Case No:	2024-0396	Date of visit:	10/10/2024
Time spent on site:	6 hours	Main Inspector:	[redacted]
Site No:	FS0091	Site Name:	Meall Mhor Loch Fyne
Business No:	FB0169	Business Name:	Bakkafrost Scotland

Case Types: 1 REP 2 DIA 3 4 5 6

Water Temp (°C): 12.32 Thermometer No: T308 FHI 045 completed N/A

Observations: Region: ST Water type: S CoGP MA M-42

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:

Last inspection - 7 Feb 2024
Recent mortality - lost around 6.17% (15,126 fish) over past month for the site (10/09 to 10/10). Mortality higher in cages 9, 10, 11 and 12 losing 11%, 8%, 10% and 10% respectively over past month.

Recent diagnosis of CMS and tenacibaculum.

Last gill treatment 3 weeks ago - 20/9/2024 - FW and FLS, whole site. Treatments roughly every 7-8 weeks. Last SLICE - whole site April 2024.

Stock from Migdale and Geocrab

Looking to ensile waste in future - developments in place / started

5 lethargic fish removed from across the site and sampled for diagnostic purposes. No moribund fish seen but several apparently lethargic fish observed. One runty fish from cage fish removed and observed but not sampled.

Results of surveillance 11/09 - Furunculosis (typical and atypical); CMS, AGD, SGPV, PRV-1, PMCV, Tenacibaculum; 24/09 - PMCV and AGD.

Case No: 2024-0396 Site No: FS0091

Date of Visit: 10/10/2024 Inspector(s): [redacted]

Registration/Authorisation Details

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

Site Details (include cleaner fish for all sections)

Total No facilities	12	Facilities stocked	12	No facilities inspected	12		
Species	A salmon						
Age group	2023 Q3						
No Fish	232,129						
Mean Fish Wt	4.3kg						
Next Fallow Date (Site)	April / May 2025	Next Input Date (Site)	2025 Q3				
Recent (last 4 wks) disease problems?	Y	Any escapes (since last visit)?	N				
If yes, detail:	CMS in last month						

Movement Records

1. Movement records available for inspection?	Y
2. Date of last inspection:	07/02/2024
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)?	Y
If yes, is there a system in place for maintenance of transportation records?	Y

Mortality Records

1. Mortality records available for inspection?	Y
2. How are mortalities disposed of?	Whole fish - Dundas Chemicals
If other detail:	
3. Mortality records complete and correctly entered?	Y
4. Recent mortality (last 4 wks):	for site 1.26% week 40; 1.08% - week 39; 1.50% - week 38; 3.07% - week 37
5. Evidence of recent increased/atypical mortalities?	Y
If yes, facility nos/no mortality per facility/no stock per facility/reason:	Recent mortality attributed to CMS and gill health related conditions.
6. Any other peaks in mortality during period checked?	Y
If yes, detail:	1.45% w/b 03/06; 1.53% w/b 12/08; 1.51% w/b 19/08 - attributed to furunculosis and maturation
7. Have increased (unexplained) mortalities been reported to vet or FHI?	N/A
If yes, detail action:	
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)?	Y
If yes, detail:	Optomease for lice counts and gill scores. Freshwater & FLS
If other, detail:	
2. Medicines records available for inspection?	Y
3. Are records complete and correctly entered?	Y
4. Are fish in a withdrawal period?	N
5. If yes, what treatment(s)?	
If other, detail:	
6. Are medicines stored appropriately?	Y

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* (*unexplained)* mortality at the site been included?	
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 *how* and *when* that will be notified to Scottish Ministers?	
5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher health status, certification if required)?	
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.)?	
7. Is documentation available regarding the measures in place to maintain the physical containment of aquaculture animals held on site?	
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?	Y
2. If yes, are results available for inspection?	Y
3. Any significant results?	Y
If yes, detail (if not detailed under recent disease problems).	See additional information
Records checked between:	01/02/2024 to inspection date

Case no:	2024-0396	Site No:	FS0091	Date of visit/ Sampling:	10/10/2024	10/1							
Priority samples:	VI		BA		PA		MG		HI				
Time sampling starts/ends:	11:30:00	13:30:00	Inspector:		VMD No.	0							
Environmental conditions:	1	Indoors	2	Dry	3	Sunny	4		5				
Summary samples	HIST	Y	BA	Y	MG	Y	VI		PA		Total Samples		

