

Case No: 2023-0009 Date of visit: 25/01/2023

Time spent on site: 3.5 hours Main Inspector: [REDACTED]

Site No: FS0948 Site Name: Easter Score Holms
Business No: FB0125 Business Name: Scottish Sea Farms Ltd

Case Types: 1 REP 2 DIA 3 4 5 6

Water Temp (°C): 7.5 Thermometer No: T172 FHI 045 completed

Observations: Region: SH Water type: S CoGP MA: S-11

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:

Following consecutive reports of mortality, a site visit was planned for the 24/01/2023. Weather did not permit the inspection of the site on the 24/01 and was rescheduled for the 25/01. Paperwork was inspected on 25/01/2023.

A bloom of *Muggiaea atlantica* (micro jellyfish) compromised gill health in early October, along with seasonal AGD and most recently diagnosed with CMS. PGD however is the main cause of mortality (24/01/2023). Following a passive surveillance inspection on the 20/12/2022, mortalities continued to be above the reporting threshold. The site conducted its last hydrogen peroxide treatment on 19/12/2022, which was found to be successful. No further chemical treatments have been conducted on site since 19/12/2022. FW is planned to be the next treatment and if weather permits begins w/b 30/01/2023. The FW treatments will target pens believed to cope with handling and attempts will lastly be made in pens 1, 2, 10, 11 (worst affected). Harvest of worst affected pens is an option. Due to weather and prioritising mortality removal from site, fish health visits have been limited since 20/12/2022, however next scheduled visit along with routine histology, bacteriology and PCR is planned for the 26/01/2023.

The stock origins are from Girlsta Hatchery and Barcaldine Smolt Unit; with primary input of fish from Langa Isle (East) in September and one pen stocked with transferred fish from Holms Geo in November, respectively.

Mortality (recent weeks):

20/12/2022-26/12/2022: 1.17%, 8074

27/12/2022-02/01/2022: 1.97%, 13470

03/01/2023-09/01/2023: 6.37%, 42780; pen 10, 4, 2, 1 most affected

10/01/2023-16/01/2023: 4.59%, 28820; pen 11, 10, 1 and 4 most affected

17/01/2023-23/01/2023: 2.82%, 16430; pen 10, 1, 5 most affected

White circular lesions were observed on the fish as well as some 'boils'/raised scales on a few fish both observed on site and during sampling. Bacteriology plates of the lesions were taken on F2, F3 and F4.

Last lice count was conducted on 29/12/2022. Weather and mortality removal have not permitted lice counts on site. Last lice counts were conducted using Optimease (only 7 day withdrawal compared to TMS). Fish are currently off feed.

FW treatment boat is planned to arrive on 30/01/2023 and plan is to prioritise to treat those with least mortality.

No cleanerfish held on site.

Case No: Site No:

Date of Visit: Inspector(s):

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	<input type="text" value="12"/>	Facilities stocked	<input type="text" value="10"/>	No facilities inspected	<input type="text" value="4"/>
Species	<input type="text" value="SAL"/>				
Age group	<input type="text" value="2022 Q2"/>				
No Fish	<input type="text" value="556,017"/>				
Mean Fish Wt	<input type="text" value="2.3kg"/>				
Next Fallow Date (Site)	<input type="text" value="September 2023"/>	Next Input Date (Site)	<input type="text" value="January 2024"/>		
Recent (last 4 wks) disease problems?		<input type="text" value="Y"/>	Any escapes (since last visit)?	<input type="text" value="N"/>	
If yes, detail:	<input type="text" value="CGD, CMS, AGD"/>				

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:

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)?	<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).

Records checked between:	<input type="text" value="20/12/2022-25/01/2023"/>
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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							
Fish nos	1	2	3	4	5							
Pool Group	P1	P2	P3	P4	P5							
Species	SAL	SAL	SAL	SAL	SAL							
Average weight	2.3kg	2.3kg	2.3kg	2.3kg	2.3kg							
Sex	N/A	N/A	N/A	N/A	N/A							
Water Type	SW	SW	SW	SW	SW							
Stock Details	Stock Origin	Girlsta Hatchery (FS0504)	Girlsta Hatchery (FS0504)	Girlsta Hatchery (FS0504)	Girlsta Hatchery (FS0504)	Girlsta Hatchery (FS0504)						
	Facility No	10	10	11	11	11						

01/2023 Additional Sample Information:
 Due to the barge and boat not having sampling facilities, fish had to be taken back to the shore base and sampled. First two fish were killed at 09:07 and the other three fish from pen 11 were killed at 09:30. In addition, media ran out of date on 22/01/2023.

