007' reported that: "As at 26 March 2008, outbreaks of ISA have been confirmed in a total of 19 facilities in the Chilean industry. In a further 17 facilities, there were suspicions of the disease, whereas 37 other fish farming facilities were situated in quarantine areas. Cermaq's company, Mainstream Chile, had confirmed cases of ISA in five of its facilities with four facilities located in quarantine areas".

2008 – April: Cermaq (who operate in British Columbia as Mainstream Canada) claimed in a submission to the Office of the Information & Privacy Commissioner that the disclosure of disease information "would result in 'undue financial loss' to Mainstream", "damage

Mainstream's business" and referred to "the harm which such information in the wrong hands can do".

2008 – April: Marine Harvest Canada claimed in a submission to the Office of the Information & Privacy Commissioner that release of disease information "would cause significant commercial harm", "undue financial loss" and that "Marine Harvest Canada's reputation could be tarnished and sales volume reduced".

2008 – May: Marine Harvest's 'Annual Report 2007' reported that: "An outbreak of ISA (infectious salmon anaemia) mid-year in Region 10 of Chile proved to be the greatest challenge of 2007....Marine Harvest reported writedowns in Chile of more than NOK 500 million for the second half of 2007, of which more than NOK 400 million was related to culling of small fish".

2008 – June: An article – "El gran secreto del salmon" (The Big Secret of Salmon) – in the Chilean newspaper *La Nacion* reported that a presentation by Professor Are Nylund from the University of Bergen identified a Norwegian company who brought ISA to Chile from Norway via infected eggs. "It is said that the ISA virus started with the company that imported eggs," said Ricardo Casas. "It is no coincidence that 60% of infected sites are from them".

2008 – June: According to the World Organization for Animal Health (OIE), there were 20 new cases of ISA in Chile between January and June 2008 – with over 14 million 'susceptible' fish and over one million deaths:

Disease outbreak summary, Chile

Infectious salmon anaemia, LOS LAGOS, Jan - Jun 2008

New outbreaks: 20
Total outbreaks: 21
Serotype(s):

Affected species

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered
Fish	14097446	4060255	1159198	2901057	

2008 – July: *NRK* in Norway reported in an article – "Sjuk Norsk Rogn til Chile?" ('Sick Norwegian Eggs to Chile') - that: "Norwegian salmon is the origin of sick salmon in Chile, says professor of fish health". Professor Are Nylund of the University of Bergen said: "There is no doubt. Norwegian roe is sold to Chile, and it has been the ISA virus. We have seen a number of ISA virus in Chile. When we go in and characterize the genetic material in them, according to the Norwegian author".

2008 – July: ISA-infected farms in Chile increased to 44 (up from 5 in July 2007).

2008 – August: A scientific paper published in the *BMC Veterinary Research* (co-authored by Marine Harvest employees) reported that: "The clinical signs and lesions are consistent with the classical descriptions of the disease in marine-farmed Atlantic salmon in the Northern hemisphere. The outbreak was caused by ISAV of European genotype".

2008 – September: *The New York Times* reported "Marine Harvest, a Norwegian company operating fish farms in Chile, continues to be the most affected by the spread of the virus".

2008 – November: A scientific paper – "ISA virus in Chile: evidence of vertical transmission" - published in the *Archives of Virology* (co-authored by Cermaq employee Dr. Siri Vike and Professor Are Nylund) reported that: "Norway exports large amounts of Atlantic salmon embryos every year to Chile; hence, the best explanation for the Norwegian ISA virus in Chile is transmission via these embryos, i.e. vertical or transgenerational transmission..... The brood stock population belongs to a Norwegian brood stock company exporting large numbers of Atlantic salmon embryos to Chile".

2008 – December: According to Marine Harvest, in third quarter (Q3), there were 32 confirmed outbreaks in Chile and by the end of the fourth quarter (Q4), there were confirmed another 44 cases for that quarter. In Q3, the disease also appeared in Region XI, to the south of Region X.

2008 – December: At the end of 2008, the total number of sites in Chile officially confirmed with ISA was 105 and 26 (25%) belonged to Marine Harvest. There were 44 suspect sites, five of which were Marine Harvest (11%).

2008 – December: The Norwegian Veterinary Institute reported in their 'Farmed Fish Health Report 2008': "Escaped farmed salmon are caught in several rivers in the region of south- and mid–Troms, and ISA-virus has been detected in some of these fish. This is an extremely unfortunate situation which has resulted in a significant degree of media attention. In addition to the risk of transmission of ISA to wild salmon, escaped salmon pose a risk of infection to salmon farms over an area larger than that possible by water-borne infection".

2009 – January: The Norwegian broodstock company Aqua Gen (part-owned by Cermaq and Marine Harvest) submitted a formal complaint to Norway's 'National Commission for the Investigation of Scientific Misconduct' regarding the scientific paper "ISA virus in Chile: evidence of vertical transmission" - published in the *Archives of Virology* (co-authored by Cermaq employee Dr. Siri Vike and Professor Are Nylund). [This information only became public knowledge in April 2011].

2009 – January: ISA was reported in Scotland: "ISA back to haunt fish farmers" reported *The Shetland Times*. *The Fish Site* reported that: "According to figures from the World Animal Health Information Database, over the course of 2008 the ISA virus claimed an outbreak in Canada, 20 outbreaks in Chile and 14 outbreaks across Norway. Now, with the inclusion of Scotland, all the big salmon farming countries have recently suffered".

2009 – January: Intrafish reported in an article – "Scottish Sea Farms confirms it owns ISA-infected site" - that Norwegian-owned company "Scottish Sea Farms confirmed it owns the salmon farm site in Scotland where ISA was discovered".

2009 – January: Norwegian-owned Grieg Seafood reported the presence of ISA at one of their sites in Scotland and admitted that: "There was always a high risk that the ISAV would spread to neighbouring sites".

2009 – January: An article – "How long can B.C. avoid ISA?" – in *Intrafish* reported: "British Columbia is the only major salmon growing area in the world that hasn't been impacted by ISA. How long will that last?"

2009 – January: The BC Salmon Farmers Association claimed that: "British Columbia has NEVER detected ISA in farmed salmon".

2009 – January: A letter to Gordon Campbell, the Premier of British Columbia, included: "We are requesting that if B.C. is still importing live farm salmon products (all species) (broodstock, milt and eggs) that the border be closed immediately to protect BC from the spread of Infectious Salmon Anemia". The Letter was signed by Alexandra Morton, David Suzuki, Chief Bob Chamberlin, Rick Routledge and over 100 other concerned citizens, scientists and fishermen.

2009 – February: A report – "ISA Virus: how it relates to salmon aquaculture in BC" - stated that: "No ISAV found in BC (or Washington State) to date".

2009 – February: *The Fish Site* reported in an article – "Cermaq Brought Down by Fish Disease" - that: "The disease situation for the Atlantic salmon in Chile became worse than expected in Q4 2008, and has incurred heavy losses on Mainstream Chile", says Cermaq CEO Geir Isaksen. "The losses will continue in Q1 this year, and we expect a negative result for Mainstream Chile also in 2009".... The result in Mainstream Chile was heavily impacted by ISA costs, including write downs of NOK 111 million on live stocks and NOK 47 million on frozen stocks."

2009 – February: A second case of ISA was reported in Scotland. ISA was reported as confirmed at Grieg's site in Shetland at Papa (operated as Hjaltland).

2009 – March: A third case of ISA was reported in Scotland – at a farm owned by Norwegian company Grieg Seafood. ISA was reported as confirmed at Grieg's site in Shetland at North Papa (operated as Hjaltland).

2009 – March: A letter from the Canadian Fisheries Minister Gail Shea (in reply to the letter dated January 2009) included: "With respect to ISAV, there is no strong evidence that ISAV is transmitted from adult to young via reproductive products and there is no evidence of ISAV occurring in eggs". Read the letter in full below:

Minister of Fisheries and Oceans / Ministre des Pêches et des Océans

Ottawa, Canada K1A 0E6

MAR 1 1 2009

Dr. David Suzuki
< wildorca@island.net >

Dear Dr. Suzuki and co-signatories:

Thank you for your recent correspondence regarding your concern over the potential spread of the infectious salmon anemia virus (ISAV) into British Columbia (B.C.).

Let me assure you that measures are in place to deal not only with ISAV but with all fish pathogens of concern. Highlights of existing measures to prevent the spread of fish diseases from other countries and other parts of Canada to B.C.'s fish farms are as follows:

- For aquaculture purposes, B.C. has a strict importation policy of fertilized eggs only for any salmonid species.
- Under the B.C. Atlantic Salmon Importation Policy, only surface-disinfected, fertilized Atlantic salmon eggs from sources certified by a Local Fish Health Officer (LFHO) are permitted for import into B.C. No live Atlantic salmon or unfertilized eggs are allowed to be imported.
- Any facility serving as a source of eggs for import into B.C. must undergo rigorous health testing under the *Fish Health Protection Regulations* before eggs can be provided to B.C. culture operations. This applies to all facilities whether within Canada or abroad. To import into B.C., a facility must be compliant with Canadian laws and regulations.
- Imports of fertilized eggs from qualifying facilities are held in strict quarantine and isolation for up to one year, and the resulting progeny undergo rigorous health testing before introduction to ocean farms. A condition of the import agreement is that results of the fish health testing must be reported to the LFHO on a monthly basis, while fish are in quarantine. Fish are only released from quarantine if all reports from screening come back as satisfactory. Any signs of a disease problem must be reported within 24-hours to meet import requirements.
- Upon completion of the quarantine and isolation period, the Minister issues licences for all introduction and transfers of fish pursuant to Section 56 of the *Fishery (General) Regulations*, and only issues licences to transfer fish in the absence of disease agents of concern that may be harmful to the protection and conservation of fish. Fish may only be transferred to sea cage pens with written approval through the LFHO and corresponding Section 56 licence.
- Site, vessel, and visitor-related fish-health protocols (including the use of foot baths and disinfection of any equipment used with fish or sediment monitoring) are in place in accordance with the industry-wide Fish Health Management Plans in British Columbia.
- With respect to ISAV, there is no strong evidence that ISAV is transmitted from adult to young via reproductive products and there is no evidence for ISAV occurring within eggs.
- In addition to surface disinfection mentioned above, all shipping materials are disinfected before disposal. The disinfectant and disinfection protocol that is used is highly effective against ISAV and other salmonid pathogens.

I appreciate the opportunity to clarify the policies and procedures in place to protect against the spread of ISAV. Thank you for your concern for our wild salmon stocks.

Sincerely,

Gail Shea, P.C., M.P.

c.c.: The Honourable Gordon Campbell, M.L.A.

2009 – April: Cermaq's 'Annual Report 2008' reported that: "Cermaq has been through a painful year. The main reason is that a virus disease, ISA, which causes immense mortality and reduced growth for Atlantic salmon, has spread to all the fish farming regions in Chile. In addition to the fact that we have lost a lot of fish, we have also had to cull large quantities

of fish before it was ready for harvesting. For our Chilean fish farming company, Mainstream Chile, this has brought about an operating loss of NOK 332 million".

2009 – April: Cermaq's 'Annual Report 2008' reported that: "Mainstream Chile and the Chilean farming industry had a very challenging year in 2008. Totally 159 sea sites of which 20 Mainstream sites were infected by ISA and with the same pattern of impact as previously seen in the other salmon farming countries."

2009 – May: A report – "ISA and the reshaping of Chile's salmon industry" - published by Intrafish included:

CASE STUDY:
MARINE HARVEST CHILE CONFRONTS ISA

Marine Harvest Chile has been in the eye of the ISA hurricane right from the onset of the disease; two of its farms were the first to have outbreaks of the disease.

Marine Harvest Chile CEO Alvaro Jimenez said the effect of ISA explains virtually all the losses of Marine Harvest Chile, which in turn had a knock-on effect on Marine Harvest's global results.

"If one looks at how the virus spread in Chile, it's clear the measures adopted were not sufficient, and the control model applied in Chile, based on Norway's experience did not produce the desired effect," he said.

"The system of eliminating just the cages that tested positive with a certain minimum level of mortality was undoubtedly insufficient, and one wonders if the complete elimination of farms having just one single sample that tested positive would not maybe have stopped the disease in the early stage and perhaps prevented the degree of contagion we have had," Jimenez said.

Discontinuing the planting of juvenile Atlantic salmon until the problem was resolved might have stopped the Olympic "relay" race we started, contaminating all the healthy fish entering the sea with old fish that were already infected and so on, he said.

2009 – May: *The Shetland Times* reported a fourth case of ISA – at a farm owned by Norwegian company Grieg Seafood.

2009 – May: *The Shetland Times* reported that: "The problems with infectious salmon anaemia (ISA) in Shetland cost the Norwegian multinational Grieg Seafoods over £810,000 in the first three months of the year".

2009 – May: The OIE's 'World Animal Health Information Database' reported in May 2009, for example, two new outbreaks of ISA (5 in total) in Scotland with 179,008 fish listed as 'susceptible' and 6,658 'deaths' and 169,501 'slaughtered'. In January 2009, one new ISA outbreak was reported with 491,829 'susceptible' fish.

2009 – May: Cermaq released its Q1 2009 results, which included a loss of NOK 65 million (USD 10 million, EUR 7.5 million). The majority of the negative impact is related to ISA outbreaks in the group's Chilean salmon farming operations. Heavily impacted by ISA costs in Chile, the Mainstream group reported a first-quarter loss of NOK 89.3 million (USD 14 million, EUR 10 million).

2009 – May: Marine Harvest's 'Annual Report 2008' reported that: "In 2008 the market value of our equity decreased by 70 percent, and Marine Harvest delivered a net deficit of almost NOK 2.9 billion. This is for the most part the consequence of serious biological problems accumulated in Chile over several years. We very much regret the large number of employees that had to leave the company as a result of the downsizing. We had to reduce the workforce in Chile by almost 1 800 employees (37 percent) in 2008....The consequences of ISA is not only an economic crisis for the industry but also very serious crisis for those employees we had to lay off and for the Chilean society. These numbers illustrate the economic effects of ISA, and the consequences of biological and fish health problems accumulating over time".

2009 – June: Grieg reported that their site in Shetland, Scotland, at Langa Isle East (operated as Hjaltland) was "being harvest following confirmation of ISA".

2009 – June: Professor Are Nylund of the University of Bergen in Norway – co-author of "ISA virus in Chile: evidence of vertical transmission" - stated that: "based on 20 years of experience, I can guarantee that if British Columbia continues to import salmon eggs from the eastern Atlantic infectious salmon diseases, such as ISA, will arrive in Western Canada".

2009 – July: *FIS* reported in an article – "Justice in the wake of ISA" – that: "The Environmental Crimes Brigade (BRIDEMA) of the Police Investigations Unit is investigating the origin and spread of infectious salmon anaemia (ISA) virus at several farming centres in the country at the behest of the Public Ministry.... For Mario Montanari, owner of Invermar, and Victor Hugo Puchi, conptroller of AquaChile, ground zero of the ISA virus is focalised in a farming centre of the Norwegian firm Marine Harvest. This plant reported the first outbreak in July 2007, in Lemuy Island."

