FHI 059, Version 13	lse	sued by: FHI		Date of it	ssue: 12/05/2020
Case No: 2022-0486				Date of visit:	11/10/2022
Time spent on site: 3	hours		Main Inspector	r:	
Site No:FS1019Business No:FB0169	Site Name: Business Name:	Strondoir Bay Bakkafrost Scotl	and		
Case Types: 1 REP	2 DIA 3	4	5	6	
Water Temp (°C): 12.6	Thermometer No:	T155		FHI 045 comple	ted
Observations:	Region: ST	Water type:	S	CoGP MA:	M-42
Dead/weak/abnormally behaving Clinical signs of disease observe Gross pathology observed? Diagnostic samples taken?		Y If yes, see a	dditional inform	nation/clinical sco nation/clinical sco nation/clinical sco	ore sheet.
UNI/REG only - if unable to carry	out intended visit detail r	eason below:			

#### **Additional Case Information:**

Cleaner fish stocks attributed as black loss. Poor performace of cleaner fish - both wrasse and lumpfish on site. Constant low level mortality since inputs with occasional instant losses after input. AGD identified within stocks but uncertain of cause of mortality. Site considers that no stocks remain on site, although several wrasse observed in some of the cages.

Several moribund fish observed although not in vast numbers. Occasional fish observed with sea lice damage to the head. Diagnostic samples taken from 4 fish.

Additional treatments in cycle - 4 x FW treatments, 1 FW and Salmosan, 4 x slice treatments, 2 rounds of hydrolysing

Case No:       2022-0486       Site No:       FS1019         Date of Visit:       11/10/2022       Inspector(s):         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         10       Facilities stocked       10       No facilities inspected       5         Site Details (include cleaner fish for all sections)         Total No facilities         Species       stamon	FHI 059, Version 13			Issu	ed by: FHI			Date of issu	e: 12/05/2020
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1. Mortality records available for inspection?       Y         2. How are mortalities disposed of?       Whole fish - Dundas Chemicals         If other detail:       Y         3. Mortality records complete and correctly entered?       Y         4. Recent mortality (last 4 wks):       Lost 70,998 fish - 17.37% for past 4 weeks - (wk 37 - 2.88%, 12,407; wk 38 - 5. Evidence of recent increased/atypical mortalities?       Y         If yes, facility nos/no mortality per facility/no stock per facility/reason:       Y         Losses ranging 23-50% per cage since beginning August 2022. Attributed to gill issues. Cage 8 - 50%/19K; cage 4 37%/17k; Cage 3 -38%/17k; cage 2 - 41%/16k. Total loss for period 153k.       Y         6. Any other peaks in mortality following input Oct 2021 (transfer). Following this grumbling mortality through to April       Y         If yes, detail:       2022 (PD). From july onwards 2022, increasing mortality associated with gill issues.       Y         7. Have increased (unexplained) mortalities been reported to vet or FHI?       Y	Mortality Records								
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<ul> <li>5. Evidence of recent increased/atypical mortalities?</li> <li>If yes, facility nos/no mortality per facility/no stock per facility/reason:</li> <li>Losses ranging 23-50% per cage since beginning August 2022. Attributed to gill issues. Cage 8 - 50%/19K; cage 4 37%/17k; Cage 3 -38%/17k; cage 2 - 41%/16k. Total loss for period 153k.</li> <li>6. Any other peaks in mortality during period checked?</li> <li>Some mortality following input Oct 2021 (transfer). Following this grumbling mortality through to April 2022 (PD). From july onwards 2022, increasing mortality associated with gill issues.</li> <li>7. Have increased (unexplained) mortalities been reported to vet or FHI?</li> </ul>	-				fish - 17.37% f	or past 4 week	ks - (wk 37 ·	- 2.88%, 12,4	07; wk 38 -
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Cage 3 -38%/17k; cage 2 - 41%/16k. Total loss for period 153k.         6. Any other peaks in mortality during period checked?       Y         Some mortality following input Oct 2021 (transfer). Following this grumbling mortality through to April 2022 (PD). From july onwards 2022, increasing mortality associated with gill issues.       Y         7. Have increased (unexplained) mortalities been reported to vet or FHI?       Y	If yes, facility nos/no	mortality per	facility/no sto	ock per facility/	/reason:				
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If yes, detail:       2022 (PD). From july onwards 2022, increasing mortality associated with gill issues.         7. Have increased (unexplained) mortalities been reported to vet or FHI?       Y	o. Any other peaks I				(transfor) Fo	llowing this on	umbling ma	rtality through	to April
7. Have increased (unexplained) mortalities been reported to vet or FHI?	If ves, detail				· · · ·	• •	•		no April
	•					associated	with gill 185	uco.	Y
If yes, detail action: Sampling activity - see under results of surveillance		anoxplained)				unveillance			
8. Have 'mortality events' been reported to FHI? If no, enter details on mortality events sheet.		rents' been re					eet.		Y

