



# The surveillance programme for infectious salmon anaemia (ISA) and bacterial kidney disease (BKD) in Norway 2019



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### Authors

Mona Dverdal Jansen and Victor Henrique Silva  
De Oliveira

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## Summary

Infectious salmon anaemia virus (pathogenic ISAV HPR-del) and *Renibacterium salmoninarum* were not detected in conjunction with surveillance in ISA-free zones and compartments in 2019.

## Introduction

Infectious salmon anaemia (ISA) is a serious disease in salmon caused by ISA virus (ISAV), a virus within the *Orthomyxoviridae* family. The disease was first described in Atlantic salmon (*Salmo salar*) in Norway in 1984 and has since been reported in several countries (USA, UK, Canada, Faroe Islands and Chile). In Norway, the number of outbreaks peaked in the early 1990s with more than 80 cases per year. In the late 1980s and early 1990s several measures were implemented in order to combat and limit the spread of the disease. Since 1993, the number of annual outbreaks has varied between 1 and 20, and ISA is still a recurring challenge to the salmon farming industry in Norway.

There are two main types of ISAV. The pathogenic type, termed ISAV HPR-deleted (ISAV HPR-del), is associated with ISA outbreaks, while the non-pathogenic type, termed ISAV HPR0, causes subclinical infections only. ISAV HPR0 is now regarded as the origin of the virulent ISAV HPR-del through differential mutations in at least two virus genes. Positive PCR-tests for ISAV HPR0 have so far not been considered notifiable by the Norwegian regulations.

ISA is an OIE listed infection and it is notifiable (list 2) in Norway and within the EU (Council Directive 2006/88/EC). In Norway, there is a legal obligation to report suspicion of ISA to the NFSA. Following a suspicion, the NFSA performs fish sampling at the suspected site and submits the samples to the national ISA reference laboratory (the Norwegian Veterinary Institute, NVI) for diagnostic investigation. If this investigation confirms an ISA diagnosis, this is reported to the NFSA. The NFSA determines the official diagnosis for the site and makes decisions on the implementation of control measurements. The latter includes immediate restrictions on fish movement which are followed by the establishment of a containment area. ISA diagnoses are reported to the EU, the EFTA Surveillance Authority (ESA) and the OIE by the NFSA.

The NFSA has declared ISA-free zones and compartments based on both historical freedom and targeted surveillance of ISAV (ISAV HPR-del) in accordance with requirements in the Council Directive 2006/88/EC and Commission Implementing Decision (EU) 2015/1554. The declarations must be accepted by EU in advance of listing of the ISA-free zones and compartments in the Norwegian regulations.

Bacterial kidney disease (BKD) is a chronic disease of salmonid fish caused by *Renibacterium salmoninarum*, first diagnosed in Norway in 1980. BKD is a list 3 disease in Norway. *R. salmoninarum* can be transmitted vertically from one generation to the next inside the eggs. Some farms have, in conjunction with the surveillance in ISA-free zones and compartments, also performed targeted surveillance for *R. salmoninarum*.

Further information on ISA and BKD can be found at [www.vetinst.no](http://www.vetinst.no).

## Aims

The aim of the ISA surveillance programme is to document conducted sampling and obtained negative laboratory results from freshwater and seawater salmonid fish farms to obtain or maintain a status as an ISA-free compartment or zone.

For sites within ISA-free compartments and zones aiming to trade with countries or areas that have national measures for BKD, the surveillance programme additionally documents conducted sampling and obtained negative laboratory results for *R. salmoninarum*.

## Materials and methods

The surveillance for ISAV (ISAV HPR-del) and *R. salmoninarum* is based on targeted surveillance by the NFSA, including inspections and sample collection, as well as the regular health inspections and investigations performed by the Fish Health Personnel (FHP).

### Infectious salmon anaemia virus (ISAV HPR-del)

Briefly, in order to obtain and maintain a status of an ISA-free compartment or zone the following applies:

- In order to maintain an ISA-free status, all sites within the compartment or zone must each year undergo targeted surveillance.
- In order to obtain status as ISA-free, all sites within the compartment or zone must undergo 2 years of targeted surveillance.
- In order to obtain status as an ISA-free independent compartment including a land site, the requirements for obtaining free status can imply that the entire site has been fallowed for a minimum of 6 weeks and restocked with fish from an ISA-free compartment or zone. An additional requirement of 2 years of inspections and sampling may be imposed.