2009 – July: *Intrafish* reported in an article – "Lawsuit asks: who's the blame for Chile's ISA?" – that: "A lawmaker in Chile and her husband have filed a lawsuit seeking to discover how the ISA virus was transmitted to Chile. The criminal lawsuit filed by Congresswoman Marisol Turres of the right-wing Independent Democratic Union (UDI) party and her husband and attorney, Marcos Velasquez, seeks to find who is to "blame" for problems caused by ISA. Investigations were under way before the lawsuit to determine how the ISA came into the Chilean salmon farming industry".

2009 - July: *The Times Colonist* reported that: "The virus that has crippled Chile's farmed salmon industry is extremely unlikely to appear at B.C.'s fish farms, says Clare Backman, environmental relations director for Marine Harvest Canada, the largest producer of farmed Atlantic salmon in B.C.".

2009 – August: In Norway, there were 72 recorded diagnoses of ISA reported between February 2003 and August 2009.

2009 – August: Norwegian broodstock company Aquagen reported that: "ISA has been diagnosed on a broodfish population belonging to Marine Harvest Norway, location Høgholmen in Bjugn".

2009 – August: An article - "Are our fish safe from ISA?" – in Marine Harvest Canada's newsletter claimed that: "The specific virus that causes ISA has never been detected in farmed Atlantic salmon on the West Coast of Canada". The article concluded: "Can we guarantee that MHC will never see ISA? Realistically no, but MHC will continue to do everything within its power to minimize its likelihood of occurring and mitigate its impact should it ever be found".

2009 – October: A sixth case of ISA was reported in Scotland.

2009 – November: *The Fish Site* reported: "A sixth case of the highly contagious salmon virus ISA has been found off the south-west coast of Shetland, almost one year after the disease was first identified....ISA was first discovered in the area on 2 January at a salmon farm owned by Norwegian multinational Scottish Sea Farms....A second case of ISA was found a week later on a farm owned by another Norwegian multinational, Hjaltland Seafarms (Grieg Seafood)".

2010 – January: A report – "The Salmon Disease Crisis in Chile" – stated that: "compared to the production level in 2007, production will be reduced cumulatively by at least 700,000 tonnes during the period 2009–11, and production value will be reduced by more than 2 billion USD".

2010 – April: Positive Aquaculture Awareness in Canada claimed: "Last week, long time anti-salmon farming activist Alexandra Morton gave testimony to the House of Commons Standing Committee on Fisheries and Oceans in Ottawa. Her allegations of SLICE© resistant sea lice, likely presence of ISA on Marine Harvest salmon farms and general proliferation of disease at salmon farms were as shocking as they were untrue."

In testimony to the House of Commons Standing Committee on Fisheries and Oceans, Dr. Mark Sheppard stated (in relation to ISA):

"It is monitored. It has been monitored for the last eight years. It is on our list of five pathogens of concern both provincially and federally, and internationally. Every single sample that we collect at the farms is monitored for that pathogen. Again, Mr. Weston, I don't know if you got the pre-brief, but there is a summary about ISA virus in there which explains why BC doesn't have it and how we plan to not get it.....The difference again why BC is free of ISA is that, contrary to what is said, the Atlantic salmon that exist in BC right now have come in as eggs originally. The brood stock and the production stock from that point forward were then developed in BC. So live growing Atlantic salmon are not imported to BC..... Eggs

that may be applied for to enter BC can only come from ISA-free countries or regions. There have been—and I don't have the figures, I'm sorry—some eggs imported to British Columbia from Iceland for example which is ISA-free, and I think in the past, maybe ten years ago, some eggs from Washington State, again ISA-free. We monitor for it 150 times a year, 800 samples a year, that sort of thing. There are tremendous bio-security measures taken. Those eggs, by the way, that are imported from ISA-free countries need to be screened again, they need to be under quarantine for at least one year and be tested again, etc. So, touch wood, BC has not seen and never will see ISA."

In her testimony, Alexandra Morton stated: "And please, if there is one thing I could beg you to do, it would be to check every single Atlantic salmon facility in British Columbia for infectious salmon anemia just as soon as you can. Minister Shea has taken an extraordinarily risky position on that. She says there is no strong evidence that this virus comes in the eggs. But the scientists who are studying this out at the University of Bergen are saying that's how it got to Chile. Now certainly these Norwegian companies did not want that virus to go to Chile. Somehow it slipped through the cracks, and I'm not hearing how we're protected. So this scientist, Dr. Are Nylund—it would be great if you guys could communicate with him—said British Columbia is guaranteed to get this virus, and it's the last thing we want with our five species of salmon. He also said we probably already have it."

2010 – April: Cermaq's 'Annual Report 2009' reported that: "The crisis in Chilean salmon farming had a serious impact on our financial accounts also for 2009. Mainstream Chile suffered a full year operating loss of NOK 172 million".

2010 – June: *Seafood Source* reported: "The ISA outbreak peaked in Chile in the fourth quarter of 2008. In 2009, the number of ISA cases leveled off nationwide. Marine Harvest experienced six cases of ISA last year, with only one outbreak each in the third and fourth quarters. By the end of 2009, Marine Harvest had experienced a total of 32 ISA cases since mid-2007, representing 23 percent of the 139 reported cases nationwide".

2010 – September: *FIS* reported in an article – "The ISA virus that hit Chile came from Norway claims study" – that: "A team of scientists from the Aquatic Biotechnology Center of the University of Santiago, have discovered that there is a link between the ISA virus that hit the Chilean salmon industry and the Norwegian strain of the disease."

2010 – November: A scientific paper – "Bioinformatic Analysis of the Genome of Infectious Salmon Anemia Virus Associated with Outbreaks with High Mortality in Chile" – in the *Journal of Virology* reported that: "Our results confirm the European origin of Chilean isolates to be the result of reassortments from Norwegian ancestors".

2010 – November: ISA is reported in Region XII in Chile.

2010 – November: *The Santiago Times* reported that "the aquaculture industry in Chile lost US$2 billion from 2007 to 2009 because of the (ISA) outbreak". *The Santiago Times* previously reported that: "In 1999 the annual cost of Infectious Salmon Anemia was 11 million US dollars in Norway and 14 million in Canada. In Scotland, meanwhile, the total cost of the epidemic was 32 million between 1998 and 1999".

2010 – November: *Infosur Hoy* reported that: "The virus, which first appeared in Chile in July 2007, caused the overall production of salmon to plummet 50% and 15,000 employees to lose their jobs, according to the country's National Fisheries Service".

2010 – November: *Fisheries Information Service* reported via an article – "Call for ban on sale of salmon infected with ISA virus" – that: "Lawmakers and environmentalists are demanding that the Chilean Health Ministry (Minsal) prohibit the marketing of more than 100 tonnes of salmon for human consumption, which is infected with the infectious salmon anemia (ISA) virus. The petition was filed by Senators of Magallane, Pedro Munoz, Guido Girardi and Alejandro Navarro, the council of Punta Arenas, Mario Pascual, and organizations like the Centro Ecocéanos, the Latin American Observatory for Environmental Conflicts (OLCA), Citizens Defense League for the Consumer and International Consumers."

2010 – December: According to the World Organization for Animal Health's World Animal Health Information Database, there were 13 cases of ISA reported in Canada between January 2005 (when records were made available) and December 2010. Only 4 out of the 13 cases listed a location: two in New Brunswick in 2007 and 2008 and two in Prince Edward Island in 2009.

In summary:

2005: two cases of "Disease present but without quantitative data"
2006: two cases of "Disease present but without quantitative data"
2007: one case in New Brunswick and one case of "Disease present but without quantitative data"
2008: one case in New Brunswick and one case of "Disease suspected but not confirmed"
2009: two cases in Prince Edward Island of "Confirmed infection/infestation without clinical signs" and one case of "Disease suspected but not confirmed"
2010: two cases of "Disease suspected but not confirmed".

2010 December: The OIE's 'World Animal Health Information Database' reported one new outbreak of ISA in 'AISÉN GRAL. CARLOS IBANEZ DEL CAMPO' (July - December 2010) with 79,520 'susceptible' fish. Another new outbreak of ISA was reported in 'MAGALLANES' (July - December 2010) with 797,567 'susceptible' fish. And two more outbreaks were reported in 'AISÉN GRAL. CARLOS IBANEZ DEL CAMPO' (January - June 2010) with 804,570 'susceptible' fish.

2011 – January: The Norwegian Veterinary Institute reported "a low-pathogenic variant of infectious salmon anemia virus" in the Faroe Islands.

2011 – March: In a letter - "Are you insured for this cover-up?" – to the Canadian Fisheries Minister (Gail Shea), Alexandra Morton asked: "Are your ministry and the Norwegian fish farmers adequately insured to cover damages if we find out BC is an ISAV suspect area, no one told us and it spreads because you did nothing?".

2011 – March: A Scottish report detailed the following in 2009 for a salmon farm at Langa Isle East in Shetland: "Infectious salmon anaemia. Total number removed from site since confirmation 174,480. Site had an unaccountable loss of 109,289."

2011 – April: Norway's 'National Commission for the Investigation of Scientific Misconduct', in response to a formal complaint by Aqua Gen filed in January 2009, ruled unanimously that there had not been any serious breaches of good scientific practice regarding the paper "ISA virus in Chile: evidence of vertical transmission" (published in the *Archives of Virology* and co-authored by Cermaq employee Dr. Siri Vike and Professor Are Nylund of the University of Bergen).

2011 – April: The Norwegian broodstock company involved in spreading ISA to Chile from Norway via infected eggs was identified publicly for the first time as Aqua Gen – a company part-owned by Cermaq and Marine Harvest. An article published in *Forskerforum* explained that: "Although researchers have not mentioned Aqua Gen in their work, the company as an exporter of salmon eggs to Chile has been designated as the source of the ISA virus". *Forskerforum* reported that Professor Are Nylund believes the conflict of the ISA virus illustrates how some heavy business interests trying to stop scientific publishing. "We have been subjected to enormous pressure, where our credibility as scientists has been lost in two years. There have been a hell, and my advice to other researchers is to never give in to pressure from business interests", said Nylund.

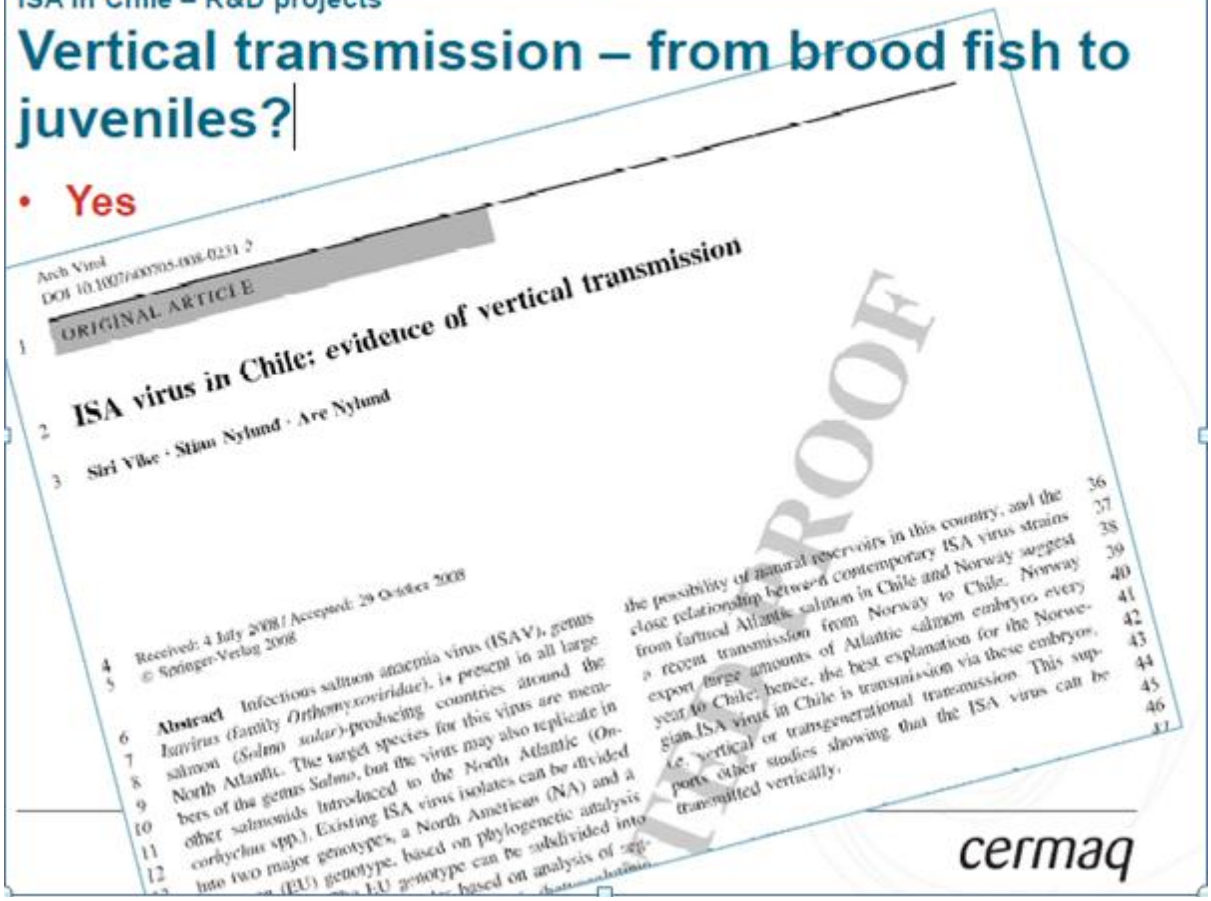
2011 – April: In a letter to Canadian Fisheries Minster Gail Shea, Alexandra Morton wrote: "You have chosen to ignore a scientific paper from Norway suggesting the ISA virus travelled in Atlantic salmon eggs to contaminate the coast of Chile. A big farm salmon egg producer called Aqua Gen, filed a complaint against the three Norwegian scientists who wrote that paper. Last week, the decision was handed down by the Norwegian Council of Research Ethics. They ruled paper is valid, the conclusions stand. Aqua Gen is owned in part by the Norwegian companies Cermaq and Marine Harvest, which are the biggest salmon feedlot operators in British Columbia and have presumably imported Atlantic eggs into BC".

2011 – April: Cermaq gave a presentation acknowledging that ISA was spread to Chile from Norway – publicly endorsing the paper "ISA virus in Chile: evidence of vertical transmission" (published in the *Archives of Virology* and co-authored by Cermaq employee Dr. Siri Vike and Professor Are Nylund).

ISA in Chile – R&D projects

Vertical transmission – from brood fish to juveniles?

