



The surveillance programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2025

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The surveillance programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2025

Authors

Torfinn Moldal, Dalina Sol Fernandez, and Hege Løkslett

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Sammendrag

Overvåkingsprogrammet har en risikobasert tilnærming. Kjerneaktiviteten er rutinemessige kliniske inspeksjoner på lokaliteter med oppdrett av atlantisk laks og regnbueørret og undersøkelser av prøver tatt fra syke fisk. Prøver fra regnbueørret og brunørret fra ferskvannslokaliteter er også inkludert. Infeksiøst hematopoetisk nekrosevirus og viral hemorragisk septikemivirus ble ikke påvist i noen av prøvene som ble undersøkt i 2025.

Summary

This surveillance programme has a risk-based approach. The core surveillance activity is the routine clinical inspections on sites with farmed salmonids and analyses of samples collected from diseased fish. Samples from rainbow trout and brown trout from freshwater sites are also included. Infectious haematopoietic necrosis virus and viral haemorrhagic septicaemia virus were not detected in any of the samples tested in 2025.

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 (*Oncorhynchus mykiss*), 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 the disease-free status for the established containment area was suspended (5, 6). Measures to eliminate the disease and prevent its spread were immediately taken by the Norwegian Food Safety Authority (NFSA). In 2011, the containment area regained its free status.

Outbreaks of IHN have caused significant economic losses in farmed rainbow trout as well as Atlantic and Pacific salmon in North America and Europe, and the disease has an impact on wild populations of Pacific salmon (7). IHN-virus (IHNV) was detected for the first time in Finland in 2017 and in Estonia in 2018. In 2021, IHNV was detected at 11 sites in Denmark and subsequently at sites in Åland in Finland due to imports from Denmark. Denmark lost the free status for IHN in December 2021, and several new outbreaks were reported in the country in the subsequent years. The virus has never been detected in Norway, but the recent detections in Denmark and Finland are worrying.

The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and performs the analyses. The results are continuously updated at site level through a digital data-sharing portal (the [EOS-portal](#)) hosted by the NVI. Staff in the NFSA has access to the portal.

Aim

The aim of the programme is to document the absence or any emergence of IHN-virus (IHNV) and VHS-virus (VHSV) in salmonids in Norway.

Materials and methods

The surveillance programme has a risk-based approach (8), where the core surveillance activity is the routine clinical inspections on sites with farmed Atlantic salmon (*Salmo salar*) and rainbow trout (*Oncorhynchus mykiss*) carried out by the fish health personnel (FHP) and laboratory investigation of diseased fish. The FHP are performing health controls based on the risk of infections, stress and increased mortality (9). Samples for the surveillance programme were selected among those that were received by the NVI for diagnostics and surveillance for other diseases, as infectious salmon anaemia or pancreas disease. In general, five samples from Atlantic salmon and ten samples from rainbow trout at each site were analysed.

In addition, the NFSA sampled rainbow trout and brown trout (*Salmo trutta*) at freshwater sites in the southeast of Norway exclusively for the surveillance programme. The number of samples that were analysed for IHN and VHS, as well as the number of sites from where the samples originated, are outlined for each species in Table 1. The geographical location of the sites with Atlantic salmon and rainbow trout are shown in Figure 1.

Table 1. The number of samples that were analysed for IHN and VHS as well as the number of sites from where the samples originated.

Species	IHN	VHS	Sites
Atlantic salmon	388	378	77
Rainbow trout, marine sites	110	110	11
Rainbow trout, freshwater sites	70	70	3
Brown trout, freshwater sites	89	89	3
Total	657	647	94

Samples on RNAlater™ submitted to the NVI were routinely processed and analysed for IHN and VHS by real-time RT-PCR with IHN primers and probes modified from Liu et al. (2008), Cuenca et al. (2020) and Hoferer et al. (2019) and VHS primers and probe from Jonstrup et al. (2013), respectively (10-14).

Results and Discussion

IHN and VHS were not detected in any of the samples in the surveillance program in 2025.

The performance of the routine clinical inspections in surveillance for freedom from VHS was evaluated in 2016, using a stochastic simulation model (15). Model results indicate that the current surveillance system, based on routine inspections by the FHP, has a high capability for detecting VHS, and that there is a high probability of freedom from VHS in Norwegian marine farmed salmonids (PFree >95%). Sensitivity analysis identified the probabilities of samples that are submitted and that submitted samples are tested, as the most influential input variables. The model provides a surveillance platform for similar exotic viral infectious diseases, e.g. IHN, in marine salmonid farming in Norway if they share similar risk factors.

