



# The surveillance programme for infectious salmon anaemia (ISA) and bacterial kidney disease (BKD) in Norway 2020



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## Summary

Infectious salmon anaemia virus (pathogenic ISAV HPRdel) and *Renibacterium salmoninarum* were not detected in conjunction with surveillance in ISA-free zones and compartments in 2020.

## 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 1990 with 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 23, 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 HPRdel), 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 HPRdel 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 also notifiable within the EU including Norway (cf. Council Directive 2006/88/EC, to be replaced by Regulation (EU) 2016/429 of 9 March 2016, the Animal Health Law, in 2021). In Norway, there is a legal obligation to immediately notify suspicion of ISA to the Norwegian Food Safety Authority (NFSA), and restrictions on fish movement will be implemented instantly. 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 measures such as the establishment of a containment area. NFSA reports ISA diagnoses to the EU and the OIE.

The NFSA has declared ISA-free zones and compartments based on both historical freedom and targeted surveillance of ISAV (ISAV HPRdel) 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 listed (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*.

## Aims

The aim of the surveillance programme is to document sufficient surveillance, including conducted sampling and obtained negative laboratory results, in specific 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 HPRdel) 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 private Fish Health Personnel (FHP).

### Infectious salmon anaemia virus (ISAV HPRdel)

The NFSA conducts inspections, and from 2020, collects samples according to the regime specified in Table 1.

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

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 private, 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 HPRdel or the non-pathogenic ISAV HPR0. Should ISAV HPRdel 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 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 HPRdel) as the causative agent.

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.

### ***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. The remaining suspended compartments and zones had their ISA-free 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 from 05.06.2020 onwards). 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 only two ISA-free sites are marked on the map.)

The results from the surveillance for ISAV (ISAV HPRdel) are shown in Table 2, while the results from the surveillance for *R. salmoninarum* are given in Table 3. All samples originated from Atlantic salmon.

Any additional, non-statutory tissues sampled and tested for ISAV HPRdel and *R. salmoninarum* are listed in the Appendix Tables A1 and A2, respectively. All samples originated from Atlantic salmon.

**Table 2:** Number of heart and kidney samples tested for ISAV (ISAV HPRdel) per month in 2020, per ISA-free compartment / suspended ISA-free zone.

ID	Category	Site	Number of samples (ISAV HPRdel)												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	160	0	0	0	94	56	0	0	310	0
4.2	ISA-free compartment	12917 Sjølseng Hall 2*	0	0	57	0	32	0	16	16	72				193	0
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	46	84	16	22	0	20	8	30	78	38	0	342	0
4.3	ISA-free compartment	18000 Rimstad	1	16	0	70	2	0	26	34	76	60	10	0	295	0

\* Empty of fish from October 2020

**Table 3:** Number of kidney samples tested for *R. salmoninarum* per month in 2020, 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	0	0	0	0	0	0	0	0	0	0	-
4.2	ISA-free compartment	12917 Sjølseng Hall 2*	0	0	20	0	0	0	0	0	36				56	0	
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	23	42	8	11	0	9	4	15	39	19	0	170	0	
4.3	ISA-free compartment	18000 Rimstad	1	8	0	69	2	0	13	17	56	30	5	0	201	0	

\* Empty of fish from October 2020

## Discussion

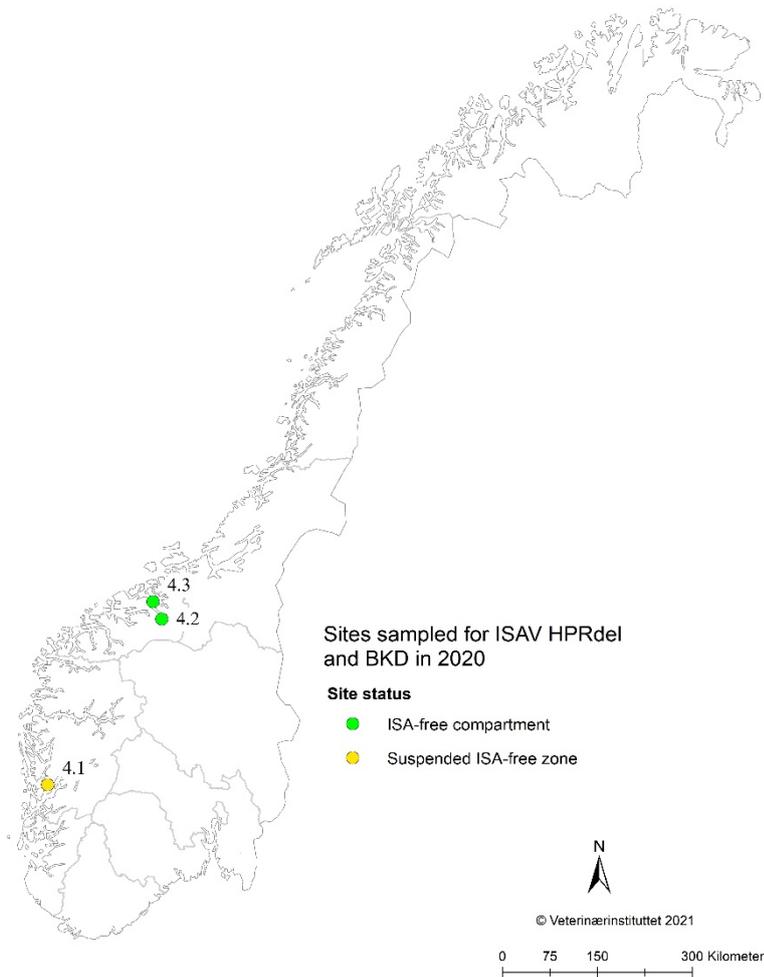
This report contains data from sampling conducted in 2020 from the three ISA-free compartments and the suspended ISA-free zone that have been in place from 05.06.2020 onwards.

