Case No:	2022-0465	Date of visit:	08/11/2022
Time spent on site:	3 hours	Main Inspector:	[redacted]
Site No:	FS1010	Site Name:	East Tarbert Bay
Business No:	FB0169	Business Name:	Bakkafrost Scotland

Case Types: 1 REP 2 DIA 3 4 5 6

Water Temp (°C):	12.9	Thermometer No:	Site	FHI 045 completed	Y

Observations: Region: ST Water type: S CoGP MA: M-46

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 visited 17/8/22 and diagnostic samples taken case 20220342. Identified from samples - AGD, IPN, vibrio, aeromonas spp, Paranucleospora theridion. - PD confirmed onsite along with gill health issues, AGD confirmed onsite.

Weekly morts for site; 19/9 1.21% 7307 fish; 26/9 4.06% 24260 fish; 3/10 10.27% 58941 fish; 10/10 12.85% 66.587 fish; 17/10 8.37% 38559 fish. Freshwater treatment scheduled week 44 - gill health and viral disease.

Morts for week 43 2022 were 48635 fish (11.53%) due to gill issues, PD and rickettsia, week 44 (10.45%), and week 45 (11.89%)

Site thermometer used as error in T146

SLICE treatment 11/9/22; Freshwater on Ronjafisk, 15/9, 11/10, 6/11

Histo health reports; 24/10/22 acute SAV, gills with multiple aetiologies- no amoebae; 18/10/22; gills low level environmental, suspect PRV, low energy stores suggesting fish not feeding. 26/9/22 AGD

Wrasse mortality reported to be low.

Due to poor weather only able to walk round 4 cages. However moribund fish were collected from theses cages.

Case No:	2022-0465	Site No:	FS1010
Date of Visit:	08/11/2022	Inspector(s):	[redacted]

Registration/Authorisation Details

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

Site Details (include cleaner fish for all sections)

Total No facilities		12	Facilities stocked		12	No facilities inspected		4
Species	sal	wrasse						
Age group	2022 S0	wild origin						
No Fish	317,906	not collected						
Mean Fish Wt	797g	mixed						
Next Fallow Date (Site)		May 2024		Next Input Date (Site)		Sept 2024		
Recent (last 4 wks) disease problems?				Y	Any escapes (since last visit)?			N
If yes, detail:	gill issues, PD, Rickettsia							

Movement Records

1. Movement records available for inspection?	Y
2. Date of last inspection:	17/08/2022
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?	Biogas - Barkip
If other detail:	
3. Mortality records complete and correctly entered?	Y
4. Recent mortality (last 4 wks):	2022 wk45 11.89%, wk44 10.45%, wk43 11.53%, wk42 8.37%
5. Evidence of recent increased/atypical mortalities?	Y

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

across site, gill health, SRS, PD

6. Any other peaks in mortality during period checked?	Y
If yes, detail:	mortality ongoing since last visit 17/8/22
7. Have increased (unexplained) mortalities been reported to vet or FHI?	Y
If yes, detail action:	health surveillance and FW treatments for gill issues
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)?	N
If yes, detail:	
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).	PCR +ve AGD, PRV, SAV, SRS, T. matitimum (4.11.22)

Records checked between:	17/8/22- 9/11/22

Case no:	2022-0465	Site No:	FS1010	Date of visit/ Sampling:	08/11/2022	08/1							
Priority samples:	VI		BA		PA		MG		HI				
Time sampling starts/ends:	12:00:00	13:00:00	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	F4	F5	P1						
	Fish nos	1	2	3	4	5	1-5						
	Pool Group	P1	P1	P1	P1	P1							
Stock Details	Species	SAL	SAL	SAL	SAL	SAL	SAL						
	Average weight	700g	700g	700g	700g	700g	700g						
	Sex	N/A	N/A	N/A	N/A	N/A	N/A						
	Water Type	SW	SW	SW	SW	SW	SW						
	Stock Origin	Girlsta Hatchery	Girlsta Hatchery	Girlsta Hatchery	Girlsta Hatchery	Girlsta Hatchery	Girlsta Hatchery						
	Facility No	1	1	1	10	10	1,10						

11/2022 Additional Sample Information:

6 Total Tests assigned 5

Case no: 2022-0465 Site No: FS1010 Method of killing: Percussive

Date of visit: 08/11/2022 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)											
External Signs											
Behaviour	**Moribund**	**S**	**S**	**S**	**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										
	Elsewhere										
Eyes	**Exophthalmic**										
	Enophthalmic (sunken)										
	Cataract										
	Haemorrhagic										
Gills	**Pale**		**S**								
	Zoned										
	Necrotic		**W**								
Lesions	**Flank**	**S**									
	Elsewhere										
Vent	**Inflamed**										
	Trailing faeces										
Lice Load	**Estimate numbers**	**0**	**0**	**0**	**0**	**1**					
Internal Signs											
Ascites	**Clear**	**S**									
	Bloody										
Oedema	**In tissues**										
Heart	**Pale/anaemic**										
	Granulomas										
	Deformed										
Liver	**Petechial haem**										
	Gross haem										
	Tissue breakdown										
	Enlarged										
	Colour number(s)	**1**	**1**	**1**	**1**	**1**					
	Granulomas										
	Lesions										
Pyloric caeca	**Petechial haem**	**W**									
	Tubules mauve										
	Lack of fat			**S**		**S**					
Spleen	**Enlarged**	**S**	**S**	**S**							
	Granulomas										
Gut	**No food present**	**S**	**S**		**S**	**S**					
	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										

Case no: 2022-0465

Date of visit: 08/11/2022

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:

F2- Inflamed hind gut. F3 -fluid filled gut, inflamed hind gut. F5 - runt

Case No: 2022-0465 Date of visit: 08/11/2022

Site No: FS1010 Inspector: [redacted]

Results Summary	Freq.	Date of Notification						
		Database	Insp	Phone	Insp	Writing	Insp	2nd Insp
MG Para Ther	4/5	21/11/2022		22/11/2022		24/01/2022		
MG PRV	0/1	01/12/2022				24/01/2022		
MG IPN	no result					24/01/2022		
MG Pisci	4/5	21/11/2022		22/11/2022		24/01/2022		
MG PMCV	no result					24/01/2022		
MG SAV	no result					24/01/2022		
MG AGD	1/5	22/11/2022		22/11/2022		24/01/2022		
MG Sal pox	4/5	22/11/2022		22/11/2022		24/01/2022		
AERO	3/5	28/11/2022				24/01/2022		
VSPE	4/5	28/11/2022				24/01/2022		
PISH	1/5	01/12/2022				24/01/2022		
EPIT	3/5	01/12/2022				24/01/2022		
GPAT	5/5	01/12/2022				24/01/2022		
CGDH	5/5	01/12/2022				24/01/2022		
LPAT	2/5	01/12/2022				24/01/2022		
ADHE	3/5	01/12/2022				24/01/2022		
SKIN	4/5	01/12/2022				24/01/2022		
HPAT	5/5	01/12/2022				24/01/2022		
IHN V	0/5	02/12/2022				24/01/2022		
MG ISA	no result					24/01/2022		
VHS V	0/5	02/12/2022				24/01/2022		
V IPN	1/5	09/01/2023				24/01/2022		
ISA	0/5	09/01/2023				24/01/2022		
SAV	1/5	09/01/2023				24/01/2022		

Report Summary			
Case Type	Date	Insp	2nd Insp
Daig, Rep	24/01/2022		

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0169	**DATE OF VISIT**	09/11/2022
SITE NO	FS1010	**SITE NAME**	East Tarbert Bay
CASE NO	20220465	**INSPECTOR**	[redacted]

Section 1: Summary

East Tarbert Bay was inspected following reports of increased mortality by the farm operator. During the inspection moribund fish were observed and five fish were removed for diagnostic sampling.

Histopathology examination revealed pathology consistent with salmonid rickettsial septicaemia (SRS). This was confirmed by qPCR in the fish tested.
Gills show multifocal, mild, hyperplasic branchitis associated with complex gill issues. Epitheliocystis (likely *Brachiomonas* sp.) were observed. Fish were confirmed positive by qPCR for *Neoparamoeba perurans* (amoebic gill disease), *Paranucleospora theridion* and salmon gill poxvirus.
The myositis and myocarditis observed could potentially be associated with the presence of salmon alpha virus and F2 displayed musculature lesions resembling HSMI.

Aeromonas sp and *vibrio* sp. were isolated from samples taken. The level and purity of growth would not suggest they would be implicated as the source of morbidity and in the lesion are likely to be present as a secondary infection.

