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MRV *Scotia*

Survey 0323S

## **PROGRAMME**

14 February – 7 March 2023

**Loading:** Aberdeen, 10 February 2023

**Port call:** Greenock, *dates flexible*

**Unloading:** Aberdeen, 07 March 2023

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, three months of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

**Out-turn days: 21 – IBTSWC/20672, 1 – RE004/20231**

**Fishing Gear:** GOV Trawl (BT 137) fitted with ground gear D.

**Hydrographic Gear:** RBR Concerto<sup>3</sup> CTD

### **Objectives**

1. Demersal trawling survey (SCOWCGFS-Q1) on the grounds off the North and West of Scotland and within ICES Subarea 6a.
2. To obtain temperature and salinity data from the surface and seabed at each trawling station.
3. Collect additional biological data in connection with the UK Workplan and also the EU Data Collection Regulation.
4. Retrieval and re-deployment of passive acoustic moorings located at discrete sites within the survey area and are part of the Scotland Passive Acoustic Network (SPAN).
5. Deployment of 21 fish tracking RFID tag receiver moorings on a transect located North of Cape Wrath.
6. Retrieval of a Metocean Hydrographic data buoy located within the South Arran MPA in the Firth of Clyde (see figure 2 for location).

## Procedures

### General

Loading of the trawl gear and scientific equipment will take place on 11 February 2023 with rigging and testing being completed on the same day. *Scotia* will depart on the morning of 14 February 2023 with a familiarisation haul being undertaken during the passage north to ensure all fishing gear/sensors are working effectively. *Scotia* will continue North and then West in order to commence fishing operations the following morning on predefined stations off the north Scottish coast and west of 4°W with weather conditions determining the route taken round the survey thereafter.

### Trawling

This is a random-stratified survey design with trawl stations being distributed within ten predefined strata that cover ICES subarea 6A (see figure 1). A total of 62 primary and 45 secondary stations have been generated (Tables 5 and 6 respectively). The intention is for the 62 trawls to be undertaken on suitable ground as near to the specified primary station positions as is practicable, and within a radius of five nautical miles of the station location. In the event that trawling is not possible within 5 nm of any primary station then the nearest appropriate secondary station located within the same stratum will be used. Hauls will be of 30 minutes duration unless circumstances dictate otherwise. Where possible, fishing operations will be restricted to daylight hours. Exact start and finish times will, however, vary slightly according to geographical location and also weather. The Scanmar system will be used to monitor the headline height, wing spread and door spread for each haul. The EK60 is the primary scientific echosounder onboard *Scotia* and will be utilised throughout the survey. Bottom contact data from each trawl will also be collected using a bottom contact sensor which is mounted on a bar in the centre of the ground-gear. These data will be downloaded after every trawl and will be scrutinised in order to compare and validate touch down and lift off times for the GOV trawl.

### Fish Sampling

All fish, as well as selected invertebrates, will be processed in accordance with the protocols as described in the Manual of the IBTS North Eastern Atlantic Surveys. *Series of ICES Survey Protocols SISP 15. 92 pp.* <http://doi.org/10.17895/ices.pub.3519>. In addition to the routine biological sampling undertaken during the survey, additional sampling as well as collection of samples will also be undertaken for both internal MSS and external projects.

### Hydrography

A CTD cast will be taken at each trawl station, weather permitting. Top and bottom temperatures will be reported and in addition calibration samples will also be retrieved from both surface and from 5m above seabed.

### SPAN West Coast Moorings

Five acoustic moorings were deployed at sites within the 1722S survey area during autumn 2022 and during the SCOWCGFS-Q4. One day has been allocated from this survey in order to retrieve and redeploy the same number of moorings from the same locations within the Minches. Completion of this objective will be at a time and period within the survey that is conducive to both the vessel captain as well as the SIC. An acoustic release system will be deployed from the vessels hangar deck to trigger each mooring which will then allow it to surface where it will then be retrieved also from the hangar deck. Re-deployment of

moorings will similarly be undertaken from the side deck. A table and map providing the confirmed mooring retrieval locations can be found below in table 1 and figure 2 respectively.

