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

MRV *Scotia*

Survey 0321S

PROGRAMME

16 February – 11 March 2021

Loading: Aberdeen, 12 February 2021
Port call: Greenock for fresh water
Unloading: Aberdeen, 11 March 2021

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.

Out-turn days: 21 – RV2102/20591, 3 – C80040/20397

Fishing Gear: GOV Trawl (BT 137) fitted with ground gear D.
Hydrographic Gear: Seabird 19+ CTD
CSEMP sampling: Day grab, Catamaran

Objectives

1. Demersal trawling survey (SCOWCGFS-Q1) of the grounds off the north and west of Scotland in 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 EU Data Collection Framework (DCF).

4. Retrieval and re-deployment of COMPASS moorings located at discrete sites within the survey area.

5. To undertake sediment and biological sampling for the Clean Seas Environmental Monitoring Programme (CSEMP) within the Clyde region.

Procedures

General

Loading of the trawl gear and scientific equipment will take place on 12 February 2021 with rigging and testing being completed on the same day. *Scotia* will depart on the morning of 16 February 2021 where she will undertake a training haul during the passage north to ensure all fishing gear/sensors are working effectively. From here she will proceed North 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 2 and 3 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 the NOAA bottom contact sensor which will be mounted on a bar in the centre of the ground-gear.

Fish Sampling

All fish 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 sampling, biological data and samples will be collected for selected target species and other 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 a calibration sample will be retained from the surface.

Compass Moorings

Six acoustic moorings were deployed at sites within the 0321S survey area during 2020. Three days have been allocated from this survey in order to retrieve and redeploy these moorings. 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 side deck to trigger each mooring which will then allow it to surface where it will then be retrieved again from the side deck. Re-deployment of moorings will similarly be undertaken from the side deck. A request to service an additional mooring deployed during the fourth quarter 2020 from a location east of Mingulay has yet to be confirmed. A table and map providing the confirmed mooring locations can be found below in Table 1 and Figure 2 respectively.

Table 1: Positions of COMPASS moorings located within the 0321S survey area.

Mooring Location	Latitude (deg dec min)	Longitude (deg dec min)	Latitude (dec deg)	Longitude (dec deg)
Hyskier	57° 2.115 N	6° 45.192 W	57.03525	-6.7532
Shiant Isles	57° 52.161 N	6° 16.183 W	57.86935	-6.269717
Tolsta Hd	58° 23.63 N	6° 0.21 W	58.39383	-6.0035
Stoer Hd	58° 15.47 N	5° 32.091 W	58.25783	-5.53485
Stanton Bank	56° 4.128 N	8° 3.855 W	56.0688	-8.06425
Garvellachs	56° 14.103 N	5° 45.534 W	56.23505	-5.7589

CSEMP sampling

The vessel will undertake sediment and biological sampling for the Clean Seas Environmental Monitoring Programme (CSEMP) within the Clyde region. Day grab sampling will be conducted during the hours of darkness with catamaran tows undertaken in daylight where possible.

Normal contact will be maintained with the Marine Laboratory.