- Yes



Arch Virol
DOI 10.1007/s00705-008-0231-2

ORIGINAL ARTICLE

ISA virus in Chile: evidence of vertical transmission

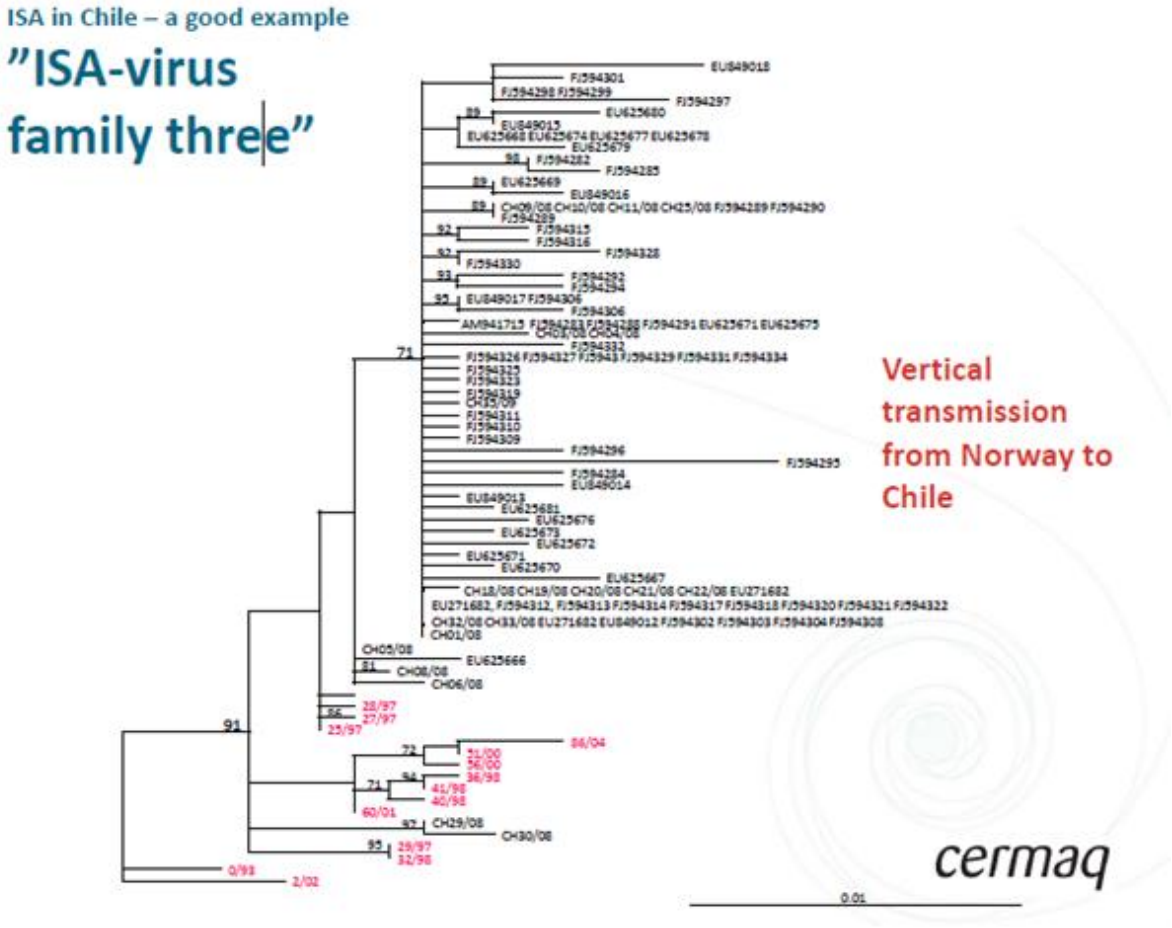
Siri Vike · Stian Nylund · Are Nylund

Received: 4 July 2008 / Accepted: 29 October 2008

Abstract Infectious salmon anaemia virus (ISAV), genus *Isavirus* (family *Orthomyxoviridae*), is present in all large salmon (*Salmo salar*)-producing countries around the North Atlantic. The target species for this virus are members of the genus *Salmo*, but the virus may also replicate in other salmonids. Introduced to the North Atlantic (*Oncorhynchus* spp.). Existing ISA virus isolates can be divided into two major genotypes, a North American (NA) and a European (EU) genotype. The EU genotype can be subdivided into [illegible] based on analysis of segment

the possibility of natural reservoirs in this country, and the close relationship between contemporary ISA virus strains from farmed Atlantic salmon in Chile and Norway suggest a recent transmission from Norway to Chile. Norway export large amounts of Atlantic salmon embryos every year to Chile; hence, the best explanation for the Norwegian ISA virus in Chile is transmission via these embryos, i.e. vertical or transgenerational transmission. This supports other studies showing that the ISA virus can be transmitted vertically.

cermaq



2011 – April: Minutes of a Cermaq Corporate Team meeting (dated 12th April) - "accidentally posted online" – referred to the paper by Dr. Siri Vike and stated that: "An important message from us should be that we are proud of this research, we initiated and financed it because we want to build knowledge and seek improvement. We take measures based upon knowledge". Cermaq advised that: "As this is very sensitive in BC we have to be careful what is commented upon in public in the time to come. We should avoid speculations about the situation in BC."

2011 – May: *The Globe & Mail* reported (in data submitted to the Cohen Committee) that: "There are approximately 35 indications of the existence of ISA identified in these records to date".

2011 – May: An Exhibit made public during the Cohen Commission revealed that the Canadian Food Inspection Agency had been notified in April 2011 of suspected evidence of ISA in British Columbia:

May 16, 2011
RDIMS #2904857

Aquatic Animal Health Division
Canadian Food Inspection Agency
Record of Decisions

Third Party Notification of Suspect Infectious Salmon Anaemia (ISA) in Salmon Aquaculture in the Marine Environment of British Columbia

Background:	**Consulted with:**
The requirement to notify CFIA of the suspicion or detection of Reportable aquatic animal diseases came into effect on January 5, 2011. Infectious Salmon Anaemia is a Reportable disease. Alexandra Morton, Raincoast Research Society, sent a series of 35 reports from the Animal Health Centre, BC Ministry of Agriculture and Lands (AHC – BCMAL), obtained through her role with the Cohen Commission, to the President of the CFIA, citing evidence of suspected cases of ISA that she said should have been reported to the World Organization of Animal Health (OIE) (2 emails dated April 28, 2011). These reports represent sample submissions from 2007 to 2010 from the aquaculture industry in BC.	Pascale Nérette, Surveillance and Monitoring, AAHD Cindy Wong, Senior Officer, Governance, Aquaculture Management, DFO (604-666-6831).

The report included:

The 6 reports involved 2 salmon farming companies: Marine Harvest Canada and Mainstream Canada. It was recommended that CFIA continue it's inspection of these cases by contacting these 2 companies for more information.

Follow-up (Decision #1):
Dr. Kim Klotins contacted Mr. Vincent Erenst, Managing Director of Marine Harvest and Mr. Fernando Villarroel, Managing Director of Mainstream on May 26, 2010. In both cases, Directors indicated that company veterinarians would provide CFIA with requested information.

Dr. Peter McKenzie (Mainstream Canada) was contacted on May 27, 2011 by Dr. Kim Klotins and provided with the AHC Case numbers (09-805 and 09-2936). Information was received on June 5, 2011 and June 20, 2011. With the supplied information, these cases were evaluated against the case definition for ISA and assessed as No Risk by Dr. Gary Kruger, Area Program Specialist (Aquatic). No additional inspection, including sampling, is required. Dr. Kim Klotins concurs.

Dr. Diane Morrison (Marine Harvest Canada) was contacted on June 1, 2011 by Dr. Kim Klotins and provided with the AHC Case numbers (08-4813, 09-109, 09-111, and 09-2849). Information was received on June 2, 2011. With the supplied information, these cases were evaluated against the case definition for ISA and assessed as No Risk Dr. Gary Kruger, Area Program Specialist (Aquatic). No additional inspection, including sampling, is required. Dr. Kim Klotins concurs.

Issues:
1. There is now a requirement for BCMAL and salmon producers to contact CFIA if they suspect or detect ISAV. The reports from BCMAL should indicate clearly whether there is a basis for suspicion of ISA based on their findings and knowledge of the disease.

Implications:
1. It is likely that CFIA will be required to present our response to this notification and our conclusions to the Cohen Commission (could be as early as late August or early September 2011).
2. No other implications were identified with this notification as it did not lead to a change in the health status of Canada's aquatic animal populations. There is no requirement to notify the OIE.

Recommendations:	Recommended by:
May 17, 2011 1. In order to decrease the uncertainty associated with the Low Risk designation of these 6 cases or to further assess the likelihood (eg. to No Risk), additional information and perhaps samples are required. It is recommended that CFIA conduct further inspections with the identified companies. June 24, 2011 2. All cases were evaluated as NO RISK for ISA. It is recommended that this information also be communicated to BCMAL and the companies that provided additional information. 3. If is recommended that CFIA work with BCMAL to identify when to report a suspicion of ISA to CFIA.	Kim Klotins, Acting National Manager, Disease Control Contingency Planning, AAHD

2011 May: The BC Salmon Farmers Association claimed (in a submission to the Cohen Inquiry dated 19th May) that: "irreparable damage will occur to the reputations and economic interests of the BCSFA's member companies and their shareholders" if disease data is released publicly (the Norwegian-owned companies Marine Harvest, Cermaq and Grieg control 92% of BC's salmon farms).

2011 May: The BC Salmon Farmers Association claimed (in a submission to the Cohen Inquiry dated 30th May) that should disease data be disclosed publicly there would be a "likelihood of misuse and irrevocable damage to the economic interests and reputations of participants and individuals".

2011 – May: Cermaq's Communications Officer in Canada, Grant Warkentin, claimed in a letter to *The Courier-Islander* that: "there is no ISA here; the disease is catastrophic for Atlantic salmon, so of course farmers are always looking for it; and again, there is no ISA here."

2011 – May: A scientific paper – "Disease interaction and pathogens exchange between wild and farmed fish populations with special reference to Norway" – published in the journal *Aquaculture* in May reported: "Recently, there were two instances of reported escapes of Atlantic salmon from two different sites with ISA in Troms County, North Norway. Escaped salmon were later caught in two different local rivers, and ISAV was isolated from these fish (Johansen et al., 2009b). These instances clearly demonstrate the potential for pathogen exchange from escaped farmed fish to wild fish."

2011 – May: A presentation at a conference organized by the World Organization for Animal Health included the following:

[Graphic: Kibenge et al, 2011 – abstract online here and download Powerpoint in full here]

2011 – June: Cermaq's Communications and Corporate Sustainability Manager in Canada, Laurie Jensen, claimed during a public meeting that "ISA is an East coast disease, not a West coast disease" and that symptoms of ISA are not in British Columbia.

2011 – June: In a "Ruling on Undertakings of Confidentiality", Justice Cohen ruled that disease information submitted by the BC Salmon Farmers Association via the Cohen Inquiry must remain confidential.

2011 – June: In a letter to the new Canadian Fisheries Minister (Keith Ashfield), Alexandra Morton wrote: "In 2010, Canada reported two cases of "suspect" ISAv to the OIE, were either of these from the west coast?"

2011 – June: A suspected case of ISA at a Cermaq-owned salmon farm in the Alta region of Norway was reported.

2011 – June: Suspected cases of ISA in Chile were reported by the Chilean Government as 14 (up from 12 in March) with Canadian company Cooke Aquaculture responsible for 5 of the cases.

2011 – July: Suspected cases of ISA in Chile were reported by the Chilean Government as 20 (up from 14 in June) with Norwegian-owned Cermaq (Mainstream) responsible for two cases.

2011 – July: Cermaq in Canada (Mainstream) claimed in a newsletter report – "The real ISA 'situation in BC' for Mainstream Canada" - that: "There is no ISA present in our broodstock..... If there were signs of exotic diseases such as ISA we would notice. Because

ISA could have such a huge negative impact on our fish and business, we take many steps to monitor for its presence."

2011 – July: In a letter to Canadian Fisheries Minister Keith Ashfield, Alexandra Morton, asked: "What "situation" is Cermaq talking about hiding from the BC public in the same paragraph as they worry about someone tweeting about ISA coming from Norway?"

2011 – July: The Norwegian newspaper *Dagbladet* referred to the "sensational" report and "quite spicy" revelations of the scientific paper "ISA virus in Chile: evidence of vertical transmission" (published in the *Archives of Virology*).

2011 – July: The Aquaculture Association of Canada reported that ISA: "has remained a recurrent problem in Eastern Canada and Maine since the initial epizootics of 1996".

2011 – July: *The Courier-Islander* reported: "The Infectious Salmon Anemia virus (ISAv) is a ticking time bomb that could explode under BC's salmon farming industry and their open net-pens. If this industry has imported such a disease into the ecology of the Pacific Northwest via infected Atlantic salmon material, the results could be an ecological catastrophe".

2011 – July: The Aquatic Animal Health Division of the Canadian Food Inspection Agency stated that: "all (ISA) cases reported to the CFIA and thereafter by the CFIA to the OIE since 2005 (confirmed and suspected) are for parts of the east coast of Canada only (New Brunswick and PEI)".

2011 – July: The BC Salmon Farmers Association claimed in a letter in the *North Island Gazette* that: "testing has never indicated an imported disease".

2011 – July: In Norway, Cermaq reported a "Minor Q2 impact from site with ISA in Finnmark" in their Q2 2011 presentation. Cermaq's Q2 2011 report stated: "In Finnmark, one site was confirmed with ISA and about 100 tonnes of fish with an average weight of around 2.3 kilogram were harvested or culled with minor impact on EBIT in the quarter."

2011 – July: Mary Ellen Walling, Executive Director BC Salmon Farmers Association, claimed in a letter to *The Courier-Islander* claimed that: "Despite thousands of fish being sampled and tested in BC each year, ISA has not been found here...The importation of salmon material has been seriously restricted by local farmers who have developed their own broodstock programs on their own accord. The small percentage of eggs that are imported are under strict regulations: including limiting sources to countries that have never seen ISA, as well as quarantine and testing programs before they're ever used"

2011 – July: The New York Times reported (July 27) in an article – "Norwegians Concede a Role in Chilean Salmon Virus" – that: "A virus that has killed millions of salmon in Chile and ravaged the fish farming industry there was probably brought over from Norway, a major salmon producer has acknowledged. Cermaq, a state-controlled Norwegian aquaculture company that has become one of the principal exporters of salmon from Chile, has endorsed a scientific study concluding that salmon eggs shipped from Norway to Chile are the "likely reason" for the outbreak of the virus in 2007, according to Lise Bergan, a company spokeswoman."

2011 – August: According to *Fisheries Information Service*: "The health crisis [in Chile] in 2008 led to the loss of more than 25,000 jobs, out of 32,000 direct jobs generated by the industry at that time".

2011 – August: *The Common Sense Canadian* reported that: "The other big question is: "Is Infectious Salmon Anaemia in British Columbia – and, if so, how is it affecting/could it affect wild salmon?" And If ISA isn't lurking in B.C., what other deadly diseases could possibly precipitate such "irrevocable" and "irreparable" financial meltdown were they to be revealed publicly? In Chile, ISA precipitated a financial meltdown which caused an estimated $2 billion in losses as up to 80% of farms were shut down in just a few years."