Add Fish/Pools - click

	Pool/Fish No	F1	F2	F3	F4	F5							
	Fish nos	1	2	3	4	5							
	Pool Group												
Stock Details	Species	SAL	SAL	SAL	SAL	SAL							
	Average weight	4.3kg	4.3kg	4.3kg	4.3kg	4.3kg							
	Sex	N/A	N/A	Male	N/A	Female							
	Water Type	SW	SW	SW	SW	SW							
	Stock Origin	Migdale Loch Damph	Migdale Loch Damph	Migdale Loch Damph	Geocrab Hatcahery	Migdale Loch Damph							
	Facility No	1	2	2	3	7							

10/2024 Additional Sample Information:

5 Total Tests assigned 4

Case no: 2024-0396 Site No: FS0091 Method of killing: Percussive

Date of visit: 10/10/2024 Inspector(s): [redacted] 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)		01:30	01:30	01:30	01:30	01:30					
External Signs											
Behaviour	Moribund										
	Lethargic	M	M	M	M	M					
	Hanging vertical										
	Spiralling										
	Flashing										
	Loss of equilibrium										
Body	Dark			M							
	Distended abdomen										
	Anorexic					W					
	Scale Oedema										
Opercula	Shortened										
	Flared										
Haemorrhaging	Throat										
	Ventrum				W						
	Base of fins										
	Elsewhere										
Eyes	Exophthalmic										
	Enophthalmic (sunken)										
	Cataract										
	Haemorrhagic	W									
Gills	Pale	S	W	M	W	W					
	Zoned	W									
	Necrotic		W	W							
Lesions	Flank					M					
	Elsewhere										
Vent	Inflamed										
	Trailing faeces										
Lice Load	Estimate numbers										
Internal Signs											
Ascites	Clear				M	M					
	Bloody				M						
Oedema	In tissues										
Heart	Pale/anaemic										
	Granulomas										
	Deformed										
Liver	Petechial haem		W		S	W					
	Gross haem			M	S	M					
	Tissue breakdown										
	Enlarged										
	Colour number(s)	3	3	6	5	6					
	Granulomas										
	Lesions										
Pyloric caeca	Petechial haem	W			M						
	Tubules mauve										
	Lack of fat			M							
Spleen	Enlarged										
	Granulomas										
Gut	No food present			M	M	M					
	Yellow pseudo-faeces	W		M	W						
	External haem										
	Internal haem										
Body wall	Haemorrhaging				M						
Swim bladder	Haemorrhaging										
	Fluid filled										
Kidney	Swollen										
	Grey	W			S	W					
	Granular										
	Liquefied										
General	Parasites present										
	Anaemia	S	M		M						

Case no: 2024-0396

Date of visit: 10/10/2024

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:

F1 and F2 - clumped haemorrhagic gills. F1 general anemic appearance. F3 - dark coloured maturing fish. F4 - fibronous cast over liver, pale coloured spleen. F5 lesion by tail - this was a smaller runtier fish with a missing eye which had healed over, the gut was fluid filled.

Case No: 2024-0396 Date of visit: 10/10/2024

Site No: FS0091 Inspector: [redacted]

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2nd Insp
ISAQ	1/5	15/10/2024		15/10/2024		07/02/2024		
PMVP	2/5	15/10/2024		18/10/2024		07/02/2024		
VHSP	0/5	15/10/2024		18/10/2024		07/02/2024		
IHNP	0/5	15/10/2024		18/10/2024		07/02/2024		
IPNM	0/5	15/10/2024		18/10/2024		07/02/2024		
SALP	0/5	15/10/2024		18/10/2024		07/02/2024		
PNST	5/5	17/10/2024		18/10/2024		07/02/2024		
SPVP	4/5	17/10/2024		18/10/2024		07/02/2024		
AGDQ	3/5	17/10/2024		18/10/2024		07/02/2024		
SEQ - HPR0	1/1	18/10/2024		18/10/2024		07/02/2024		
ASAL	2/5	07/02/2024				07/02/2024		
YRUK	2/5	07/02/2024				07/02/2024		
VSP	1/5	07/02/2024				07/02/2024		
AERH	2/5	07/02/2024				07/02/2024		
GPAT	4/5	07/02/2024				07/02/2024		
HPAT	5/5	07/02/2024				07/02/2024		
LPAT	5/5	07/02/2024				07/02/2024		
KPAT	4/5	07/02/2024				07/02/2024		
SULC	1/5	07/02/2024				07/02/2024		
SKIN	1/5	07/02/2024				07/02/2024		
PMCH	5/5	07/02/2024				07/02/2024		
PISH	1/5	07/02/2024				07/02/2024		
MGPISCI	1/1	07/02/2024				07/02/2024		

Report Summary			
Case Type	Date	Insp	2nd Insp
DIAG, REP	07/02/2024		
DIAG, REP - reissued	21/02/2024		

AMENDED FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0169	**DATE OF VISIT**	10/10/2024
SITE NO	FS0091	**SITE NAME**	Meall Mhor Loch Fyne
CASE NO	20240396	**INSPECTOR**	[redacted]

This report replaces the fish health report R09 issued on 7 February 2025 by [redacted]. The previous report should be discarded. The origin of fish sampled had been entered incorrectly in the original report and has now been updated correctly within this amended report.

