

Not to be cited without prior reference to Marine Scotland, Marine Laboratory, Aberdeen

MRV *Alba na Mara*

Survey 1922A

PROGRAMME

29 November – 3 December 2022

Ports

Loading: Leith, Friday 25 November 2022

Sailing: Leith, Tuesday 29 November 2022

Unloading: Leith, Saturday 3 December 2022

In setting the survey programme and specific objectives, etc. the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the Survey Report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

Sampling Gear:

BT 158 with 50 mm cod-end

2 m beam trawl with 50 mm cod-end

Day grab and table

Catamaran and neuston net

Objectives

1. To undertake flatfish sampling in St Andrews Bay, Inner Firth of Forth and the Forth estuary (Tancred) in support of the Clean Seas Environment Monitoring Programme (OSPAR and UK MS).
2. To undertake sediment sampling in the St Andrews Bay, Inner Firth of Forth and the Forth estuary in support of the Clean Seas Environment Monitoring Programme (OSPAR and UK MS).
3. To undertake survey of sea-surface litter in surface waters of the Forth and Scottish east coast and record seabed litter collected by the trawls (UK MS D10).

Estimated Days per Project: 3 days ST04a (OSPAR & MSFD D8); 2 day ST04c (MSFD D10)

Procedure

Fishing and scientific gear will be loaded in Leith at the end of the previous survey, prior to *Alba na Mara* sailing on 29 November. Flounder will be sampled in St Andrews Bay and in the Forth estuary (Tancred bank), dab will be sampled in the Inner Firth of Forth. Five sediment stations will be sampled at each sampling region (St Andrews Bay, Inner Firth of Forth and

the Forth estuary), and at each station one grab will be taken for contaminants. The neuston trawl (catamaran) will be deployed in the Firth of Forth using specific coordinates provided in Table 4 and each tow will last 30 minutes. This net is to be towed at five knots, or less, for 30 minutes in order to collect and sample microplastics floating on the sea surface. Records will be made of seabed litter caught by the trawls.

Tables 1, 2 and 4 list the sediment, fishing and sea surface litter survey sites, respectively.

On completion of this survey, passage will be made to Leith from where all scientific gear and samples will be transferred to MSS (Aberdeen).

General Arrangements

Liquid nitrogen and other chemicals (e.g. methanol, formalin) will be carried aboard for the preservation and storage of biological material.

Normal contacts will be maintained with the Laboratory.

Submitted:

M Campbell

21 November 22

Approved:

I Gibb

22 November 2022

Table 1: Sediment sampling locations.

Region	Area	Site	decLat	decLong	Lat	Long
Forth	Inner Offshore	Kingston Hudds	56.097	-2.923	56 05.80N	002 55.40W
Forth	Inner Offshore	Fairway Buoy	56.050	-3.002	56 03.00N	003 00.09W
Forth	Inner Offshore	Firth of Forth 49	56.119	-2.862	56 07.14N	002 51.74W
Forth	Inner Offshore	Firth of Forth 38	56.080	-2.987	56 04.79N	002 59.22W
Forth	Inner Offshore	Firth of Forth 33	56.049	-3.046	56 02.95N	003 02.74W
Forth	Lower Forth Estuary	LFE GC	56.016	-3.486	56 00.96N	003 29.16W
Forth	Lower Forth Estuary	Tancred	56.005	-3.509	56 00.28N	003 30.54W
Forth	Lower Forth Estuary	Crombie	56.030	-3.531	56 01.80N	003 31.86W
Forth	Lower Forth Estuary	LFE FEEAP station 7 (from 2011)	56.028	-3.543	56 01.68N	003 32.58W
Forth	Lower Forth Estuary	LFE EB (from 2012)	56.014	-3.454	56.00.84N	003 27.24W
E Scotland	St Andrews Bay	St Andrews Bay @ surveillance site 1	56.362	-2.628	56 21.72N	002 37.68W
E Scotland	St Andrews Bay	St Andrews Plankton Station 15	56.438	-2.660	56 26.28N	002 39.60W
E Scotland	St Andrews Bay	St Andrews Bay @ surveillance site 2A	56.346	-2.616	56 20.76N	002 36.96W
E Scotland	St Andrews Bay	St Andrews Bay	56.373	-2.698	56 22.38N	002 41.88W
E Scotland	St Andrews Bay	St Andrews Bay – mid trawl	56.376	-2.749	56 22.56N	002 44.94W

Table 2: Proposed fishing locations and fish requirements.

