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**Food Standards Scotland *E. coli* programme
management and analysis**

**Technical Report for January 1st to December 31st
2016**

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Quality statement: This report is a compilation of the information included on the reports provided daily/weekly to FSS and showing the results of the E. coli analyses undertaken on samples submitted via the Official Control programme. All results were quality checked and approved prior to release to FSS and the results compiled in this report have been further checked against a copy of the original reports held on a central database. Information relating to the origin of the samples (place (including co-ordinates), date and time of collection) is as provided by contracted sampling staff and has not undergone verification checks by Cefas.

Executive Summary

This report contains the *E. coli* results for bivalve molluscan shellfish from representative monitoring points (RMPs) tested on behalf of the Food Standards Scotland (FSS) for the period January 1st to December 31st 2016. All analyses were carried out using the EU stipulated reference method for the enumeration of *E. coli* in live bivalve molluscs - ISO TS 16649-3 Microbiology of food and animal feed: – Microbiology of food and animal feeding stuffs – Enumeration of β -glucuronidase positive *Escherichia coli* – part 3: Most Probable Number technique using 5-bromo-4-chloro-3-indolyl- β -D-glucuronide acid (Anon 2005a). Results were expressed as *E. coli* Most Probable Number (MPN) per 100g bivalve flesh and intravalvular fluid. All methods of analysis used are accredited by the United Kingdom Accreditation Service (UKAS) to ISO/IEC 17025 (Anon 2005b).

Bivalve shellfish collected from Shetland were analysed at Shetland Seafood Quality Control (SSQC), Scalloway, under a sub-contracting agreement with Centre for Environment, Fisheries and Aquaculture Science (Cefas). All other samples (collected from 12 locations covering eight local authority areas) were analysed at the Cefas Shellfish Microbiology Laboratory, Weymouth.

A total of 2091 samples were submitted for analysis, just over half of which came from two local authorities: Shetland (598) and Argyll & Bute (586). A further 388 came from Comhairle nan Eilean Siar (Lewis & Harris and Uist & Barra). Together, these three council areas accounted for 75% of the samples submitted. No samples were submitted this year from Caithness, Angus, or the Orkney Islands.

Of the 2091 samples, 598 were analysed at SSQC (Shetland and Orkney) and 1,493 were analysed at Cefas. A total of 30 samples (1.43%) were rejected on arrival at the laboratory. In these cases, sample rejection was due to exceedance of time and/or temperature criteria. Two samples were later rejected due to lab error. Common mussels, Pacific oysters, razor clams and common cockles accounted for 94% of samples. Other bivalve species tested were surf clams, carpet clams, rayed artemis, native oysters, queen scallops and king scallops.

Sampling of scallops (both king and queen) for classification purposes was suspended at the end of July 2016.

The majority of *E. coli* MPN/100g results (94.5%) fell within the expected classification status ascribed to the area i.e. Class A, B or C, [see main body text for classification status definitions] detailed in the Shellfish Harvesting Classifications Scotland: <http://www.foodstandards.gov.scot/shellfish-classification-document-2015-16> . A total of 114 samples returned “outwith” results, i.e. *E. coli* MPN/100g greater than the permitted upper maximum for the classification status of the area. All outwith results were reported to the FSS immediately in accordance with the agreed Laboratory Reporting Procedures. All other results were reported according to a predetermined weekly schedule. Real time results of testing for all RMPs by species, including datasets for the last 5 years, where available, are accessible through the Cefas website: <https://www.cefasc.org.uk/cefasc-data-hub/food-safety/classification-and-microbiological-monitoring/scotland-classification-and-monitoring/shellfish-monitoring-results/>

No significant technical or logistical problems were identified during this reporting period.

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1 Introduction

Bivalve molluscan shellfish (known hereafter as shellfish) can, through the natural process of filter feeding, accumulate faecal borne pathogens (e.g. noroviruses, hepatitis A virus) which may lead to illnesses in the consumer.

In accordance with EU law, shellfish harvesting areas are classified by the Food Standards Scotland (FSS) according to the level of faecal contamination that they are exposed to. This is achieved by monitoring of *Escherichia coli* in shellfish flesh and intravalvular fluid (FIL). In this context *E. coli* is used as an indicator of sewage contamination. Subsequent treatment processes (e.g. depuration, heat treatment) are prescribed according to the classification status of the area. The classification categories are set out in Table 1.