**Table 1:** Location of SPAN W Coast moorings to be retrieved during survey 0323S.

Location name	Depth(m)	Declat	declon	Lat (Deg dec min)	Long ( Deg dec min )
Tolsta	99	58.38588	-6.00812	58° 23.153' N	6° 00.487' W
Hyskier	49	57.03622	-6.75513	57° 02.173' N	6° 45.308' W
Hyskier b	53	57.03957	-6.76606	57° 02.374' N	6° 45.9634' W
Hyskier c	43	57.03285	-6.76588	57° 01.971' N	6° 45.953' W
Shiants	72	57.86933	-6.26983	57° 52.160' N	6° 16.190' W

During survey 0323S the intention will be to redeploy five moorings and across three separate locations. The locations for the redeployed Hyskier, Tolsta and Shiants moorings will be similar to those being retrieved, however, an additional two moorings will be deployed at the Tolsta site that together with the redeployed mooring will form a triangular configuration within the Tolsta location. A table providing locations of redeployed moorings can be found below in table 2.

**Table 2:** Location of SPAN W Coast moorings to be redeployed during survey 0323S.

Location name	Depth(m)	Declat	declon	Lat (Deg dec min)	Long ( Deg dec min )
Tolsta	95	58.3947	-6.01245	58° 23.682' N	6° 00.747' W
Tolsta b	94	58.40041	-6.00564	58° 24.0245' N	6° 00.3386' W
Tolsta c	96	58.39446	-5.99955	58° 23.6678' N	5° 59.9732' W
Hyskier	46	57.03617	-6.75533	57° 02.1701' N	6° 45.3199' W
Shiants	69	57.8761	-6.2726	57° 52.567' N	6° 16.361' W

### **Marine Scotland Science / Atlantic Salmon Trust (AST) Fish Tracking Moorings**

21 tag receivers are to be deployed along a 50 nm transect running east to west and located North of Cape Wrath. The tracking units are being deployed to monitor the movements of Atlantic salmon (*Salmo salar*) post-smolts through the Atlantic Ocean northwest of the Scottish mainland. Marine Scotland Science and the AST are tagging approximately 1600 smolts on the west coast and in deploying the 21 receivers it hopes to detect their movements in areas of renewable energy interest. See Table 3 below and Figure 2 respectively for mooring positions and map providing locations of the receiver units.

**Table 3:** Locations of MSS/AST moorings to be deployed during survey 0323S.

ID	Decimal Latitude	Decimal Longitude	Lat (Deg dec min)	Lon(Deg dec min)
1	58.8365	-5.75	58° 50.19 N	5° 45 W
2	58.8376	-5.6905	58° 50.256 N	5° 41.43 W
3	58.8386	-5.6311	58° 50.316 N	5° 37.866 W
4	58.8397	-5.5716	58° 50.382 N	5° 34.296 W
5	58.8408	-5.5121	58° 50.448 N	5° 30.726 W
6	58.8419	-5.4526	58° 50.514 N	5° 27.156 W
7	58.843	-5.3932	58° 50.58 N	5° 23.592 W
8	58.8415	-5.2995	58° 50.49 N	5° 17.97 W
9	58.8374	-5.1762	58° 50.244 N	5° 10.572 W
10	58.8334	-5.053	58° 50.004 N	5° 3.18 W
11	58.8293	-4.9298	58° 49.758 N	4° 55.788 W
12	58.8253	-4.8066	58° 49.518 N	4° 48.396 W
13	58.8212	-4.6834	58° 49.272 N	4° 41.004 W
14	58.8172	-4.5602	58° 49.032 N	4° 33.612 W
15	58.8188	-4.4487	58° 49.128 N	4° 26.922 W
16	58.8185	-4.3717	58° 49.11 N	4° 22.302 W
17	58.8182	-4.2946	58° 49.092 N	4° 17.676 W
18	58.818	-4.2176	58° 49.08 N	4° 13.056 W
19	58.8177	-4.1405	58° 49.062 N	4° 8.43 W
20	58.8174	-4.0635	58° 49.044 N	4° 3.81 W
21	58.8172	-3.9865	58° 49.032 N	3° 59.19 W

**MSS Metocean Hydro Data Buoy – Firth of Clyde**

Survey 0323S will endeavour to retrieve the hydrographic buoy located approximately 1.3 nm off the south coast of Arran. See Table 4 below and Figure 2 respectively for position of buoy as well as map providing location of the buoy.