Region	Site	decLat	decLong	Lat	Long	Species	Gear	BE	Chem
E Scotland Coast	St Andrews Bay	56.360	-2.750	56 21.60N	002 45.00W	Flounder	Bottom trawl	50	25
Inner Firth of Forth	Kingston Hudds	56.130	-2.901	56 07.80N	002 54.06W	Dab	Bottom trawl	50	25
Lower Forth Estuary	Tancred Bank	56.030	-3.560	56 01.80N	003 33.60W	Flounder	Beam Trawl	50	25

Table 3: Fish sample preparation requirements.

Full sampling details in SOP 0820 and SOP 0830.

	Flounder	Dab
Total number of fish required	50	50
Size range of fish required	20 – 35 cm	20 – 30 cm
Disease	50	50
Blood	25	25
Bile	25	25
Liver (S9 fraction EROD)	15 MALES	15 MALES
Liver (histology)	50	50
Liver (metals) (~ 2g)	25 (5 pools)	25 (5 pools)
Liver (chemistry) (> 4g)	25 (5 pools)	25 (5 pools)
Gonad (histology)	All MALES only	All MALES only
Otolith	50	50
Flesh (metals) (> 10g)	25 (5 pools)	25 (5 pools)
Flesh (chemistry) (> 30g)	25 (5 pools)	25 (5 pools)

Table 4: Proposed neuston net (sea surface litter) sampling start locations.

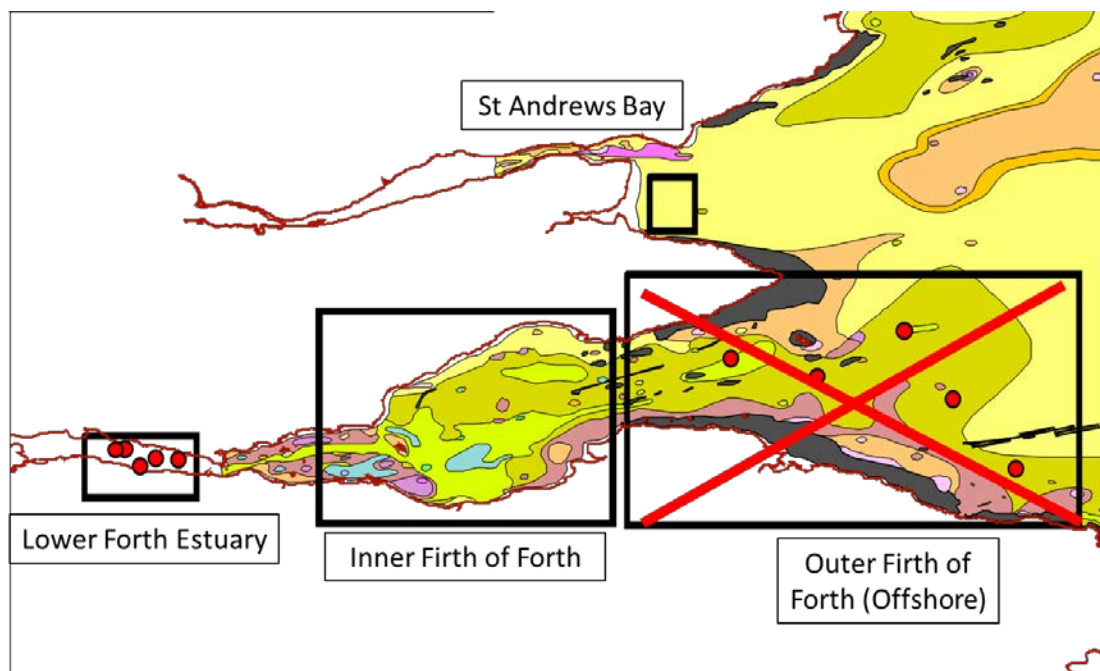
Station	Field ID	decLat	decLong	Lat	Long
Forth 1	FoF1	56.025	-3.551	56 01.50N	003 33.06W
Forth 2	FoF2	56.011	-3.448	56 00.66N	003 26.88W
Forth 3	FoF3	56.008	-3.382	56 00.48N	003 22.92W
Forth 4	FoF4	56.020	-3.098	56 01.20N	003 05.88W
Forth 5	FoF5	56.111	-2.848	56 06.66N	002 50.88W
Forth 6	FoF6	56.081	-2.981	56 04.86N	002 58.86W