All ISA-free compartments submitted samples for analyses for both ISAV and *R. salmoninarum* in 2020, while the suspended ISA-free zone submitted samples for ISAV only. All samples returned a negative test result.

In 2020, 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 for at least two years and none of the compartments has 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. The number of submitted samples for 2020 exceeded this requirement.



**Figure 1:** The geographic locations of the ISA-free compartments and the suspended, ISA-free zone sampled in 2020. (The ISA-free compartment 4.2 consists of two separate compartments within one site.)

## Appendix

**Table A1:** Additional tissue samples (roe, milt, fry or gills) tested for ISAV (ISAV HPRdel) per month in 2020, per ISA-free compartment/suspended ISA-free zone.

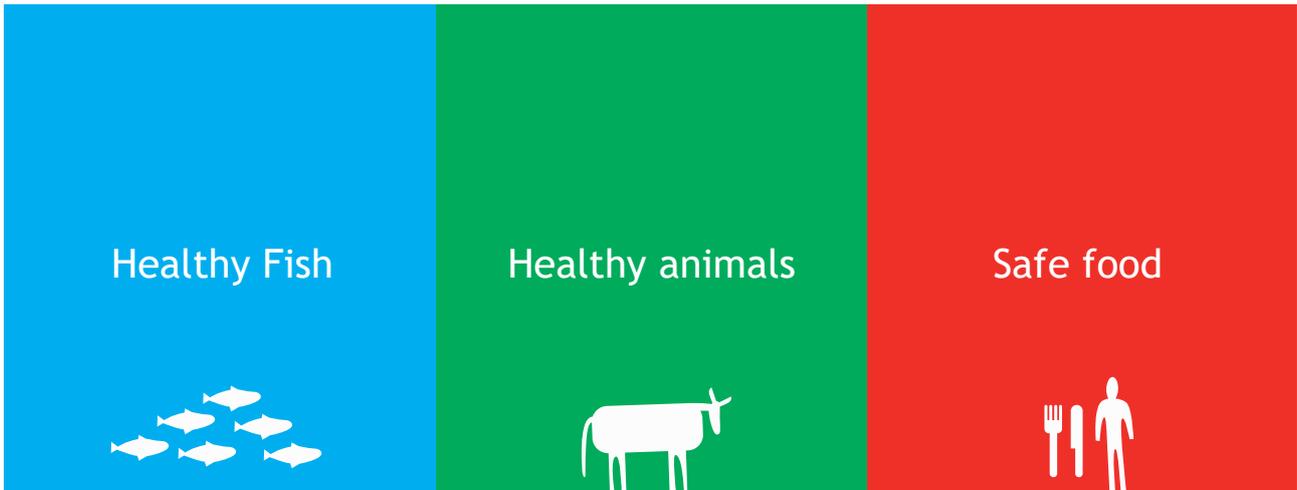
ID	Category	Site	Number of samples (ISAV HPRdel)													Total	Positive	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
4.1	Suspended ISA-free zone	12112 Femangervågen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
4.2	ISA-free compartment	12917 Sjølseng Hall 2*	0	20	10	0	0	0	0	0	0	0					30	0
4.2	ISA-free compartment	12917 Sjølseng VH 1&2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
4.3	ISA-free compartment	18000 Rimstad	10	9	3	38	0	0	0	0	0	31	0	0	0	0	91	0

\* Empty of fish from October 2020

**Table A2:** Additional tissue samples (fry) tested for *R. salmoninarum* per month in 2020, 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	0	0	0	0	0	0	0	0	0	0	0	-
4.2	ISA-free compartment	12917 Sjølseng Hall 2*	0	0	10	0	0	0	0	0	0	0					10	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	0	-
4.3	ISA-free compartment	18000 Rimstad	10	9	0	0	0	0	0	0	0	0	0	0	0	0	19	0

\* Empty of fish from October 2020



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