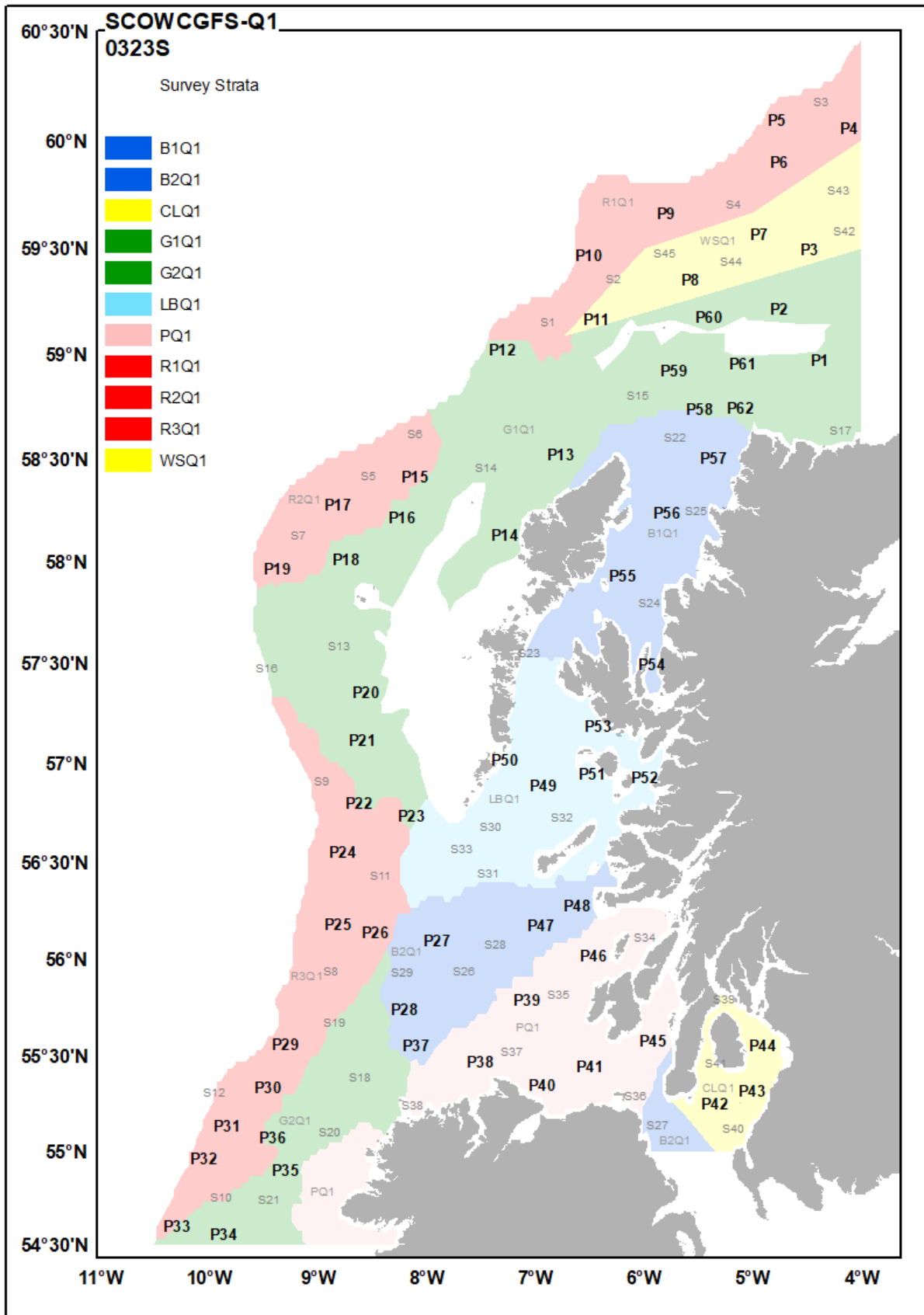
**Table 4:** Location of MSS Hydro Data Buoy to be retrieved during survey 0323S.