Section 1: Summary

The above site was inspected following reports of increased mortality by the farm operator. During the visit, all cages were inspected. Numerous lethargic fish were observed across the site and five were removed for diagnostic sampling.

Histopathological examination revealed features consistent with *Aeromonas salmonicida* (furunculosis) which was isolated on plates. Mild hyperplasic branchitis was also observed. Myocarditis (some could also be related to the presence of piscine myocarditis virus). Coagulative hepatocellular necrosis was also observed. One fish also displayed bacterial ulcerative dermatitis and some features resembling *Piscirickettsia* sp. which was confirmed by PCR.

Aeromonas salmonicida was identified on plates taken from fish 1 and 5. The level and purity of growth would suggest this bacterium is present as a primary pathogen in fish 1 and as a secondary pathogen in fish 5. *Yersinia ruckeri* was identified on plates taken from f fish 4 and 5. The level and purity of growth would suggest this bacterium is present as a primary pathogen in fish 4 and as a secondary pathogen in fish 5. *Vibrio sp*. was identified on plates taken from fish 5. The level and purity of growth would suggest this bacterium would be the primary source of this lesion.

Fish were tested for various pathogens by qPCR. All fish sampled tested positive for *Paranucleospora theridion*, four fish were positive for salmon gill poxvirus, three for *Neoparamoeba perurans*, two for piscine myocarditis virus and one for *Piscirickettsia* sp. In addition, one fish tested positive for infectious salmon anaemia virus, the virus strain was confirmed as HPR-0 which is recognised to be non-pathogenic and is not subject to statutory control measures.

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

UKAS Accredited Inspection Body - Type C No. 0269
Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB
Tel – 0131 244 3498 Email – ms.fishhealth@gov.scot
Website - https://www.gov.scot/policies/fish-health-inspectorate/

Section 2: Case Detail

Observations

The site was inspected following reports of increased mortality by the farm operator, with losses of around 6.17% of stock (15,126 fish) in the four weeks leading up to the inspection. Mortality had been attributed to cardiomyopathy syndrome and gill health related conditions. Some peaks in mortality were experienced across the summer months, up to 1.53% for the site per week and were attributed to furunculosis and maturing stock.

Clinical signs and gross pathological observation of the five lethargic fish removed for sampling included:

A dark colouration to the body (F3) and anorexic appearance (F5). Haemorrhaging was observed across the ventrum (F4) and within the eyes (F1). The gills of all five fish appeared pale, zoned (F1) and necrotic (F2, F3). A lesion was present on the flank of F5. Internal observation revealed clear ascites within the body cavity (F4, F5), bloody ascites (F4). Across the surface of the liver petechial haemorrhaging was evident (F2, F4, F5) along with gross haemorrhaging (F3, F4, F5). Petechial haemorrhaging was observed across the pyloric caeca of F1 and F4, and this organ appeared to have a lack of fat within F3. Within the gut, no food was present (F3, F4, F5) along with yellow pseudo-faeces (F1, F3, F4). Haemorrhaging was present across the body wall of F4 and the kidney appeared grey in colour (F1, F4, F5). There was a general anaemic appearance with respect to F1, F2 and F3.

Samples

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

Fish number	Facility number	Species	Stage	Origin
1	1	Atlantic salmon	4.3 kg / 2023 Q3	Migdale Loch Damph
2	2	Atlantic salmon	4.3 kg / 2023 Q3	Migdale Loch Damph
3	2	Atlantic salmon	4.3 kg / 2023 Q3	Migdale Loch Damph
4	3	Atlantic salmon	4.3 kg / 2023 Q3	Geocrab Hatchery
5	7	Atlantic salmon	4.3 kg / 2023 Q3	Migdale Loch Damph

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Results

Bacteriology: Kidney and gill material from all five fish and lesion material from F5 was inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated from the samples taken:

- *Aeromonas salmonicida* from kidney and gill material of fish 1 and 5. The level and purity of growth would suggest this bacterium is present as a primary pathogen in fish 1 and as a secondary pathogen in fish 5.

- *Yersinia ruckeri* from kidney material of fish 4 and 5. The level and purity of growth would suggest this bacterium is present as a primary pathogen in fish 4 and as a secondary pathogen in fish 5.