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 has been experiencing on-going increased mortalities since August 2022. The inspectorate has previously visited on 17th August 2022, but mortality issues have persisted and have been further increasing. The reported moralities are attributed to gill health issues, viral disease (salmonid alpha virus) and bacterial disease (*Piscirickettsia salmonis)*. On the day of the inspection adverse weather and sea condition resulted in only 4 of the 12 stocked pens being able to be inspected. However, moribund fish were observed at the pen margins and five were remove for diagnostic examination.

Fish F1 had flank lesions. F2 had pale necrotic gills. Internally, all the fish sampled had pale livers and F2 has ascites. F1- F3 had enlarged spleens. A lack of fat on the pyloric caeca was observed in F3 and F5. None of the fish had food in their guts except for F3 which had yellow pseudo-faeces.

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 five fish according to the table below:

Fish number	Facility number	Species	Stage	Origin
1-3	1	Atlantic salmon	2022 S0 @ 700g	Girlsta Hatchery
4-5	10	Atlantic salmon	2022 S0 @ 700g	Girlsta Hatchery

Results

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

The following bacteria were isolated;

- *Aeromonas* sp.: F1 (Kidney, Lesion); F3 & F4 (Kidney)
- *Vibrio* sp. (isolate 1): F1 (Kidney, Lesion); F4 (Kidney);
- *Vibrio* sp. (isolate 2): F1 (Kidney, Lesion); F2-F4 (Kidney)

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

Piscirickettsia salmonis.

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	18.24	20.11	20.18	19.67	POSITIVE
F2	17.68	34.17	34.16	35.15	POSITIVE
F3	-	-	-	-	negative
F4	18.36	35.05	35.06	40.52	POSITIVE
F5	18.78	35.02	34.65	34.52	POSITIVE

DNA sequence analysis was performed on kidney samples. The results confirmed the QPCR positive amplification of *Piscirickettsia salmonis*.

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 gill poxvirus

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	20.8	27.76	27.62	27.95	POSITIVE
F2	18.95	26.6	26.61	26.51	POSITIVE
F3	17.9	32.54	32.9	32.78	POSITIVE
F4	-	-	-	-	negative
F5	18.66	24.17	24.37	24.24	POSITIVE

The samples were also tested by qPCR for infectious haematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), infectious salmon anaemia virus (ISAV), salmonid

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alphavirus (SAV), viral haemorrhagic septicemia virus (VHSV), piscine reovirus (PRV) and piscine myocarditis virus (PMCV). These tests were reported as no result.

The samples which presented no results by qPCR were run by cell culture for infectious haematopoietic necrosis virus (IHNV), infectious salmon anaemia virus (ISAV), viral haemorrhagic septicemia virus (VHSV), Infectious pancreatic necrosis virus (IPNV) and Salmonid alphavirus (SAV). Fish, F5 tested positive for IPN and fish F2 tested positive for SAV. All other cell culture tests were negative.

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	-	-	-	-	negative
F3	-	-	-	-	negative
F4	-	-	-	-	negative
F5	18.66	33.6	32.95	33.83	POSITIVE

Paranucleospora theridion

Fish Number	Endogenous control Cp value	Cp Values			Reported Result (PCR)
F1	-	-	-	-	negative
F2	18.95	21.62	22.05	21.96	POSITIVE
F3	17.9	24.23	24.31	23.78	POSITIVE
F4	20.62	26.36	26.9	26.64	POSITIVE
F5	18.66	19.58	19.08	19.4	POSITIVE

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

Histopathological examination revealed the following:

Gill: Filament necrosis, focal, mild and presence of few intracellular blue round structures (likely *Piscirickettsia* sp.) (F1). Filament hyperplasia and lamellar fusion mild, multifocal (F2, F3, F4) and diffuse (F5). Few basophilic epithelial inclusions (likely epitheliocystis) (F2, F3, F4). F4 displayed moderate, diffuse inflammatory cell infiltrate in the centre gill filament and branchial arch. Lamellar telangiectasia with multifocal thrombosis and free blood among gill filaments (F2).

Skin & Muscle: Partial absence of epidermal layer, musculature necrosis and degeneration, some inflammatory cell infiltration and haemorrhage, presence of few blue round structures that stained Giemsa positive within the cells (likely *Piscirickettsia* sp.) observed in F1. F2 displayed focally extended degeneration and inflammation of the red muscle and to a lesser extension in F3 & F4.

Heart: Minimal, multifocal necrosis (F1), F2-F5 exhibited mild multifocal inflammatory cell infiltration and fibre degeneration. Mild epicarditis (F2, F4). F5: no atrium.

