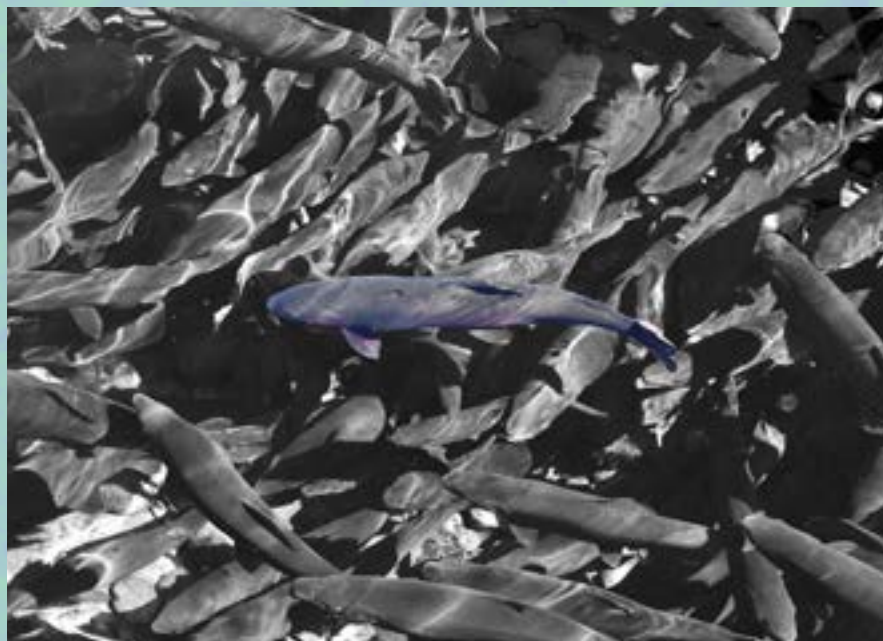


## The surveillance programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2015



# Surveillance programmes for terrestrial and aquatic animals in Norway

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# The surveillance programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2015

Anne-Gerd Gjevre, Ingebjørg Modahl, Trude M Lyngstad

***This surveillance programme has a risk-based approach. The core surveillance activity was the routine clinical inspections on farmed salmonid sites and analyses of samples collected from diseased fish. Viral haemorrhagic septicaemia virus and infectious haematopoietic necrosis virus was not detected at any of the sites tested in the 2015 surveillance.***

## Introduction

Viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) are two important diseases in salmonid fish caused by rhabdovirus infections (1).

VHS has most frequently been recorded in farmed rainbow trout, but may also cause losses in other wild and farmed fish species, both marine and freshwater (2, 3). Norway obtained disease free status for VHS and IHN in 1994 (4). VHS was diagnosed in farmed rainbow trout in Norway in 2007 and disease free status was temporarily suspended (5, 6). Measures to eliminate the disease and prevent its spread were immediately taken by the Norwegian Food Safety Authority (NFSA). In 2011 Norway regained its VHS free status.

Outbreaks of IHN have resulted in significant economic losses in farmed rainbow trout and salmon in North America and Europe, and the disease has also had an impact on wild populations of Pacific salmon. IHN has never been diagnosed in Norway.

The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and publishes the overall results in monthly and annual reports available on the NVI website ([www.vetinst.no](http://www.vetinst.no)). In 2015 all fish samples were analysed at the NVI.

## Aim

The aim of the programme is to document the absence of VHS virus (VHSV) and IHN virus (IHNV) in fish farms in order to maintain Norway's VHS and IHN free status.

## Materials and methods

The surveillance programme has a risk-based approach (7), where the core surveillance activity was the routine clinical inspections on farmed salmonid sites carried out by the fish health services (FHS) and laboratory investigation of suspicious samples. Sites with farmed salmonids are inspected by FHS at least six times a year in a normal situation. Additional inspections may be required at the time of sea transfer of smolt and in cases of increased mortality or suspicion of disease. The routine inspections should be spread approximately equally throughout the year (8).

In 2015, the surveillance programme for VHS included laboratory investigation of relevant samples from active sites with both rainbow trout and salmon, while the programme for IHN were focused on samples from sites with salmon. The samples were submitted by the FHS in connection with disease investigation or the NFSA in connection with inspections on sites with rainbow trout targeting moribund or newly dead fish. An active site was defined as having stocked fish for at least three months of the year. In 2015, 64 marine sites with rainbow trout and 685 marine sites with Atlantic salmon were registered as active. These numbers are based on monthly reports on production statistics to the Norwegian Authorities, biomass data obtained as described in Kristoffersen et al 2009 (9). Active freshwater sites are not included in these numbers (data not available).

Samples on RNAlater™ submitted to the NVI were processed and analysed for VHSV and IHNV by real-time RT-PCR with VHSV primers and probe from Jonstrup et al. 2013 and IHNV primers and probe modified from Liu *et al.* 2008 (10, 11).