Table 5. Sub-sampling requirements for sediment collection				
Analysis type	Scoop / spatula	Beaker	Storage container	Required amount
<i>Metals/TOC¹</i>	Plastic	Plastic	Plastic bag 9 x 13 cm	1/3 filled
<i>PSA²</i>	Plastic	Plastic	Plastic tub (PSA)	1/3 filled
<i>Hydrocarbons (including PAHs)</i>	Metal	Metal	Solvent washed Aluminium can	3/4 filled
<i>CBs/ PBDEs</i>	Metal	Metal	Solvent washed Aluminium can	3/4 filled
<i>Organotins</i>	Metal	Metal	Solvent washed Aluminium can	3/4 filled
<i>Asbestos</i>	Plastic	Plastic	Plastic bag 6 x 6 cm	1/2 filled

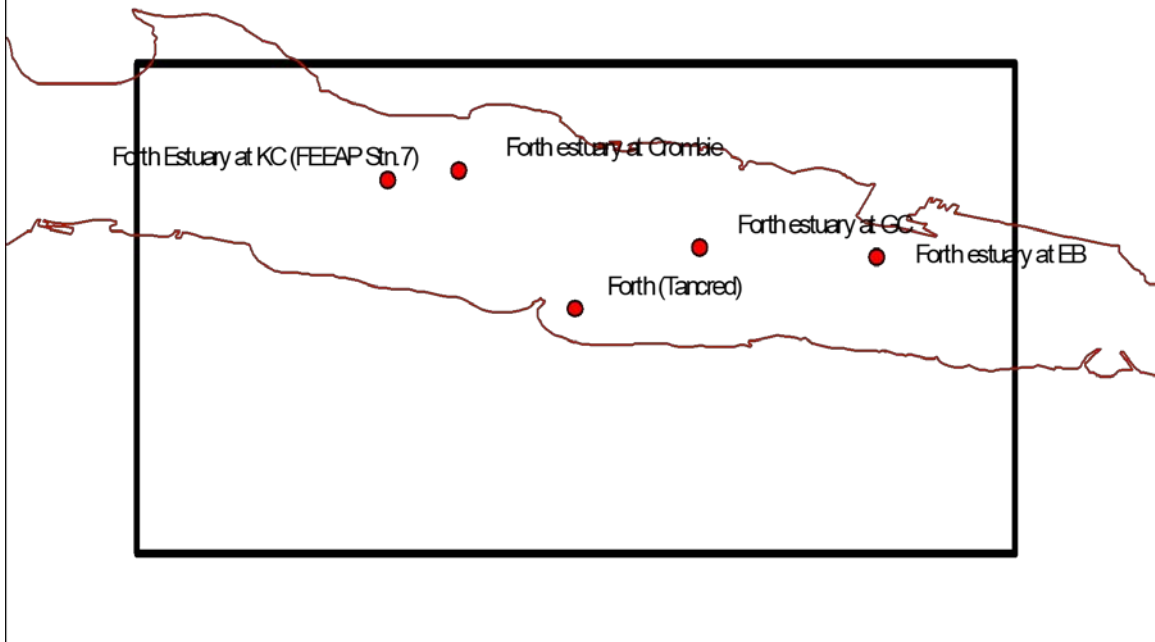
¹ Total Organic Carbon

² Particle Size Analysis

Maps of sampling regions



Lower Forth Estuary



St Andrews Bay



Inner Firth of Forth

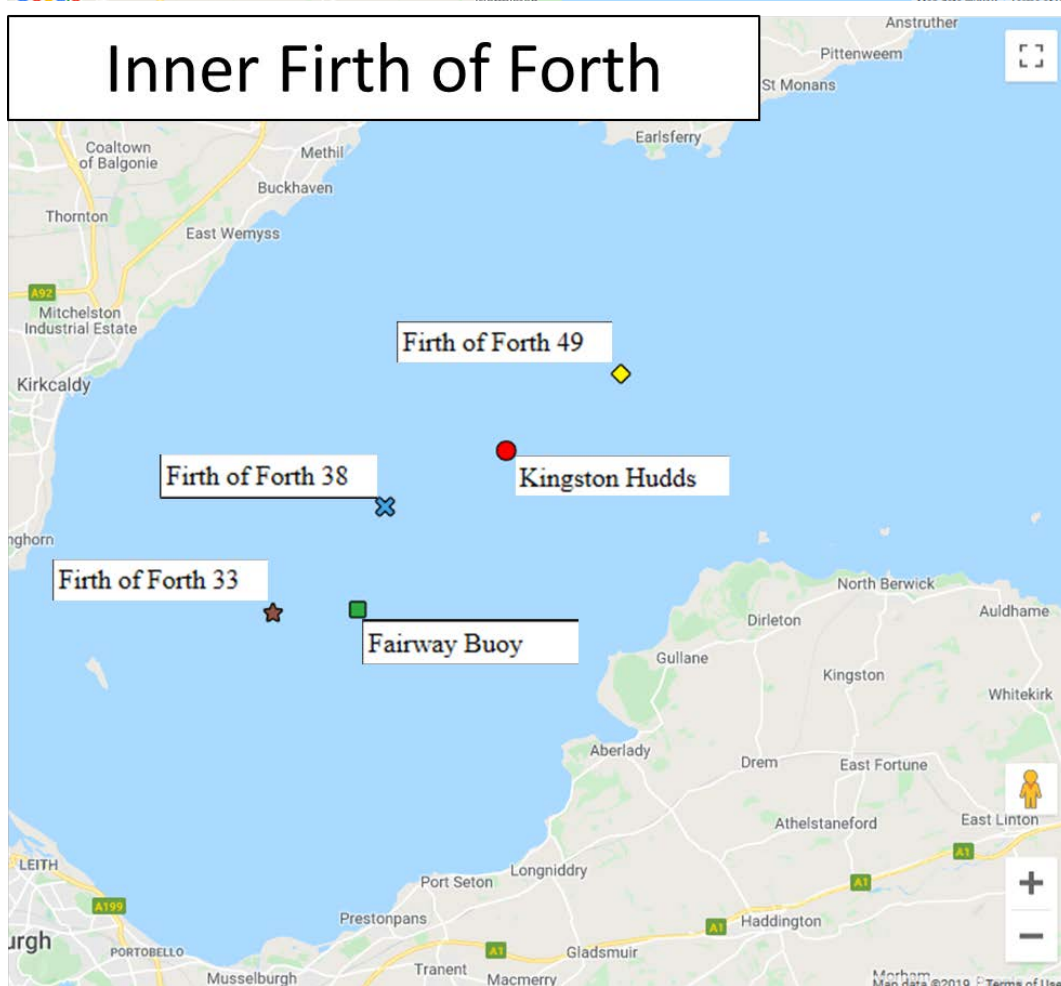


Table 5: Latitude and longitude limits for sediment and fishing sites (extracted from Station dictionary Oct 2017) (decimal)

Matrix	Region	Area	Site	Station dictionary	Nominal Station Latitude	Nominal Station Longitude	Longitude East Limit	Longitude West Limit	Latitude North Limit	Latitude South Limit
FI	EScotland	St Andrews Bay	St Andrews Bay	EScotland_CarnoustieFifeN_fi02	56.376	-2.749	-2.712	-2.777	56.421	56.342
FI	Forth	Inner Offshore	Kingston Hudds	Forth_FirthFinnerOffshore_fi01	56.096	-2.923	-2.616	-3.583	56.319	55.780
FI	Clyde	Lower Forth Estuary	Tancred	Forth_LowerForthEstuary_fi01	56.004	-3.509	-3.428	-3.589	56.049	55.959
SE	Forth	Inner Offshore	Kingston Hudds	Forth_FirthFinnerOffshore_se01	56.096	-2.923	-2.890	-2.955	56.114	56.078
SE	Forth	Inner Offshore	Fairway Buoy	Forth_FirthFinnerOffshore_se02	56.049	-3.001	-2.969	-3.033	56.067	56.032
