Case No: 2023-0205 Date of visit: 17/05/2023

Time spent on site: 2h Main Inspector: [redacted]

Site No: FS1342 Site Name: West Strome
Business No: FB0169 Business Name: Bakkafrost Scotland

Case Types: 1 DIA 2 REP 3 4 5 6

Water Temp (°C): 9.8 Thermometer No: T173 FHI 045 completed

Observations: Region: HI Water type: S CoGP MA M-20

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:

Additional Case Information:

Site inspection conducted after reports of increased mortalities during an inspection at another site.
Mortalities have been low since input.

Mortalities for the last four weeks, wk 17 466 (0.08%), wk 18 333 (0.06%), wk 19 saw a marked increase of 2619 (0.46%) and wk 20 6517 (1.15%).

Majority of fish are eating reasonably well. One cage inspected and three fish were removed for diagnostic sampling. ~100 fish swimming slowly on the surface, spiralling, lethargic and moribund. Some Eye damage noted as well as some bi-lateral exophthalmia.

One fw and FLS treatment 24/4/2023 to the 27/4/2023. No significant mortality increase. Sea lice numbers have just increased.

A novel species of jellyfish had been observed in the area suspected to be Sarsia tubulosa, it is unsure if this is part of the increased mortality

Case No:

Date of Visit:

Registration/Authorisation Details

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

Site Details (include cleaner fish for all sections)

Total No facilities
Species
Age group
No Fish
Mean Fish Wt
Next Fallow Date (Site)
Recent (last 4 wks) disease problems?
If yes, detail:

Movement Records

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

Transport Records

1. Are any movements carried out by (or on behalf) of the business (not using a STB)?

If yes, is there a system in place for maintenance of transportation records?

Mortality Records

1. Mortality records available for inspection?
2. How are mortalities disposed of?

If other detail:

3. Mortality records complete and correctly entered?
4. Recent mortality (last 4 wks):
5. Evidence of recent increased/atypical mortalities?

If yes, facility nos/no mortality per facility/no stock per facility/reason:

see additional comments

6. Any other peaks in mortality during period checked?

If yes, detail:

7. Have increased (unexplained) mortalities been reported to vet or FHI?

If yes, detail action:

8. Have 'mortality events' been reported to FHI? If no, enter details on mortality events sheet.

Treatments and Medicines Records

1. Recent treatments (see comment)?
If yes, detail:
If other, detail:
2. Medicines records available for inspection?
3. Are records complete and correctly entered?
4. Are fish in a withdrawal period?
5. If yes, what treatment(s)?
If other, detail:
6. Are medicines stored appropriately?

Biosecurity Records

1. Biosecurity records available for inspection?
2. Has the manner and frequency of mortality removal, recording and safe disposal been considered?

3. Has the manner and period in which the APB will notify Scottish Ministers or veterinary professional of any *increased* (*unexpl*
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 be

5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher health status, cert

6. Have the husbandry and biosecurity measures implemented between each epidemiological unit to minimise transmission of d

7. Is documentation available regarding the measures in place to maintain the physical containment of aquaculture animals held
8. Have the biosecurity procedures been adequately implemented on site?
If no, detail:

Results of Surveillance

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

2023-0205	
	17/05/2023
	16
SAL	
2022 Q3	
563,268	
1.44kg	
	March 2024

Issue with elevated mortality but no disease confirmed, lethargy and eye damage noted. Biology department suspect bac

site inspectio

ained) mortality at the site been included?
en included and *how* and *when* that will be notified to Scottish Ministers?

ification if required)?

disease been covered (movement of staff, visitors, equipment, live or dead fish etc.)?