Table 1. Criteria for the classification of bivalve shellfish harvesting areas

Classification category	Microbiological standard ¹	Post-harvest treatment required
Class A	≤ 230 <i>E. coli</i> MPN/100g of flesh and FIL ²	None - shellfish can be harvested for direct human consumption.
Class B	90% of samples must be ≤ 4,600 <i>E. coli</i> MPN/100g; all samples must be less than 46,000 <i>E. coli</i> MPN/100g ³ .	Shellfish can be sold for human consumption: -after purification in an approved plant, or -after re-laying in an approved Class A re-laying area, or -after an EU-approved heat treatment process.
Class C	≤ 46,000 <i>E. coli</i> MPN/100g ⁴	Shellfish can be sold for human consumption only after re-laying for at least two months in an approved re-laying area followed, where necessary, by treatment in a purification centre, or after an EU-approved heat treatment process.
Prohibited	>46,000 <i>E. coli</i> MPN/100g ⁵	Harvesting not permitted

This lays down policy for the monitoring and classification of shellfish harvesting areas in Scotland. The FSS protocol for classification and management document for 2016-17 can be obtained by request from shellfish@fss.scot.

Cefas is contracted by FSS to deliver microbiological monitoring results (*E. coli* MPN/100g flesh and FIL) for all Scottish shellfish production areas. Local sampling officers are responsible for collecting shellfish samples according to a schedule agreed with FSS, which they send under controlled time and temperature specifications (Appendix I) to Cefas Weymouth Laboratory or, for Shetland and Orkney samples only, to Shetland Seafood Quality Control (SSQC), NAFC Marine Centre, Shetland. Cefas collates all results and forwards them to FSS weekly, or in real time in the event of results exceeding the upper maximum for the

¹ The reference method stipulated in Regulation is ISO 16649-3

² By cross reference from Regulation (EC) No 854/2004, via Regulation (EC) No 853/2004, to Regulation (EC) No 2073/2005

³ From Regulation (EC) No 1021/2008

⁴ From Regulation (EC) No 854/2004

⁵ This level is not specified in the Regulation, but does not comply with classes A, B or C. The Competent Authority is able to prohibit any production and harvest of shellfish on the ground of health risk (EURL 2010)

prescribed classification category (described as 'outwith' results) as per agreed laboratory reporting procedures (Appendix II).

All data generated under the Scottish shellfish harvesting classification programme for the last 5 years are available on the Cefas website: <https://www.cefasc.co.uk/cefasc-data-hub/food-safety/classification-and-microbiological-monitoring/scotland-classification-and-monitoring/shellfish-monitoring-results/>

This report presents summary data for the microbiological monitoring for Scotland generated between January 1st and December 31st 2016.

2 Methodology

The EU reference method is followed for enumeration of *E. coli* in shellfish is ISO TS 16649-3 (ISO 2005). Initial preparation of shellfish samples is described in ISO 6887-3 (ISO 2003) and derivation of MPN results is described in ISO 7218 (ISO 2007). The entire method is published as the UK NRL SOP, which is downloadable at: <https://www.cefasc.co.uk/nrl/methods/>

This procedure is transcribed in Cefas SOPs 1172, 1175 and SSQC SOP BM018. Both Cefas and SSQC laboratories hold method-specific accreditation to ISO/IEC 17025 under UKAS testing scope certification No. 2273 and 2651, respectively.

2.1 Receipt and analysis of shellfish

A total of 2091 samples were submitted between January 1st and December 31st 2016 for *E. coli* analysis (SSQC *n*= 598; Cefas *n*=1,493). 1.43% (*n*=30) were rejected on arrival at the laboratory. Sample rejection was due to exceedances of time and/or temperature criteria. Reasons for rejection were: that time between sample collection and arrival at the laboratory exceeded 48 hours and/or sample receipting temperature at the laboratory exceeded 10°C. A further two samples were rejected after analysis due to a lab error. A total of 2,059 valid results were generated between January 1st and December 31st 2016. The number of samples received and analysed by local authority is presented in Table 2.