5 Total Tests assigned 6

Case no: 2023-0009

Site No: FS0948

Method of killing: Percussive

Date of visit: 25/01/2023

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)		88mins	88mins	100min	100min	100min				
External Signs										
Behaviour	Moribund	S	S	M	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	W								
	Elsewhere									
Eyes	Exophthalmic									
	Enophthalmic (sunken)									
	Cataract									
	Haemorrhagic									
Gills	Pale	M	M		W	S				
	Zoned	S	S	W	M	M				
	Necrotic									
Lesions	Flank									
	Elsewhere									
Vent	Inflamed									
	Trailing faeces									
Lice Load	Estimate numbers	4	2	2	3	2				
Internal Signs										
Ascites	Clear			W						
	Bloody	M	S							
Oedema	In tissues									
Heart	Pale/anaemic	M	M	M	M	M				
	Granulomas									
	Deformed									
Liver	Petechial haem		W							
	Gross haem									
	Tissue breakdown									
	Enlarged									
	Colour number(s)	3	3	2	3	3				
	Granulomas									
	Lesions									
Pyloric caeca	Petechial haem									
	Tubules mauve									
	Lack of fat									
Spleen	Enlarged	M	M	M	M	M				
	Granulomas									
Gut	No food present	S	S	S	S	S				
	Yellow pseudo-faeces	W	W	W	W	W				
	External haem									
	Internal haem									
Body wall	Haemorrhaging									
Swim bladder	Haemorrhaging									
	Fluid filled									
Kidney	Swollen									
	Grey									
	Granular									
	Liquefied									
General	Parasites present									
	Anaemia									

Case no: 2023-0009

Date of visit: 25/01/2023

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

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	Granular																		
	Liquefied																		
General	Parasites present																		
	Anaemia																		

Additional comments:

Fish 1: Haemorrhaging observed behind the anal fin. Damaged jaw was also observed.

Site No: FS0948
Case No: 2023-0009
Nature of non-compliance:
Action taken (FHI):
Non-compliance relevant to (delete): VirologyMolGen/Bacteriology/Histology/Parasitology



Case No: **2023-0009** Date of visit: **25/01/2023**

Site No: **FS0948** Inspector: **[REDACTED]**

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2 nd Insp
CGDH	5/5	09/02/2023		09/02/2023		16/02/2023		
AMGD	3/5	09/02/2023		09/02/2023		16/02/2023		
CMPS	5/5	09/02/2023		09/02/2023		16/02/2023		
HPAT	5/5	09/02/2023		09/02/2023		16/02/2023		
SULC	3/5	09/02/2023		09/02/2023		16/02/2023		
LPAT	2/5	09/02/2023		09/02/2023		16/02/2023		
SKIN	3/5	09/02/2023		09/02/2023		16/02/2023		
AGDQ	4/5	09/02/2023		09/02/2023		16/02/2023		
IHNP	0/5	09/02/2023		09/02/2023		16/02/2023		
IPNM	3/5	09/02/2023		09/02/2023		16/02/2023		
ISAQ	0/5	09/02/2023		09/02/2023		16/02/2023		
PNST	5/5	09/02/2023		09/02/2023		16/02/2023		
SPVP	5/5	09/02/2023		09/02/2023		16/02/2023		
SALP	0/5	09/02/2023		09/02/2023		16/02/2023		
VHSP	0/5	09/02/2023		09/02/2023		16/02/2023		
VVIS (Isolate A)	4/5	13/02/2023		15/02/2023		16/02/2023		
VSPE (Isolate B)	1/5	13/02/2023		15/02/2023		16/02/2023		
VSPE (Isolate C)	4/5	13/02/2023		15/02/2023		16/02/2023		
VSPE (Isolate D)	3/5	13/02/2023		15/02/2023		16/02/2023		

Report Summary			
Case Type	Date	Insp	2 nd Insp
DIA	22/02/2023		

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS No	FB0125	DATE OF VISIT	25/01/2023
SITE No	FS0948	SITE NAME	Easter Score Holms
CASE No	20230009	INSPECTOR	██████████

Section 1: Summary

The above site was inspected following reports of increased mortality by the farm operator. During the physical inspection of four pens, five fish were removed for diagnostic sampling.

Histopathology examination revealed mild, multifocal, hyperplastic branchitis. Amoebic gill disease was observed, and one fish also displayed features resembling salmon gill poxvirus. *Neoparamoeba perurans* (the causative agent of AGD) and salmon gill poxvirus were also confirmed in all tested fish by qPCR. All fish also tested positive for *Paranucleospora theridion* by qPCR. In addition, fish displayed pathology consistent with cardiomyopathy syndrome (CMS) and tested positive for piscine myocarditis virus by qPCR. Furthermore, mild multifocal hepatic necrosis and bacterial myocarditis were observed. One fish displayed ulcerative dermatitis with the presence of Gram-negative rod -shaped bacteria.