Treatments and Medicines Records	
1. Recent treatments (see comment)?	Y
If yes, detail: T.M.S.	
FW	
treatment	
finished last	
If other, detail: week	
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?	Y
2. Has the manner and frequency of mortality removal, recording and safe disposal been considered?	Y
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?	Y
4. Has the action that will be taken in the event that the presence or suspicion of the presence of a listed disease	e
is detected been included and how and when that will be notified to Scottish Ministers?	Y
5. Has the health status of aquaculture animals being stocked on the farm site been covered (equal or higher	Y
health status, certification if required)?	
6. Have the husbandry and biosecurity measures implemented between each epidemiological unit to minimise	Y
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	Y
aquaculture animals held on site?	
8. Have the biosecurity procedures been adequately implemented on site?	Y
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, anaemia and AGD	
Records checked between: 12/05/21 to 11/10/2022	

F۲	HI 059, Version 13							lss	ued by:	FHI			
	Case no:	2022-04	186	Site No:	:	FS1019			Date of		11/	10/2022	12/ <sup>-</sup>
	Priority samples:	VI		BA		PA		MG	Samplin	g: HI		l	
	Time sampling starts/ends:	15:4	5:00	17:0	0:00	I	Inspecto	or:			VMD No	D.	0
	Environmental conditions:	1	Indoors	2		3		4		5			
l	Summary samples	HIST	Y	BA	Y	MG	Y	VI		PA		Total Sa	mples
A	dd Fish/Pools - click												
	Pool/Fish No	F1			F4								
	Fish nos	1	2	3	4								
	Pool Group		<b>.</b>		<b>a</b>								
	Species	SAL	SAL	SAL	SAL								
	Average weight	2.2000			2.2000								
	Sex	N/A		N/A	N/A								
	Water Type	SW	SW	SW	SW								
ock Details		Landcatch	Landcatch	Landcatch	Landcatch								

Stock Origin Facility No

3

3

4

4

12/2022	2/2022 Additional Sample Information:													
			dard dia											
4	l	Total To	ests ass	igned	3	ĺ								

FHI 059, Version 13			Issued by: FHI				Date of issue: 12/05				5/202	
Case no:	2022-0486		Site N	o:	FS101	9	Met	hod of	killing:	Anaest	hetic	]
Date of visit:	11/10/20	)22	Inspec	ctor(s):				S	heet Re	elevant:	Y	)
S for strong preser	nce: <b>M</b> for medium presence: <b>W</b>	for weak pre	sence									
Fish Number			2	2 3	4							T I
	er death (if > 45 minutes)											1
External Signs	· ·											1
Behaviour	Moribund			W	W							Į
	Lethargic	S	S	S	S							ļ
	Hanging vertical				_							ļ
	Spiralling				_		_					
	Flashing Loss of equilibrium		-		-							ł
Body	Dark											ł
Body	Distended abdomen											ł
	Anorexic											1
	Scale Oedema											Ì
Opercula	Shortened											1
	Flared											I
Haemorrhaging	Throat											ļ
	Ventrum		W									ļ
	Base of fins											ļ
_	Elsewhere				_							ł
Eyes	Exophthalmic											ł
	Enophthalmic (sunken)											ł
	Cataract Haemorrhagic											ł
Gills	Pale	W	S	s	м							ł
	Zoned	M	S	M	Ŵ		-					ł
	Necrotic	S	Ŵ		Ŵ							1
Lesions	Flank	-										Ì
	Elsewhere											1
Vent	Inflamed											1
	Trailing faeces											Ι
Lice Load	Estimate numbers											I
			_	_								ļ
Internal Signs			<u> </u>									ļ
Ascites	Clear	w	S		-							ł
Oedema	Bloody In tissues	••					_					ł
Heart	Pale/anaemic		W		w							ł
	Granulomas											ł
	Deformed						_					t
Liver	Petechial haem	W										1
	Gross haem											Î
	Tissue breakdown											I
	Enlarged											ļ
	Colour number(s)	3	3 3	3 3	3							ļ
	Granulomas						_					ł
Puloric cost	Lesions Retechiel beem											ł
Pyloric caeca	Petechial haem Tubules mauve											ł
	Lack of fat											ł
Spleen	Enlarged											ł
	Granulomas											t
Gut	No food present	S	S	S	S							t
	Yellow pseudo-faeces				S							1
	External haem											I
	Internal haem											ļ
Body wall	Haemorrhaging	S										ļ
Swim bladder	Haemorrhaging								_			ł
	Fluid filled											ł
Kidney	Swollen				-							ł
	Grey Granular											ł
	Liquefied											ł
General	Parasites present											ł
- viiviui	Anaemia											t