Table 2. Numbers of samples received and results reported between January 1st and December 31st 2016

Local Authority area	No. of samples received	No. of samples tested	No. of valid results reported (% in parentheses)
Argyll and Bute ¹	586	570 ^a	570 ^b (97.2)
Comhairle nan Eilean Siar: Lewis and Harris	217	217	217 (100)
Comhairle nan Eilean Siar: Uist and Barra	171	167 ^a	167 ^a (97.7)
Dumfries and Galloway	69	63 ^a	63 ^a (91.3)
East Lothian	24	24	24 (100)
Fife	61	59 ^a	59 ^a (96.7)
Highland Council: Lochaber	105	104 ^a	104 ^a (99.0)
Highland Council: Ross and Cromarty	31	31	31 (100)
Highland Council: Skye and Lochalsh	44	44	44 (100)
Highland Council: Sutherland	93	93	93 (100)

Local Authority area	No. of samples received	No. of samples tested	No. of valid results reported (% in parentheses)
North Ayrshire	17	16 ^a	16 ^c (94.1)
Shetland Islands	598	598	598 (100)
South Ayrshire	75	69	69 (92.0)
Total	2091	2061	2059

^a. Exceeded 48 hours from sample collection to receipt at the laboratory and or receipting temperature > 10°C, ^b Rejected on FSS advice due to bed closure, ^c Collected in error, dispatched from North Ayrshire

2.2 Reporting of results

All results were reported in accordance with the agreed laboratory reporting procedures detailed in Appendix II. Results from the programme are available online via the Cefas website:

<https://www.cefas.co.uk/cefas-data-hub/food-safety/classification-and-microbiological-monitoring/scotland-classification-and-monitoring/shellfish-monitoring-results/>

A summary of samples received from each local authority by month is given in Table 3. The breakdown of samples by month was based on the number of samples submitted and in accordance with schedules determined by FSS. Therefore, some samples received and analysed in November were attributed to December.

Table 3. Breakdown of samples received from Local Authorities by month 2016

Local Authority Area	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Argyll and Bute	46	50	52	56	49	50	46	49	44	46	49	43
Comhairle nan Eilean Siar: Lewis and Harris	18	18	18	18	18	18	18	19	18	18	18	18
Comhairle nan Eilean Siar: Uist and Barra	14	14	14	14	11	16	14	14	14	16	14	16
Dumfries and Galloway	6	4	6	6	4	7	6	8	5	5	6	6
East Lothian	2	2	2	2	2	2	2	2	2	2	2	2
Fife	4	11	11	4	4	4	4	3	4	4	3	5
Highland Council: Lochaber	10	8	14	11	9	9	5	9	8	8	5	9
Highland Council: Ross and Cromarty	3	3	3	3	3	3	3	2	2	2	2	2
Highland Council: Skye and Lochalsh	4	4	4	4	4	3	4	3	3	5	3	3
Highland Council: Sutherland	6	9	6	9	11	8	6	7	7	8	8	8
North Ayrshire	2	2	3	2	1	2	1	1	2	1	2	1
Shetland Islands	49	49	51	49	51	51	48	49	50	51	49	51
South Ayrshire	3	3	11	7	8	6	9	3	6	6	6	7

3 Samples received by production area

Summaries of samples for each classified production area follow by local authority.

3.1 ARGYLL & BUTE COUNCIL

Production Area	Species	Site Identification No.	Samples Received	Outwiths	Rejected samples
Ardcastle Bay Oysters	Pacific oysters	AB-634-1280-13	10	0	0
Ardcastle Bay Mussels	Common mussels	AB-635-1281-08	9	1	0
Ardcastle Bay Scallops	Queen Scallops	AB-636-1282-15	8	0	0
Campbeltown Loch	Common cockles	AB-029-008-04 (Kildalloig Bay)	13	0	2
Carradale Bay	Razors	AB-511-930-16	8	0	0
Castle Stalker	Common cockles	AB-492-909-04 (Port Appin)	12	0	0
Colonsay	Pacific oysters	AB-041-1199-13 (The Strand East)	12	1	0
Colonsay East of the Strand	Razors	AB-774-1987-16 (Islands of Colonsay and Oronsay)	7	0	1
Dunstaffnage Cockles	Common cockles	AB-696-1511-04	13	3	0
East Tarbert Bay	Pacific oysters	AB-541-972-13 (Isle of Gigha)	12	3	0
Eriska Shoal	Common cockles	AB-490-907-04	12	2	0
Eriska Shoal Carpet Clams	Carpet clams	AB-547-1006-02	11	0	0
Gallochoille Old Pier	Pacific oysters	AB-699-1519-13	12	0	0
Ganavan Cockles	Common cockles	AB-697-1512-04	12	1	0
Islay	Pacific oysters	AB-094-011-13 (Loch Gruinart Craigens)	11	0	0
Kerrera East	Common cockles	AB-697-1513-04 (Ardantrive)	13	4	0
Kerrera West	Common cockles	AB-697-1514-04 (Oitir Mhor)	10	1	0
Kilfinichen Bay	Common cockles	AB-695-1507-04	12	1	0
Loch A Chumhainn: Inner Deep Site	Pacific oysters	AB-112-017-13	12	0	0
Loch A Chumhainn: Outer	Pacific oysters	AB-113-018-13	12	0	0
Loch Craignish Cockles	Common cockles	AB-786-2028-04 (Ardfern)	12	0	0
Loch Creran Cockles	Common cockles	AB-729-1685-04	13	0	0
Loch Creran Upper Oysters	Pacific oysters	AB-129-021-13 (East – Barrington)	12	1	0
Loch Creran: Rubha Mor	Pacific oysters	AB-130-022-13	12	2	0

