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MRV *Alba na Mara*

Survey 1622A

PROGRAMME

23-28 October 2022

Ports

Loading: Troon, 18 October 2022

Sailing: Troon, 24 October 2022

Unloading: Troon, 28 October 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 the Clyde (with sediment) in support of the Clean Seas Environment Monitoring Programme (OSPAR and MSFD D8).
2. To undertake fish sample preparation for subsequent eco-toxicological analyses (biological effects).
3. To undertake survey of seabed litter and sea-surface litter in the Firth of Clyde (MSFD D10).

Estimated Days per Project: 3 days ST04a (OSPAR & MSFD D8); 1 days ST04c (MSFD D10) and 1 days ST014

Scientific gear will be loaded on to the *MRV Alba na Mara* in Troon on Tuesday 18 October. Scientific crew will board the vessel on Sunday 23 October and sail on Monday 24 October after all relevant safety drills have been completed.

Sediment sampling will be carried out in four water bodies in the Firth of Clyde (Table 1 and Figure 1). At each water body, there are five or six locations for sampling. At each location one surface (0-2 cm) sediment sample will be collected by Day grab for contaminant analysis.

Flatfish (dab, plaice or flounder) will be collected for determination of disease status,

contaminant concentrations and contaminant-induced biological effects from Bowling, Holy Loch, Hunterston, and Garroch Head fishing stations (Table 2 and Figure 2). Fish sample preparation for subsequent analysis will also take place on board (Table 3). In addition, extra samples will be taken for preparation of EROD laboratory reference material from Bowling. Benthic macrolitter collected during trawling will also be identified, quantified and recorded.

The catamaran neuston net will be towed at five knots in order to survey and sample sea-surface litter from various locations (see Table 4). Priority areas for sampling include Loch Long and the Solway. If time allows, microplastic analysis may be carried out on board.

On completion of the survey, passage will be made to Troon where MSS scientific gear and staff will be unloaded on 28 October 2022.

General Arrangements

Liquid nitrogen, formalin and methanol will be carried for the preservation and storage of biological materials.

Normal contacts will be maintained with the Laboratory.

Submitted:
M Campbell
30 September 2022

Approved:
I Gibb
18 October 2022

Table 1: Intended Sediment locations.

Region	Area	Site	Lat	Long	Lat	Long
Clyde	Inner Firth of Clyde	Off Cloch Point	55.948	-4.894	55 56.88N	004 53.64W
Clyde	Inner Firth of Clyde	East of Strone Point	55.984	-4.881	55 59.04N	004 52.86W
Clyde	Inner Firth of Clyde	Lunderston Bay	55.923	-4.911	55 55.38N	004 54.66W
Clyde	Inner Firth of Clyde	Weymss Point	55.897	-4.926	55 53.82N	004 55.56W
Clyde	Inner Firth of Clyde	E of Toward (UIFM 2)	55.868	-4.945	55 52.08N	004 56.70W
Clyde	Inner Firth of Clyde	Holy Loch - FRS	55.971	-4.892	55 58.26N	004 53.52W
Clyde	Largs Channel	Hunterston - FRS	55.764	-4.885	55 45.84N	004 53.10W
Clyde	Largs Channel	Hunterston2	55.777	-4.890	55 46.62N	004 53.40W
Clyde	Largs Channel	Hunterston3	55.786	-4.891	55 47.16N	004 53.46W
Clyde	Largs Channel	Hunterston4	55.792	-4.889	55 47.52N	004 53.34W
Clyde	Largs Channel	Hunterston5	55.741	-4.904	55 44.46N	004 54.24W
Clyde	Middle Offshore	East of Brodick	55.586	-4.955	55 35.16N	004 57.30W
Clyde	Middle Offshore	Middle Offshore South	55.434	-4.968	55 26.04N	004 58.08W
Clyde	Middle Offshore	Middle Offshore	55.506	-4.899	55 30.36N	004 53.94W
Clyde	Middle Offshore	5 km SW of Lady Isle	55.508	-4.814	55 30.48N	004 48.84W
Clyde	Middle Offshore	7 km off Whiting Bay	55.477	-4.988	55 28.62N	004 59.28W
Clyde	Middle Offshore	Garroch Head - FRS	55.660	-4.986	55 39.60N	004 59.16W
Clyde	Outer Offshore	Clyde (N of Ailsa Craig)	55.3333	-5.083	54 45.00N	003 60.00W
Clyde	Outer Offshore	Clyde (SE of Ailsa Craig)	55.2241	-5.058	54 46.02N	003 50.10W
Clyde	Outer Offshore	Clyde (SW of Ailsa Craig)	55.1663	-5.223	54 45.42N	003 51.78W
Clyde	Outer Offshore	Clyde (Johnston's Point)	55.323	-5.368	54 45.00N	003 54.96W
Clyde	Outer Offshore	Clyde (NE of Ailsa Craig)	55.3405	-5.039	54 43.62N	003 57.60W