Moritella viscosa was isolated from four of the five fish and due to the level and purity of growth observed it is thought to be implicated in the fish morbidity as a primary pathogen.

Three *Vibrio* spp. isolates were also isolated but the level and purity of growth did not suggest they would be implicated in morbidity of the fish sampled.

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

Following six weeks of reports of increased mortality above the reporting threshold, a site inspection was conducted. The four pens with the highest observed mortality were inspected and approximately 20 moribund and lethargic fish that showed gasping behaviour were observed around the sides in all 4 pens. In addition, specifically in pen 2 and 10, fish were noted to have white circular skin lesions on the flanks, but some were observed to have raised 'boils'. Three to four gravid females were observed per fish sampled. Gill condition in fish removed for sampling, showed ragged and pale gills, with some white lesions observed on the tips.

All fish sampled were lethargic and moribund. All fish were observed to have zoned gills. Open skin lesions were sampled on F2, F3 and F4. Internally, all fish had yellow pseudofaeces present in the hind gut. F1 and F2 exhibited bloody ascites in the cavity when sampled.

Samples

Samples were collected from 1-5 fish according to the table below:

Fish number	Facility number	Species	Stage	Origin
1-2	10	Atlantic salmon	2.3kg 2022 Q2	Girlsta Hatchery (FS0504)
3-5	11	Atlantic salmon	2.3kg 2022 Q2	Girlsta Hatchery (FS0504)

Results

Bacteriology: Kidney and gill material from F1 to F5 fish were inoculated onto appropriate media for the isolation of bacteria. In addition, lesion material from F2, F3 and F4 was inoculated onto appropriate media for the isolation of bacteria.

The following bacteria were isolated:

- *Moritella viscosa*: F2 (Kidney, Lesion, Gill); F3 (Gill); F4 (Lesion, Gill); F5 (Kidney, Gill)
- *Vibrio* spp.:
 - Isolate B found in fish: F4 (Lesion);
 - Isolate C found in fish: F2 (Lesion); F3 & F5 (Kidney); F4 (Kidney, Lesion);
 - Isolate D found in fish: F2 (Kidney, Lesion); F3 & F4 (Lesion, Gill);

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 pancreatic necrosis virus (IPNV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	-	-	-	-	NEGATIVE
F2	18.41	30	29.83	29.91	POSITIVE
F3	15.82	31.19	31.34	31.74	POSITIVE
F4	-	-	-	-	NEGATIVE
F5	20.34	31.71	31.61	31.24	POSITIVE

Salmon gill pox virus (SGPV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.92	28.19	28.4	28.49	POSITIVE
F2	19.4	30.23	30.21	29.99	POSITIVE
F3	19.42	26.2	26.2	26.27	POSITIVE
F4	19.29	24.16	24.16	24.05	POSITIVE
F5	19.67	20.7	20.73	20.56	POSITIVE

Piscine myocarditis virus (PMCV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	19.29	23.89	23.87	23.82	POSITIVE
F2	18.41	21.39	21.7	21.38	POSITIVE
F3	15.82	25.81	25.96	26.07	POSITIVE
F4	16.07	18.13	18.39	18.04	POSITIVE
F5	20.34	21.43	21.38	21.36	POSITIVE

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), infectious salmon anaemia virus (ISAV), salmonid alphavirus (SAV), viral haemorrhagic septicaemia virus (VHSV) and piscine reovirus (PRV).

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	-	-	-	-	NEGATIVE
F2	19.4	34.17	33.18	33.06	POSITIVE
F3	19.42	30.72	30.53	30.43	POSITIVE
F4	19.29	28.67	29.11	28.75	POSITIVE
F5	19.67	30.47	30.25	30.23	POSITIVE

Paranucleospora theridion

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.92	24.92	25.21	25.02	POSITIVE
F2	19.4	27.86	28.24	28.81	POSITIVE
F3	19.42	32.35	32.72	32.81	POSITIVE
F4	19.29	23.81	23.38	23.65	POSITIVE
F5	19.67	25.59	25.94	25.48	POSITIVE

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from F1-F5.

Histopathological examination revealed the following:

Gill: Lamellar hyperplasia and fusion, mild, multifocal and some lamellar necrosis (F1-F5), F2 also displayed some filament bluntness. Occasional to few amoeboid cells resembling *Neoparamoeba perurans* observed in F3, F4 & F5. F4 displayed a plankton-like structure among gill filament and bacteria on the cell debris. F5 exhibited few apoptotic cells shedding off and some nuclei karyorrhexis. Lamellar telangiectasia with multifocal thrombosis and lamellar congestion (F3 & F4).