Submitted:
F Burns
26 January 2021

Approved:
I Gibb
10 February 2021

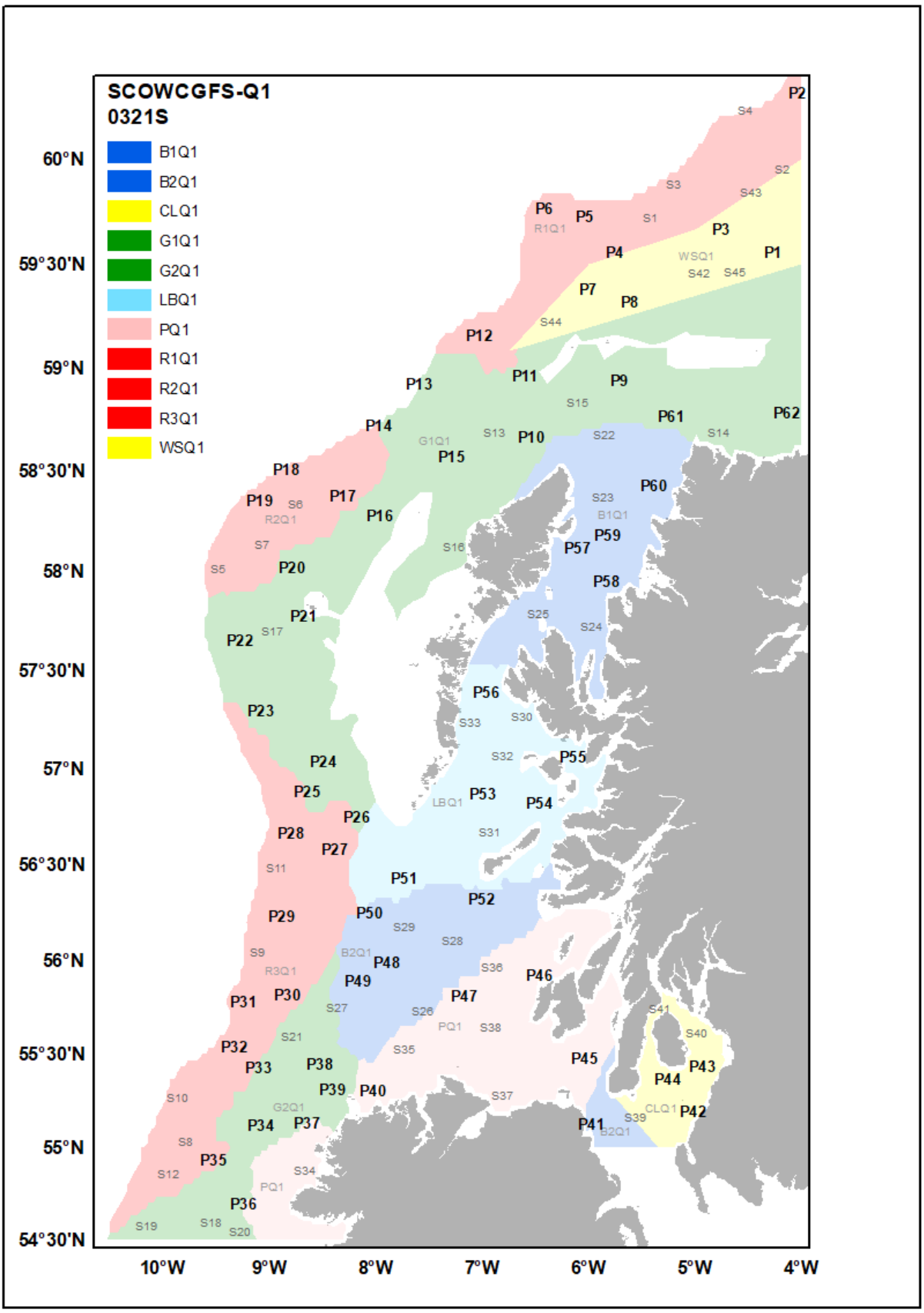

Figure 1: 0321S (SCOWCGFS-Q1) – 2020 ICES Subarea 6a Survey Strata showing primary (bold face with prefix 'P') and secondary trawling stations (plain face prefix 'S').

Table 2: 0321S – Positions of primary sampling stations.