Figure 1: Location of intended sediment locations in the Clyde.

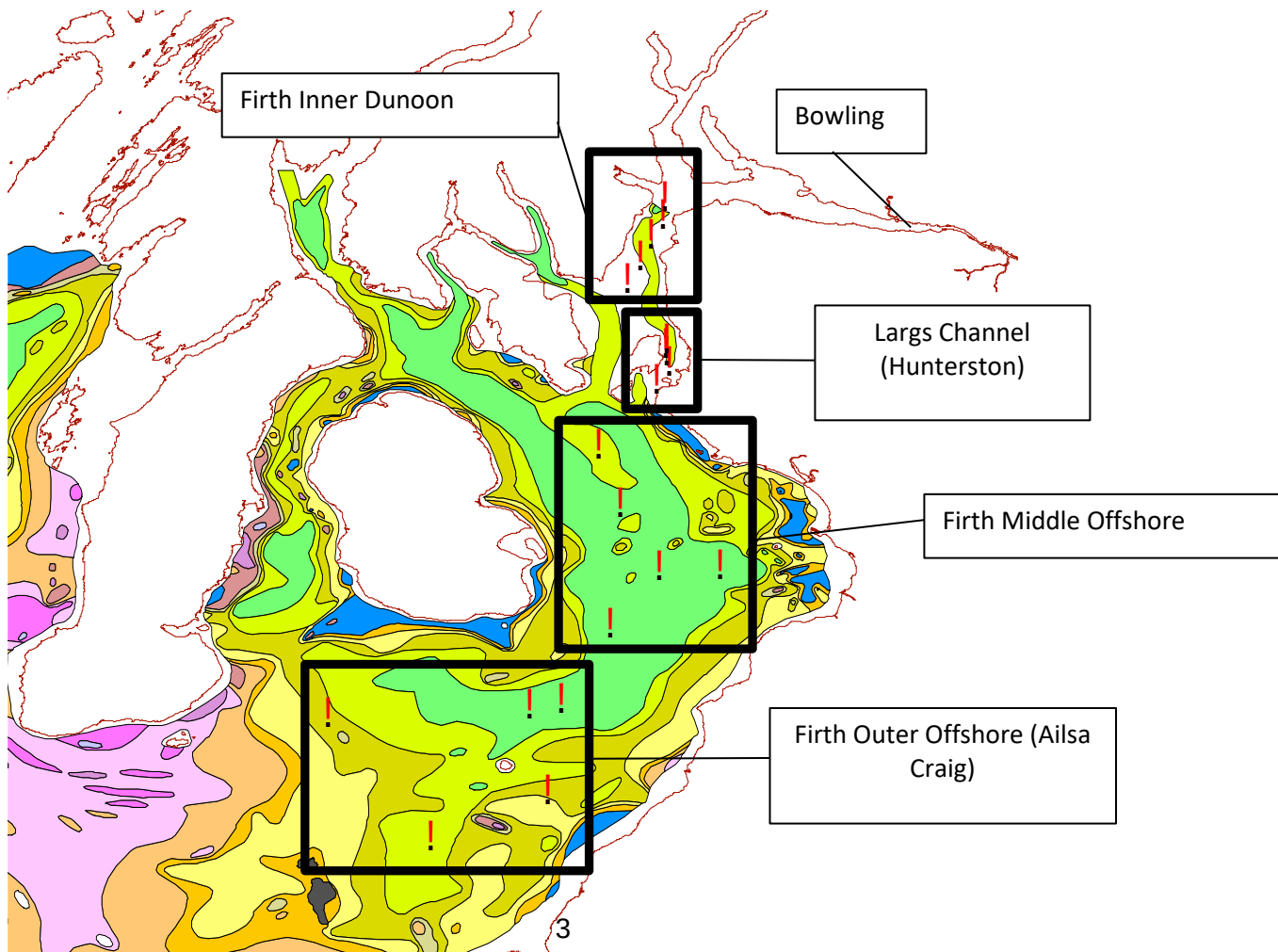


Table 2: Intended fishing locations and fish requirements.

Region - Area	Site	Lat Long (Dedimal)		Lat Long (DMS)		Species	No.
Clyde - Outer estuary	Bowling	55.925	-4.480	55 55.50N	004 28.80W	Flounder	50
Clyde - Inner Firth	Holy Loch	55.971	-4.892	55 58.26N	004 53.52W	Dab	50
Clyde - Largs Channel	Hunterston	55.764	-4.885	55 45.84N	004 53.10W	Plaice	20
Clyde - Middle Offshore	Garroch Head	55.660	-4.986	55 39.60N	004 59.16W	Plaice	25

Figure 2: Location of intended fishing locations in the Clyde.