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Gut and pyloric caeca: Peritonitis, mild, multifocal (F1, F2, F4) and some haemorrhage, presence of some bacteria within the intestinal lumen (F1). F5 displayed absence of abdominal adipose tissue.

Pancreas: Within the normal range.

Liver: Several granulomas (F1 & F5), minimal cuffing (F1).

Kidney: Interstitial cell (haemopoietic) necrosis mild, multifocal (F1 & F2), several renal tubules with hyaline droplets.

Spleen: Capsulitis and some cuffing (F1), foci of cellular necrosis (F2).

Signed: [redacted] Date: 09/01/2023

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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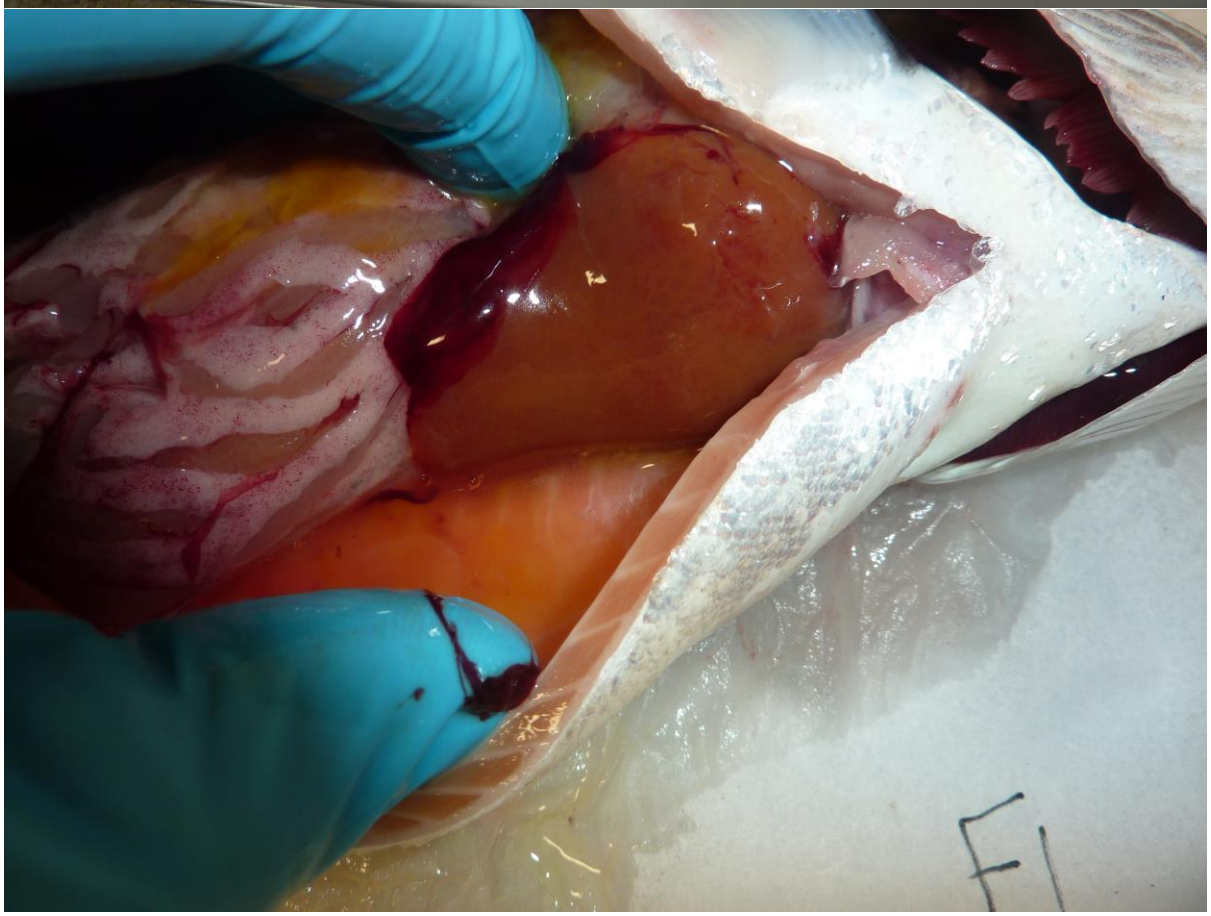
F3
F2


F1


F1


ETB
F4


F5