2011 – August: A report – 'Fish Farmageddon: The Infectious Salmon Aquaculture' – published by the Global Alliance Against Industrial Aquaculture included: "According to data obtained in August from the Ministry of Agriculture, Aquaculture and Fisheries in New Brunswick, there were 10 cases of 'ISA Virus' and Virus' and 9 cases of 'ISA Virus (H0) in 2007 with 528,000 fish 'depopulated due to ISA'. In 2009, there were no cases of 'ISA Virus' but 9 cases of 'ISA Virus (H0)' and 4 cases of 'ISA Virus (H0) in 2010 and 2 cases in 2011 (data up to May)."

Summary of Diseases and Incidences for 2007-2011

	Year Diagnosed and Number of Farms				
Disease/Parasite Reported	2007	2008	2009	2010	2011 (May)
Infectious Salmon Anemia Virus	10	0	0	1 (1 fish)	0
Infectious Salmon Anemia Virus (H0)	9	4	9	4	2
Bacterial Kidney Disease	0	17	22	15	13
Enteric Redmouth	0	0	1	1	0
Skin Lesions	0	2	6	7	3
Sea Lice	0	3	37	42	10

2011 – August: Reporting from the Cohen Commission in Canada, Alexandra Morton stated in her blog: "While the panel included scientists who were working with two of the pathogens of greatest concern, Plasmacytoid Leukemia - which Dr. Miller suggests might be weakening and killing the majority of Fraser sockeye and Infectious Salmon Anemia which is following the salmon farming industry around the world, - none seemed concerned about these diseases. Dr. MacWilliams, presumably has access to the fish farm disease records said she has seen no evidence of the exotic Infectious Salmon Anemia virus in BC. MacWilliams did research that found rainbow trout could be lethally infected with this exotic virus, but went on to say that Pacific salmon were relatively resistant to ISAv."

2011 – August: Under cross-examination at the Cohen Commission (23rd August), Dr. Michael Kent from Oregon State University testified: "I'm basing there is no record of ISA virus in B.C. based on the limited -- on the fishes that have 20 been screened for the disease, and with a specific test. These tests are far too non-specific to ascribe ISA and in light of -- if ISA had been actually isolated in B.C., then I would add a little bit more weight to these particular lesions and my diagnosis would go up a little bit higher as far as ISA being a differential diagnosis. But if we have these types of changes that we see here and are known pathogens and known conditions within B.C. that can cause these, ISA would be pretty well on my list." Read the transcript in full online here.

2011 – August: Under cross-examination at the Cohen Commission (23rd August), Dr. Christine MacWilliams from the Department of Fisheries & Oceans testified: "If ISA were detected here, I would presume it came from a break in biosecurity, either at a farm level or through international transport. I would not presume it's coming from wild fish in B.C., because there have been tests, and people have looked for ISA with very sensitive micro tests and it has not been found. So I would presume that that was an iatrogenic introduction, that a break in biosecurity somewhere along the line." Read the transcript in full online here.

2011 – August: Reporting from the Cohen Commission in Canada, Alexandra Morton stated in her blog: "Today, we also saw a "confidential briefing" by Sheppard to the Minister of Agriculture and Lands in 2007 saying "there is no importation of live ...eggs to BC." However, by that time 26,082,000 Atlantic salmon eggs had been imported to BC. In this document Sheppard also said "The most likely source of ISA virus in BC is from wild migrating wild fishes..." When Sheppard saw the document he said: "Sometimes these briefings go places they shouldn't" *Yes, like on a screen in a court room*".

2011 – August: Reporting from the Cohen Commission in Canada, Watershed Watch stated that: "The questioning of the Aquaculture witnesses included discussion about…… Dr. Gary Marty's statements in BCSFA fish health records that refer to "ISA-like symptoms". A transcript for 26th August is available via the Cohen Commission's web-site.

2011 – August: Reporting from the Cohen Commission in Canada, Alexandra Morton stated in her blog: "Infectious Salmon Anemia virus (ISAv) is an influenza virus appearing in Atlantic salmon farms worldwide. While the province of BC, the salmon farming industry, the Minister of Fisheries, MPs etc., have all been saying infectious salmon anemia is not here the province of BC has recorded the symptoms of this disease over 1,100 times in their database which only a very few people have ever seen. Disturbingly, ISAv symptoms are spiking just after marine anemia symptoms in three different years."

2011 – August: Under cross-examination at the Cohen Commission (31st August), Dr. Peter McKenzie (Veterinarian and Fish Health Manager, Mainstream Canada - owned by the Norwegian Government-owned company Cermaq) testified: "We've never found ISA in that testing, no.....I feel very comfortable that the program that we have in place would detect the virus if it was to occur..... we have now a report from CFIA that, you know, they've looked at the data we have on ISA and they see it as a no-risk, in their words from their report, and Canada recognizes, based on international standards, that B.C. is free of ISA, based on this infrastructure of fish health expertise that is in place. But - but - the commentary by people that a lot of it was initiated when Ms. Morton raised the concerns of the ISA reports, comments of that constantly in the media seem to dissuade or dismiss all of this expertise in these layers of audits and credentials." Read the transcript in full here.

2011 – August: Under cross-examination at the Cohen Commission (31st August), Dr. Gary Marty (Fish Pathologist, Animal Health Centre, Ministry of Agriculture) testified: "Throughout the audit program, we test between 600 and 800 fish every year, since 2003, with a highly sensitive and specific PCR test, and those have been all negative. And so that gives me a great deal of confidence that we don't have ISAV in British Columbia.... we can then state with a level of confidence that we have 95 percent confidence that the prevalence of ISAV in our population, our British Columbia fish, is less than two percent..... we're now at the point where we have over 5,000 tests for ISAV, all are negative, and that gives us an

extremely high level of confidence that our industry is free from ISAV." Read the transcript in full here.

2011 – August: An Exhibit (#1675) marked as evidence during the Cohen Commission (31st August) detailed an affidavit from Dr. Gary Marty (Fish Pathologist, Animal Health Centre, Ministry of Agriculture) which included:

8. All of my pathology reports are written with the understanding that they will be interpreted by a veterinarian with training and experience in fish medicine. I expect fish health veterinarians to understand that "one of the classic lesions associated with ISAV infection" is very different from more specific language that was not used in my reports. For example, I did not report that I had found "a lesion pathognomonic for ISAV", and I did not report that I had found "a lesion diagnostic for ISAV".

9. In my view, results from the Auditing and Surveillance Program provide a high degree of confidence that the finding of sinusoidal congestion recorded in these 35 case reports is not a result of ISAV infection.

14. Every one of the 201 cases of sinusoidal congestion in the liver tested negative by PCR for ISAV. In my view, this clearly rules out ISAV as a potential cause of sinusoidal congestion in these cases. Based on these results, I do not view the presence of sinusoidal congestion in a BC farm salmon to be worthy of reportable suspicion of ISAV. Animal Health Centre veterinary virologist Dr.

15. Additionally between 2006 and 2011 Program histopathology and PCR results were reviewed by at least one of 4 Provincial fish health veterinarians (Drs. Joanne Constantine, Ian Keith, Mark Sheppard, or Andrea Osborn) or one private veterinarian (Dr. Sonja Saksida). I believe they did not view the presence of sinusoidal congestion along with negative PCR results for ISAV to be worthy of reportable suspicion of ISAV.

17. My confidence that ISAV is not in BC is further strengthened by 100% negative test results from every farm fish tested by PCR for ISAV as part of the BC Fish Health Auditing and Surveillance Program. Results from this program from 2003 through the first quarter of 2010 are freely available to the public at the Ministry web site which is located at the following URL: http://www.agf.gov.bc.ca/ahc/fish_health/index.htm.

Read the exhibit in full here.

Other Exhibits made public included specific disease reports authored by Dr. Gary Marty. For example, Exhibit #1549-018:

BRITISH COLUMBIA
The Best Place on Earth

Ministry of Agriculture and Lands

Animal Health Centre

AAVLD - Accredited Laboratory

Ministry of Agriculture and Lands
1767 Angus Campbell Road
Abbotsford BC V3G 2M3
Telephone : (604) 556-3003
Facsimile: (604) 556-3010
Toll-Free : 1-800-661-9903

Final Report AHC Case: 08-4567

Last Updated: 12/03/08 10:37 AM
Pathologist: Gary D. Marty
Received Date: 11/28/08
Collected Date:
Client Ref No: BI251108

Veterinarian: **Dr. Peter McKenzie**
Clinic: **Mainstream Canada**
Phone: (250) 286-0022
Fax: (250) 286-0042

This report from Mainstream's farm at Brent Island included reference to "classic lesions associated with ISAV infections" (this is one of over 1,000 cases which refer to "classic lesions associated with ISAV infections"):

Final Comment: Most of the lesions in these fish are consistent with the clinical history of a vaccine reaction. One fish has hepatic sinusoidal congestion that might have been caused by something other than a vaccine. Comments on specific lesions follow:

Sinusoidal congestion in the liver (fish 5) is evidence of circulating vasodilators. I have seen it associated with viral hemorrhagic septicemia virus and *Listonella anguillarum* infection. Sinusoidal congestion is one of the classic lesions associated with ISAV infections, but ISAV has never been identified in British Columbia. Consider bacteriology and virology and PCR for VHSV and IHNV (if not already done). The golden to amphophilic cytoplasmic inclusions in hepatocytes vary from 0.5 to 1.5 times the size of hepatocyte nuclei. The inclusions might be remnants of ingested erythrocytes (this type of inclusion has not been described with any salmon virus).

2011 – August: An Exhibit (#1679) marked as evidence during the Cohen Commission (31st August) detailed a confidential 'Briefing Note for Minister' (for the Minister of Agriculture

and Lands) dated August 2007 by Dr. Mark Sheppard - it included the incorrect statement that there is no importation of Atlantic salmon eggs to B.C.:

First Nations Considerations:
First Nations and the coastal communities have expressed concerns about the potential for exotic viral diseases to emerge in BC fish or salmon eggs.

Strategic Analysis:

- This remains an unofficial report of ISA in southern Chile although Intrafish has published a news story (Aug 01, 2007).
- ISA virus is not a human health or food safety concern.
- The Ministry remains confident that farmed fish in BC are free of ISA disease.

- Company veterinarians and BCMAL's fish health audit and surveillance program is well suited to detect any viral problems, including ISAv, at fish farms as early as possible.
- The most likely source for ISA in BC is from migrating wild fishes from other regions of the Pacific Ocean as there is no importation of live Atlantic salmon or eggs to BC.
- All farming companies continue to take steps to prevent infections on farms.
- New entry fish from BC hatcheries to marine fish farms are free of ISA virus..

Financial Implications: ISA outbreak(s) generally begin as a low-level mortality but has potential to increase in intensity. The presence of ISA would profoundly impact a company's business due to initial slaughter orders of entire populations and subsequent bio-containment activity.

Next Steps: BCMAL is well aware of ISA. Our monitoring and surveillance activity will continue. We will consider elevating the numbers of surveillance samples in 2008. We plan to increase the frequency of reporting FHASP results to the Animal Health Branch website .

Contact: Dr. Mark Sheppard, Aquatic Animal Health Veterinarian

Telephone: 250 897-7546

In fact, data published by the Department of Fisheries & Oceans clearly shows that over 29 million Atlantic salmon eggs were imported into British Columbia from Scotland, Ireland, Washington State, New Brunswick and Iceland between 1984 and 2009.

Atlantic salmon eggs authorized for import into B.C. from 1985 to Present

Year	Maximum number of eggs authorized for import	Area of origin
1985	130,000	Scotland
1986	1,144,000	Scotland
1987	1,281,000	Scotland; Washington State
1988	2,700,000	Scotland; Washington
1989	500,000	Washington State
1990	0	
1991	735,000	New Brunswick; Ireland; Washington State
1992	640,000	New Brunswick; Washington State
1993	1,447,000	New Brunswick; Ireland; Washington State
1994	750,000	Washington State
1995	775,000	Washington State; Ireland
1996	1,500,000	Washington State
1997	1,600,000	Washington State
1998	2,400,000	Washington State
1999	2,400,000	Washington State
2000	2,500,000	Washington State
2001	800,000	Washington State
2002	0	
2003	0	
2004	4,700,000	Iceland
2005	80,000*	Iceland
2006	0	
2007	1,750,000	Iceland
2008	800,000	Iceland
2009	600,000	Iceland
2010	0	

*Although these eggs were viable and free of disease, the importing company made the decision not to cultivate them based on operational priorities. After receiving authorization from DFO, the eggs were destroyed.

N.B. July 15, 2011 – As a result of an intensive audit of departmental records and historical fish health documents, this table has been updated to clarify several points:

- Data is now available from 1985 to 2010
- From 2000-2010, numbers reflect the actual number of eggs imported. Numbers from 1985-1999 reflect the number of eggs requested for import through the Introductions and Transfers database.
- Where the request for import and the actual import occurred in different years, the number of eggs imported is reflected in the actual year.

View “Public Reporting on Aquaculture in the Pacific Region - Salmon Egg Imports” online here.

2011 – August: An Exhibit (#1683) marked as evidence during the Cohen Commission (31st August) revealed that the Government bent the rules to allow the import of Atlantic salmon eggs into British Columbia for use by the Norwegian companies Stolt (now named Marine Harvest) and Mainstream (Cermaq).

Government of Canada
Fisheries and Oceans

Gouvernement du Canada
Pêches et Océans

To: / À: John C. Davis
Regional Director General

Date: October 3, 2003
CT#: 368384

Subject: / Objet: **REQUEST TO IMPORT ATLANTIC SALMON EGGS FROM ICELAND (DECISION SOUGHT)**

From / De: Laura Richards, Regional Director Science

BY E-MAIL

Via: Sue Farlinger, Regional Director HEB

Via: Allison Webb, A/ Director Sustainable Aquaculture

REQUEST TO IMPORT ATLANTIC SALMON EGGS FROM ICELAND

(Decision Sought)

SUMMARY

- Two BC salmon farming companies wish to import Atlantic salmon eggs from Stofnfiskur, an Icelandic company which is not certified under the Canadian Fish Health Protection Regulations (FHPR).
- Under the *Fisheries Act*, a Section 4 approval can be granted for such an importation if risks are deemed to be acceptable.
- Failure to provide permission for egg importation may trigger a trade challenge under the World Trade Organization, because Canada's requirements are more stringent than recommended by the World Animal Health Organization.
- Additionally, DFO could also be viewed as causing a competitive disadvantage of the aquaculture industry by denying them access to alternate strains.
- An approach, using established procedure through the mechanism of a risk assessment, is proposed.