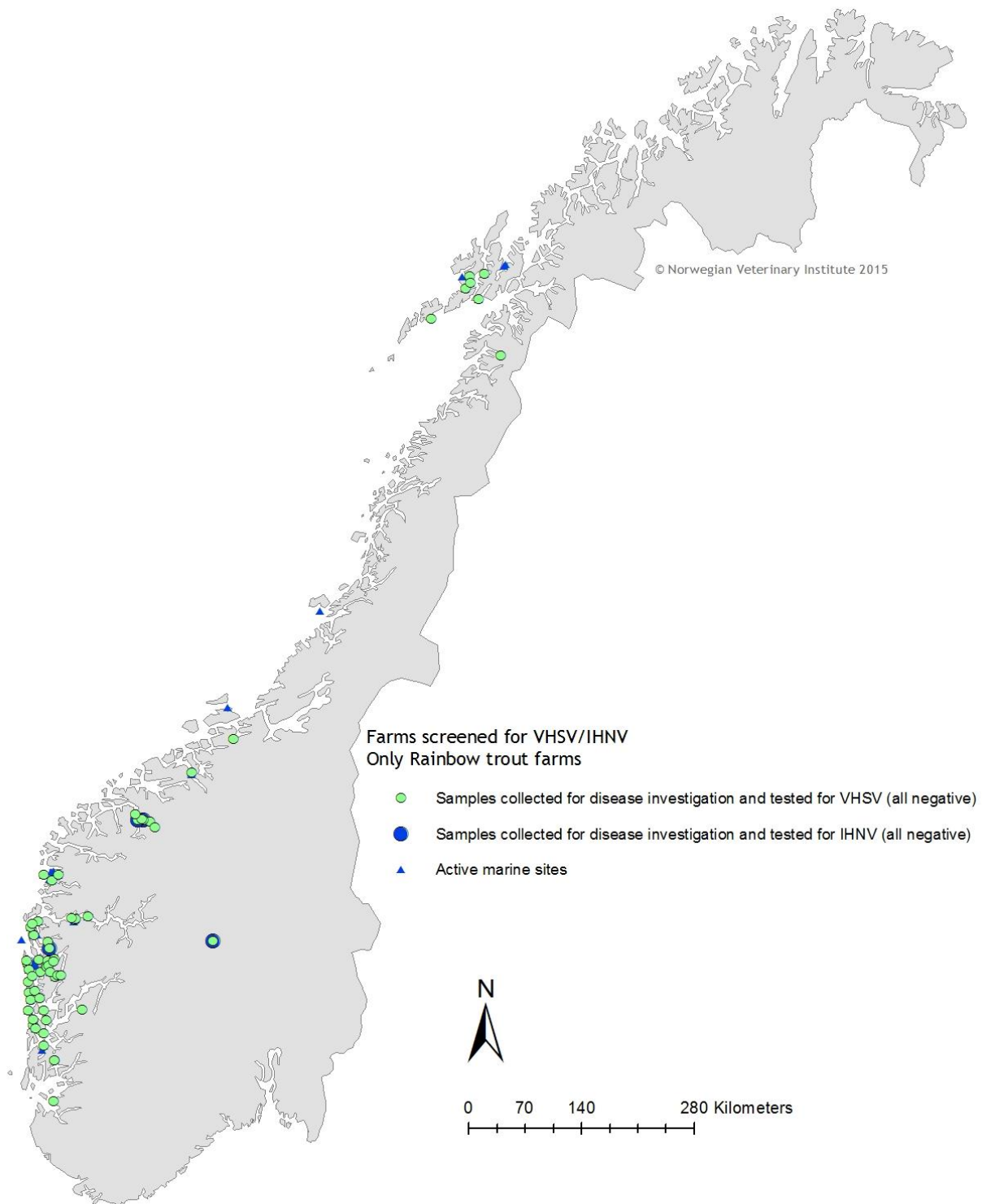
## Results

In total, 1112 fish samples from 59 of the sites with rainbow trout and 141 of the sites with Atlantic salmon were tested for VHSV in 2015. All samples were negative (Figure 1, 2).