#### FHI 059, Version 13

Case no: 2022-04

Date of visit:

11/10/2022

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

Fish Number						
	r 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					
opicen	Granulomas					
Gut	No food present					
Gui	Yellow pseudo-faeces					
	External haem					
	Internal haem					
Body well						
Body wall Swim bladder	Haemorrhaging					
Swim blauder	Haemorrhaging					
Kidnov	Fluid filled					
Kidney	Swollen					
	Grey					
	Granular	_				
	Liquefied					
- ·						1
General	Parasites present Anaemia					

#### Additional comments:

F1 & F2 - blood clot over the liver. Strong haemorrhaging over gills of F4, weak haemorrhaging over the gills of F2 & F3. Adhesions observed in all fish. F1 showed an area of extensive haemorrage and bruising on the internal wall of the body cavity - sample taken for histology.

Site No: FS1019

Case No: 2022-0486

Nature of non-compliance:

Action taken (FHI):

Non-compliance relevant to (delete): VirologyMolGen/Bacteriology/Histology/Parasitology

FHI 059, Version 13

Case No:	2022-048	6		Date of vis	sit: 11/10/2	022		
Site No:	FS1019			Inspecto	or:			
Results Summary	Freq.			[	Date of Noti	fication		
		Database	Insp	Phone	Insp	Writing	Insp	2 <sup>nd</sup> Insp
ASAL	2/4	03/11/202	2			08/12/2022		
YRUK	1/4	03/11/202	2			08/12/2022		
AERH	2/4	03/11/202	2			08/12/2022		
GPAT	4/4	03/11/202	2			08/12/2022		
EPIT	1/4	03/11/202	2			08/12/2022		
CGDH	4/4	03/11/202	2			08/12/2022		
AGDQ	1/4	03/11/202	2			08/12/2022		
IHNP	0/4	03/11/202				08/12/2022		
IPNM	0/4	03/11/202				08/12/2022		
ISAQ	0/4	03/11/202				08/12/2022		
PMVP	0/4	03/11/202	2			08/12/2022		
SALP	0/4	03/11/202	2			08/12/2022		
PNST	4/4	03/11/202				08/12/2022		
SPVP	4/4	03/11/202	2			08/12/2022		
Report Summary								
Case Type	Date	Insp	2 <sup>nd</sup> Insp					

Report Summary			
Case Type	Date	Insp	2 <sup>nd</sup> Insp
DIA	08/12/20		





# FISH HEALTH INSPECTORATE VISIT REPORT

# SUMMARY FOR INFORMATION OF SITE OPERATOR

 BUSINESS No
 FB0169

 SITE NO
 FS1019

 CASE NO
 20220486

DATE OF VISIT11/10/2022SITE NAMEStrondoir BayINSPECTORInspector

# Section 1: Summary

Following a report of increased mortality, an inspection of the site was conducted and diagnostic sampling undertaken. Increased mortality of over 17% had been experienced for the four weeks preceding the visit and had been attributed to amoebic gill disease and anaemia. Diagnostic samples were taken from 4 fish.

From the case description and information provided by the site and in conjunction with the clinical signs and gross pathology observed, the pathogens identified and histopathological observations from the fish sampled, it is most likely that complex gill disease is the significant factor responsible for the condition of the fish and the mortality being experienced on site.

Histopathology examination revealed features consistent with *Aeromonas salmonicida* (furunculosis) and complex gill issues, along with mild, multifocal hepatic and splenic necrosis.

The bacterial species Yersinia ruckeri and Aeromonas salmonicida subsp. salmonicida were isolated from the samples taken. Both are primary fish pathogens and the level and purity would suggest they are contributary factors in the morbidity of this case. Molecular genetic testing revealed positive results for Neoparamoeba perurans (the causative agent of amoebic gill disease), salmon gill poxvirus and Paranucleospora theridion.