ID	Decimal Latitude	Decimal Longitude	Lat (Deg dec min)	Lon (Deg dec min)
Hydro Buoy	55.41514	-5.19596	55° 24.9084 N	5° 11.7576 W

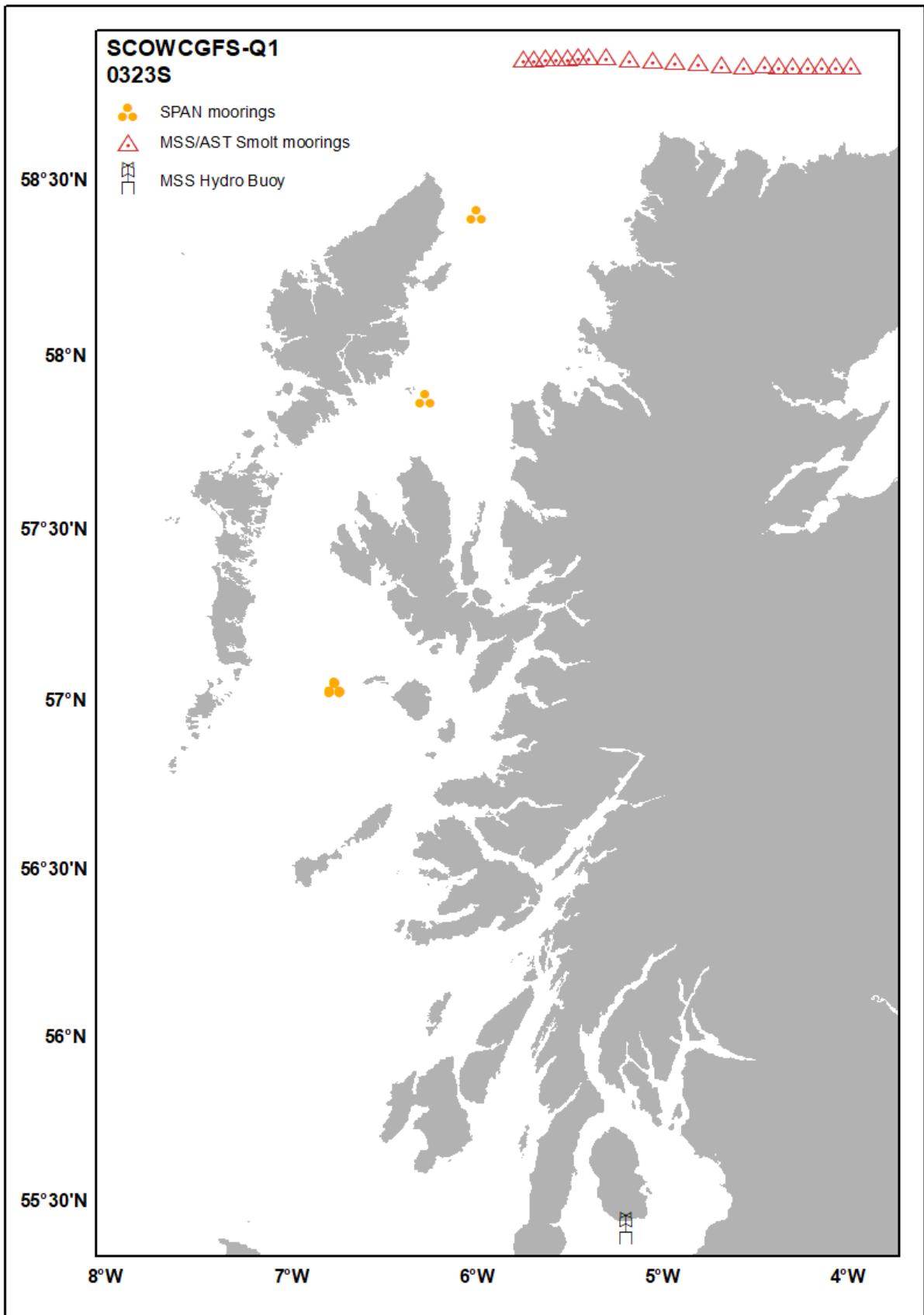
Normal contact will be maintained with the Marine Laboratory.

Submitted:  
F Burns  
01 February 2023

Approved:  
I Gibb  
10 February 2023



**Figure 1:** 0323S (SCOWCGFS-Q1) – 2023 ICES Subarea 6a Survey Strata showing primary (bold face with prefix 'P') and secondary trawling stations (plain face prefix 'S').