Analysis / DFO Comment

- The NRFD considers that for the purposes of the FHPR, the company's health testing history can be considered equivalent to the first of four inspections.
- The company meets European testing standards and is currently not prepared to increase the level of testing to meet FHPR requirements.
- Discussions have been initiated by the NRFD to review the definitions on which FHPR sampling procedures are based. In the future, Canada may accept a testing level stipulated by the World Animal Health Organization (OIE) which matches the European requirements.
- Given that the company meets OIE and European health testing requirements, Canada and especially BC may be challenged on restrictive trade practices should egg importation not be permitted. The effects of such a trade challenge may be profound such that it is difficult to maintain the safeguards (FHPR, Atlantic Salmon Importation Policy) which Canada and the Region currently have in place to prevent inadvertent importation of exotic fish pathogens.

Read the full Exhibit in full online here.

Following the importation of 150,000 Atlantic salmon eggs in British Columbia in 2005, the fry were subsequently culled (presumably due to disease problems).

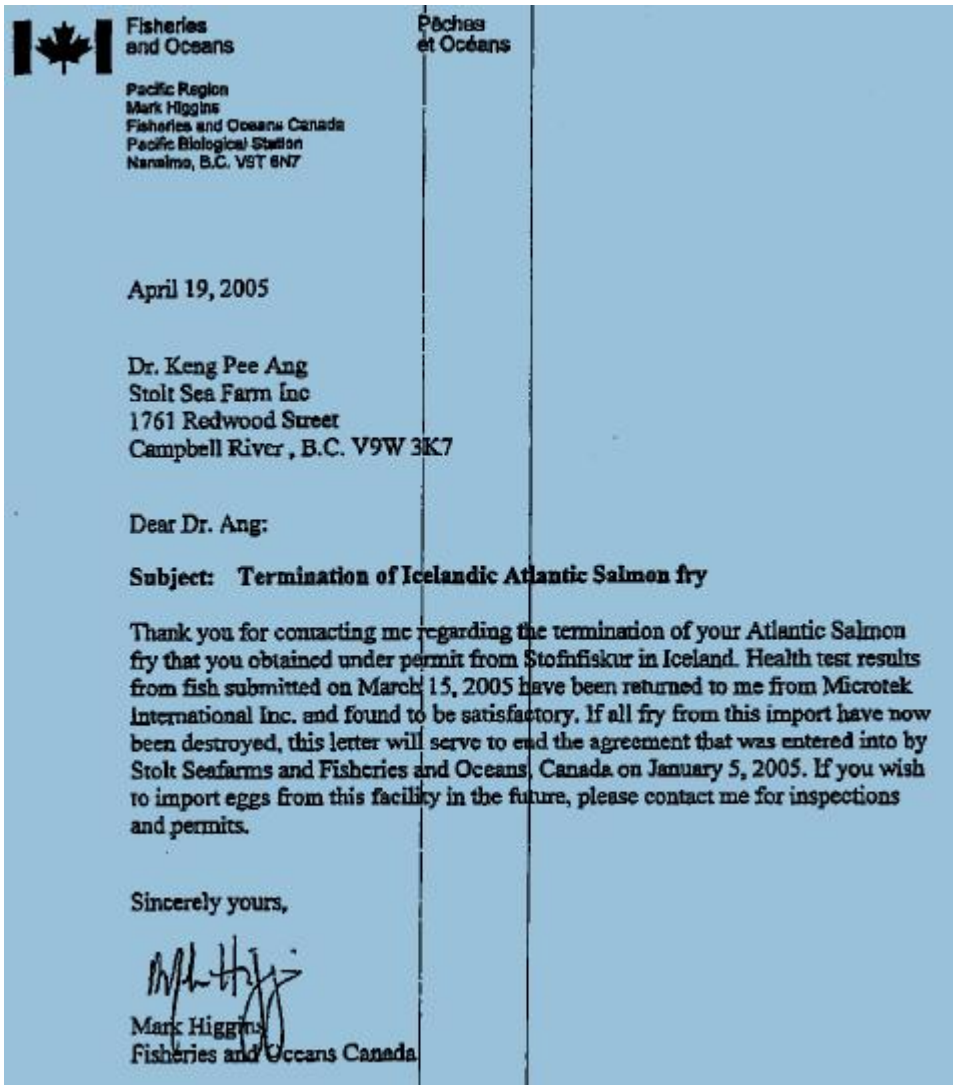
Higgins, Mark

From: Judy A. Knutson [judy.knutson@stoltseafarm.com]
Sent: March 22, 2005 1:29 PM
To: kieserd@pac.dfo-mpo.gc.ca
Subject: Stofinfiskur

Hi Dorothy.

Fry samples have been collected and are being sent away today for viral sampling. I would like to be able to cull the remaining fish tommorrow if you would give me permission.

Regards Judy Knutson



Fisheries and Oceans / Pêches et Océans

Pacific Region
Mark Higgins
Fisheries and Oceans Canada
Pacific Biological Station
Nanaimo, B.C. V9T 6N7

April 19, 2005

Dr. Keng Pee Ang
Stolt Sea Farm Inc
1761 Redwood Street
Campbell River , B.C. V9W 3K7

Dear Dr. Ang:

Subject: Termination of Icelandic Atlantic Salmon fry

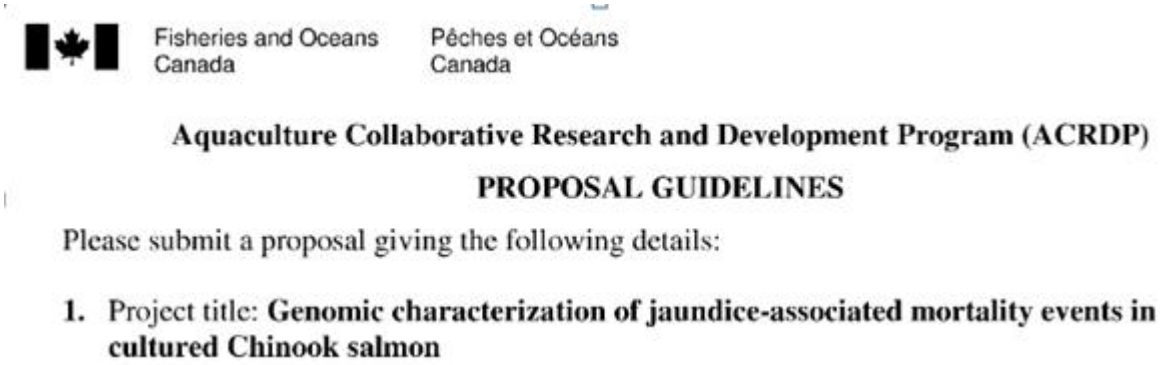
Thank you for contacting me regarding the termination of your Atlantic Salmon fry that you obtained under permit from Stofnfiskur in Iceland. Health test results from fish submitted on March 15, 2005 have been returned to me from Microtek International Inc. and found to be satisfactory. If all fry from this import have now been destroyed, this letter will serve to end the agreement that was entered into by Stolt Seafarms and Fisheries and Oceans, Canada on January 5, 2005. If you wish to import eggs from this facility in the future, please contact me for inspections and permits.

Sincerely yours,

Mark Higgins
Fisheries and Oceans Canada

Read the Exhibit (#1684) in full online here

2011 – August: An Exhibit (#1527) made public during the Cohen Commission detailed a project involving Creative Salmon in the Clayoquot Sound UNESCO Biosphere Reserve:



Fisheries and Oceans Canada / Pêches et Océans Canada

Aquaculture Collaborative Research and Development Program (ACRDP)

PROPOSAL GUIDELINES

Please submit a proposal giving the following details:

1. Project title: **Genomic characterization of jaundice-associated mortality events in cultured Chinook salmon**

The $95,000 project involving Dr. Kristi Miller from the Department of Fisheries & Oceans included:

4. Project problem / rationale (maximum length ½ page)

Over the past seven years mortalities of Chinook salmon farmed in the Tofino inlet have been observed with unique clinical presentation. The salmon present with mild to severe yellow discolouration of the skin (jaundice). This is most evident on the abdomen and around the eyes. These fish also have very pale gills indicating anemia. Internal signs include pale livers and often the stomachs of the fish are empty indicating the fish have not eaten for a number of days although the overall condition of the fish is good. Grossly the other organs appear unaffected. The clinical presentation is very different from Marine Anemia syndrome, another Chinook salmon disease, which typically presents with splenomegaly, renomegaly, and anemia (Kent and Poppe 1998).

Histological examination has found severe liver and kidney damage (hydropic degeneration). The proposed etiology includes a pathogen or exposure to a negative environmental influence (hereafter referred to as an undefined toxin). Repeated testing using traditional diagnostic tests have been unable to identify a pathogen. Tests including classical bacterial culture, viral cell culture, PCR, blood assessment and histopathology have yielded negative results for pathogens including *Renibacterium salmoninarum* (BKD), *Listinella sp* (vibriosis), VHSV, IHNV, ISAV, VEN, EIBS, Loma *salmonae*, and *Nucleospora salmonis* (marine anemia).

2011 – September: An article – "Hell to pay for letting ISA virus into the Pacific" – by D.C. Reid published in The Times Colonist (6th September) stated that: "The worst possible thing that could happen to Pacific salmon has happened: Norwegian, Atlantic Ocean ISA virus that has wiped out every fish farm country in the world has been brought to the Pacific Ocean where there was no ISA - until it was brought to Chile and now B.C..... You will be staggered by how many hundreds of times HEM (interstitial haemorrhage) and SSC (sinusoidal congestion) were found in fish farm Atlantic salmon. These are the classic symptoms of ISA that wiped out 500 farms in Chile, resulting in a $2-billion loss. ISA in Norway is so entrenched it has never been completely wiped out. Scotland looks on the edge of a disease meltdown. And over the last six months Chilean farms sequenced for ISA have grown to 23, suggesting another cyclic infectious disaster soon."

A correction – "B.C. farmed salmon not positive for virus" – was published in *The Times Colonist* the following day (7th September) including: "The infectious salmon anaemia virus (ISAV) has never been found in a test of farmed salmon in British Columbia. More than 4,700 tests were performed between 2003 and 2010, and there has never been a positive result. Tests for ISAV are done on a regular basis".

2011 – September: In a letter to *The Courier-Islander* newspaper, Dr. Gary Marty wrote: "Every one of the hundreds of fish with "classic symptoms of ISA" in the provincial fish health database was tested for the ISA virus using a highly sensitive and specific PCR test. All fish tested negative - no virus. From 2003 to 2010, the province tested 4,726 dead farm fish for the ISA virus, and all fish tested negative - no virus. These results are available on public websites summarized in Cohen Commission exhibit No. 1471, Aug. 22. The provincial database that contains "classic symptoms of ISA" is available to the public as part of the Cohen Commission proceedings. However, any public comment on these medical records needs to respect ethical guidelines as outlined by the College of Veterinarians of B.C."

Positive Aquaculture Awareness referred to Cohen Commission - Exhibit 1471 August 22, 2011:

Publicly available PCR test results for infectious salmon anaemia virus (ISAV) in British Columbia farmed salmon over the past 8 years (2003 - 2010). Data were compiled as part of the BC Fish Health Auditing and Surveillance Program.

Year	# Positive	# Negative
2003	0	648
2004	0	675
2005	0	586
2006	0	644
2007	0	763
2008	0	588
2009	0	585
2010	0	237
TOTAL	0	**4,726**

2011 – September: In a letter to *The Courier-Islander*, Ruth Salmon of the Canadian Aquaculture Industry Alliance claimed: "D.C. Reid's anti-salmon farming column, "Hell to pay for letting ISA virus into the Pacific," Sept. 6, makes a blatantly false allegation. No cases of ISA have ever been documented in British Columbia. B.C. salmon farmers routinely monitor their fish for viruses. Fish health experts who recently testified at the Cohen Commission of Inquiry into Fraser River sockeye declines confirmed that ISA has never been detected in B.C. Exhibit No. 1471 of the Cohen Commission shows no instances of ISA in more than 4,700 samples."

2011 – October: In a letter published in *Island Tides* (5th October), Dr. Gary Marty wrote: "On August 23, Alexandra Morton's lawyer Gregory McDade asked Dr Michael Kent, 'I suggest to you that there are some 1,100 references in [provincial] document 2864 to ... classical signs of ISA' (p. 37 of transcripts). On August 22, however, Cohen Commission exhibit #1471 pointed out that every one of the 1,100 'references to ISA' in the provincial fish health database was tested for the ISA virus using a highly sensitive and specific PCR test. All fish tested negative—no virus. Indeed, from 2003–2010 the Province tested 4,726 dead farm fish for the ISA virus, and all fish tested negative—no virus. The province has developed PCR tests for other foreign fish viruses to ensure that we are prepared if we ever need the tests."

2011 – October: Alexandra Morton wrote in her blog: "In my report is the extremely disturbing records from the Province of BC of over 1,000 reports of the symptoms of the exotic Atlantic salmon virus Infectious Salmon Anemia (ISA)! The provincial vets never reacted to their own reports with proper testing, even though they report farm salmon dying of the lesions associated with this disease. This Atlantic salmon virus has spread around the world in salmon farms, but Canada does not require imported eggs to be disinfected and has no place on the import certificate for foreign hatcheries to report this virus.

I have written to the Minister of Fisheries repeatedly about the extreme risk this virus poses to BC wild salmon. Many other scientists joined me in signing one of these letters, but ex-

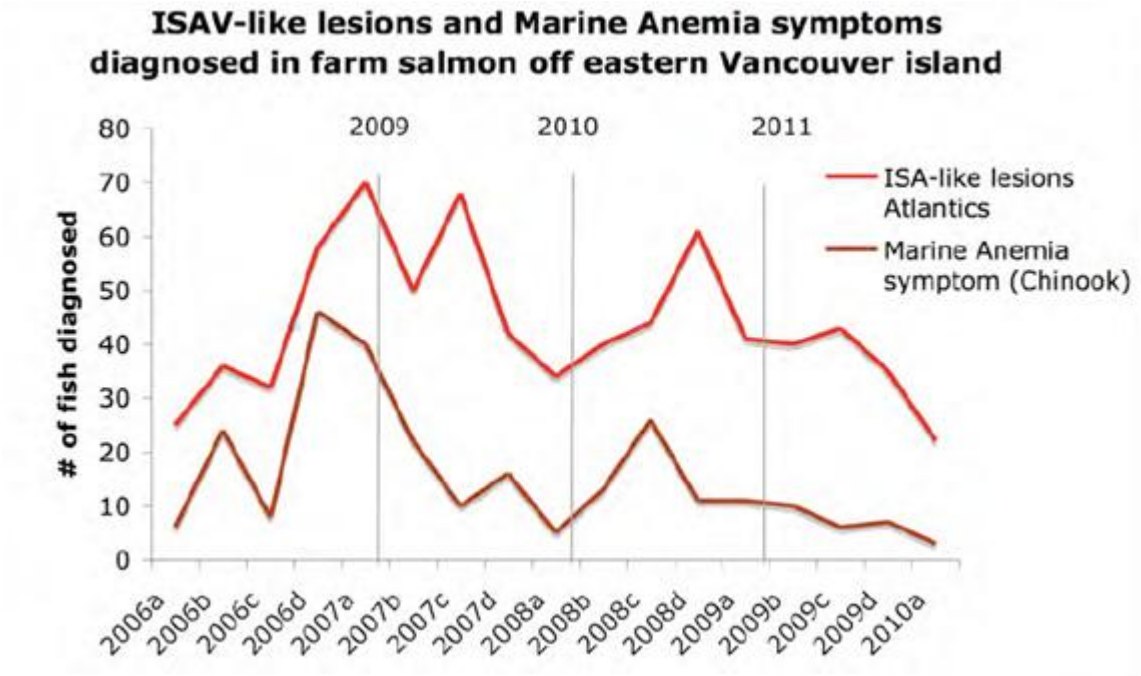
Minister Gail Shea refused to close the border to eggs, or test all the salmon farms according to DFO's own Manual of Compliance or even accept the virus can travel in the eggs.