Production Area	Species	Site Identification No.	Samples Received	Outwiths	Rejected samples
Loch Creran: Shian	Pacific oysters	AB-131-023-13	3	0	0
Loch Fyne: Ardinglas	Common mussels	AB-147-035-08 (The Point)	5	1	1
Loch Fyne: Ardinglas Oysters	Pacific oysters	AB-147-036-13 (The Shore)	12	1	0
Loch Fyne: Otter Ferry	Pacific oysters	AB-151-039-13 (Balliemore)	12	0	0
Loch Fyne: Otter Point	Common cockles	AB-714-1659-04 (Otter Point)	12	1	0
Loch Fyne: Stonefield	Queen scallops	AB-154-043-15 (North Bay)	8	1	0
Loch Fyne: Stonefield Oysters	Pacific oysters	AB-435-840-13 (North Bay Oysters)	12	1	0
Loch Linnhe	Pacific oysters	AB-172-047-13	11	2	0
Loch Melfort	Common mussels	AB-178-051-08	10	0	0
Loch Melfort Queen Scallops	Queen Scallops	AB-674-1451-15 (Creag Aoil Queen Scallops)	7	1	0
Loch na Cille	Common cockles	AB-617-1204-04	13	0	0
Loch Na Keal	Pacific oysters	AB-284-080-13 (Eilean Liath)	12	0	0
Loch Na Keal West	Pacific oysters	AB-286-082-13 (Eilean Casach)	12	1	0
Loch Riddon Cockles	Common cockles	AB-656-1409-04	12	0	0
Loch Spelve Cockles	Common cockles	AB-767-1963-04 (North West Spelve)	11	1	0
Loch Spelve: Croggan Pier	Pacific oysters	AB-199-055-13	12	0	0
Loch Spelve: North	Common mussels	AB-200-1915-08 (Ardura)	12	0	0
Loch Striven	Common mussels	AB-205-063-08 (Troustan)	13	0	1
Lynn of Lorn: Sgeir Liath	Pacific oysters	AB-318-068-13	12	0	0
Machrie Bay	Razors	AB-510-929-16	7	0	0
North Connel Cockles	Common cockles	AB-758-1909-04 (Ledaig Point Cockles)	12	1	0
Oitir Mhor Bay	Pacific oysters	AB-308-701-13	12	1	0
Peninver Razors	Razors	AB-766-1962-16 (Peninver Razors)	9	0	0
Saddell Bay	Razors	AB-512-931-16	8	0	0
Seil Point	Pacific oysters	AB-245-070-13 (Poll a' Bhrochain Cyster)	12	1	0
Seil Sound East	Common mussels	AB-247-703-08 (East of Balvicar)	12	1	0
Seil Sound North	Pacific oysters	AB-247-735-13 (Balvicar North)	12	2	0
Seil Sound: Balvicar	Pacific oysters	AB-247-728-13 (Rubha nan Ron South)	13	1	1
Sound of Gigha	Razors	AB-515-1250-16	8	0	2
Ulva: Loch Tuath Soriby Bay	Pacific oysters	AB-285-081-13	1	0	0

Production Area	Species	Site Identification No.	Samples Received	Outwiths	Rejected samples
West Jura	Razors	AB-482-805-16	10	1	2

3.2 DUMFRIES AND GALLOWAY COUNCIL

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Fleet Bay Razors	Razors	DG-752-1880-16	14	1	2
Loch Ryan	Native oysters	DG-191-174-12 (Leffnoll Point)	10	7	0
Loch Ryan Cockles	Common cockles	DG-746-1809-04	8	2	0
Loch Ryan Soleburn	Common cockles	DG-762-1935-04	3	1	0
Luce Bay Drummore	Razors	DG-751-1824-16	10	0	1
Luce Bay Razors	Razors	DG-499-865-16 (Luce Sands Razors)	10	0	1
Wigtown Bay: Islands of Fleet	Razors	DG-305-182-16 (Wigtown Bay)	14	0	2