Station	Decimal lat	Decimal lon	lat	lon	Stratum	Station	Decimal lat	Decimal lon	lat	lon	Stratum
P1	59.55162	-4.25605	5933.10N	0415.36W	windsock	P32	55.53544	-9.32597	5532.13N	0919.56W	red3
P2	60.30296	-4.02946	6018.18N	0401.77W	red1	P33	55.42738	-9.10023	5525.64N	0906.01W	green2
P3	59.66026	-4.75136	5939.62N	0445.08W	windsock	P34	55.11429	-9.07162	5506.86N	0904.30W	green2
P4	59.54973	-5.74624	5932.98N	0544.77W	red1	P35	54.92724	-9.51620	5455.63N	0930.97W	red3
P5	59.72334	-6.02958	5943.40N	0601.77W	red1	P36	54.68920	-9.23582	5441.35N	0914.15W	pink
P6	59.76397	-6.41632	5945.84N	0624.98W	red1	P37	55.12801	-8.64255	5507.68N	0838.55W	pink
P7	59.37376	-5.99571	5922.43N	0559.74W	windsock	P38	55.44665	-8.51543	5526.80N	0830.93W	green2
P8	59.30839	-5.60201	5918.50N	0536.12W	windsock	P39	55.31142	-8.33290	5518.69N	0819.97W	green2
P9	58.93251	-5.70893	5855.95N	0542.54W	green1	P40	55.25743	-8.01689	5515.45N	0801.01W	pink
P10	58.66076	-6.48154	5839.65N	0628.89W	green1	P41	55.12269	-5.96590	5507.36N	0557.95W	blue2
P11	58.95461	-6.55209	5857.28N	0633.13W	green1	P42	55.19106	-5.00757	5511.46N	0500.45W	clyde
P12	59.15539	-7.02276	5909.32N	0701.37W	red1	P43	55.43198	-4.81919	5525.92N	0449.15W	clyde
P13	58.91834	-7.58117	5855.10N	0734.87W	green1	P44	55.36996	-5.24667	5522.20N	0514.80W	clyde
P14	58.71271	-7.96771	5842.76N	0758.06W	green1	P45	55.47399	-6.02784	5528.44N	0601.67W	pink
P15	58.56052	-7.28306	5833.63N	0716.98W	green1	P46	55.91440	-6.45276	5554.86N	0627.17W	pink
P16	58.27059	-7.82397	5816.24N	0749.44W	green1	P47	55.82691	-7.16048	5549.61N	0709.63W	pink
P17	58.36983	-8.25486	5822.19N	0815.29W	red2	P48	55.98439	-7.88715	5559.06N	0753.23W	blue2
P18	58.50176	-8.83178	5830.11N	0849.91W	red2	P49	55.88597	-8.15886	5553.16N	0809.53W	blue2
P19	58.34629	-9.10935	5820.78N	0906.56W	red2	P50	56.24431	-8.04765	5614.66N	0802.86W	blue2
P20	58.01155	-8.78598	5800.69N	0847.16W	green1	P51	56.42423	-7.72425	5625.45N	0743.45W	lightblue
P21	57.77069	-8.67117	5746.24N	0840.27W	green1	P52	56.31794	-6.99447	5619.08N	0659.67W	blue2
P22	57.64875	-9.26804	5738.93N	0916.08W	green1	P53	56.86192	-6.98552	5651.71N	0659.13W	lightblue
P23	57.28805	-9.19849	5717.28N	0911.91W	green1	P54	56.81775	-6.45137	5649.06N	0627.08W	lightblue
P24	57.02875	-8.49139	5701.72N	0829.48W	green1	P55	57.05507	-6.14014	5703.30N	0608.41W	lightblue
P25	56.87699	-8.64130	5652.62N	0838.48W	green1	P56	57.38674	-6.93940	5723.20N	0656.36W	lightblue
P26	56.74371	-8.16799	5644.62N	0810.08W	green1	P57	58.10759	-6.21992	5806.46N	0613.20W	blue1
P27	56.57489	-8.31913	5634.49N	0819.15W	red3	P58	57.94122	-5.82662	5756.47N	0549.60W	blue1
P28	56.65950	-8.79068	5639.57N	0847.44W	red3	P59	58.17119	-5.81854	5810.27N	0549.11W	blue1
P29	56.23014	-8.88097	5613.81N	0852.86W	red3	P60	58.41821	-5.38232	5825.09N	0522.94W	blue1
P30	55.81380	-8.81031	5548.83N	0848.62W	red3	P61	58.76010	-5.21901	5845.61N	0513.14W	green1
P31	55.77483	-9.35386	5546.49N	0921.23W	red3	P62	58.77764	-4.00716	5846.66N	0400.43W	green1

Table 3: 0321S – Positions of secondary sampling stations.

