

Case No: 2022-0418 Date of visit: 07/09/2022

Time spent on site: 5hrs Main Inspector: [Redacted]

Site No: FS1259 Site Name: Stulaigh
Business No: FB0119 Business Name: Mowi Scotland Ltd

Case Types: 1 REP 2 DIA 3 [] 4 [] 5 [] 6 []

Water Temp (°C): 13.9 Thermometer No: T152 FHI 045 completed []

Observations: Region: WI Water type: S CoGP MA: W-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:
[Redacted]

Additional Case Information:

Site has reported 2 mortality events in the last 2 weeks (wk33 (1.11%) and wk34 (4.22%)). In total, site has lost 42,073 fish over that 2 week period. Mortalities were attributed to gill infections.

The mortality for the site last week (wk35) reached 3.9% (38,035 fish). Mortalities removed from the site on Monday and Tuesday this week (5th and 6th September) totalled 3.7% (27,377 fish), all being attributed to poor gill health.

In addition to poor gill health, PD, CMS and HSMI have also been detected in the stocks but are currently not contributing to the mortalities on site. Poor gill health has been reported as the primary cause for mortality on the site.

Gills positive for AGD, Branchiomonas, Paranucleospora and Poxvirus in August 22.

Deadhaul harvest completed yesterday, with 12,110 fish removed from two of the worst affected cages (7 and 9). More fish will be harvested next week, potentially moving to live haul. Site plans to harvest all the fish from the 8 worst affected cages (1,2,3,4,6,7,8,9) over the next 8 week period and then monitor the remaining fish.

Whole site was FW treated in June and July 22 and the cages with lower mortalities are due to be treated with FW again next week (wk37). A peroxide treatment was also completed in July 22.

A total of 64,571 lumpfish were input in December 21 and a further 27,359 in August 22. Of the 91,930 lumpfish put into the site, only 32,680 remain. 59,250 mortalities have occurred since input (64%). Only 2 lumpfish were observed across the site and both appeared in poor physical health. They were positioned beyond the reach of the hand net so could not be caught for sampling.

Staff had not been out with sweep nets the day of inspection. There were a lot of visible mortalities in the majority of the cages (~10 in some and between 20-30 in others). The general population were very lethargic and lice were visible on some fish that were sitting high in the water column. Several moribunds were noted across the site. Moribunds were targeted from the worst affected cages and removed for diagnostic sampling.

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Date of Visit: **07/09/2022** Inspector(s): **[REDACTED]**

Registration/Authorisation Details

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

Site Details (include cleaner fish for all sections)

Total No facilities	14	Facilities stocked	14	No facilities inspected	14
Species	SAL LUM				
Age group	Q4	2022.00			
No Fish	716,797	32,680			
Mean Fish Wt	2.3kg	~40g			
Next Fallow Date (Site)	April/May 23		Next Input Date (Site)	October 23	
Recent (last 4 wks) disease problems?			Y	Any escapes (since last visit)?	N
If yes, detail:	Poor gill health				

Movement Records

- 1. Movement records available for inspection? Y
- 2. Date of last inspection: **03/05/2022**
- 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)?
- If yes, is there a system in place for maintenance of transportation records?

Mortality Records

- 1. Mortality records available for inspection? Y
- 2. How are mortalities disposed of? **Other (detail)**
- If other detail: **Fish are collected in bins and stored at the shorebase before going to White Shore Cockels for landfill.**
- 3. Mortality records complete and correctly entered? Y
- 4. Recent mortality (last 4 wks): **See additional comments.**
- 5. Evidence of recent increased/atypical mortalities? Y
- If yes, facility nos/no mortality per facility/no stock per facility/reason: **High mortality over the last month attributed to poor gill health.**
- 6. Any other peaks in mortality during period checked? Y
- If yes, detail: **Wk18: 1.4% (CMS), Wk19: 1.92% (CMS, Handling and Treatment) and Wk21: 1.71% (CMS)**
- 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: T.M.S.
- 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? Y
- 5. If yes, what treatment(s)? T.M.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). PD, CMS, HSMI, AGD and SGPV