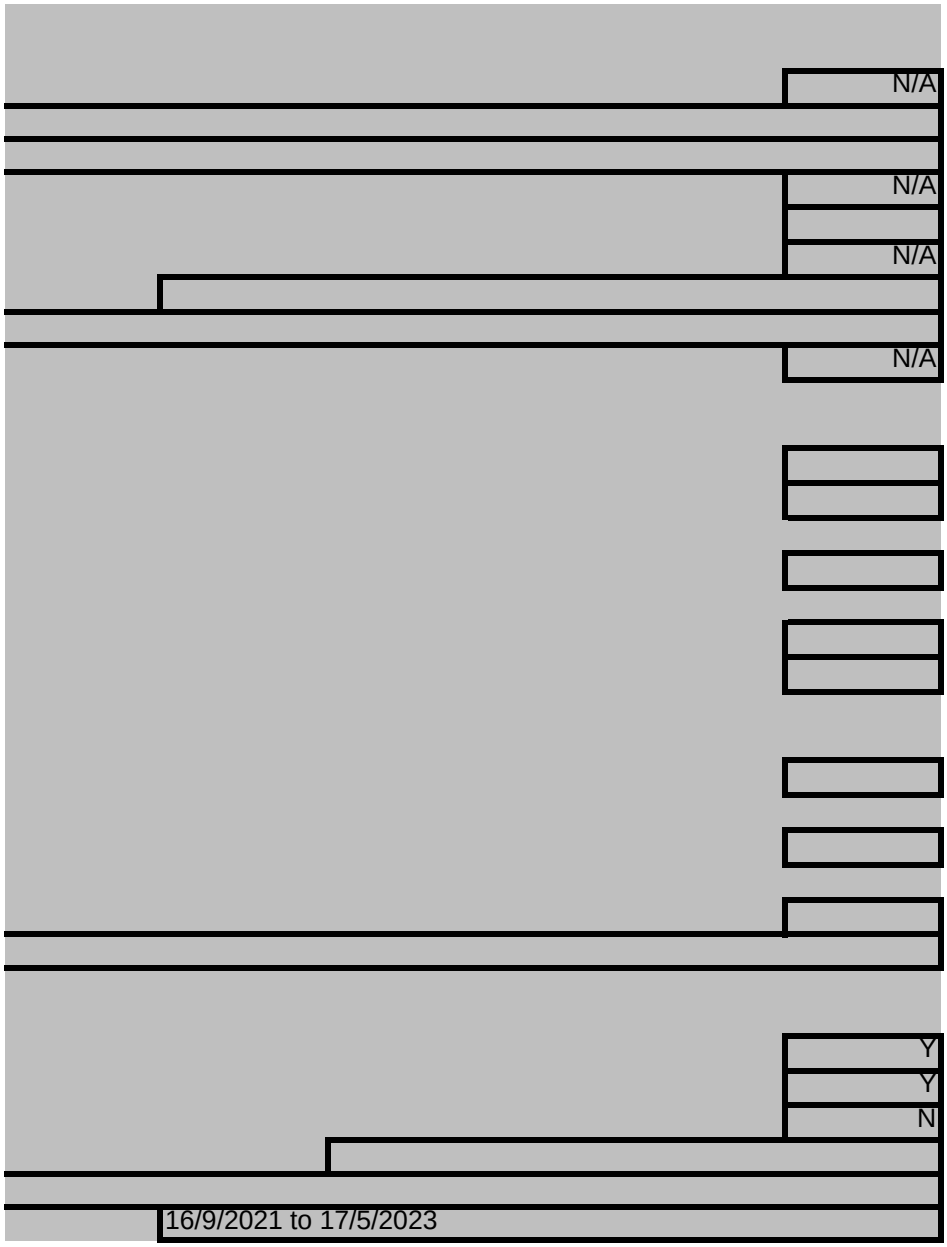
l on site?

Records checked between:

Site No:	FS1342				
		Inspector(s):	[redacted]		
					N
					N/A
Facilities stocked		14	No facilities inspected		1
	Next Input Date (Site)		September 2024		
	Y	Any escapes (since last visit)?			N

cterial infection but not confirmed yet

	Y
16/09/2021	
	Y
	N/A
	N/A
	N/A
	Y
Biogas - Barkip	
	Y
see additional information	
	Y
	N
	Y
n samples taken	
	Y


N/A
N/A
N/A
N/A
Y
Y
N
16/9/2021 to 17/5/2023

Case no:	2023-0205	Site No:	FS1342	Date of visit/ Sampling:	17/05/2023	17//5/20							
Priority samples:	VI		BA		PA		MG		HI				
Time sampling starts/ends:	18:30:00	19:30:00	Inspector:		VMD No.	0							
Environmental conditions:	1	Indoors	2		3		4		5				
Summary samples	HIST	Y	BA	Y	MG	Y	VI		PA		Total Samples		

Add Fish/Pools - click

	Pool/Fish No	F1	F2	F3	P1								
	Fish nos	1	2	3	1-5								
	Pool Group	P1	P1	P1									
Stock Details	Species	SAL	SAL	SAL	SAL								
	Average weight	1.44kg	1.44kg	1.44kg	1.44kg								
	Sex	N/A	N/A	N/A	N/A								
	Water Type	SW	SW	SW	SW								
	Stock Origin	Applecross	Applecross	Applecross	Applecross								
	Facility No	4	4	4	4								