R09

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

Skin & Muscle: F2, F3 & F4 lesion: Absence of the epidermis, oedema of dermis, mild some inflammatory cell infiltrated, haemorrhage on the dermis and hypodermis, mixed bacteria present.

Heart: Very mild to moderate endocarditis (F1, F4 & F5). F2 displayed few thrombi and cellular inflammation at the edge of the atrium. F3 exhibited nest of basophilic nuclei.

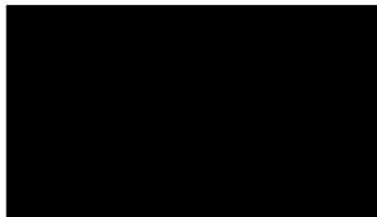
Gut and pyloric caeca: Some cell sloughing (potentially associated with post-mortem artefacts) in F4 & F5.

Pancreas: Within the normal range.

Liver: Foci of sinusoidal haemorrhage (F1), hepatocellular necrosis, mild, multifocal (F2), some foci hepatocellular vacuolation (macrovisicules) (F2).

Kidney: Some shrunken glomeruli and some dilation of the lumen of renal tubules (F1).

Spleen: Within the normal range.



Signed:

Date: 22/02/2023

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/>

Easter Score Holms (FS0948) Diagnostic Photos: 20230009



Figure 1 Fish 1 and Fish 2 overview

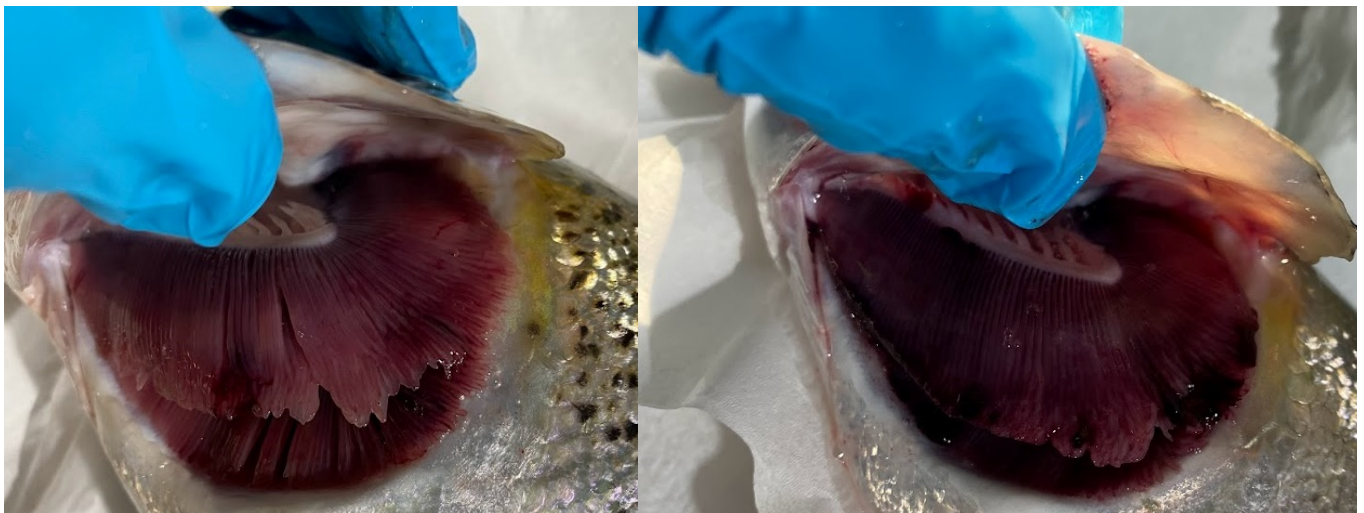


Figure 2 Overview of gills on sampled a) Fish 1 and b) Fish 2



Figure 3 Picture of lesions found on Fish 2.



Figure 4 Internal view of Fish 1. Close-up of the liver haemorrhaging.



Figure 5 Internal view of Fish 2 with bloody ascites visible.



Figure 6 External view of sampled a) Fish 3, b) Fish 4 and c) Fish 5



Figure 7 Picture of gills of Fish 3



Figure 8 Lesion on Fish 3



Figure 9 Internal view of Fish 3



Figure 10 Picture of Gills on Fish 4



Figure 11 Picture of 'boil-like lesion on Fish 4



Figure 12 Internal view of Fish 4



Figure 13 Picture of gill of Fish 5



Figure 14 Internal view of Fish 5