Records checked between: 03/05/2022 - 07/09/2022

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								
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		Glenfinnan	Glenfinnan	Loch Garry	Loch Garry	Glenfinnan							
	Stock Origin												
Facility No	10	8	6	1	3								

Case no: 2022-0418

Site No: FS1259

Method of killing:

Date of visit: 07/09/2022

Inspector(s):

Sheet Relevant: Y

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

Fish Number		F1	F2	F3	F4	F5				
Time sampled after death (if > 45 minutes)		45mins	45mins	45mins	45mins	45mins				
External Signs										
Behaviour	Moribund	S	S	S	S	S				
	Lethargic	S	S	S	S	S				
	Hanging vertical									
	Spiralling									
	Flashing									
	Loss of equilibrium					W				
Body	Dark									
	Distended abdomen			M		M				
	Anorexic	M			M					
	Scale Oedema									
Opercula	Shortened			W	W	W				
	Flared									
Haemorrhaging	Throat	W								
	Ventrum	W								
	Base of fins	W								
	Elsewhere									
Eyes	Exophthalmic			W						
	Enophthalmic (sunken)									
	Cataract									
	Haemorrhagic									
Gills	Pale		S	S	S	S				
	Zoned	W								
	Necrotic		M	M	S	S				
Lesions	Flank					W				
	Elsewhere					W				
Vent	Inflamed									
	Trailing faeces									
Lice Load	Estimate numbers		5	8	4	3	2			
Internal Signs										
Ascites	Clear									
	Bloody									
Oedema	In tissues									
Heart	Pale/anaemic	M	S	S	S	S				
	Granulomas									
	Deformed									
Liver	Petechial haem			W						
	Gross haem									
	Tissue breakdown									
	Enlarged									
	Colour number(s)									
	Granulomas									
	Lesions									
Pyloric caeca	Petechial haem					W				
	Tubules mauve									
	Lack of fat									
Spleen	Enlarged		W		M	W				
	Granulomas									
Gut	No food present		M			W				
	Yellow pseudo-faeces	S								
	External haem									
	Internal haem									
Body wall	Haemorrhaging									
Swim bladder	Haemorrhaging									
	Fluid filled									
Kidney	Swollen									
	Grey									
	Granular									
	Liquefied									
General	Parasites present									
	Anaemia									

Additional comments:

F1 - right eye absent.
F5 - sitting at the surface gasping and circling.

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 Site No: **FS1259** Inspector: **[REDACTED]**

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2 nd Insp
MG_SAV	1/5	13/09/2022		13/09/2022		13/09/2022		
MG_ISA	0/5	13/09/2022		13/09/2022		13/09/2022		
MG_VHS	0/5	13/09/2022		13/09/2022		13/09/2022		
MG_PARA_THER_Q	5/5	13/09/2022		13/09/2022		13/09/2022		
MG_SAL_POX	5/5	13/09/2022		13/09/2022		13/09/2022		
MG_AGDQ	5/5	13/09/2022		13/09/2022		13/09/2022		
MG_PMCV	3/5	13/09/2022		13/09/2022		13/09/2022		
VSPE	5/5	28/09/2022		28/09/2022		28/09/2022		
AMGD	3/5	28/09/2022		28/09/2022		28/09/2022		
EPIT	2/5	28/09/2022		28/09/2022		28/09/2022		
CGDH	4/5	28/09/2022		28/09/2022		28/09/2022		
GPAT	4/5	28/09/2022		28/09/2022		28/09/2022		
HPAT	5/5	28/09/2022		28/09/2022		28/09/2022		
LPAT	4/5	28/09/2022		28/09/2022		28/09/2022		
CMPS	4/5	28/09/2022		28/09/2022		28/09/2022		
MG_IHNQ	0/5	28/09/2022		28/09/2022		28/09/2022		
MG_IPN	0/5	28/09/2022		28/09/2022		28/09/2022		

Report Summary			
Case Type	Date	Insp	2 nd Insp
REP	09/09/2022		
DIA	05/10/2022		

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS No	FB0119	DATE OF VISIT	07/09/2022
SITE No	FS1259	SITE NAME	Stulaigh
CASE No	20220418	INSPECTOR	██████████

Section 1: Summary

The site was inspected due to recent mortality reports above the reporting threshold, all attributed to gill issues. Five fish were selected for diagnostic sampling.

