

Case No: 2022-0549 Date of visit: 09/11/2022

Time spent on site: 2 hours Main Inspector: [REDACTED]

Site No: FS0336 Site Name: Druimyeon Bay
Business No: FB0169 Business Name: Bakkafrost Scotland

Case Types: 1 REP 2 DIA 3 4 5 6

Water Temp (°C): 12.9 Thermometer No: Site FHI 045 completed Y

Observations: Region: ST Water type: S CoGP MA: M-46

Dead/weak/abnormally behaving fish present? Y If yes, see additional information/clinical score sheet.
Clinical signs of disease observed? Y If yes, see additional information/clinical score sheet.
Gross pathology observed? Y If yes, see additional information/clinical score sheet.
Diagnostic samples taken? Y

UNI/REG only - if unable to carry out intended visit detail reason below:
[REDACTED]

Additional Case Information:

Mort events; 26/9 3.82% 25213 fish; 3/10 9.66% 61355 fish; 10/10 7.19% 55650 fish; 17/10 7.58% 54440 fish

Site inspected on the 17/8/2022 (case no. 2022-0362). Mortality occurring from compromised gill health and PD. The site freshwater treated and the fish are responding well. Mortality is beginning to decrease. FHI to monitor.

Freshwater treatment scheduled for week 44

wk. 24/10/22 8.99% - gill issues, viral (PD) and rickettsia

Morts/site week 44 2022 8.46%, week 45 2022 14.96%

Wrasse mortality reported to be low.

Treatments; freshwater on Ronjafisk 13/9, 14/9, 8/10, 4/11

Health surveillance results; SRS, SAV, PRV and AGD positive by PCR 24/10/22, AGD, PRV, SAV, SRS and T maritimum positive by PCR 4/11/22

Poor weather meant I was only able alight 1 cage. However was able to get moribund fish from this cage.

Site thermometer used as error in T146

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 Date of Visit: **09/11/2022** Inspector(s): **[REDACTED]**

Registration/Authorisation Details

1. Business/site details summary checked by site representative? **N/A**
 2. Changes made to details? **N/A**

Site Details (include cleaner fish for all sections)

Total No facilities	12	Facilities stocked	12	No facilities inspected	1
Species	Sal wrasse				
Age group	22 Q2& Q3	wild caught			
No Fish	534,799	not collected			
Mean Fish Wt	406g	mixed			
Next Fallow Date (Site)	May 2024		Next Input Date (Site)	Sept 2024	
Recent (last 4 wks) disease problems?			Y	Any escapes (since last visit)?	N
If yes, detail:	SRS AGD				

Movement Records

1. Movement records available for inspection? **Y**
 2. Date of last inspection: **17/08/2022**
 3. Are records complete and correctly entered? **Y**
 4. Are movement records available for dead fish and waste? **Y**
 5. Are records complete and correctly entered? **Y**
 6. Are health certificates for introductions (outwith GB) available? **N/A**

Transport Records

1. Are any movements carried out by (or on behalf) of the business (not using a STB)? **[REDACTED]**
 If yes, is there a system in place for maintenance of transportation records? **[REDACTED]**

Mortality Records

1. Mortality records available for inspection? **Y**
 2. How are mortalities disposed of? **Biogas - Barkip**
 If other detail: **[REDACTED]**
 3. Mortality records complete and correctly entered? **Y**
 4. Recent mortality (last 4 wks): **weeks 2022; 42;7.58%. 43; 8.99%, 44; 8.46%, 45 14.96%**
 5. Evidence of recent increased/atypical mortalities? **Y**
 If yes, facility nos/no mortality per facility/no stock per facility/reason:

across site Gill issues, PD and SRS
 6. Any other peaks in mortality during period checked? **Y**
 If yes, detail: **Gill issues, PD and SRS across site**
 7. Have increased (unexplained) mortalities been reported to vet or FHI? **Y**
 If yes, detail action: **FW treatments for AGD**
 8. Have 'mortality events' been reported to FHI? If no, enter details on mortality events sheet. **Y**

Treatments and Medicines Records

1. Recent treatments (see comment)?	<input type="checkbox"/>	N
If yes, detail: <input type="text"/>		
If other, detail: <input type="text"/>		
2. Medicines records available for inspection?	<input type="checkbox"/>	Y
3. Are records complete and correctly entered?	<input type="checkbox"/>	Y
4. Are fish in a withdrawal period?	<input type="checkbox"/>	N
5. If yes, what treatment(s)?	<input type="text"/>	
If other, detail: <input type="text"/>		
6. Are medicines stored appropriately?	<input type="checkbox"/>	Y