The NFSA conducts inspections, and from 2020 also collects samples, according to the regime specified in Table 1. Samples must be collected during a one-month period in the spring and autumn each year and the sample material must include heart and mid-kidney. Sample collection should be risk-based, meaning that samples must be collected from individuals that are sick, weak, or newly deceased (but *not* from so-called "loser"-fish unless they show signs indicative of ISA). Samples are submitted to NFSA-appointed laboratories or the NVI for RT-PCR analysis in accordance with the requirements of Commission Implementing Decision (EU) 2015/1554. In the event of a positive result, sequencing is performed to determine whether the virus is the pathogenic ISAV HPR-del or the non-pathogenic ISAV HPR0. Should ISAV HPR-del be detected, the ISA free zone or compartment will immediately be suspended and a diagnostic investigation will be performed as described in the introduction. The NVI will assist the NFSA with required epidemiological investigations. The NVI receives monthly reports from the appointed laboratories, collates the data and supplies monthly and yearly reports on the data to the NFSA.

In the event that one site within an ISA-free compartment or zone has its ISA-free status repealed, all sites within the compartment or zone will lose their ISA-free status.

Table 1. NFSA inspection and sampling regime.

Category	Inspections	Sampling
Establishment of an ISA-free zone/compartment	6/year	2 * 75 fish
Maintenance of an ISA-free zone/compartment	2/year	2 * 30 fish

In addition to the inspections conducted by the NFSA, all sites are required to have regular inspections by FHP, with additional risk-based sampling in the event of any unexplained morbidity or mortality to rule out ISAV (ISAV HPR-del) as the causative agent.

### *Renibacterium salmoninarum*

Ireland, Northern Ireland, Isle of Man and Jersey have been given approval for national measures for BKD (2010/221/EU). For placing roe, milt or fish on the market in countries within the EEA with BKD national measures, the live products must come from an ISA-free site located within an ISA-free compartment or zone where targeted surveillance for BKD must have been performed by the NFSA at all sites within the compartment or zone.

There are separate sampling requirements depending on the type of establishment tested, however the required number of samples are the same both to obtain and maintain surveillance for BKD:

- For stripping stations, a minimum of 30 fish must be sampled per year, with priority to the last 9 months before stripping and the stripping period.
- For other sites, a minimum of 60 fish must be sampled per year.

Risk-based sampling of kidney tissue should be performed and samples must be submitted to NFSA-appointed laboratories for RT-PCR analyses. In the event of a positive result, the NFSA may submit samples for verification to the NVI and the NVI will assist the NFSA with epidemiological investigations. The NVI receives monthly reports from the appointed laboratories, collates the data and supplies monthly and yearly reports on the data to the NFSA.

## Results

In June 2019, all existing Norwegian ISA-free compartments and ISA-free zones were suspended by the NFSA.

At the end of March 2020, the status as ISA-free compartments was reinstated for three compartments. In addition, one ISA-free zone maintained its status as suspended, while the remaining suspended compartments and zones had their status repealed.

As a consequence, the results presented in this report are restricted to the three ISA-free compartments and the one suspended ISA-free zone (status as per 05.06.2020). A map of the ISA-free compartments and the suspended ISA-free zone is shown in Figure 1. (As one site, Sjølseng, contains two separate ISA-free compartments two sites are marked on the map.)

The results from the surveillance for ISAV (ISAV HPR-del) are shown in Table 2, while the results from the surveillance for *R. salmoninarum* are given in Table 3.

Any additional, non-statutory tissues sampled (e.g. roe, milt or fry) and tested for ISAV (ISAV HPR-del) are listed in Table A1 in the Appendix. All samples originated from Atlantic salmon.

**Table 2.** Number of heart and kidney samples tested for ISAV (ISAV HPR-del) per month in 2019, per ISA-free compartment/suspended ISA-free zone.

ID	Category	Site	Number of samples (ISAV HPR-del)												Total	Positive
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
4.1	Suspended ISA-free zone	12112 Femangervågen	0	0	0	0	20	0	36	68	0	0	62	0	186	0
4.2	ISA-free compartment	12917 Sjølseng Hall 2	0	7	0	7	20	58	68	6	66	14	8	0	254	0
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	16	16	14	17	0	0	26	64	0	22	14	189	0
4.3	ISA-free compartment	18000 Rimstad	0	0	0	0	0	78	0	164	0	113	63	0	418	0

**Table 3.** Number of kidney samples tested for *R. salmoninarum* per month in 2019, per ISA-free compartment/suspended ISA-free zone.