3.3 EAST LoTHIAN

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Gullane Point North	Razors	EL-601-1087-16 (Gullane North)	12	0	0
Gullane Point South	Razors	EL-703-1525-16 (Gullane South)	12	0	0

3.4 FIFE COUNCIL

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Fife Ness Surf Clams	Surf clams	FF-771-1974-19 (Kingsbarns)	18	0	0
Firth of Forth: North	Surf clams	FF-068-184-19 (Anstruther)	13	2	1
Forth Estuary: Largo Bay	Razors	FF-072-188-16	12	0	0
Forth Estuary Surf Clams	Surf clams	FF-772-1975-19 (Shell Bay)	18	2	1

3.5 HIGHLAND COUNCIL: LOCHABER

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Arisaig	Pacific oysters	HL-004-202-13 (Sgeirean Buidhe)	12	1	0
Camas Garbh Artemis	Rayed artemis	HL-769-1969-05 (Sound Of Sleat Artemis)	1	0	0
Camas Garbh Clams	Carpet clams	HL-765-1961-02 (Sound Of Sleat Clams)	9	0	1
Loch Ailort	Common mussels	HL-114-937-08 (Eilean Dubh)	10	1	0
Loch Ailort 3	Pacific oysters	HL-114-207-13 Camus Driseach	11	0	0
Loch Beag	Common mussels	HL-118-215-08 Ardnambuth	10	1	0
Loch Eil	Common mussels	HL-134-216-08 Duisky	10	1	0
Loch Eil: Fassfern	Common mussels	HL-136-219-08 Fassfern	10	0	0
Loch Leven: Lower	Common mussels	HL-170-222-08 Lower	6	1	0
Loch Leven: Upper	Common mussels	HL-171-223-08 Upper	6	4	0
Loch Moidart	Pacific oysters	HL-179-227-13 South Channel	10	0	0
Loch Sunart	Common mussels	HL-206-1237-08 Liddesdale	10	0	0

3.6 HIGHLAND COUNCIL: SUTHERLAND

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Dornoch Firth	Common mussels	HS-054-239-08	3	0	0
Dornoch Firth 2	Common mussels	HS-466-876-08 (Meikle Ferry)	3	0	0
Kyle of Durness	Pacific oysters	HS-773-1984-13 (Keoldale)	12	0	0
Kyle of Tongue	Pacific oysters	HS-103-303-13 K	12	0	0
Loch Eriboll	Common mussels	HS-139-307-08 (Loch Eriboll – MacLennan)	11	1	0
Loch Glencoul	Common mussels	HS-157-310-08 (Kylesku)	13	0	1
Loch Inchard	Common mussels	HS-162-311-08 (Site 1 - D. Ross)	13	1	0
Loch Laxford	Common mussels	HS-167-320-08 (Weavers Bay)	13	1	0
Tongue Bay Razors	Razors	HS-788-2068-16	13	0	0

3.7 COMHAIRLE NAN EILEAN SIAR: LEWIS AND HARRIS

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Broad Bay Aiginish	Razors	LH-743-1740-16	12	1	0
East Loch Tarbert	Common mussels	LH-057-104-08 (Fuam an Tolla)	1	0	0
East Loch Tarbert	Common mussels	LH-057-106-08 (Sound of Scalpay)	11	0	0
Loch Erisort: Garbh Eilean	Common mussels	LH-357-747-08	12	2	0
Loch Erisort: Gob Glas	Common mussels	LH-357-711-08	12	2	0
Loch Leurbost	Common mussels	LH-168-114-08	12	0	0
Loch Leurbost: Crosbost	Pacific oysters	LH-339-795-13 (Site 1 Crosbost)	12	1	0
Loch Roag: Barraglom	Common mussels	LH-185-120-08	12	1	0
Loch Roag: Ceabhagh	Common mussels	LH-381-772-08 (Keava)	12	0	0
Loch Roag: Drovinish	Common mussels	LH-186-121-08	12	0	0
Loch Roag: Eilean Chearstaigh	Common mussels	LH-344-791-08 (Buckle Point)	12	0	0
Loch Roag: Eilean Teinish	Common mussels	LH-338-720-08	12	0	0
Loch Roag: Linngeam	Common mussels	LH-187-122-08	12	0	0
Loch Roag: Miavaig	Common mussels	LH-188-123-08	12	0	0
Loch Roag: Torranish	Common mussels	LH-189-124-08	12	1	0
Loch Seafort	Common mussels	LH-193-126-08	12	1	0
Loch Stockinish	Common mussels	LH-203-127-08	12	0	0
Seilebost	Common cockles	LH-249-129-04	12	1	0
Tong Sands	Common cockles	LH-605-1100-04	13	1	0