)23	Additional Sample Information:

4	Total Tests assigned	3	

Case no: 2023-0205 Site No: FS1342 Method of killing: Percussive

Date of visit: 17/05/2023 Inspector(s): [redacted] Sheet Relevant: Y

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

Fish Number		1	2	3							
Time sampled after death (if > 45 minutes)											
External Signs											
Behaviour	Moribund	S	S	S							
	Lethargic	S	S	S							
	Hanging vertical										
	Spiralling			S							
	Flashing										
	Loss of equilibrium	W	W	W							
Body	Dark										
	Distended abdomen		W								
	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										
	Elsewhere										
Vent	Inflamed										
	Trailing faeces										
Lice Load	Estimate numbers										
Internal Signs											
Ascites	Clear		S								
	Bloody										
Oedema	In tissues										
Heart	Pale/anaemic	m	m	s							
	Granulomas										
	Deformed			W							
Liver	Petechial haem										
	Gross haem										
	Tissue breakdown										
	Enlarged										
	Colour number(s)	5	5	5							
	Granulomas										
	Lesions										
Pyloric caeca	Petechial haem										
	Tubules mauve	S	W								
	Lack of fat	S									
Spleen	Enlarged	S	S	S							
	Granulomas	W		m							
Gut	No food present										
	Yellow pseudo-faeces										
	External haem										
	Internal haem										
Body wall	Haemorrhaging										
Swim bladder	Haemorrhaging										
	Fluid filled										
Kidney	Swollen										
	Grey	W	W	W							
	Granular	S	S	S							
	Liquefied										
General	Parasites present										
	Anaemia										

Case no: 2023-0205

Date of visit: 17/05/2023

S for strong presence: **M** for medium presence: **W** for w

Fish Number											
Time sampled after death (if > 45 minutes)											
External Signs											
Behaviour	**Moribund**										
	Lethargic										
	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**										
	Elsewhere										
Vent	**Inflamed**										
	Trailing faeces										
Lice Load	**Estimate numbers**										
Internal Signs											
Ascites	**Clear**										
	Bloody										
Oedema	**In tissues**										
Heart	**Pale/anaemic**										
	Granulomas										
	Deformed										
Liver	**Petechial haem**										
	Gross haem										
	Tissue breakdown										
	Enlarged										
	Colour number(s)										
	Granulomas										
	Lesions										
Pyloric caeca	**Petechial haem**										
	Tubules mauve										
	Lack of fat										
Spleen	**Enlarged**										
	Granulomas										
Gut	**No food present**										
	Yellow pseudo-faeces										
	External haem										
	Internal haem										
Body wall	**Haemorrhaging**										
Swim bladder	**Haemorrhaging**										
	Fluid filled										
Kidney	**Swollen**										
	Grey										
	Granular										
	Liquefied										
General	**Parasites present**										
	Anaemia										

Additional comments:

Within the pen some fish with exophthalmia, others with eye damage. Some fish were hanging vertically as well as spiralling. Numerous fish moribund swimming on the surface.

Case No: 2023-0205 Date of visit: 17/05/2023

Site No: FS1342 Inspector:

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2nd Insp
AGD (Neoparamoeba perurans) (PCR) - AGDQ	0/2	24/05/2023		24/05/2023		27/06/2023		
IHN (PCR) - IHNP	0/3	24/05/2023		23/03/2023		27/06/2023		
IPN (PCR) - IPNM	0/3	24/05/2023		23/03/2023		27/06/2023		
ISA (real time qPCR - heart & kidney) - ISAQ	0/3	24/05/2023		23/03/2023		27/06/2023		
Paranucleospora theridion (PCR) - PNST	0/2	24/05/2023		24/03/2023		27/06/2023		
Piscine myocarditis virus (CMS) (PCR) - PMVP	0/3	24/05/2023		23/03/2023		27/06/2023		
Salmon gill poxvirus (PCR) - SPVP	0/2	24/05/2023		24/03/2023		27/06/2023		
Salmonid alphavirus (SAV) (PCR) - SALP	0/3	24/05/2023		23/03/2023		27/06/2023		
VHS (PCR) - VHSP	0/3	24/05/2023		23/03/2023		27/06/2023		
Gill pathology - GPAT	3/3	31/05/2023		31/05/2023		27/06/2023		
Heart pathology - HPAT	3/3	31/05/2023		31/05/2023		27/06/2023		
Kidney pathology - KPAT	3/3	31/05/2023		31/05/2023		27/06/2023		
Spleen pathology - SPAT	3/3	31/05/2023		31/05/2023		27/06/2023		
Yersinia ruckeri (ERM) - YRUK	3/3	02/06/2023		02/06/2023		27/06/2023		

Report Summary			
Case Type	Date	Insp	2nd Insp
DIA	27/06/2023		

		[redacted]	

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0169	**DATE OF VISIT**	17/05/2023
SITE NO	FS1342	**SITE NAME**	West Strome
CASE NO	20230205	**INSPECTOR**	[redacted]

Section 1: Summary

The site was inspected following reports of increased mortality occurring at the site, three fish were removed from one pen for further examination and subsequent diagnostic sampling.