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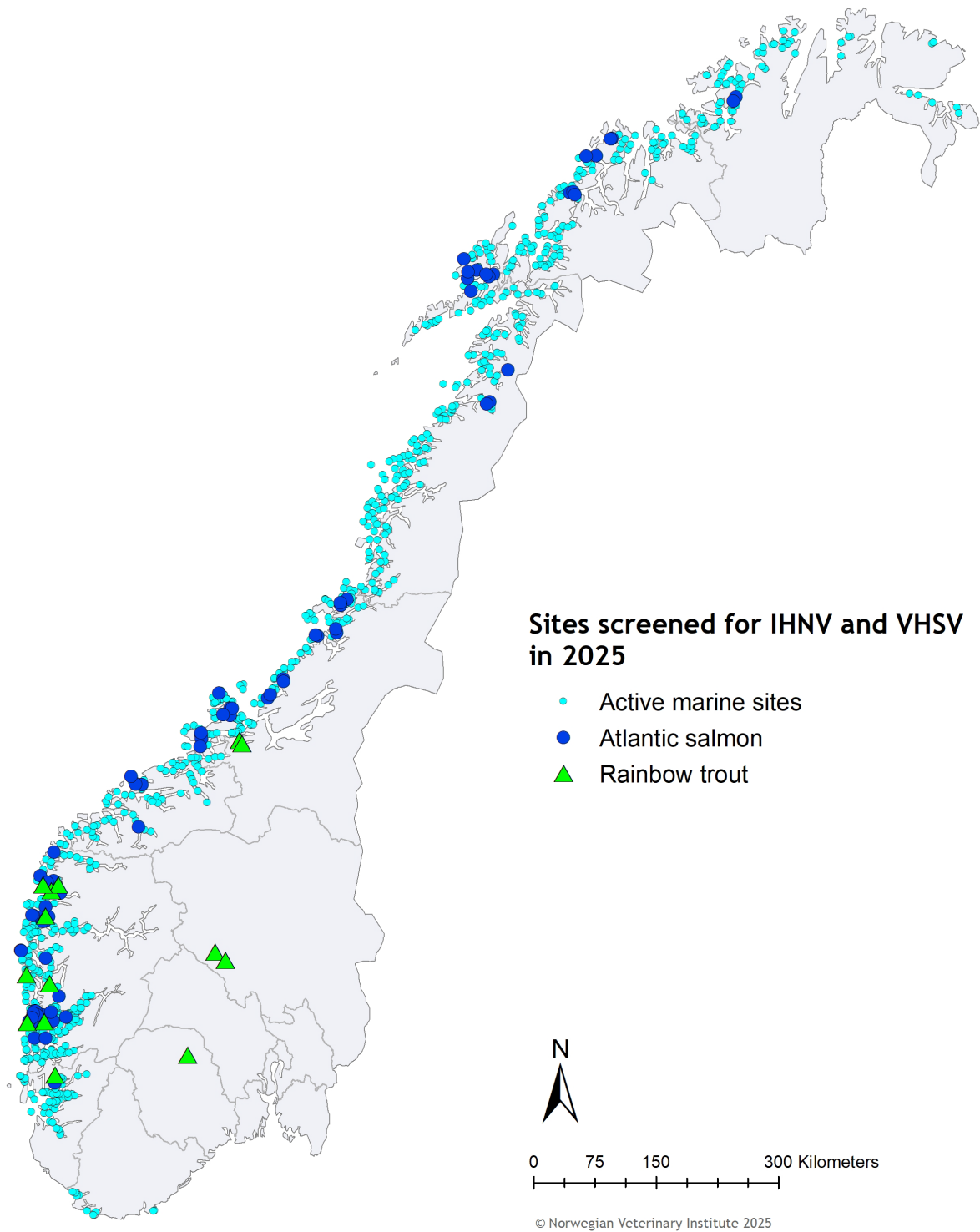


Figure 1. Sites with Atlantic salmon and rainbow trout screened for IHN and VHS in 2025. All marine sites with Atlantic salmon or rainbow trout that have been active for at least three months are also marked. Illustration: Attila Tarpai, Norwegian Veterinary Institute

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postmottak@vetinst.no

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