SE	Forth	Inner Offshore	Firth of Forth 49	Forth_FirthFinnerOffshore_se03	56.119	-2.862	-2.83	-2.894	56.137	56.101
SE	Forth	Inner Offshore	Firth of Forth 38	Forth_FirthFinnerOffshore_se04	56.079	-2.986	-2.954	-3.019	56.097	56.061
SE	Forth	Inner Offshore	Firth of Forth 33	Forth_FirthFinnerOffshore_se05	56.049	-3.045	-3.013	-3.077	56.067	56.031
SE	Forth	Lower Forth Estuary	LFE GC	Forth_LowerForthEstuary_se04	56.015	-3.486	-3.386	-3.586	56.061	55.96
SE	Forth	Lower Forth Estuary	Tancred	Forth_LowerForthEstuary_se02	56.004	-3.509	-3.428	-3.589	56.049	55.959
SE	Forth	Lower Forth Estuary	Crombie	Forth_LowerForthEstuary_se05	56.029	-3.530	-3.43	-3.6305	56.0799	55.97
SE	Forth	Lower Forth Estuary	LFE FEEAP station 7	Forth_LowerForthEstuary_se07	56.028	-3.543	-3.523	-3.563	56.048	56.008
SE	Forth	Lower Forth Estuary	LFE EB (from 2012)	Forth_LowerForthEstuary_se03	56.014	-3.453	-3.445	-3.645	56.064	55.96
SE	EScotland	St Andrews Bay	St Andrews Bay @ surveillance site 1	EScotland_CarnoustieFifeN_se03	56.361	-2.627	-2.607	-2.647	56.381	56.341
SE	EScotland	St Andrews Bay	St Andrews Plankton Station 15	EScotland_CarnoustieFifeN_se04	56.438	-2.659	-2.639	-2.679	56.458	56.418
SE	EScotland	St Andrews Bay	St Andrews Bay @ surveillance site 2A	EScotland_CarnoustieFifeN_se05	56.345	-2.615	-2.595	-2.635	56.365	56.325
SE	EScotland	St Andrews Bay	St Andrews Bay	EScotland_CarnoustieFifeN_se08	56.373	-2.698	-2.681	-2.718	56.385	56.362
SE	EScotland	St Andrews Bay	St Andrews Bay – mid trawl	EScotland_CarnoustieFifeN_se01	56.376	-2.749	-2.712	-2.777	56.421	56.342