Biosecurity Records

1. Biosecurity records available for inspection?	<input type="checkbox"/>
2. Has the manner and frequency of mortality removal, recording and safe disposal been considered?	<input type="checkbox"/>
3. Has the manner and period in which the APB will notify Scottish Ministers or veterinary professional of any <i>increased (unexplained)</i> mortality at the site been included?	<input type="checkbox"/>
4. Has the action that will be taken in the event that the presence or suspicion of the presence of a listed disease is detected been included and <i>how</i> and <i>when</i> that will be notified to Scottish Ministers?	<input type="checkbox"/>
5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher health status, certification if required)?	<input type="checkbox"/>
6. Have the husbandry and biosecurity measures implemented between each epidemiological unit to minimise transmission of disease been covered (movement of staff, visitors, equipment, live or dead fish etc.)?	<input type="checkbox"/>
7. Is documentation available regarding the measures in place to maintain the physical containment of aquaculture animals held on site?	<input type="checkbox"/>
8. Have the biosecurity procedures been adequately implemented on site?	<input type="checkbox"/>
If no, detail: <input type="text"/>	

Results of Surveillance

1. Has any animal health surveillance been carried out by, or on behalf of, the business?	<input type="checkbox"/>	Y
2. If yes, are results available for inspection?	<input type="checkbox"/>	Y
3. Any significant results?	<input type="checkbox"/>	Y
If yes, detail (if not detailed under recent disease problems). <input type="text"/>		

Histo 3/11/22 - SAV, gill pathology likely AGD and environmental; Histo 18/10 systemic infection rickettsia like organism, AGD, SAV, environmental gill pathology. 24/10/22 Histo AGD. PCR results 24.10.22 positive for AGD- PRV1,HSMI- SAV- Piscirikettsia

Records checked between: 17/8/22- 9/11/22

Case no: Site No: Date of visit/
Sampling:

Priority samples: VI BA PA MG HI

Time sampling starts/ends: Inspector: VMD No.

Environmental conditions: 1 2 3 4 5

Summary samples HIST BA MG VI PA Total Samples

Add Fish/Pools - click

	Pool/Fish No	F1	F2	F3	F4	F5	P1						
	Fish nos	1	2	3	4	5	1-5						
	Pool Group	P1	P1	P1	P1	P1							
	Species	SAL	SAL	SAL	SAL	SAL	SAL						
	Average weight	400g	400g	400g	400g	400g	400g						
	Sex												
	Water Type	SW	SW	SW	SW	SW	SW						
Stock Details		Applecross Hatchery	Applecross Hatchery	Applecross Hatchery	Applecross Hatchery	Applecross Hatchery	Applecross Hatchery						
	Stock Origin												
	Facility No	10	10	10	10	10	10						

Case no: 2022-0549

Site No: FS0336

Method of killing: Percussive

Date of visit: 09/11/2022

Inspector(s):

Sheet Relevant: Y

S for strong presence: M for medium presence: W for weak presence

Fish Number		1	2	3	4	5				
Time sampled after death (if > 45 minutes)										
External Signs										
Behaviour	Moribund	S	S	S	S	S				
	Lethargic	S	S	S	S	S				
	Hanging vertical									
	Spiralling									
	Flashing									
	Loss of equilibrium									
Body	Dark									
	Distended abdomen									
	Anorexic									
	Scale Oedema									
Opercula	Shortened									
	Flared									
Haemorrhaging	Throat									
	Ventrum									
	Base of fins									
	Elsewhere									
Eyes	Exophthalmic									
	Enophthalmic (sunken)									
	Cataract									
	Haemorrhagic									
Gills	Pale									
	Zoned									
	Necrotic									
Lesions	Flank		M							
	Elsewhere									
Vent	Inflamed									
	Trailing faeces									
Lice Load	Estimate numbers	0	0	0	0	0				
Internal Signs										
Ascites	Clear									
	Bloody									
Oedema	In tissues									
Heart	Pale/anaemic									
	Granulomas									
	Deformed									
Liver	Petechial haem									
	Gross haem									
	Tissue breakdown									
	Enlarged									
	Colour number(s)	1	1	1	1	1				
	Granulomas									
	Lesions									
Pyloric caeca	Petechial haem									
	Tubules mauve									
	Lack of fat									
Spleen	Enlarged		S							
	Granulomas									
Gut	No food present	S	S		S	S				
	Yellow pseudo-faeces									
	External haem									
	Internal haem									
Body wall	Haemorrhaging									
Swim bladder	Haemorrhaging									
	Fluid filled									
Kidney	Swollen									
	Grey									
	Granular									
	Liquefied									
General	Parasites present									
	Anaemia				S					

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Additional comments:

F1- adhesions in body cavity, F2 enlarged gall bladder, F4 - white faecal casts

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 Site No: **FS0336** Inspector: **[REDACTED]**