3.8 NORTH AYRSHIRE COUNCIL

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Arran: Lamlash Bay	Common mussels	NA-007-329-08	3	1	0
Arran: Pirmill	Razors	NA-008-330-16	1	0	0
Fairlie	Pacific oysters	NA-065-332-13 (Southannan Sands)	13	0	1

3.9 HIGHLAND COUNCIL: ROSS AND CROMARTY

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Inner Loch Torridon	Common mussels	RC-090-1616-08 (Dubh Aird)	12	1	0
Loch Kanaird	Pacific oysters	RC-625-1233-13 (Ardmair)	12	2	0
Loch Ewe & Loch Thurnaig Scallops	King scallops	RC-142-250-07 (Loch Ewe)	7	2	0

3.10 SOUTH AYRSHIRE COUNCIL

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Ballantrae Razors	Razors	SA-780-1999-16	13	0	1
Croy bay	Razors	SA-681-1482-16 (Culzean Bay)	13	1	1
Girvan South Razors	Razors	SA-778-1997-16	14	0	1
Lendalfoot Razors	Razors	SA-776-1995-16	13	0	1
Meikle Craigs Annual	Razors	SA-643-1316-16 (Meikle Craigs)	9	0	1
North Bay	Razors	SA-337-719-16 (Barassie)	13	0	1

3.11 SHETLAND ISLANDS

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Aith Voe Sletta	Common mussels	SI-326-733-08 (Slyde)	12	0	0
Baltasound Mussels	Common mussels	SI-010-395-08 (Baltasound Harbour)	12	0	0
Basta Voe Cove	Common mussels	SI-324-399-08 (Inner - Site 1 – Thomason)	12	1	0
Basta Voe Outer	Common mussels	SI-323-403-08 (Outer)	12	2	0
Brindister Voe	Common mussels	SI-023-406-08	12	1	0
Busta Voe Lee North	Common mussels	SI-327-755-08 (Hevden Ness)	12	1	0
Busta Voe Lee South	Common mussels	SI-328-767-08 (Greentaing)	12	0	0
Catfirth	Common mussels	SI-032-412-08	12	0	0
Clift Sound Houss	Common mussels	SI-633-1270-08	12	0	0
Clift Sound: Booth	Common mussels	SI-036-413-08 (Booth)	12	1	0
Clift Sound: Stream Sound	Common mussels	SI-035-414-08 (East Hogaland)	12	0	0
Clift Sound: Whal Wick	Common mussels	SI-038-1522-08 (Wester Quarff)	12	0	0
Dales Voe - Fora Ness	Common mussels	SI-502-869-08 (West Taing)	12	0	0
Dales Voe: Scarvar Ayre	Common mussels	SI-050-420-08	12	0	0
Eshanness Mussels	Common mussels	SI-785-2013-08	14	0	0
Gon Firth	Common mussels	SI-076-423-08 (Cole Ness)	12	0	0
Gruting Voe: Braewick Voe	Common mussels	SI-080-424-08	12	0	0
Gruting Voe: Browland Voe	Common mussels	SI-081-425-08	12	0	0
Gruting Voe: Quilse	Common mussels	SI-083-427-08	12	0	0
Gruting Voe: Seli Voe	Common mussels	SI-084-428-08	12	0	0
Hamar Voe	Common mussels	SI-655-1404-08	12	1	0
Hamnavoe	Common mussels	SI-348-736-08 (Copister)	11	1	0
Lang Sound	Common mussels	SI-107-429-08	12	1	0
Lee of Vollister	Common mussels	SI-760-1920-08 (Whale Firth)	10	0	0
Mid Yell Voe	Common mussels	SI-216-432-08 (Seafield)	12	0	0
Mid Yell Voe East	Common mussels	SI-797-2083-08 (Bunya Sand)	7	0	0
Muckle Roe	Common mussels	SI-221-433-08 (Pobies Geo)	12	1	0
North Uyea	Common mussels	SI-230-453-08 (North)	12	0	0
Olna Firth Inner	Common mussels	SI-232-435-08 (Inner)	12	0	0