Station	Decimal lat	Decimal lon	lat	lon	Stratum	Station	Decimal lat	Decimal lon	lat	lon	Stratum
S1	59.71532	-5.41351	5942.92N	0524.81W	red1	S24	57.71177	-5.96321	5742.71N	0557.79W	blue1
S2	59.94513	-4.16988	5956.71N	0410.19W	red1	S25	57.77530	-6.46188	5746.52N	0627.71W	blue1
S3	59.90636	-5.18999	5954.38N	0511.40W	red1	S26	55.72282	-7.55643	5543.37N	0733.39W	blue2
S4	60.22033	-4.51776	6013.22N	0431.07W	red1	S27	55.74503	-8.35176	5544.70N	0821.11W	blue2
S5	58.00149	-9.47166	5800.09N	0928.30W	red2	S28	56.09422	-7.26963	5605.65N	0716.18W	blue2
S6	58.32320	-8.75142	5819.39N	0845.09W	red2	S29	56.17098	-7.72388	5610.26N	0743.43W	blue2
S7	58.12585	-9.05835	5807.55N	0903.50W	red2	S30	57.25456	-6.51294	5715.27N	0630.78W	lightblue
S8	55.02308	-9.78393	5501.38N	0947.04W	red3	S31	56.66420	-6.92375	5639.85N	0655.42W	lightblue
S9	56.03619	-9.11039	5602.17N	0906.62W	red3	S32	57.05718	-6.80329	5703.43N	0648.20W	lightblue
S10	55.26393	-9.85167	5515.84N	0951.10W	red3	S33	57.23062	-7.16873	5713.84N	0710.12W	lightblue
S11	56.47781	-8.93079	5628.67N	0855.85W	red3	S34	54.86662	-8.59585	5452.00N	0835.75W	pink
S12	54.85254	-9.94221	5451.15N	0956.53W	red3	S35	55.51981	-7.73065	5531.19N	0743.84W	pink
S13	58.67579	-6.88282	5840.55N	0652.97W	green1	S36	55.95500	-6.90317	5557.30N	0654.19W	pink
S14	58.67784	-4.77396	5840.67N	0446.44W	green1	S37	55.26173	-6.80284	5515.70N	0648.17W	pink
S15	58.82349	-6.09934	5849.41N	0605.96W	green1	S38	55.64096	-6.90820	5538.46N	0654.49W	pink
S16	58.11223	-7.17055	5806.73N	0710.23W	green1	S39	55.15795	-5.55788	5509.48N	0533.47W	clyde
S17	57.69106	-8.96313	5741.46N	0857.79W	green1	S40	55.60845	-5.05165	5536.51N	0503.10W	clyde
S18	54.58920	-9.54023	5435.35N	0932.41W	green2	S41	55.73645	-5.32551	5544.19N	0519.53W	clyde
S19	54.56990	-10.14977	5434.19N	1008.99W	green2	S42	59.44966	-4.95538	5926.98N	0457.32W	windsock
S20	54.51016	-9.26770	5430.61N	0916.06W	green2	S43	59.83360	-4.46318	5950.02N	0427.79W	windsock
S21	55.58678	-8.77889	5535.21N	0846.73W	green2	S44	59.21482	-6.42931	5912.89N	0625.76W	windsock
S22	58.67988	-5.84677	5840.79N	0550.81W	blue1	S45	59.43373	-4.61709	5926.02N	0437.03W	windsock
S23	58.35916	-5.85293	5821.55N	0551.18W	blue1						