Histopathology examination revealed complex gill issues and some vascular disturbance. Amoebic gill disease, confirmed by qPCR, and epitheliocystis (likely *Branchiomonas* sp.) also observed. The fish also displayed myocarditis. Some of the pathology is consistent with cardiomyopathy syndrome (CMS) and this was also confirmed by qPCR. Mild, multifocal hepatic necrosis also observed.

Paranucleospora theridion, salmon gill poxvirus and salmonid alphavirus were detected using qPCR.

Vibrio sp. identified from gill and lesion material, however the level and purity of growth would not suggest it would be implicated as the primary source of morbidity.

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 was inspected due to recent mortality reports above the reporting criteria, all attributed to gill issues and which resulted in the loss of 42,073 fish in a 2-week period. At the time of inspection, the site was stocked with 716,797 Q4 Atlantic salmon at an average weight of 2.3kg originating from Loch Garry and Glenfinnan. These were stocked alongside farmed lumpfish at an average weight of ~40g. All cages were inspected and mortalities were observed in every cage ranging from ~10 in some, to 20-30 in the worst affected cages. The general population was very lethargic with some physical damage noted on some fish. Five moribund fish were removed from cages 1,3,6,8 and 10.

All five fish were moribund and F5 appeared to have lost equilibrium. Externally, F1 and F4 appeared anorexic, while F3 and F5 had distended abdomens. The opercula on F3-5 were shortened and the gills of F2-5 were pale and necrotic. Zoning was observed on the gills of F1. F1 displayed mild haemorrhaging on the throat, ventrum and at the base of the fins. The right eye was absent in F1 and exophthalmia was observed on F3. Lesions were visible on the flank and head of F5 and lice were observed on all fish.

R09

Internally, the hearts of all fish were anaemic/pale. Petechial haemorrhaging was observed on the liver of F3 and on the pyloric caeca of F5. The spleen was enlarged in F2 and F3-4. No food was present in the gut of F2 and F5, with yellow pseudo-faeces observed in the gut of F1.

Samples

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

Fish number	Facility number	Species	Stage	Origin
F1	10	Atlantic salmon	2021 Q4; 2.3kg	Glenfinnan FS0742
F2	8	Atlantic salmon	2021 Q4; 2.3kg	Glenfinnan FS0742
F3	6	Atlantic salmon	2021 Q4; 2.3kg	Loch Garry FS1104
F4	1	Atlantic salmon	2021 Q4; 2.3kg	Loch Garry FS1104
F5	3	Atlantic salmon	2021 Q4; 2.3kg	Glenfinnan FS0742

Results

Bacteriology: Kidney and gill material from F1-5 and lesion material from F5 were inoculated onto appropriate media for the isolation of bacteria.

The following bacterium was isolated:

- *Vibrio* sp. (Gill: 5/5 fish & Lesion: F5)

From the tests conducted, we do not have evidence of resistance to amoxicillin, oxytetracycline, sulphamethoxazole/trimethoprim or florfenicol.