Table 6: Latitude and longitude limits for sediment and fishing sites (extracted from Station dictionary Oct 2017)

Matrix	Site	Station dictionary	Nominal Station Latitude	Nominal Station Longitude	Longitude East Limit	Longitude West Limit	Latitude North Limit	Latitude South Limit
FI	St Andrews Bay	EScotland_CarnoustieFifeN_fi02	56 22.56N	002 44.94W	002 42.72W	002 46.62W	56 25.26N	56 20.52N
FI	Kingston Hudds	Forth_FirthFInnerOffshore_fi01	56 05.76N	002 55.38W	002 36.96W	003 34.98W	56 19.14N	55 46.80N
FI	Tancred	Forth_LowerForthEstuary_fi01	56 00.24N	003 30.54W	003 25.68W	003 35.34W	56 02.94N	55 57.54N
SE	Kingston Hudds	Forth_FirthFInnerOffshore_se01	56 05.76N	002 55.38W	002 53.40W	002 57.30W	56 06.84N	56 04.68N
SE	Fairway Buoy	Forth_FirthFInnerOffshore_se02	56 02.94N	003 00.06W	002 58.14W	003 01.98W	56 04.02N	56 01.92N
SE	Firth of Forth 49	Forth_FirthFInnerOffshore_se03	56 07.14N	002 51.72W	002 49.80W	002 53.64W	56 08.22N	56 06.06N
SE	Firth of Forth 38	Forth_FirthFInnerOffshore_se04	56 04.74N	002 59.16W	002 57.24W	003 01.14W	56 05.82N	56 03.66N
SE	Firth of Forth 33	Forth_FirthFInnerOffshore_se05	56 02.94N	003 02.70W	003 00.78W	003 04.62W	56 04.02N	56 01.86N
SE	LFE GC	Forth_LowerForthEstuary_se04	56 00.90N	003 29.16W	003 23.16W	003 35.16W	56 03.66N	55 57.60N
SE	Tancred	Forth_LowerForthEstuary_se02	56 00.24N	003 30.54W	003 25.68W	003 35.34W	56 02.94N	55 57.54N
SE	Crombie	Forth_LowerForthEstuary_se05	56 01.74N	003 31.80W	003 25.80W	003 37.83W	56 04.79N	55 58.20N
SE	LFE FEEAP station 7	Forth_LowerForthEstuary_se07	56 01.68N	003 32.58W	003 31.38W	003 33.78W	56 02.88N	56 00.48N
SE	LFE EB (from 2012)	Forth_LowerForthEstuary_se03	56 00.84N	003 27.18W	003 26.70W	003 38.70W	56 03.84N	55 57.60N
SE	St Andrews Bay @ surveillance site 1	EScotland_CarnoustieFifeN_se03	56 21.66N	002 37.62W	002 36.42W	002 38.82W	56 22.86N	56 20.46N
SE	St Andrews Plankton Station 15	EScotland_CarnoustieFifeN_se04	56 26.28N	002 39.54W	002 38.34W	002 40.74W	56 27.48N	56 25.08N
SE	St Andrews Bay @ surveillance site 2A	EScotland_CarnoustieFifeN_se05	56 20.70N	002 36.90W	002 35.70W	002 38.10W	56 21.90N	56 19.50N
SE	St Andrews Bay	EScotland_CarnoustieFifeN_se08	56 22.38N	002 41.88W	002 40.86W	002 43.08W	56 23.10N	56 21.72N
SE	St Andrews Bay – mid trawl	EScotland_CarnoustieFifeN_se01	56 22.56N	002 44.94W	002 42.72W	002 46.62W	56 25.26N	56 20.52N