**Figure 2:** Locations of various moorings and hydro buoy to be deployed / retrieved during survey 0323S.

**Table 5:** 0323S – Positions of primary sampling stations.

Station	Decimal lat	Decimal lon	lat	lon	Stratum	Station	Decimal lat	Decimal lon	lat	lon	Stratum
P1	59.00151	-4.38144	5900.09N	0422.89W	green1	P32	54.96585	-10.05829	5457.95N	1003.50W	red3
P2	59.20831	-4.76198	5912.50N	0445.72W	green1	P33	54.59571	-10.29829	5435.74N	1017.90W	green2
P3	59.49071	-4.48190	5929.44N	0428.91W	windsock	P34	54.55381	-9.87293	5433.23N	0952.38W	green2
P4	60.05227	-4.11594	6003.14N	0406.96W	red1	P35	54.89660	-9.30376	5453.80N	0918.23W	green2
P5	60.09115	-4.81729	6005.47N	0449.04W	red1	P36	55.06884	-9.41921	5504.13N	0925.15W	green2
P6	59.89533	-4.75412	5953.72N	0445.25W	red1	P37	55.55220	-8.10371	5533.13N	0806.22W	blue2
P7	59.56153	-4.93833	5933.69N	0456.30W	windsock	P38	55.46905	-7.50779	5528.14N	0730.47W	pink
P8	59.34672	-5.56891	5920.80N	0534.13W	windsock	P39	55.78865	-7.08021	5547.32N	0704.81W	pink
P9	59.65657	-5.79932	5939.39N	0547.96W	red1	P40	55.34534	-6.97660	5520.72N	0658.60W	pink
P10	59.46390	-6.63048	5927.83N	0637.83W	red1	P41	55.44258	-6.49990	5526.55N	0629.99W	pink
P11	59.16185	-6.43191	5909.71N	0625.91W	windsock	P42	55.24473	-5.35376	5514.68N	0521.23W	clyde
P12	59.01950	-7.30543	5901.17N	0718.33W	green1	P43	55.31548	-4.87933	5518.93N	0452.76W	clyde
P13	58.51549	-6.77203	5830.93N	0646.32W	green1	P44	55.55071	-5.02896	5533.04N	0501.74W	clyde
P14	58.12639	-7.27213	5807.58N	0716.33W	green1	P45	55.57855	-5.89168	5534.71N	0553.50W	pink
P15	58.40915	-8.11140	5824.55N	0806.68W	red2	P46	56.01980	-6.46779	5601.19N	0628.07W	pink
P16	58.21080	-8.23579	5812.65N	0814.15W	green1	P47	56.17078	-6.95485	5610.25N	0657.29W	blue2
P17	58.27401	-8.82379	5816.44N	0849.43W	red2	P48	56.27798	-6.61544	5616.68N	0636.93W	blue2
P18	58.00758	-8.74164	5800.45N	0844.50W	green1	P49	56.88312	-6.92615	5652.99N	0655.57W	lightblue
P19	57.95858	-9.37814	5757.51N	0922.69W	red2	P50	57.01445	-7.28085	5700.87N	0716.85W	lightblue
P20	57.35073	-8.51908	5721.04N	0831.14W	green1	P51	56.94095	-6.47307	5656.46N	0628.38W	lightblue
P21	57.11589	-8.59755	5706.95N	0835.85W	green1	P52	56.92817	-5.99835	5655.69N	0559.90W	lightblue
P22	56.79528	-8.62621	5647.72N	0837.57W	green1	P53	57.18261	-6.41944	5710.96N	0625.17W	lightblue
P23	56.73084	-8.14483	5643.85N	0808.69W	green1	P54	57.48832	-5.93181	5729.30N	0555.91W	blue1
P24	56.54646	-8.77325	5632.79N	0846.39W	red3	P55	57.92484	-6.19976	5755.49N	0611.99W	blue1
P25	56.17669	-8.81984	5610.60N	0849.19W	red3	P56	58.23238	-5.79163	5813.94N	0547.50W	blue1
P26	56.13828	-8.41153	5608.30N	0824.69W	red3	P57	58.49705	-5.35975	5829.82N	0521.59W	blue1
P27	56.09742	-7.90551	5605.85N	0754.33W	blue2	P58	58.73429	-5.49307	5844.06N	0529.58W	green1
P28	55.74060	-8.30115	5544.44N	0818.07W	blue2	P59	58.91602	-5.71929	5854.96N	0543.16W	green1
P29	55.56060	-9.29832	5533.64N	0917.90W	red3	P60	59.17040	-5.39736	5910.22N	0523.84W	green1
P30	55.33107	-9.38450	5519.86N	0923.07W	red3	P61	58.98666	-5.08953	5859.20N	0505.37W	green1
P31	55.12909	-9.84343	5507.75N	0950.61W	red3	P62	58.73562	-5.10753	5844.14N	0506.45W	green1