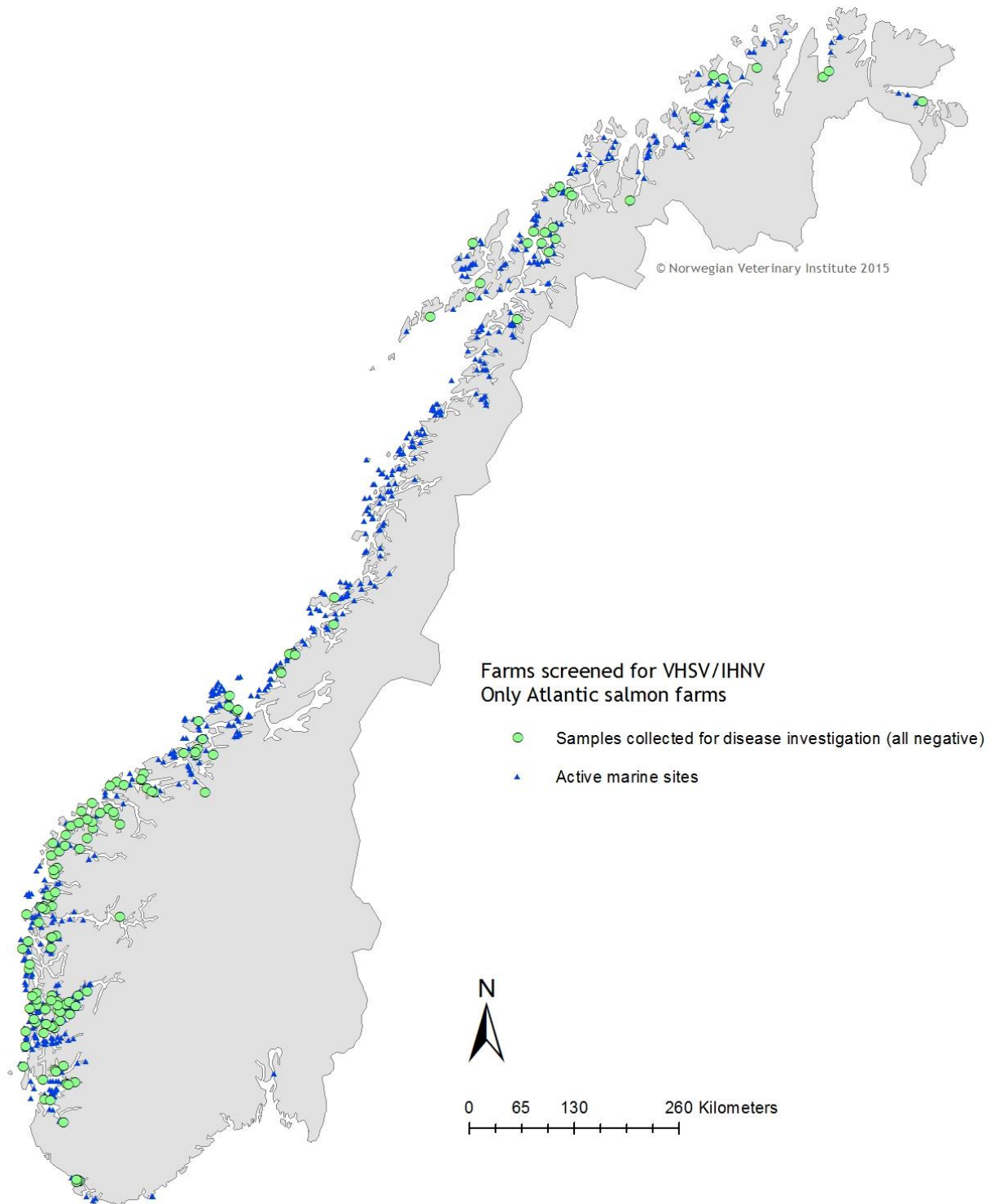
Of the fish samples included in the VHSV surveillance programme, 516 were from the rainbow trout and 596 were from the Atlantic salmon. The mean number of samples per site was 8 and 4 for rainbow trout and Atlantic salmon sites, respectively.

In total, 609 fish samples from four sites with rainbow trout and 141 sites with Atlantic salmon were tested for IHNV in 2015. All samples were negative (Figure 1, 2).

Of the fish samples included in the IHNV surveillance programme, 13 were obtained from the rainbow trout sites and 596 were from the Atlantic salmon sites. The mean number of samples per site was 3 and 4 for rainbow trout and Atlantic salmon sites, respectively.



**Figure 1.** Map of active marine sites with rainbow trout in 2015. Active freshwater sites are not shown (data not available). Green and blue circle symbols indicate sites included in the 2015 surveillance programme.



**Figure 2.** Map of active marine sites with Atlantic salmon in 2015. Active freshwater sites are not shown (data not available). Green symbols indicate sites included in the 2015 surveillance programme for VHS and IHN.

## Discussion and conclusion

Neither VHSV- nor IHNV-positive salmonids were detected during the risk based surveillance programme in 2015.

The performance of the routine clinical inspections in surveillance for freedom from VHS was evaluated using a stochastic simulation model (12). The system has been running in Norway for many years and provides a high probability of freedom from VHS (Probability of freedom > 95 %).

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The Norwegian Veterinary Institute (NVI) is a nationwide biomedical research institute and Norway's leading centre of expertise regarding biosafety in aquatic and terrestrial animals. The aim of the Institute is to become Norway's contingency centre of preparedness for One Health.

The primary mission of the NVI is to give research-based independent advisory support to ministries and governing authorities. Preparedness, diagnostics, surveillance, reference functions, risk assessments, and advisory and educational functions are the most important areas of operation. The Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad and Tromsø, with about 330 employees in total.

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The Norwegian Food Safety Authority (NFSA) is a governmental body whose aim is to ensure through regulations and controls that food and drinking water are as safe and healthy as possible for consumers and to promote plant, fish and animal health and ethical farming of fish and animals.

We encourage environmentally friendly production and we also regulate and control cosmetics, veterinary medicines and animal health personnel. The NFSA drafts and provides information on legislation, performs risk-based inspections, monitors food safety, plant, fish and animal health, draws up contingency plans and provides updates on developments in our field of competence. The NFSA comprises two administrative levels, five regions in addition to the head office, and has some 1250 employees. The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Trade, Industry and Fisheries and the Ministry of Health and Care Services.

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