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2 nd Insp
MG IHN	0/2	22/11/2022				24/01/2022		
MG Para ther	5/5	22/11/2022		22/11/2022		24/01/2022		
MG IPN	1/2	22/11/2022		22/11/2022		24/01/2022		
MG ISA	0/2	22/11/2022				24/01/2022		
MG Pisci	5/5	22/11/2022		22/11/2022		24/01/2022		
MG PMCV	0/2	22/11/2022				24/01/2022		
MG SAV	1/2	22/11/2022		22/11/2022		24/01/2022		
MG VHS	0/2	22/11/2022				24/01/2022		
MG AGD	5/5	22/11/2022		22/11/2022		24/01/2022		
MG Sal pox	5/5	22/11/2022		22/11/2022		24/01/2022		
VSPE	2/5	25/11/2022				24/01/2022		
GPAT	5/5	01/12/2022				24/01/2022		
CGDH	5/5	01/12/2022				24/01/2022		
EPIT	5/5	01/12/2022				24/01/2022		
KPAT	3/5	01/12/2022				24/01/2022		
PISH	3/5	01/12/2022				24/01/2022		
SPAT	3/5	01/12/2022				24/01/2022		
SALH	1/5	01/12/2022				24/01/2022		
V IHN	0/3	01/12/2022				24/01/2022		
V VHS	0/3	01/12/2022				24/01/2022		
V IPN	1/3	09/01/2023				24/01/2022		
V SAV	0/3	09/01/2023				24/01/2022		
V ISA	0/3	09/01/2023				24/01/2022		

Report Summary			
Case Type	Date	Insp	2 nd Insp
Diag, Rep	24/01/2022		

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS No	FB0169	DATE OF VISIT	09/11/2022
SITE No	FS0336	SITE NAME	Druimyeon Bay
CASE No	20220549	INSPECTOR	██████████

Section 1: Summary

Druimyeon Bay was inspected following reports of increased mortality by the farm operator. During the inspection moribund fish were observed and five fish were removed for diagnostic sampling.

Histopathology examination revealed mixed and complex pathology. There were pathology consistent with salmonid rickettsial septicaemia (SRS). This was confirmed by qPCR in all five fish tested. Gills displayed multifocal, mild, hyperplastic branchitis associated with complex gill issues. Lesions could also be associated with environmental factors. Epitheliocystis (likely *Brachiomonas* sp.) was also observed. All fish were confirmed positive by qPCR for *Neoparamoeba perurans* (amoebic gill disease), *Paranucleospora theridion* and salmon gill poxvirus. F2 displayed absence of pancreatic acinar tissue. This could be associated with the presence of salmon alphavirus. This was confirmed by qPCR.

Please contact myself or the duty inspector should you require any further information, have any queries regarding this report or if any problems develop.

Section 2: Case Detail

Observations

The site had been experiencing on-going increased mortalities since August 2022. The inspectorate has previously visited on 17th August 2022, but mortality issues have persisted and have been further increasing. The reported mortalities are attributed to gill health issues, viral disease (salmonid alphavirus) and bacteria disease (*Piscirickettsia salmonis*). On the day of the inspection adverse weather and sea condition resulted in only 1 of the 12 stocked pens being able to be inspected. However, moribund fish were observed at the pen margins and five were removed for diagnostic examination.

Externally fish F2 had an area of skin haemorrhaging, about the size of a 20p piece located on the flank above the pelvic fin of F3. Fish F2 had an enlarged spleen and adhesions were observed in the body cavity of F1.

Samples

Samples were collected from five fish according to the table below:

Fish number	Facility number	Species	Stage	Origin
1-5	10	Atlantic salmon	400g - 2022 Q2 & Q3	Applecross Hatchery

Results

Bacteriology: Kidney, gill and lesion material from five fish were inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated;

- *Vibrio* sp. (Isolate a): F2 (Kidney); *Vibrio* sp. (Isolate b): F1 (Kidney); F2 (Kidney, Lesion);

The level and purity of growth would not suggest it is implicated in fish morbidity.

Tissue samples were tested for segments of nucleic acid indicative of the presence of the pathogen specified below using real-time PCR (qPCR).

Piscirickettsia salmonis.

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.7	21.78	21.83	21.75	POSITIVE
F2	21.15	23.97	24.09	24.07	POSITIVE
F3	21.05	36.12	36.6	36.85	POSITIVE
F4	21.09	19.02	19.28	19.15	POSITIVE
F5	20.45	28.79	28.77	28.23	POSITIVE

DNA sequence analysis was performed on kidney samples. The results confirmed the QPCR positive amplification of *Piscirickettsia salmonis*.