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 gillpox virus (SGPV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.81	30.19	30.28	29.99	POSITIVE
F2	18.76	23.59	23.34	23.50	POSITIVE
F3	18.50	24.17	24.59	24.55	POSITIVE
F4	19.38	24.16	24.03	24.55	POSITIVE
F5	19.23	28.92	28.90	28.60	POSITIVE

Salmonid alphavirus (SAV)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	16.60	32.93	32.97	32.71	POSITIVE
F2	-	-	-	-	Negative
F3	-	-	-	-	Negative
F4	-	-	-	-	Negative
F5	-	-	-	-	Negative

Piscine myocarditis virus (CMS)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	-	-	-	-	Negative
F2	18.05	20.61	20.62	20.65	POSITIVE
F3	-	-	-	-	Negative
F4	17.90	16.83	16.85	16.90	POSITIVE
F5	18.56	23.12	23.07	23.13	POSITIVE

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), infectious salmon anaemia virus (ISAV) 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):

Paranucleospora theridion

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.81	24.53	24.38	24.38	POSITIVE
F2	18.76	26.76	26.89	26.75	POSITIVE
F3	18.50	23.61	23.82	24.15	POSITIVE
F4	19.38	25.39	24.12	25.02	POSITIVE
F5	19.23	27.10	27.09	27.22	POSITIVE

Neoparamoeba perurans (AGD)

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.81	25.04	25.23	25.22	POSITIVE
F2	18.76	32.25	31.27	31.38	POSITIVE
F3	18.50	28.67	29.08	28.52	POSITIVE
F4	19.38	26.67	26.41	26.48	POSITIVE
F5	19.23	30.08	29.84	29.94	POSITIVE

Histology: Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from F1-5. The tissue samples were fixed in 10% neutral buffered formalin.

Histopathological examination revealed the following:

Gill: Lamellar epithelial hyperplasia and hypertrophy with mild, multifocal and lamellar fusion (F1-F3, F5). F5 also displayed an area of haemorrhage and lamellar congestion. All fish exhibited mild vascular disturbance. Several basophilic epithelial inclusions (likely epitheliocystis) observed in F2 and F3 and several amoeboid cells resembling *Neoparamoeba perurans* observed in F2, F3 and F5. —Lamellar telangiectasia with multifocal thrombosis and lamellar congestion. F4 reading hindered by autolysis artefacts.

Skin & Muscle: F2: Absence of the epidermis, some inflammatory cell infiltrated, haemorrhage and foci of necrosis in the dermal outer layer.

Heart: F1 and F3 displayed mild, multifocal cellular infiltration and musculature degeneration in both cardiac chambers and in the spongy and compactum layer. F5 displayed several big thrombi in the ventricle chamber. F2 displayed several foci of inflammatory cell infiltrate and musculature necrosis and F4 more moderate. Mild epericarditis (F2 and F3).

Gut and pyloric caeca: Mild peritonitis (F1, F2 and F4). Cell sloughing (potentially associated with post-mortem artefacts) in all fish.

Pancreas: Within the normal range.

Liver: Hepatocellular necrosis, mild, multifocal (F1-F4), some foci hepatocellular vacuolation (macrovisicules).

Kidney: Occasional necrotic glomeruli (F2). Increased number of melanomacrophage aggregates (F1, F4).

Spleen: Foci of white pulp necrosis and some congestion (F2, F3).



Signed:

Date: 05/10/2022

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/>

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS No	FB0119	DATE OF VISIT	07/09/2022
SITE No	FS1259	SITE NAME	Stulaigh
CASE No	20220418	INSPECTOR	[REDACTED]

Inspection under the Aquatic Animal Health (Scotland) Regulations 2009

The above site was inspected, in accordance with the Aquatic Animal Health (Scotland) Regulations 2009 following a report of increased and unexplained mortalities.

All epidemiological units were inspected.

Samples were taken for diagnostic purposes. A separate report will be issued detailing the results of these tests.

Records

Mortality records were inspected and found to be adequately maintained.

Reports detailing the results of animal health surveillance carried out by or on behalf of the business and/or Marine Scotland were available for inspection.

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

Signed:



Fish Health Inspector

Date: 09/09/2022

The Fish Health Inspectorate Service Charter detailing standards of service is available on the Marine Scotland website at www.gov.scot/Topics/marine/Fish-Shellfish/FHI/charter

Fish 1 -





Fish 2 –



Fish 3 –



Fish 4 –



Fish 5 –