- *Vibrio* sp. from lesion material of fish 5. The level and purity of growth would suggest this bacterium would be the primary source of this lesion.

Following observations in histopathology, tissue samples associated with fish 5 were tested for segments of nucleic acid indicative of the presence of the *Piscirickettsia* using real-time PCR (qPCR). The result from this fish was positive. This was a non-standard test so Cp values are not included.

From the tests conducted, we do not have evidence of resistance to amoxycillin, oxytetracycline, sulphamethoxazole/trimethoprim or florfenicol for both the *Aeromonas salmonicida* and *Yersinia ruckeri* isolates identified.

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

Infectious salmon anaemia virus (ISAV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1		-	-	-	Negative
F2		-	-	-	Negative
F3		-	-	-	Negative
F4		-	-	-	Negative
F5	15.34	31.41	31.75	32.25	**POSITIVE**

Genetic sequencing was undertaking on the product obtained in association with the ISAV positive result. This confirmed the presence of HPR-0 which is recognised to be a non-pathogenic strain of the virus and is not subject to statutory control measures.

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Salmon gill poxvirus (SGPV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.76	38.22	>40.00	>40.00	**POSITIVE**
F2		-	-	-	Negative
F3	21.91	37.06	36.48	36.63	**POSITIVE**
F4	21.74	32.09	31.93	32.10	**POSITIVE**
F5	22.07	35.71	35.61	35.52	**POSITIVE**

Piscine myocarditis virus (PMCV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1		-	-	-	Negative
F2		-	-	-	Negative
F3		-	-	-	Negative
F4	15.02	32.68	32.38	32.87	**POSITIVE**
F5	15.06	21.64	21.69	21.62	**POSITIVE**

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), salmonid alphavirus (SAV) and viral haemorrhagic septicemia virus (VHSV).

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	21.76	33.85	33.36	33.40	**POSITIVE**
F2		-	-	-	Negative
F3	21.91	35.14	35.19	35.57	**POSITIVE**
F4		-	-	-	Negative
F5	22.07	30.48	30.46	30.64	**POSITIVE**

Paranucleospora theridion

R09

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	21.76	34.36	35.09	34.96	**POSITIVE**
F2	21.80	32.72	32.96	32.71	**POSITIVE**
F3	21.91	35.44	35.02	34.70	**POSITIVE**
F4	21.74	31.84	31.92	32.05	**POSITIVE**
F5	22.07	31.88	31.78	32.07	**POSITIVE**

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from all five fish. Material from the lesion of F5 was also taken. The tissue samples were fixed in 10% neutral buffered formalin.

Histopathological examination revealed the following:

Gill: Some lamellar hyperplasia and fusion, multifocal, (F1, F2, F4, F5). Dense aggregates of Gram-negative rod-shape bacteria (F1), several aneurysmal dilation/telangiectasia (F1, F2, F4). Free blood among gill filaments (F1). Some autolysis artefacts observed in all fish.

Skin & Muscle: Lesion: Marked ulcerative dermatitis with presence of Gram-negative rod-shaped bacteria on the dermal outer layer and presence of few round blue structures resembling bacteria (likely *Piscirickettsia* sp.) (F5), myositis mainly observed on the red skeletal musculature (F5).

Heart: Several, scattered, dense aggregates of Gram-negative rod-shape bacteria and some surrounding by fibre necrosis (F1). Minor, multifocal, myocarditis (F2, F3, F4, F5). F2 displayed a focally extended area of necrosis with thrombi and Gram-negative rod-shape bacteria. Epicarditis (F3, F5).

Gut and pyloric caeca: F5 displayed some peritonitis. All fish displayed cell sloughing (potentially associated with post-mortem artefact), ranging from marked to mild.

Pancreas: Within the normal range.

Liver: Coagulative hepatocellular necrosis, mild, multifocal (F4) and perivasculitis (F4, F5). Hepatocellular vacuolation (macrovesicles), some to moderate, diffuse (F1, F2, F3).

Kidney: Interstitial cell (haemopoietic) necrosis with few small aggregates of Gram-negative rod-shape bacteria (F1, F4, F5). F5 exhibit some hyaline droplet on the epithelium of the renal tubules. F3 displayed a granuloma-like structure walling off some unknown structures.

Spleen: Some cuffing (F1. F5).

Please contact me or the duty inspector should you require any further information or have any queries regarding this report.

R09

Scottish Government
Riaghaltas na h-Alba
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Signed: [redacted] Date: 21 February 2025

Fish Health Inspector

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Scottish Government website at Fish Health Inspectorate Service Charter - gov.scot (www.gov.scot)

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