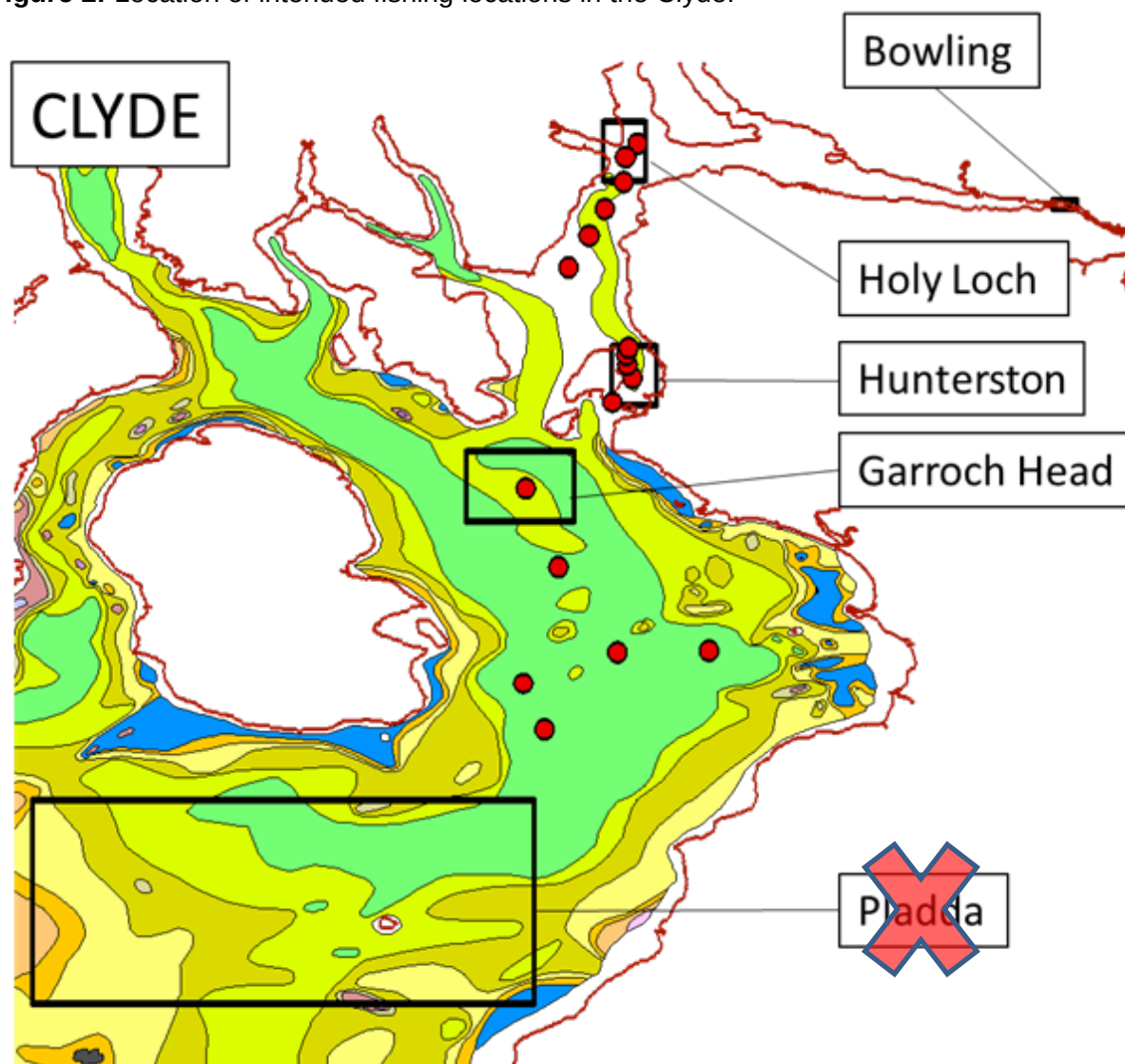


Table 3: Fish sample preparation requirements.

Full sampling details in SOP 0820 and SOP 0830.

At Hunterston site, only chemistry samples are taken. There is no time series here for biological effects, only contaminants.

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

Table 4: Possible catamaran neuston trawl locations with priority areas. Cat tows are at 5 kn for 30 min unless otherwise stated.

Station	Field ID	decLat	decLong	Lat	Long
Loch Long 1	LL1	56.195	-4.767	56 11.70N	004 46.02W
Loch Long 2	LL2	56.181	-4.775	56 10.86N	004 46.50W
Loch Long 3	LL3	56.126	-4.830	56 07.56N	004 49.80W
Loch Long 4	LL4	56.074	-4.882	56 04.44N	004 52.92W
Loch Long 5	LL5	56.045	-4.891	56 02.70N	004 53.46W
Loch Long 6	LL6	55.974	-4.881	55 58.44N	004 52.86W
Loch Long 7	LL7	55.970	-4.820	55 58.20N	004 49.20W
Clyde 1	Clyde1	55.901	-4.924	55 54.06N	004 55.44W
Clyde 2	Clyde2	55.794	-4.880	55 47.64N	004 52.80W
Clyde 3	Clyde3	55.629	-5.001	55 37.74N	005 00.06W
Clyde 4	Clyde4	55.461	-4.935	55 27.66N	004 56.10W
Clyde 5	Clyde5	55.375	-5.042	55 22.50N	005 02.52W
Solway1	Solway1	54.800	-3.740	54 48.00N	003 44.40W
Solway2	Solway2	54.755	-3.865	54 45.30N	003 51.90W
Solway3	Solway3	54.700	-4.161	54 42.00N	004 09.66W
Solway4	Solway4	54.635	-4.443	54 38.10N	004 26.58W
Solway5	Solway5	54.788	-5.167	54 47.28N	005 10.02W
Solway6	Solway6	54.624	-5.001	54 37.44N	005 00.06W

Figure3: Locations of possible cat tows.