The DFO Director General of Science waived the Canadian Fish Health Protection Regulations so Atlantic salmon eggs could be imported from a foreign hatchery that does not meet Canada's regulations.

In the summer of 2009 Marine Harvest began requesting repeated tests for the Atlantic salmon virus (ISA) from the Province of BC. In April 2010, the fish farms refused the Province of BC further access to their fish for disease testing and BC went along with this. At the same time the Norwegian companies in BC signed a Memorandum of Understanding between themselves to limit viruses from spreading from one company to the next. The governments of Canada and BC are not part of this agreement, nor are the wild salmon migrating past. On the stand no one in the federal government could tell us what kind of sampling is going on currently in salmon farms and there was no record of a government farm disease audit in the Cohen documents after April 2010.

If the Atlantic Infectious Salmon Anemia virus is in British Columbia, I hope the salmon farmers and the governments of BC and Canada are insured for any impact this could have on wild salmon and the people of this country. Of course no amount of money can bring the fish back, but maybe we could react fast enough to salvage something. However, you will see a Province of BC vet tries to tell a Minister this virus could only come from the wild because there have been no salmon eggs imported into BC. When he wrote this in 2007 over 30 million eggs imported had been imported since 1986. I don't know how he could misinform the Minister of Agriculture and Lands who was in charge of regulating salmon farms at the time and guide his thinking on this disease."

2011 – October: A report – "What is Happening to the Fraser Sockeye?" – by Alexandra Morton made public by the Cohen Commission included:



The 61-page report also stated:

Dr Gary Marty reports the Classic lesions associated with Infectious Salmon Anemia 1,100 times in the BCMAL Audit data and the reports he makes directly to the companies. He has acronyms for the symptoms that he defines:

- Hemorrhage/congestion (interstitial, kidney); HEM probably is a nonspecific result of endothelial damage; HEM is often associated with VHSV and bacterial infections. Renal congestion and hemorrhage is one of the classic signs of infectious salmon anemia (ISA), but ISAV has never been isolated from fish in BC.

- Sinusoidal congestion (liver); SSC is a nonspecific result of sinusoidal damage. In BC Atlantic salmon, sinusoidal congestion is an uncommon feature of infection with viral hemorrhagic septicemia virus (VHSV) and *Listonella anguillarum*. Sinusoidal congestion is one of the classic lesions associated with infectious salmon anemia virus (ISAV) infection, but ISAV has never been identified in British Columbia.

In the reports to the companies Dr. Gary Marty repeatedly states:

> BCP002977 "More diffuse sinusoidal congestion is one of the classic lesions associated with ISAV infection, but ISAV has never been identified in BC"
>
> BCP002975 "More diffuse sinusoidal congestion is one of the classic lesions associated with ISAV infection, but ISAV has never been identified in BC"

He has reported ISAv lesions in Pacific salmon (BCP0002977) and in 100% of the 4 Sablefish he reports on in (BCP002864)

And also included:

Beginning in July 2009, during the in-migration of Fraser sockeye that disappeared and continuing through July 2010, Marine Harvest requested an unprecedented 32 PCR tests for ISAV from Dr. Marty (BCP002971, BCP002975). Prior to this time, back through 2006 Marine Harvest only requested 2 of these tests (BCP002957, BCP002977). In April 2010 not only was Marine Harvest ordering an unprecedented number of tests for ISAv, Marine Harvest, Mainstream and Grieg refused the Province of BC further access to their dead fish, and they signed an MOU regarding viruses between themselves.

- "Whereas it is recognized that it is of benefit to the Parties to work together to manage viral fish disease and to minimize the spread of viral disease between farms, as a disease outbreak at one farm could adversely affect other farms….develop comprehensive Viral Disease Outbreak Management Plan….define minimum standards as well as minimum required capacity for mass mortality removal…The parties may not seek to enforce any aspect of this MOU in Court, including bringing an application for a declaration or injunction" BCS005022

Read the report in full online here.

2011 – October: ISA is officially reported in Pacific salmon in British Columbia for the first time – in sockeye salmon caught in Rivers Inlet on the Central Coast by scientists at Simon Fraser University. Tests by the Atlantic Veterinary College – an OIE Reference Laboratory – found two positive cases of the European genotype of the ISA virus leading to a disease report to the World Organization for Animal Health (OIE) and Canadian Food Inspection Agency.

An official OIE disease report was sent by Dr. Fred Kibenge on 15th October 2011 to Dr. Brian Evans (Executive Vice President, CFIA, & Canada's OIE Delegate) – it included:

Content of information to provide from an OIE Reference Laboratory to inform the OIE on positive results of samples on OIE listed diseases

This form is intended to provide guidance to OIE Reference Laboratories wishing to submit their positive results on OIE listed diseases to the OIE. Please sent it by email to information.dept@oie.int
Please note that filling in this form does not avoid the requirement for the Reference Laboratories to inform the OIE Delegate of the Member Country or Territory from which the samples originated. It also doesn't replace the responsibility of the OIE delegate to inform the OIE Central Bureau, of any positive results for OIE listed diseases according to OIE' disease notification requirements.

Name of the OIE Reference Laboratory: Atlantic Veterinary College

Name of the designated OIE expert: Dr. Fred Kibenge

Name of the OIE listed disease or other identified disease in the sample(s): Infectious salmon anaemia (ISA)

Country of origin of the sample(s): Canada

Name, address and position of the person having sent the sample(s):

Dr. Rick Routledge
Professor
Dept. of Statistics & Actuarial Sci.
Simon Fraser University
8888 University Drive
Burnaby, BC

Nicole Gerbrandt
Hakai Scholar
The Hakai Network for Coastal People, Ecosystems and Management
Department of Biological Sciences
Simon Fraser University

Date when the sample(s) were received by the laboratory: October 04, 2011.

Date(s) of laboratory results: October 12, 2011.

Date when the results were sent to the applicant: October 13, 2011.

Sample id	Sample description				Type of test(s)	Date	Result(s)	Serotype (if applicable)
	Type	Species	Location	Date of collection				
1-48	heart tissues from smolts	Sockeye salmon (*Oncorhynchus nerka*)	British Columbia	22/05/2011 to 18/07/2011 (attached)	Real-time RT-PCR	05/10/2011 & 08/10/2011	two samples positive	European genotype

Other comments:

All samples were tested for ISAV using our real-time RT-PCR with TaqMan probe for ISAV segment 8 (Workenhe *et al.*, 2008). Samples that were positive were then further tested using our real-time RT-PCR with TaqMan probes for ISAV segment 6 for genotyping (Kibenge *et al.*, 2009). On the basis of our test results, samples #26 and #36 tested positive for ISAV of the European genotype. All the submitted material for samples #26 and #36 was used up in this testing, and no further testing (for example virus isolation and DNA sequencing) was attempted.

Cited references:

Kibenge, F., Kibenge, M., Simard, S., Riveroll, A., Pallapothu, M., and Salonius, K. 2009. Development of a DIVA system for an infectious salmon anaemia (ISA) virus vaccine using a qRT-PCR test based on segment 6 of the ISA virus. 14th *European Association of Fish Pathologists International Conference on Diseases of Fish and Shellfish, Prague, Czech Republic, September 14-19, 2009.*

Workenhe, S.T., Kibenge, M.J.T., Iwamoto, T., and Kibenge, F.S.B. 2008. Absolute Quantitation of Infectious Salmon Anaemia Virus Using Different Real-time Reverse Transcription PCR Chemistries. *Journal of Virological Methods, 154:128-134.*

Date and signature:

October 15, 2011.

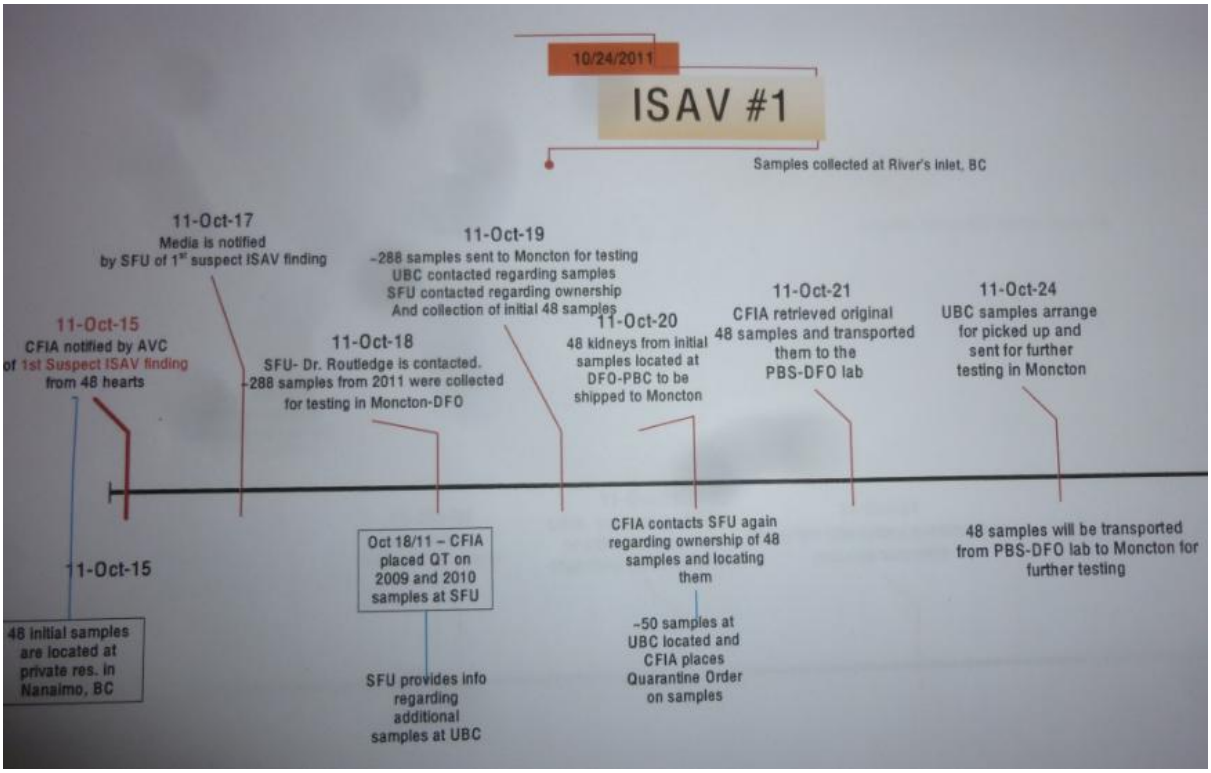
The laboratory results detailed the two positive samples (out of 48) in sockeye salmon caught in Rivers Inlet in June 2011:

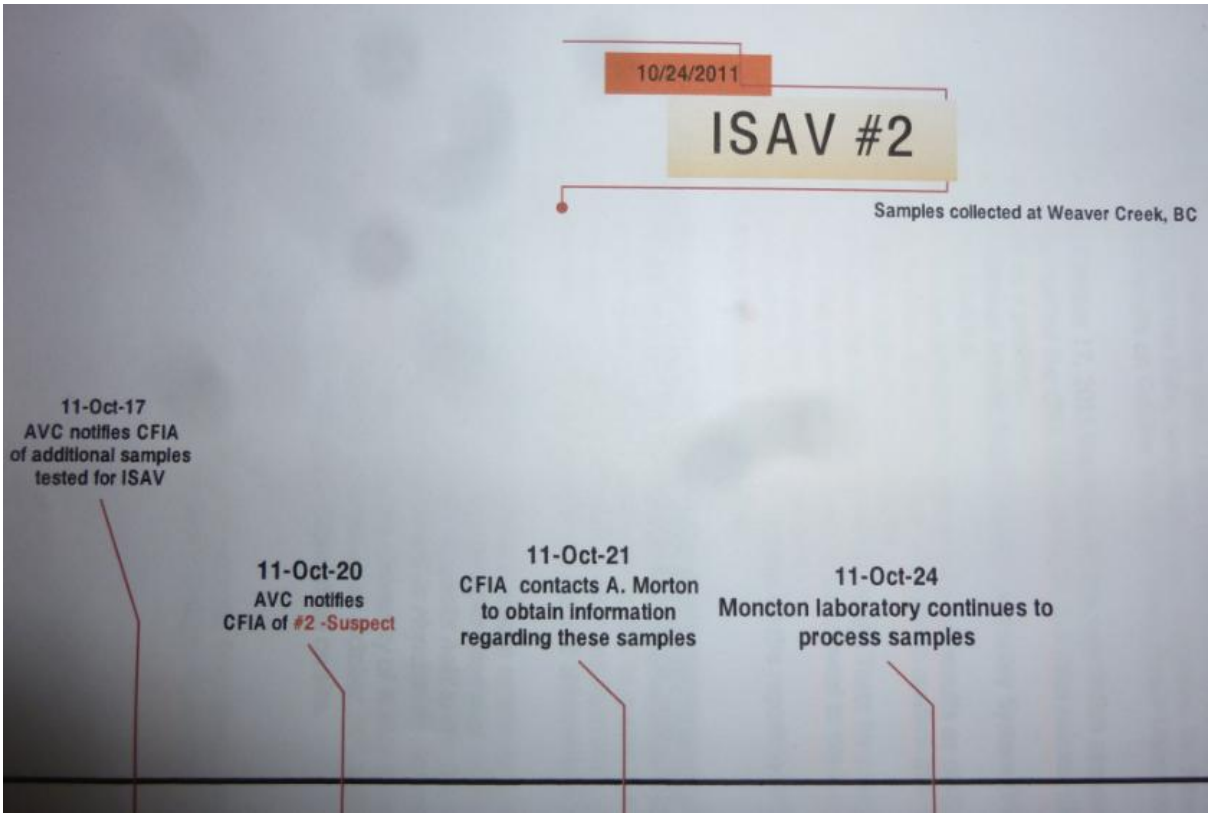
Lab #	Sample ID	ISAV seg 8 Probe, Cts Detects all ISAV	ISAV Seg 6 Probe 52 Cts Detects European genotype	ISAV Seg 6 Probe 82 Cts Detects North American genotype
VT 10042011-1	Sokeye heart_1	0	not done	not done
VT 10042011-2	Sokeye heart_2	0	not done	not done
VT 10042011-3	Sokeye heart_3	0	not done	not done
VT 10042011-4	Sokeye heart_4	0	not done	not done
VT 10042011-5	Sokeye heart_5	0	not done	not done
VT 10042011-6	Sokeye heart_6	0	not done	not done
VT 10042011-7	Sokeye heart_7	0	not done	not done
VT 10042011-8	Sokeye heart_8	0	not done	not done
VT 10042011-9	Sokeye heart_9	0	not done	not done
VT 10042011-10	Sokeye heart_10	0	not done	not done
VT 10042011-11	Sokeye heart_11	0	not done	not done
VT 10042011-12	Sokeye heart_12	0	not done	not done
VT 10042011-13	Sokeye heart_13	0	not done	not done
VT 10042011-14	Sokeye heart_14	0	not done	not done
VT 10042011-15	Sokeye heart_15	0	not done	not done
VT 10042011-16	Sokeye heart_16	0	not done	not done
VT 10042011-17	Sokeye heart_17	0	not done	not done
VT 10042011-18	Sokeye heart_18	0	not done	not done
VT 10042011-19	Sokeye heart_19	0	not done	not done
VT 10042011-20	Sokeye heart_20	0	not done	not done
VT 10042011-21	Sokeye heart_21	0	not done	not done
VT 10042011-22	Sokeye heart_22	0	not done	not done
VT 10042011-23	Sokeye heart_23	0	not done	not done
VT 10042011-24	Sokeye heart_24	0	not done	not done
VT 10042011-25	Sokeye heart_25	0	not done	not done
VT 10042011-26	Sokeye heart_26	29.82	32.7	0
VT 10042011-27	Sokeye heart_27	0	not done	not done
VT 10042011-28	Sokeye heart_28	0	not done	not done
VT 10042011-29	Sokeye heart_29	0	not done	not done
VT 10042011-30	Sokeye heart_30	0	not done	not done
VT 10042011-31	Sokeye heart_31	0	not done	not done
VT 10042011-32	Sokeye heart_32	0	not done	not done
VT 10042011-33	Sokeye heart_33	0	not done	not done
VT 10042011-34	Sokeye heart_34	0	not done	not done
VT 10042011-35	Sokeye heart_35	0	not done	not done
VT 10042011-36	Sokeye heart_36	30.86	33.21	0
VT 10042011-37	Sokeye heart_37	0	not done	not done
VT 10042011-38	Sokeye heart_38	0	not done	not done
VT 10042011-39	Sokeye heart_39	0	not done	not done
VT 10042011-40	Sokeye heart_40	0	not done	not done
VT 10042011-41	Sokeye heart_41	0	not done	not done
VT 10042011-42	Sokeye heart_42	0	not done	not done
VT 10042011-43	Sokeye heart_43	0	not done	not done
VT 10042011-44	Sokeye heart_44	0	not done	not done
VT 10042011-45	Sokeye heart_45	0	not done	not done
VT 10042011-46	Sokeye heart_46	0	not done	not done
VT 10042011-47	Sokeye heart_47	0	not done	not done
VT 10042011-48	Sokeye heart_48	0	not done	not done
ADL-ISAV (European genotype)		17.24	18.5	0
NBISAV01 (North American genotype)		17.17	0	15.1
NTC (water)		0	0	0