Virology: Tissue samples were tested for segments of nucleic acid indicative of the presence of the pathogens specified below using real-time PCR (qPCR).

Salmon gill poxvirus

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.06	28.55	28.35	28.54	POSITIVE
F2	21.13	23.62	23.86	23.78	POSITIVE
F3	20.99	31.86	31.72	31.76	POSITIVE
F4	21.62	25.09	25.09	24.91	POSITIVE
F5	21.13	26.95	26.93	27.08	POSITIVE

Infectious Pancreatic Necrosis

R09

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1					No result
F2					Negative
F3	19.09	35.47	35.59	35.98	POSITIVE
F4					No result
F5					No result

Salmonid alphavirus

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1					No result
F2	19.32	27.69	27.69	27.67	POSITIVE
F3					Negative
F4					No result
F5					No result

From the samples tested by qPCR, F2 and F3 tested negative for infectious haematopoietic necrosis virus (IHNV), piscine myocarditis virus (PMCV), infectious salmon anaemia virus (ISAV), and viral haemorrhagic septicemia virus (VHSV). The other three fish were also tested but have been reported as “no result”.

The samples were also tested for infectious pancreatic necrosis virus (IPNV) and salmonid alphavirus (SAV) by qPCR. F3 tested positive for IPN and F2 tested positive for SAV. There were no results for the other three fish.

The three samples which presented no results by qPCR were run by cell culture for infectious haematopoietic necrosis virus (IHNV), infectious salmon anaemia virus (ISAV), viral haemorrhagic septicemia virus (VHSV), Infectious pancreatic necrosis virus (IPNV) and Salmonid alphavirus (SAV). Fish, F4 tested positive for IPN. All other cell culture tests were negative.

Parasitology: Tissue samples were tested for segments of nucleic acid indicative of the presence of the parasites specified below using real-time PCR (qPCR).

Neoparamoeba perurans (AGD)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.06	31.51	31.34	31.29	POSITIVE
F2	21.13	33.64	33.52	33.77	POSITIVE
F3	20.99	34.21	34.47	34.46	POSITIVE
F4	21.62	32.08	32.05	32.2	POSITIVE
F5	21.13	32.68	32.86	32.58	POSITIVE

Paranucleospora theridion

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.06	22.94	22.87	22.96	POSITIVE

R09

Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB

Tel - 0131 244 3498 Fax - 0131 244 0944 Email - ms.fishhealth@gov.scot

Website - www.gov.scot/Topics/marine/science

F2	21.13	22.78	22.73	22.7	POSITIVE
F3	20.99	26.94	26.99	27.12	POSITIVE
F4	21.62	21.94	22.04	21.85	POSITIVE
F5	21.13	22.03	22.04	22.27	POSITIVE

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from five fish. The tissue samples were fixed in 10% neutral buffered formalin.

Histopathological examination revealed the following:

Gill: Filament hyperplasia and lamellar fusion mild to some, multifocal (F1, F3). Few basophilic epithelial inclusions (likely epitheliocystis) (F1-F5). Filament necrosis and branchitis and presence of few round blue structures resembling bacteria (likely *Piscirickettsia* sp.). F4 displayed a small area of necrosis with mixed bacteria associated (F1). Lamellar telangiectasia with multifocal thrombosis and free blood among gill filaments (F2). F5 displayed some autolysis artefacts.

Skin & Muscle: Partial absence of epidermal layer and mild inflammatory cell infiltration (F2).

Heart: Mild, multifocal myocarditis (F2, F5). Mild epicarditis (F2, F3, F5). F2: no atrium.

Gut and pyloric caeca: Peritonitis, mild, multifocal (F1, F2, F3, F5) and presence of some to few round blue structures resembling bacteria (likely *Piscirickettsia* sp.) (F1, F5).

Pancreas: Almost no pancreatic acinar tissue (F2).

Liver: Some cuffing (F2), hepatocellular necrosis, minimal, focal (F4, F5).

Kidney: Interstitial cell (haemopoietic) necrosis and cellular vacuolation mild to marked, multifocal (F1, F4 & F5) and few intracellular round blue structures resembling bacteria (likely *Piscirickettsia* sp.) (F1, F4 & F5), these bacteria stain Gram-negative and Giemsa positive.

Spleen: Necrosis, multifocal, mild and few intracellular round blue structures resembling bacteria (likely *Piscirickettsia* sp.) (F1, F4), these bacteria stain Gram-negative and Giemsa positive. Some cuffing (F2). Capsulitis, mild, multifocal (F2). Slightly congested F1.

Signed:



Fish Health Inspector

Date: 24/01/2023

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Marine Scotland website at <https://www.gov.scot/publications/fish-health-inspectorate-service-charter/>