Histopathological examination revealed features of necrotising myocarditis, nephritis and splenitis that could be related to bacterial infection. Occasional/rare bacteria were observed in the heart, kidney and spleen of some fish. Mild epithelial lamellar branchitis also observed.

Yersinia ruckeri, the causative agent of Enteric Redmouth (ERM), was isolated from plates taken from kidney material of F1-F3. The purity of growth would not suggest the bacterium would be the primary cause of morbidity however, as a primary fish pathogen the level of growth observed would suggest a risk to fish health which is confirmed by the histopathology observed.

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

During an inspection at Sgeir Dughall it was reported that West Strome had just reported elevated mortalities, a site visit was conducted following the inspection at Sgeir Dughall.

At the time of inspection, the site was stocked with 563,298 Atlantic salmon at an average weight of 1.44kg. Mortalities had been low until week 19 when levels had increased.

On inspection of pen four ~100 fish were observed swimming slowly below the surface, some were lethargic and moribund others were aimless and some spiralling was also noted. A number of fish had eye damage and some bi-lateral exophthalmia was also observed. Three were removed from the pen for diagnostic sampling.

F1-F3 were moribund and lethargic with a loss of equilibrium, F3 also displayed spiralling behaviour, the body of F2 was notable distended.

Internally the hearts of F1-F3 were pale/anaemic and was also deformed in F3. Clear ascites was present in F2. The tubules of the Pyloric caeca of F1 and F2 were mauve in appearance and lacking fat in F1. F1-F3 displayed splenomegaly with granulomas noted in F1 and F3. The kidneys of F1-F3 were grey and granular.

UKAS accredited testing laboratory No. 1964
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

Samples

Samples were collected from F1-F3 fish according to the table below:

Fish number	Facility number	Species	Stage	Origin
F1-F3	4	A. salmon	1.44kg 2022 Q3	Applecross

Results

Bacteriology: Kidney and gill material from F1-F3 was inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated:

- *Yersinia ruckeri* (isolate A kidney F1-F3)

From the tests conducted, we do not have evidence of resistance to oxytetracycline, sulphamethoxazole/trimethoprim or florfenicol, but no evidence of sensitivity to amoxycillin.

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

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), infectious salmon anaemia virus (ISAV), salmonid alphavirus (SAV) and viral haemorrhagic septicemia virus (VHSV), salmon gill poxvirus (SGPV) and piscine myocarditis virus (PMCV).

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

The samples tested negative for *Neoparamoeba perurans* (AGD) and *Paranucleospora theridion*.

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from F1-F3. The tissue samples were fixed in 10% neutral buffered formalin.

Histopathological examination revealed the following:

Gill: F3 displayed mild lamellar epithelial hyperplasia and haemorrhage. Occasional several basophilic epithelial inclusions (likely epitheliocystis) observed in all fish. Few aneurysmal dilation/telangiectasia and cell debris with bacteria among gill filaments (F2-F3).

Skin & Muscle: Within normal range.

Heart: Mild to moderate necrotising myocarditis (F1-F3) with rare rod-shape Gram-negative bacteria (F1). Epicarditis, mild (F1-F3).

Gut and pyloric caeca: Peritonitis, mild (likely associated with vaccine administration).

Pancreas: Within the normal range.

Liver: Some cuffing observed in all fish.

Kidney: Foci of interstitial cell necrosis with presence of some neutrophil-like cells observed in all fish and F1, F2 also displayed occasional to some Gram-negative bacteria.

Spleen: Necrotising splenitis, multifocal, mild (F1 - F3), chronic (F2) with occasional to some Gram-negative bacteria (F1, F2 & F3), some evidence of erythrophagocytosis observed in all fish. F3 also displayed mild capsulitis.

Signed: [redacted] Date: 27/6/2023

Fish Health Inspector

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/

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F1-3

F1

F1

F2

F2

F3