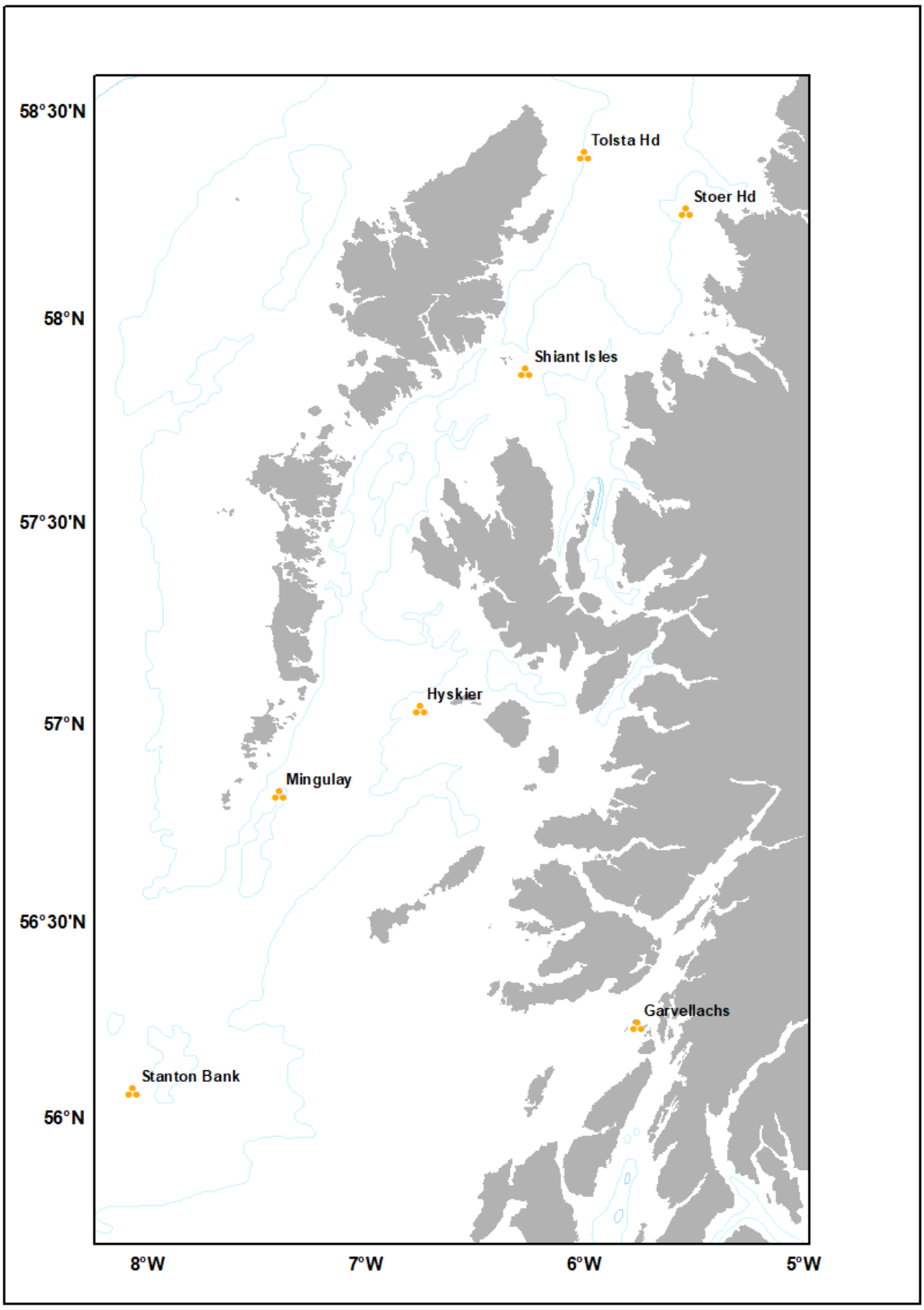

Figure 2: 0321S - Location of 6 Compass moorings plus additional mooring East of Mingulay.