Download the report in full online here

2011 – October: The Canadian Food Inspection Agency reported to the Cohen Commission a second case (ISAV #2) of ISA in coho salmon from Weaver Creek in the Fraser River system – in addition to the first case (ISAV #1) of ISA in sockeye salmon in Rivers Inlet.

CFIA documents made available to the Cohen Commission included two ‘Time-Line Charts’:





And various 'Situation Reports' (Internal) including:

SITUATION REPORT (INTERNAL)
Update # 2

Date / Time: October 19, 2011	**# of PREOC's Activated:** 0	**Event:** ISAV
Operational Period #: October 19, 2011	**PEP Task #:** N/A	**Name:**
Operational Time: 8:00 – 16:00		**Function:** Planning (Situation Reporting Unit)

EVENT OVERVIEW:

-CFIA received two notifications of infectious salmon anaemia virus (ISAV) in wild sockeye salmon in British Columbia (B.C.)

-Two of 48 wild sockeye salmon, submitted by Simon Fraser University to the Atlantic Veterinary College, which is an OIE reference laboratory for the ISAV, were interpreted as positive. Dr. Kibenge from the Atlantic Veterinary College notified the CFIA of his test results on October 15, 2011. Simon Fraser University released the test results to the media on October 17, 2011.

-This laboratory is not part of the National Aquatic Animal Health Laboratory System (NAAHLS). Fisheries and Oceans Canada (DFO) is responsible for the NAAHLS.

-The detection does not meet CFIA's case definition for interpreting test results as confirmed positive for infection with ISAV. The finding remains suspect by CFIA. Even if the NAAHLS is able to confirm this suspect finding as positive, this case will likely remain suspect to CFIA given chain of custody issues.

-Dr. Kibenge notified the CFIA on October 17, 2011 that he is testing new finfish samples from B.C. for ISAV.

-CFIA is gathering more information before making a final decision on the reporting of this finding currently considered as suspect to the World Organization for Animal Health (OIE).

CURRENT STATUS:

On October 18, 2011, CFIA Operations staff visited Dr. Routledge at Simon Fraser University (SFU), to quarantine and collect samples for further testing. Approximately 336 smolts were collected by SFU staff in May and June 2011; approximately 288 of these samples were provided to CFIA on October 18th. These 288 samples will be divided into 2 shipments and sent to the Gulf Fisheries Centre – DFO, Moncton, today. The additional 48 smolts are located at a private residence in Nanaimo, BC, and also require further testing. Operations staff are in process of contacting SFU to locate and collect these samples.

Samples collected by SFU from 2009 and 2010 have been quarantined on site.

ACTIONS PLANNED FOR NEXT OPERATIONAL PERIOD:

1) Operations staff are in process of locating and collecting the 48 smolts, from which the original samples were taken, held at the private residence in Nanaimo, BC, and will send samples for testing.

2) A small team, which includes staff from the Aquatic Animal Health Division (AAHD), CFIA's Science Branch and DFO, is considering the assessment of the laboratory at the Atlantic Veterinary College.

3)

4)

5)

RESOURCE COMMITMENTS:

-NAAHP staff will be required to continue communicating with SFU to collect remaining samples.

INTERGOVERNMENTAL / STAKEHOLDERS / REGULATED PARTIES:

-Samples were also sent to A. Nylund at the University of Bergen in Norway. AAHD is drafting a letter to be sent to A. Nylund to find out the circumstances under which these samples were sent (e.g. who sent these samples, when, how and

ADDITIONAL INFORMATION:

Communications

-At AAHD, Dr. Cornelius Kiley is the main spokesperson for the CFIA on this topic. Dr. Nathalie Bruneau is the main contact person for communication issues and questions related to the NAAHP.
-AAHD is reviewing questions and answers drafted by Public Affairs.
-Public Affairs (Bryan Blom and Tammy Jarbeau) are drafting communication products, including a notice to be published on CFIA's external website that will be sent to AAHD on October 19 for review. Dr. Nathalie Bruneau is the technical advisor for these products.

ATTACHMENTS

PREPARED BY: Jody Grainger, A/Regional Operations Coordinator

REVIEWED BY: Dr. Joe Beres, A/Regional Director, BC Mainland & Interior Region

APPROVED BY:

Dr. Cornelius Kiley
A/Director, Aquatic Animal Health Division

Situation Report Sent:
Date: October 19, 2011 Time:

RDMIS # 3043933

SITUATION REPORT (INTERNAL)
Update # 3

Date / Time: October 20, 2011	**# of PREOC's Activated:** 0	**Event:** ISAV
Operational Period #: October 20, 2011	**PEP Task #:** N/A	**Name:**
Operational Time: 8:00 – 16:00	*New information in italics*	**Function:** Planning (Situation Reporting Unit)

-CFIA received two notifications of infectious salmon anaemia virus (ISAV) in wild sockeye salmon in British Columbia (B.C.)

-Two of 48 wild sockeye salmon, submitted by Simon Fraser University to the Atlantic Veterinary College, which is an OIE reference laboratory for the ISAV, were interpreted as positive. Dr. Kibenge from the Atlantic Veterinary College notified the CFIA of his test results on October 15, 2011. Simon Fraser University released the test results to the media on October 17, 2011.

-Dr. Kibenge notified the CFIA on October 17, 2011 that he is testing new finfish samples from B.C. for ISAV.

-On October 20, 2011, Dr. Kibenge notified the CFIA that tissues from a coho salmon that was part of another set of samples from B.C were interpreted as a positive.

-This laboratory is not part of the National Aquatic Animal Health Laboratory System (NAAHLS). Fisheries and Oceans Canada (DFO) is responsible for the NAAHLS.

-The detection does not meet CFIA's case definition for interpreting test results as confirmed positive for infection with ISAV. The finding remains suspect by CFIA. Even if the NAAHLS is able to confirm this suspect finding as positive, this case will likely remain suspect to CFIA given chain of custody issues.

-It seems that Dr. Kibenge did not follow the OIE's Manual of Diagnostic Tests for Aquatic Animals 2011, which defines a positive PCR as presumptive and lists the processes that need to be followed to confirm ISA.

-DFO has also issues with the controls associated to the samples.

-CFIA is gathering more information before making a final decision on the reporting of this finding currently considered as suspect to the World Organization for Animal Health (OIE).

On October 18, 2011, CFIA Operations staff visited Dr. Routledge at Simon Fraser University (SFU), to quarantine and collect samples for further testing. Approximately 336 smolts were collected by SFU staff in May and June 2011; approximately 288 of these samples were provided to CFIA on October 18th. These 288 samples arrived in 2 shipments at the Gulf Fisheries Centre – DFO, Moncton, this morning. The additional 48 smolts are located at a private residence in Nanaimo, BC, and also require further testing. Operations staff is in process of contacting SFU to confirm the owner, locate and collect these samples. *CFIA has also been made aware that the kidneys from the 48 smolts held at the private residence in Nanaimo were removed. It is believed that these kidneys were sent to the DFO Pacific Biological Centre in Nanaimo. Operations staff is in process of confirming the owner and source of the kidneys to send for further testing.*

CFIA has also been made aware that approximately 50 smolts, collected by the University of British Columbia (UBC) in May and June 2011 may be held at UBC. Operations staff is in process of confirming the presence and ownership of these samples and will quarantine as necessary. The NAAHLS Moncton laboratory received some of the samples on October 20, 2011.

Samples collected by SFU from 2009 and 2010 have been quarantined on site.

2) A small team, which includes staff from the Aquatic Animal Health Division (AAHD), CFIA's Science Branch and DFO, is considering the assessment of the laboratory at the Atlantic Veterinary College.

3) Operations staff is in process of locating and collecting the kidneys from 48 smolts, from which the original samples were taken, held at the Pacific Biological Centre, and are sending samples for testing at the Moncton laboratory.

4) Operations staff is in process of locating approximately 50 smolts, also from which the original samples were taken, that may be held at UBC, and will quarantine as necessary.

5) Samples will also need to be collected at Dr. Kibenge's laboratory at the Atlantic Veterinary College on October 20-21 by the CFIA. A discussion with the NAAHLS laboratory at Moncton may be necessary, depending on the type of samples that will be collected.

[redacted]

-NAAHP staff in BC will be required to continue communicating with SFU and UBC to collect remaining samples.

[redacted]

International

-Samples were also sent to A. Nylund at the University of Bergen in Norway. AAHD is drafting a letter to be sent to A. Nylund to find out the circumstances under which these samples were sent (e.g. who sent these samples, when, how and why).

-Dr. Kibenge confirmed on October 20 that he did not send the samples to Norway. CFIA and DFO continue to investigate.

[redacted]

Communications

-At AAHD, Dr. Cornelius Kiley is the main spokesperson for the CFIA on this topic. Dr. Nathalie Bruneau is the main contact person for communication issues and questions related to the NAAHP.

-AAHD is reviewing questions and answers drafted by Public Affairs.

-Public Affairs (Bryan Blom and Tammy Jarbeau) are drafting communication products, including a notice to be published on CFIA's external website. Dr. Nathalie Bruneau is the technical advisor for these products.

-Public Affairs is finalizing the information bulletin, which should be approved on October 20 or October 21.

-There was no media interview on October 19-20.

[redacted]

INPUT PROVIDED BY: Jody Grainger, A/Regional Operations Coordinator

REVIEWED BY: Dr. Joe Beres, A/Regional Director, BC Mainland & Interior Region

APPROVED BY:

Dr. Cornelius Kiley
A/Director, Aquatic Animal Health Division

Situation Report Sent:
Date: October 20, 2011 Time:

RDMIS # *3045775*

SITUATION REPORT (INTERNAL)
Update # 4

Date / Time: October 21, 2011	**# of PREOC's Activated:** 0	**Event:** ISAV
Operational Period #: October 21, 2011	**PEP Task #:** N/A	**Name:**
Operational Time: 8:00 – 16:00	*New information in italics*	**Function:** Planning (Situation Reporting Unit)

EVENT OVERVIEW:

-CFIA received two notifications of infectious salmon anaemia virus (ISAV) in wild sockeye salmon in British Columbia (B.C.)

-Two of 48 wild sockeye salmon, submitted by Simon Fraser University (SFU) to the Atlantic Veterinary College (AVC), which is an OIE reference laboratory for the ISAV, were interpreted as positive. Dr. Kibenge from the Atlantic Veterinary College notified the CFIA of his test results on October 15, 2011. Simon Fraser University released the test results to the media on October 17, 2011.

-Dr. Kibenge notified the CFIA on October 17, 2011 that he is testing new finfish samples from B.C. for ISAV.

-On October 20, 2011, Dr. Kibenge notified the CFIA that tissues from a coho salmon that was part of another set of samples from B.C were interpreted as a positive.

-This laboratory is not part of the National Aquatic Animal Health Laboratory System (NAAHLS). Fisheries and Oceans Canada (DFO) is responsible for the NAAHLS.

-The detection does not meet CFIA's case definition for interpreting test results as confirmed positive for infection with ISAV. The finding remains suspect by CFIA. Even if the NAAHLS is able to confirm this suspect finding as positive, this case will likely remain suspect to CFIA given chain of custody issues.

-It seems that Dr. Kibenge did not follow the OIE's Manual of Diagnostic Tests for Aquatic Animals 2011, which defines a positive PCR as presumptive and lists the processes that need to be followed to confirm ISA.

-DFO has also issues with the controls associated to the samples.

-CFIA is gathering more information before making a final decision on the reporting of this finding currently considered as suspect to the World Organization for Animal Health (OIE).