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Olna Firth Outer	Common mussels	SI-232-434-08 (Foula Wick)	12	0	0
Papa Little Voe	Common mussels	SI-235-1350-08 (Millburn)	12	0	0
Ronas Voe East	Common mussels	SI-523-919-08 (Clifts)	12	0	0
Ronas Voe Mussels 2	Common mussels	SI-522-918-08 (West Of Black Well)	12	0	0
Sandsound Voe	Common mussels	SI-242-443-08	12	1	0
South of Houss Holm	Common mussels	SI-261-444-08	12	0	0
South Uyea	Common mussels	SI-263-454-08 (South)	12	1	0
South Voe Mussels	Common mussels	SI-421-825-08	12	1	0
Stream Sound: Ux Ness	Common mussels	SI-373-1096-08 (Easterdale)	12	1	0
Stromness Voe	Common mussels	SI-273-467-08 (Burra Holm)	12	0	0
The Rona	Common mussels	SI-517-944-08 (Aith Ness)	12	0	0
Uyea Sound	Common mussels	SI-441-845-08 (Cow Head)	12	0	0
Vaila Sound Linga	Common mussels	SI-288-457-08 (Linga)	12	1	0
Vaila Sound: East of Linga and Galtaskerry	Common mussels	SI-288-1061-08 (Whitesness)	12	1	0
Vaila Sound: Riskaness	Common mussels	SI-289-458-08	12	2	0
Vementry North	Common mussels	SI-322-464-08 (Suthra Voe West)	12	0	0
Vementry South	Common mussels	SI-321-459-08 (Clousta Voe – Noonsbrough)	12	0	0
Wadbister Voe	Common mussels	SI-294-466-08	12	0	0
Weisdale Voe	Common mussels	SI-297-469-08 (North Flotta)	12	2	0
Weisdale Voe Upper	Common mussels	SI-378-1521-08 (Olligarth)	12	1	0
West of Lunna	Common mussels	SI-380-770-08 (Cul Ness)	16	0	0

3.12 HIGHLAND COUNCIL: SKYE AND LOCHALSH

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Kishorn Razors	Razors	SL-802-2089-16 (Strome Islands)	1	0	0
Loch Eishort	Common mussels	SL-137-281-08 (Drumfearn)	12	0	0
Loch Harport: Inner	Pacific oysters	SL-159-286-13 (Carbost)	11	0	0
Loch Harport Inner Cockles	Common cockles	SL-159-286-04 (Carbost)	12	0	0
Loch Hourn Razors	Razors	SL-801-2088-16 (Barrisdale Bay)	1	0	0
Loch Sligachan	King scallops	SL-195-291-07	7	0	0

3.13 COMHAIRLE NAN EILEAN SIAR: UIST & BARRA

Production Area	Species	Site	Samples Received	Outwiths	Rejected samples
Caolas Bhearnaraigh	Razors	UB-735-1706-16	14	0	1
Caolas Eiriosgaigh Razors	Razors	UB-684-1485-16 (Eiriosgaigh Razors)	12	0	1
Cidhe Eolaigearraidh	Pacific oysters	UB-427-830-13 (Sound Of Barra: Pacific Oysters)	13	1	1
Garbh Lingeigh	Pacific oysters	UB-713-1622-13	12	4	0
North Ford	Common cockles	UB-493-852-04 (Oitir Mhor)	12	0	0
North Uist 2	Common mussels	UB-540-969-08 (Lochmaddy)	12	1	0
Oitir Mhor Razors	Razors	UB-683-1484-16 (Rubha nan Eun)	12	1	0
South Ford	Common cockles	UB-259-162-04	12	0	1
South Ford Faoileann	Razors	UB-734-1705-16	11	0	0
South Uist 1	Common mussels	UB-537-966-08 (Loch Skipport East)	12	0	0
Traigh Cille Bharra Cockles	Common cockles	UB-392-790-04	12	2	0
Traigh Cille Razors	Razors	UB-711-1574-16	12	0	0
Traigh Mhor	Common cockles	UB-282-165-04	13	0	1
Traigh Mhor Razors	Razors	UB-615-1194-16	12	1	0

4 Outwith results between 1st January and 31st December 2016

The number of outwith results i.e. those which exceeded the upper *E. coli* MPN/100g for the extant classification status are reported for all classified production areas by local authority in Table 3.