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	Clyde	Outer estuary	Bowling	Clyde_ClydeEstuaryOuter_fi02	55.925	-4.480	-4.469	-4.492	55.932	55.923
FI	Clyde	Inner Firth	Holy Loch	Clyde_FirthCInnerDunoon_fi01	55.971	-4.892	-4.874	-4.914	56.005	55.95
FI	Clyde	Largs Channel	Hunterston	Clyde_LargsChannel_fi01	55.764	-4.885	-4.864	-4.906	55.794	55.739
FI	Clyde	Middle Offshore	Garroch Head	Clyde_FirthCMiddleOffshor_fi01	55.660	-4.986	-4.942	-5.043	55.695	55.629
SE	Clyde	Inner Firth of Clyde	Off Cloch Point	Clyde_FirthCInnerDunoon_se01	55.948	-4.894	-4.8139	-4.9745	55.9924	55.9026
SE	Clyde	Inner Firth of Clyde	East of Strone Point	Clyde_FirthCInnerDunoon_se02	55.984	-4.881	-4.8491	-4.9134	56.002	55.966
SE	Clyde	Inner Firth of Clyde	Lunderston Bay	Clyde_FirthCInnerDunoon_se03	55.923	-4.911	-4.8788	-4.943	55.9413	55.9054
SE	Clyde	Inner Firth of Clyde	Weymss Point	Clyde_FirthCInnerDunoon_se04	55.897	-4.926	-4.8941	-4.9582	55.9145	55.8786
SE	Clyde	Inner Firth of Clyde	E of Toward (UIFM 2)	Clyde_FirthCInnerDunoon_se05	55.868	-4.945	-4.9128	-4.977	55.8859	55.8499
SE	Clyde	Inner Firth of Clyde	Holy Loch - FRS	Clyde_FirthCInnerDunoon_se06	55.971	-4.892	-4.874	-4.914	56.005	55.95
SE	Clyde	Largs Channel	Hunterston - FRS	Clyde_LargsChannel_se01	55.764	-4.885	-4.864	-4.906	55.794	55.739
SE	Clyde	Largs Channel	Hunterston2	Clyde_LargsChannel_se02	55.777	-4.890	-4.8840	-4.8940	55.7860	55.7730
SE	Clyde	Largs Channel	Hunterston3	Clyde_LargsChannel_se03	55.786	-4.891	-4.8860	-4.8960	55.7900	55.7840
SE	Clyde	Largs Channel	Hunterston4	Clyde_LargsChannel_se04	55.792	-4.889	-4.8850	-4.8970	55.7960	55.7880
SE	Clyde	Largs Channel	Hunterston5	Clyde_LargsChannel_se05	55.741	-4.904	-4.8990	-4.9090	55.7450	55.7350
SE	Clyde	Middle Offshore	East of Brodick	Clyde_FirthCMiddleOffshor_se01	55.586	-4.955	-4.9234	-4.987	55.6042	55.5682
SE	Clyde	Middle Offshore	Middle Offshore South	Clyde_FirthCMiddleOffshor_se02	55.434	-4.968	-4.9367	-5.0001	55.452	55.416
SE	Clyde	Middle Offshore	Middle Offshore	Clyde_FirthCMiddleOffshor_se03	55.506	-4.899	-4.8673	-4.9309	55.5242	55.4882
SE	Clyde	Middle Offshore	5 km SW of Lady Isle	Clyde_FirthCMiddleOffshor_se04	55.508	-4.814	-4.7819	-4.8455	55.5257	55.4897
SE	Clyde	Middle Offshore	7 km off Whiting Bay	Clyde_FirthCMiddleOffshor_se05	55.477	-4.988	-4.956	-5.0194	55.4946	55.4586
SE	Clyde	Middle Offshore	Garroch Head - FRS	Clyde_FirthCMiddleOffshor_se06	55.660	-4.986	-4.942	-5.043	55.695	55.629
SE	Clyde	Outer Offshore	Clyde (N of Ailsa Craig)	Clyde_FirthCOuterOffshore_se01	55.3333	-5.0833	-5.0517	-5.1149	55.3513	55.028
SE	Clyde	Outer Offshore	Clyde (SE of Ailsa Craig)	Clyde_FirthCOuterOffshore_se02	55.2241	-5.058	-5.0265	-5.0895	55.2421	55.2061
SE	Clyde	Outer Offshore	Clyde (SW of Ailsa Craig)	Clyde_FirthCOuterOffshore_se03	55.1663	-5.2228	-5.1913	-5.2543	55.1483	55.1483
SE	Clyde	Outer Offshore	Clyde (Johnston's Point)	Clyde_FirthCOuterOffshore_se04	55.323	-5.3683	-5.3367	-5.3999	55.341	55.305
SE	Clyde	Outer Offshore	Clyde (NE of Ailsa Craig)	Clyde_FirthCOuterOffshore_se05	55.3405	-5.0386	-5.007	-5.0702	55.358	55.3225