CURRENT STATUS:

On October 18, 2011, CFIA Operations staff visited Dr. Routledge at SFU to quarantine and collect samples for further testing. Approximately 336 smolts were collected by SFU staff in May and June 2011; approximately 288 of these samples were provided to CFIA on October 18th. These 288 samples arrived in 2 shipments at the Gulf Fisheries Centre (GFC) – DFO, Moncton, on October 20th. The additional 48 smolts are located at a private residence in Nanaimo, BC, and also require further testing. Operations staff *has made contact with the owner of the samples and will pick up and deliver the samples to the DFO Pacific Biological Centre (PBC) in Nanaimo, today. CFIA has confirmed that the kidneys from these 48 smolts held at the private residence in Nanaimo were removed, and were located at the PBC. The kidneys have been sent to the GFC in Moncton.*

CFIA has confirmed that approximately 50 smolts, collected by the University of British Columbia (UBC) in May and June 2011 are held at UBC. Operations staff plans to pick these samples up on October 24th, and will ship them to GFC in Moncton. CFIA has also been made aware that an unknown number of samples, from which a second positive notification was made, were sent to and are currently located at the Atlantic Veterinary College. Operations staff is in process of confirming the sample date, location, and species of these samples.

Samples collected by SFU from 2009 and 2010 have been quarantined on site.

ACTIONS PLANNED FOR NEXT OPERATIONAL PERIOD:

1) A small team, which includes staff from the Aquatic Animal Health Division (AAHD), CFIA's Science Branch and DFO, is considering the assessment of the laboratory at the Atlantic Veterinary College.

2) Samples will also need to be collected at Dr. Kibenge's laboratory at the Atlantic Veterinary College on October 20-21 by the CFIA. A discussion with the NAAHLS laboratory at Moncton may be necessary, depending on the type of samples that will be collected.

3) Operations staff plans to collect samples currently held at UBC on October 24, 2011, for shipment to the GFC.
4) Operations staff to obtain further information on unknown number of samples sent to the Atlantic Veterinary College.
5) Operations staff to pick up 48 smolts currently held at a private residence in Nanaimo, and deliver to the PBC today.
6) One of the students who collected some of the samples in BC will send GPS coordinates of all collection locations to CFIA.
7) For the second notification, CFIA will proceed with the usual investigation processes. CFIA will contact the individual who collected the samples on October 21-24 to get the following information: collection dates and sites and collected species.
8) CFIA received on October 20-21 multiple requests for additional samples of fish that the Agency collected from various researchers. CFIA is preparing to respond to these requests.
9) It was decided that the samples collected by the Crown (DFO and CFIA) will remain under quarantine until a decision about their disposal is made.

RESOURCE COMMITMENTS:

-NAAHP staff in BC Operations will be required to continue communicating with SFU and UBC to collect remaining samples.

INTERGOVERNMENTAL / STAKEHOLDERS / REGULATED

International

-Samples were also sent to A. Nylund at the University of Bergen in Norway. AAHD is drafting a letter to be sent to A. Nylund to find out the circumstances under which these samples were sent (e.g. who sent these samples, when, how and why).
-Dr. Kibenge confirmed on October 20 that he did not send the samples to Norway. CFIA and DFO continue to investigate.

Trade Partners

-To ensure our trade partners are aware, CFIA Policy and Programs Branch (PPB) is pro-actively providing information to Posts and CFIA veterinarians in the key countries (China, Japan). CFIA is requesting they ensure trade partners are aware of the situation and can respond to questions if they arise.
-PPB has scheduled a meeting with our veterinary liaison in Brussels and aquatic animal health contacts at DG SANCO in the EU for Monday morning. The information bulletin has been provided to them in advance.
-PPB briefed the US contacts (the Animal and Plant Health Inspection Service (APHIS), US Fish and Wildlife Service and National Oceanographic and Atmospheric (NOAA)) on October 20 and 21. Media lines and links to the information bulletin have been forwarded to these organizations.
-PPB was contacted directly by Officials for Chile (Sernepesca) and provided them a copy of the information bulletin.

ADDITIONAL INFORMATION:

Communications

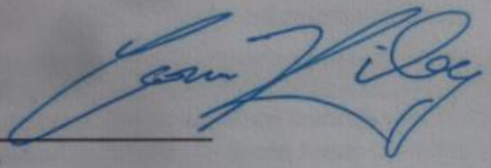
-At AAHD, Dr. Cornelius Kiley is the main spokesperson for the CFIA on this topic. Dr. Nathalie Bruneau is the main contact person for communication issues and questions related to the NAAHP.
-AAHD is reviewing questions and answers drafted by Public Affairs.
-Public Affairs (Bryan Blom and Tammy Jarbeau) are drafting communication products. Dr. Nathalie Bruneau is the technical advisor for these products.
-CFIA briefed the President on the situation on October 20.
-The information bulletin was approved and posted on CFIA's website on October 21.
-CFIA Public Affairs briefed Atlantic Veterinary College Public Affairs on October 21.
-CFIA Public Affairs will send the information bulletin to the ListServ.
-DFO will post a link to the CFIA's information bulletin on their website.
-CFIA Public Affairs is finalizing the fact sheet on ISA and it will be posted on CFIA's website on October 21-24.

ATTACHMENTS

PREPARED BY: Jody Grainger, A/Regional Operations Coordinator and
Emilie D'Amours, Policy Analyst

REVIEWED BY: Dr. Joe Beres, A/Regional Director, BC Mainland & Interior Region

APPROVED BY:



Dr. Cornelius Kiley
A/Director, Aquatic Animal Health Division

Situation Report Sent:
Date: October 21, 2011 Time:

RDMIS # 3047446

SITUATION REPORT (INTERNAL)
Update # 5

Date / Time: October 24, 2011	**# of PREOC's Activated:** 0	**Event:** ISAV
Operational Period #: October 24, 2011	**PEP Task #:** N/A	**Name:**
Operational Time: 8:00 – 16:00	*New information in italics*	**Function:** Planning (Situation Reporting Unit)

EVENT OVERVIEW:

-CFIA received two notifications of infectious salmon anaemia virus (ISAV) in wild sockeye salmon in British Columbia (B.C.)
-Two of 48 wild sockeye salmon, submitted by Simon Fraser University (SFU) to the Atlantic Veterinary College (AVC), which is an OIE reference laboratory for the ISAV, were interpreted as positive. Dr. Kibenge from the Atlantic Veterinary College notified the CFIA of his test results on October 15, 2011. Simon Fraser University released the test results to the media on October 17, 2011.
-Dr. Kibenge notified the CFIA on October 17, 2011 that he is testing new finfish samples from B.C. for ISAV.
-On October 20, 2011, Dr. Kibenge notified the CFIA that tissues from a coho salmon that was part of another set of samples from B.C were interpreted as a positive.
-This laboratory is not part of the National Aquatic Animal Health Laboratory System (NAAHLS). Fisheries and Oceans Canada (DFO) is responsible for the NAAHLS.
-The detection does not meet CFIA's case definition for interpreting test results as confirmed positive for infection with ISAV. The finding remains suspect by CFIA. Even if the NAAHLS is able to confirm this suspect finding as positive, this case will likely remain suspect to CFIA given chain of custody issues.
-It seems that Dr. Kibenge did not follow the OIE's Manual of Diagnostic Tests for Aquatic Animals 2011, which defines a positive PCR as presumptive and lists the processes that need to be followed to confirm ISA.
-DFO has also issues with the controls associated to the samples.
-CFIA is gathering more information before making a final decision on the reporting of this finding currently considered as suspect to the World Organization for Animal Health (OIE).

CURRENT STATUS:

On October 18, 2011, CFIA Operations staff visited Dr. Routledge at SFU to quarantine and collect samples for further testing. Approximately 336 smolts were collected by SFU staff in May and June 2011; approximately 288 of these samples were provided to CFIA on October 18th. These 288 samples arrived in 2 shipments at the Gulf Fisheries Centre (GFC) – DFO, Moncton, on October 20th.

Operations staff has collected the 48 samples that were held at a private residence and has delivered the samples to the DFO Pacific Biological Station (PBS) in Nanaimo. These samples have been sent to the GFC in Moncton for further testing. CFIA is waiting for confirmation that the kidneys from these 48 smolts held at the private residence in Nanaimo belong to the original 48 samples. The kidneys have been sent to the GFC in Moncton for further testing.

CFIA has confirmed *approximately 61 smolts,* collected by the University of British Columbia (UBC) in May and June 2011 are held at UBC. Operations staff plans to pick these samples up on October 24th, and will ship them to GFC in Moncton.

Samples collected by SFU from 2009 and 2010 have been quarantined on site.

Second Notification:

CFIA has also been made aware that an unknown number of samples, from which a second positive notification was made, were sent to and are currently located at the Atlantic Veterinary College. Operations staff is in process of confirming the sample date, location, and species of these samples.

ACTIONS PLANNED FOR NEXT OPERATIONAL PERIOD:

1) A small team, which includes staff from the Aquatic Animal Health Division (AAHD), CFIA's Science Branch and DFO, is considering the assessment of the laboratory at the Atlantic Veterinary College.

2) Samples will also need to be collected at Dr. Kibenge's laboratory at the Atlantic Veterinary College by the CFIA. A discussion with the NAAHLS laboratory at Moncton may be necessary, depending on the type of samples to be collected. Sample collection by CFIA is ongoing.

3) Operations staff plans to collect samples currently held at UBC on October 24, 2011, for shipment to the GFC.

4) Operations staff has delivered 48 smolts that were held at a private residence in Nanaimo, to the PBS.

5) One of the students who collected some of the samples in BC will send GPS coordinates of all collection locations to CFIA.

6) CFIA received on October 20-21 multiple requests for additional samples of fish that the Agency collected from various researchers. CFIA is preparing to respond to these requests.

7) It was decided that the samples collected by the Crown (DFO and CFIA) will remain under quarantine until a decision about their disposal is made.

8) The NAAHLS Moncton lab is conducting tests on the sample of 288 fish. So far, the results for ISAV are negative but all the tests have not been completed yet. It was agreed that CFIA will report externally only when all the test results will be available.

9) CFIA and DFO agreed to have a technical discussion about which samples and tests should be prioritized n the next few days.

Second Notification:

10) Operations staff to obtain further information on unknown number of samples *from the second notification* sent to the Atlantic Veterinary College.

11) CFIA contacted the individual who collected the samples on October 24 to get the following information: collection dates and sites and collected species. The Agency is collecting the required information.

RESOURCE COMMITMENTS:

-NAAHP staff in BC Operations will be required to continue working with SFU, UBC and other parties to collect remaining samples.

INTERGOVERNMENTAL / STAKEHOLDERS / REGULATED

International

AAHD is drafting a letter to be sent to A

-Samples were also sent to A. Nylund at the University of Bergen in Norway. AAHD is drafting a letter to be sent to A. Nylund to find out the circumstances under which these samples were sent (e.g. who sent these samples, when, how and why).

-It was confirmed on October 21 that Alexandra Morton sent materials from the 48 samples to Norway (A. Nyland at the U. of Bergen).

Trade Partners

-CFIA has contacted international trade partners and provided information on the situation with respect to the reported finding. Feedback from trade partners indicated for now the concern is minimal; however, they greatly appreciated the information from CFIA. The EU requested and received confirmation from CFIA that the animals and genetic material being exported from Canada still meets the assurances of the EU certification requirements. Further updates will be planned as additional information comes available.

-CFIA briefed the US contacts (the Animal and Plant Health Inspection Service (APHIS), US Fish and Wildlife Service and National Oceanographic and Atmospheric (NOAA)) on October 20 and 21. Media lines and links to the information bulletin have been forwarded to these organizations.

ADDITIONAL INFORMATION:

Communications

-At AAHD, Dr. Cornelius Kiley is the main spokesperson for the CFIA on this topic. *No media inquiry.* Dr. Nathalie Bruneau is the main contact person for communication issues and questions related to the NAAHP.

-AAHD is reviewing questions and answers drafted by Public Affairs.

-Public Affairs (Bryan Blom and Tammy Jarbeau) are drafting communication products. Dr. Nathalie Bruneau is the technical advisor for these products.

-The information bulletin was approved and posted on CFIA's website on October 21.

-The information bulletin will be posted on DFO's website on October 24-25.

-CFIA received a request to distribute the information bulletin from the American Veterinary Medical Association. The Agency agreed to that request.

-The fact sheet on ISA will be posted on CFIA's website on October 24-25.

-CFIA sent an email to inform Chief Veterinary Officers (CVOs) and the Canadian Council of Fisheries and Aquaculture Ministers (CCFAM) on the second notification of ISAV on October 21.

-Minister's offices from CFIA and DFO wrote a joint statement on the situation on October 24.

-DFO distributed the joint statement to a number of publications.

-DFO posted the joint statement on its website on October 24. The CFIA's website will link to this joint statement very soon.

-The Chief Veterinary Officer of BC also issued an information bulletin to comment on the situation on October 21.

Briefings

-CFIA briefed the President on the situation on October 20.

-CFIA Public Affairs briefed Atlantic Veterinary College Public Affairs on October 21.

-CFIA briefed the BC Chief Veterinary Officer on October 21.

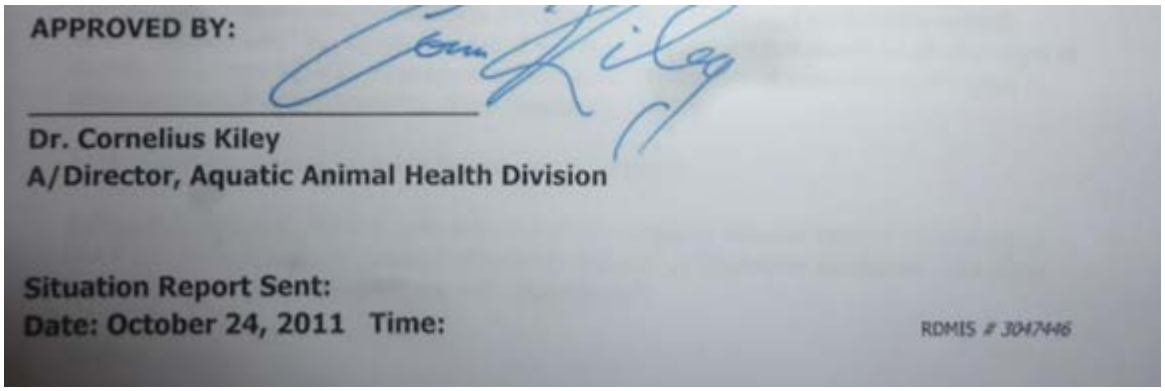
ATTACHMENTS

-Timelines chart for ISA Notification #1 and #2 attached.

PREPARED BY: Kate Schoen, A/Regional Operations Coordinator and Emilie D'Amours, Policy Analyst

REVIEWED BY: Dr. Joe Beres, A/Regional Director, BC Mainland & Interior Region

APPROVED BY:



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Note: This report is available to download online via: http://www.wildsalmonfirst.org/fish-farmageddon-infectious-salmon-aquacalypse

Part 1 - download here

Part 2 - download here

The report - "Fish Farmageddon: The Infectious Salmon Aquacalypse" – is also available. Download a copy in full online here