**Table 6:** 0323S – Positions of secondary sampling stations.

Station	Decimal lat	Decimal lon	lat	lon	Stratum	Station	Decimal lat	Decimal lon	lat	lon	Stratum
S1	59.14926	-6.88594	5908.96N	0653.16W	red1	S24	57.79337	-5.90507	5747.60N	0554.30W	blue1
S2	59.34730	-6.28516	5920.84N	0617.11W	red1	S25	58.24354	-5.44313	5814.61N	0526.59W	blue1
S3	60.17490	-4.37073	6010.49N	0422.24W	red1	S26	55.93382	-7.66214	5556.03N	0739.73W	blue2
S4	59.69920	-5.17747	5941.95N	0510.65W	red1	S27	55.13176	-5.94334	5507.91N	0556.60W	blue2
S5	58.41099	-8.53764	5824.66N	0832.26W	red2	S28	56.07579	-7.36984	5604.55N	0722.19W	blue2
S6	58.61154	-8.11007	5836.69N	0806.60W	red2	S29	55.93210	-8.25148	5555.93N	0815.09W	blue2
S7	58.12195	-9.18868	5807.32N	0911.32W	red2	S30	56.67447	-7.41419	5640.47N	0724.85W	lightblue
S8	55.93912	-8.88325	5556.35N	0853.00W	red3	S31	56.41902	-7.43607	5625.14N	0726.16W	lightblue
S9	56.90523	-8.96898	5654.31N	0858.14W	red3	S32	56.72564	-6.75180	5643.54N	0645.11W	lightblue
S10	54.74827	-9.89695	5444.90N	0953.82W	red3	S33	56.56417	-7.68002	5633.85N	0740.80W	lightblue
S11	56.42414	-8.43201	5625.45N	0825.92W	red3	S34	56.11118	-5.99168	5606.67N	0559.50W	pink
S12	55.30251	-9.96229	5518.15N	0957.74W	red3	S35	55.81819	-6.78812	5549.09N	0647.29W	pink
S13	57.57781	-8.80913	5734.67N	0848.55W	green1	S36	55.28990	-6.08410	5517.39N	0605.05W	pink
S14	58.45326	-7.45160	5827.20N	0727.10W	green1	S37	55.52059	-7.21891	5531.24N	0713.13W	pink
S15	58.79552	-6.05428	5847.73N	0603.26W	green1	S38	55.23928	-8.13020	5514.36N	0807.81W	pink
S16	57.47255	-9.47557	5728.35N	0928.53W	green1	S39	55.78881	-5.25980	5547.33N	0515.59W	clyde
S17	58.63114	-4.13271	5837.87N	0407.96W	green1	S40	55.11258	-5.15943	5506.76N	0509.57W	clyde
S18	55.38280	-8.61157	5522.97N	0836.69W	green2	S41	55.45585	-5.34232	5527.35N	0520.54W	clyde
S19	55.66917	-8.85486	5540.15N	0851.29W	green2	S42	59.57387	-4.15258	5934.43N	0409.15W	windsock
S20	55.09500	-8.88189	5505.70N	0852.91W	green2	S43	59.76256	-4.21242	5945.75N	0412.75W	windsock
S21	54.73973	-9.45581	5444.38N	0927.35W	green2	S44	59.42979	-5.19969	5925.79N	0511.98W	windsock
S22	58.59521	-5.71219	5835.71N	0542.73W	blue1	S45	59.46986	-5.80943	5928.19N	0548.57W	windsock
S23	57.54660	-7.05739	5732.80N	0703.44W	blue1						