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**

An inspection was conducted in response to increased mortality experienced on the site. During the inspection several moribund fish were observed across the cages inspected. The occasional fish showed damage to the head suspected to be a result of sea lice infestation. Four fish were removed from the site for closer examination and diagnostic sampling. All four fish appeared to be lethargic in behaviour and fish 3 and 4 were moribund. External haemorrhaging across the ventrum was observed on fish 2. All fish had pale and zoned gills which appeared necrotic in fish 1, 2 and 4 and haemorrhagic in fish 2, 3 and 4. Internally, clear ascites (fish 2) and bloody ascites (fish 1) was observed within the body cavity. The heart appeared anaemic in fish 2 and 4. Petechial haemorrhaging was observed across the liver of fish 1, which also showed extensive haemorrhage R09

Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB Tel – 0131 244 3498 Fax – 0131 244 0944 Email – <u>ms.fishhealth@gov.scot</u> Website - <u>www.gov.scot/Topics/marine/science</u> and bruising on the internal wall of the body cavity. None of the fish had food present within the gut and yellow faecal casts were observed within fish 4.

## Samples

Fish number	Facility number	Species	Stage	Origin
1	3	Atlantic salmon	2.2 kg / 2021 S0	Landcatch
2	3	Atlantic salmon	2.2 kg / 2021 S0	Landcatch
3	4	Atlantic salmon	2.2 kg / 2021 S0	Landcatch
4	4	Atlantic salmon	2.2 kg / 2021 S0	Landcatch

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

## <u>Results</u>

R09

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

The following bacteria were isolated from fish F1-F4:

- Yersinia ruckeri: F3 (Kidney);
- Aeromonas salmonicida subsp. salmonicida: F1 & F2 (Kidney)

From the tests conducted, we do not have evidence of either isolates being resistance to amoxycillin, 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).

Fish Number	Endogenous control Cp value		Cp Values		Reported Result (PCR)
F1	22.76	25.76	26.15	26.17	POSITIVE
F2	23.61	28.61	28.75	28.55	POSITIVE
F3	23.52	33.03	32.99	33.32	POSITIVE
F4	23.65	37.91	38.13	38.02	POSITIVE

Salmon gill poxvirus (SGPV)

The samples tested negative for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), infectious salmon anaemia virus (ISAV), piscine myocarditis virus (PMCV), 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).

Fish Number	Endogenous control Cp value		Cp Values	Reported Result (PCR)	
F1	-	-	-	-	Negative
F2	-	-	-	-	Negative
F3	-	-	-	-	Negative
F4	23.65	33.02	32.80	33.09	POSITIVE

Paranucleospora theridion

Fish Number	Endogenous control Cp value		Cp Values	Reported Result (PCR)	
F1	22.76	28.64	28.95	28.92	POSITIVE
F2	23.61	33.20	33.54	32.88	POSITIVE
F3	23.52	32.55	32.47	32.57	POSITIVE
F4	23.65	32.63	32.22	32.13	POSITIVE

**Histology:** Tissue samples of gill, skin and skeletal muscle, heart, pyloric caeca, pancreas, hind gut, liver, spleen and kidney were taken from fish 1-4. The tissue samples were fixed in 10% neutral buffered formalin prior to examination by light microscopy. The following histopathological changes were observed:

<u>Gill:</u> Lamellar hyperplasia, multifocal, several, mild in all fish and presence of several dense aggregates of Gram-negative bacteria (F1 & F2). Filament tip bluntness and necrosis, increase of eosinophilic granular cells at the filament centre observed in F3. Occasional basophilic epithelial inclusions (likely epitheliocystis) (F4). Lamellar telangiectasia with multifocal thrombosis in all fish.

Skin & Muscle: Lesion: musculature necrosis and mild haemorrhage (F1).

<u>Heart:</u> F1 display several small dense aggregates of Gram-negative bacteria in the two chambers. F2 displayed marked epicarditis and displayed a pustule-like lesion filled with mostly neutrophil-like granulocytes.

Gut and pyloric caeca: Mild cell sloughing (potentially associated with post-mortem artefact) (F3).

Pancreas: Within the normal range.

<u>Liver:</u> Hepatocellular necrosis, mild, multifocal (F1, F3, F4) and mild infiltration (F3), some mild, diffuse hepatocellular vacuolation (macrovisicules) (F1- F3).

<u>Kidney:</u> Some renal tubular dilation, some shrunken glomeruli and interstitial cell (haemopoietic) necrosis (F1).

Spleen: cellular necrosis, mild, multifocal (F3), some cuffing (F4).



Date: 8 December 2022

Fish Health Inspector

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

Strondoir Bay – 2022-486





Fish 1 – Pale, zoned, necrotic gills



Fish 2 – Pale, zoned, clumped necrotic gills with slight haemorrhaging



Fish 3 – Pale zoned gills with slight haemorrhaging



Fish 4 – Pale, zoned necrotic gills with haemorrhaging



Fish 1 – Blood clot over the liver. Extensive haemorrhaging and bruising on the internal wall of the body cavity



Fish 2 – Blood clot over the liver