ID	Category	Site	Number of samples ( <i>R. salmoninarum</i> )												Total	Positive
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
4.1	Suspended ISA-free zone	12112 Femangervågen	0	0	0	0	10	0	18	34	0	0	0	0	62	0
4.2	ISA-free compartment	12917 Sjølseng Hall 2	0	0	0	0	0	0	34	0	30	0	4	0	68	0
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	8	8	7	8	0	0	13	34	7	11	7	103	0
4.3	ISA-free compartment	18000 Rimstad	0	0	0	0	0	39	0	60	0	46	63	5	213	0

## Discussion

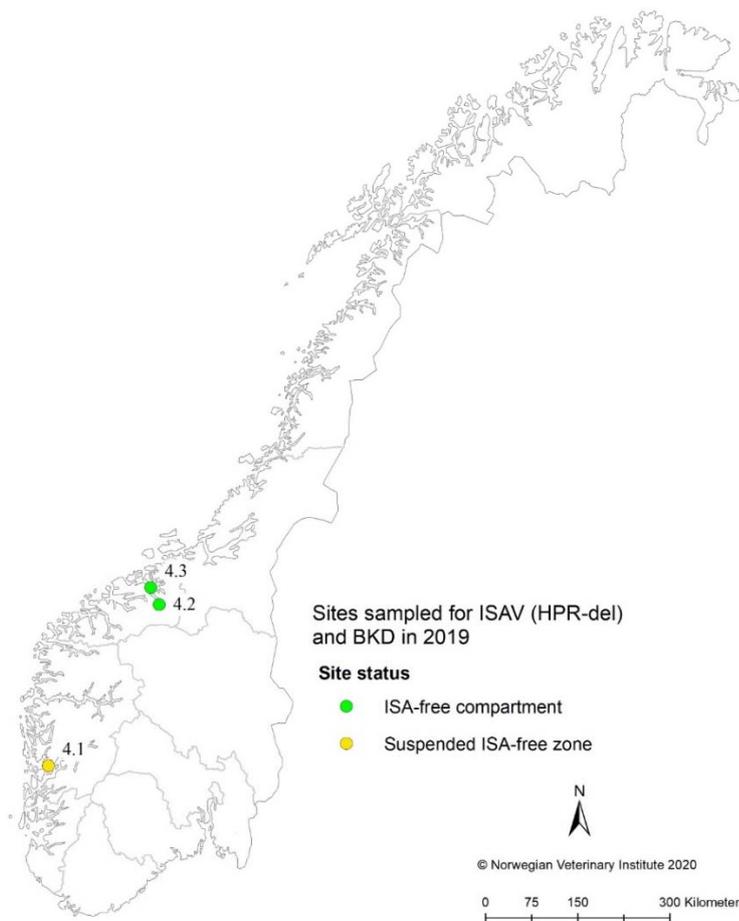
This report contains data from sampling conducted in 2019 from the three ISA-free compartments and the suspended ISA-free zone that are in place as per 05.06.2020.

All ISA-free compartments and the suspended ISA-free zone submitted samples for analyses for both ISAV and *R. salmoninarum* in 2019. All samples returned a negative test result.

In 2019, all three ISA-free compartments submitted a sample number above the minimum requirement for the maintenance of an ISA-free status.

The Norwegian Food Safety Authority has not participated sufficiently in the targeted surveillance for BKD and none of the compartments or zones have the opportunity for trade to countries or areas with national measures for BKD.

The ISA-free status for the zone Femangervågen is suspended because additional measures are necessary in order to protect the zone from passive introduction of the disease, cf. Council Directive 2006/88/EC, annex V, part II, point 1.5. After the buffer zone has been implemented for a period of time, the zone will restore its ISA-free status. The NFSA demands a permanent, strengthened surveillance for this suspended ISA-free zone, with a yearly minimum requirement of 150 samples submitted per year.



**Figure 1.** The geographic locations of the ISA-free compartments and the suspended, ISA-free zone sampled in 2019. (The ISA-free compartment 4.2 consists of two separate compartments within one site.)

## Appendix

**Table A1.** Additional tissue samples (roe, milt or fry) tested for ISAV (ISAV HPR-del) per month in 2019, per ISA-free compartment/suspended ISA-free zone.

ID	Category	Site	Number of samples (ISAV HPR-del)												Total	Positive	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
4.1	Suspended ISA-free zone	12112 Femangervågen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
4.2	ISA-free compartment	12917 Sjølseng Hall 2	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
4.3	ISA-free compartment	18000 Rimstad	0	21	0	0	0	0	0	0	277	0	0	60	0	358	0

Frisk fisk



Sunne dyr



Trygg mat



*Faglig ambisiøs, fremtidsrettet og samspillende - for én helse!*



**Veterinærinstituttet**  
Norwegian Veterinary Institute

Oslo

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postmottak@vetinst.no  
www.vetinst.no