Table 3. Outwith results between 1st January and 31st December 2016

Local Authority area	No. of valid results reported	No. of outwith results (% in parentheses)
Argyll and Bute	577	37 (6.4)
Comhairle nan Eilean Siar: Lewis and Harris	217	11 (5.1)
Comhairle nan Eilean Siar: Uist and Barra	166	10 (6.0)
Dumfries and Galloway	63	11 (6.9)
East Lothian	24	0 (0)
Fife	59	4 (6.8)
Highland Council: Lochaber	104	9 (9.4)
Highland Council: Ross and Cromarty	31	5 (16.1)
Highland Council: Skye and Lochalsh	44	0 (0)
Highland Council: Sutherland	93	3 (3.2)
North Ayrshire	16	1 (6.25)
Shetland Islands	598	21 (3.5)
South Ayrshire	69	1(1.44)
Total	2061	113 (5.5%)

5 References

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Number technique using 5-bromo-4-chloro-3-indolyl- β -D-glucuronide acid.
International Organization for Standardization, Geneva.

ISO 2005 ISO/IEC 17025. General requirements for the competence of testing and
calibration laboratories. International Organization for Standardization, Geneva.

6 Appendix I

Rejection criteria for samples for *E. coli* analysis⁶ version 2

- All samples must be appropriately labelled so as to enable accurate identification of individual samples;
- If multiple samples are packed in a single coolbox each sample must be contained within an intact sample bag (so as not to leak and cause potential contamination of other samples in the coolbox);
- Shellfish must not be immersed in water or mud/sand.
- No more than 48 hours⁷ should have elapsed between sample collection⁸ and the start of testing⁹;
- Sample temperature –
 - *Where the time elapsed between sample collection and receipt at the laboratory is **more than** 4 hours:* the sample temperature (or water sample, if measured) should be between 1°C and 10°C. Where the temperature exceeds >10°C samples should be rejected;
 - *Where the time elapsed between sample collection and receipt at the laboratory is **less than** 4 hours:* the sample temperature (or water sample, if measured) should be less than the temperature at the time of sampling, or between 1°C and 10°C;
 - Samples should not be frozen.
- No analysis can be undertaken on less than 10 individual live shellfish per sample. May be also the amended one

⁶ Sample rejection criteria are derived from recommendations of the UK NRL for the laboratory testing of bivalve molluscs for the classification of bivalve mollusc harvesting areas under Regulation (EC) No. 854/2004 <https://www.cefas.co.uk/nrl/>

⁷ Cut off point for rejected samples 48 hours and 29 minutes.

⁸ Sample collection is the time at which shellfish are removed from the bed.

⁹ Start of testing is defined as the time at which opening and homogenising (shucking) of shellfish begins.

Appendix II

Laboratory reporting procedures – *E. coli*

The supplier shall:

1. Report results of samples to the Clients office in Scotland, using e-mail distribution lists provided by the client.
2. Report all results using electronic reporting templates agreed during the transition period.
3. Inform the client by telephone followed up by email of any difficulty or failure to deliver the required service.
4. Notify the client and local authority/sampling officer within 2 hours of assessment of any rejected samples.
5. Prioritise the reporting of results of samples from incidents of human illness.
6. In the event that results are delayed, the Supplier will advise the designated contact of reasons for the delay.
7. Immediately inform the client by telephone followed by an email (informing the client) of any results which exceed the classification status for the production area in any given month. For avoidance of doubt this is results of greater than 230 *E. coli* /100g in a class A area; greater than 4,600 in a class B area; greater than 46,000 in a class C area; or where the laboratory results are reported as >18,000.
8. Provide a weekly summary of results of all analyses by 15:00 Tuesday of samples analysed in the previous week (Mon-Fri) (with the exception of bank holidays and a two week period around Christmas).
9. Place the results in a spreadsheet compatible with the SHS 2 database as soon as they become available or work with the client towards direct entry of results into SHS 2.
10. Maintain the results of the clients *E. coli* monitoring programme. This information will be used to compile reports, provide information as necessary and for any annual or other reports and reviews or to answer *ad hoc* enquiries about the results. All data are the property of the client.
11. Provide a draft annual report on the *E. coli* results generated under the scope of this Schedule by calendar year by February 28th each year. The client will submit comments within one month of receipt of the draft annual report.
12. Submit the finalised annual report within one month of receipt of comments from the Client. Should no Client comment be received by the agreed deadline the draft report will be finalised and submitted.

13. Place results on the Supplier website in the agreed format.