SCOTTISH MARINE BIOLOGICAL ASSOCIATION

DUNSTAFFNAGE MARINE RESEARCH LABORATORY

Cruise Report

R.R.S. Challenger

Cruise 8/1979

29th May - 11th June

1979

Aims: (1) To obtain further fish samples from the SMBA permanent station in the Rockall Channel.

(2) To begin a seasonal survey of the deep-sea demersal fish populations of the upper slope of the Porcupine Sea Bight using the large Granton trawl.

(3) To continue seasonal surveys of the deep-sea demersal fish populations of the Porcupine Sea Bight from 500 to 4800 m using the IOS semi-balloon trawl.

(4) To collect invertebrate samples from all stations for IOS (Wormley).

(5) To carry out comparative fishing trials between the SMBA Granton trawl, the IOS semi-balloon trawl and the SMBA single warp box trawl at depths from 500 to 1250 m.

(6) To collect samples of fish muscle for ^{137}Caesium analysis for the MAFF Radiobiological Laboratory at Lowestoft.

Weather: Excellent. Force 6 winds were experienced during the first weekend but there was little swell and scientific work continued. Thereafter the winds were 3/4 and latterly flat calm.

RRS Challenger Cruise 8/79

Duration of Cruise: 0700 29th May (Ardrossan) until 1900 11th June 1979 (Barry) - All times BST.

Locality: SMBA deep station - Rockall Channel (55°00'N 12°00'W) and the Porcupine Sea Bight (49°20'N to 52°30'N and 11°30'N to 15°00'W).

Scientific Staff:

J.D.M. Gordon	SMBA Principal Scientist
Mrs. J.A.R. Duncan	SMBA
Miss S. McLean	SMBA
N.R. Merrett	IOS (Wormley)
Miss R. Larcombe	IOS (Wormley)
B. Rackham	MAFF Radiobiological Unit

Ship's Officers:

Captain	P. Maw
Chief Officer	P. Coombs
2nd Officer	S. Sykes
3rd Officer	A. Brigden
Fishing Skipper	F. Dunning
Chief Engineer	D. Rowlands
2nd Engineer	R. Anderson
3rd Engineer	J. Richardson
4th Engineer	B. Entwhistle

Narrative:

The scientific party joined Challenger at Ardrossan at 2000 hrs (28/5) and the ship sailed at 0700 (29/5) for Bowling to take on bunkers. Bunkering was completed by 1400 and Challenger headed for station 1 (SMBA permanent station) in the Rockall Channel. Challenger was on station at 2225 (30/5) and the SMBA single warp trawl was fished in a sounding of 2900 m until 0530 (31/5). Challenger then steamed south to begin a transect of trawl stations on the northern slope of the Porcupine Sea Bight. The IOS semi-balloon trawl was fished at stations 2 and 3 (500 and 1000 m) between 0036 and 0937 (1/6). The SMBA Granton trawl was then rigged and shot at station 4 (1000 m) at 1125 but a failure in the compressed air supply to the port winch delayed payout until 1616. The net was finally recovered with a good catch at 1936 and Challenger proceeded to station 5 (1250 m) where the Granton trawl was fished between 2142 (1/6) to 0226 (2/6) with only a short delay during trawling due to a similar fault in the starboard compressed air supply. Challenger then steamed back up the slope and the Granton trawl was fished at station 6 (500 m) from 0930 to 1351. On this occasion the net was streamed on the surface for two hours while an electrical fault on the winch was repaired. The final haul with Granton trawl on this transect (Station 7 - 750 m) was completed between 1608 and 1951. Unfortunately on recovery it was found that the port wing of the trawl had become fouled by about ? of a discarded trawl and probably was the cause of the rather

poor catch. Before leaving the upper slope the opportunity was taken to fish the SMBA single warp trawl at 1000 m (Station 8) between 0645 and 1044 (3/6) thus giving comparative data between the three trawls at the same depth and in the same area.

Then began a series of stations at 500 m intervals down the slope and onto the Porcupine Abyssal Plain using the IOS semi-balloon trawl. Station 9 (1500 m) was worked between 1230 and 1639 (3/6). At station 10 (2000 m) the net was shot at 1826 but was not recovered until 0030 (4/6) due to the 50 m bridles to the trawl doors having become seriously twisted. Nevertheless there was an excellent catch and by the time this was sorted at 0300 it was decided to heave to until morning before beginning the task of disentangling the wires and modifying the rig. Extra swivels were encorporated into the bridles and the net was finally shot at station 11 (2500 m) at 1039 and recovered at 1638. Station 12 (3000 m) was successfully worked between 2127 (4/6) and 0425 (5/6) but at station 13 (3500 m) the net failed to take the bottom and only a few mid-water organisms were taken. Station 14 (4000 m) was fished between 1412 and 2310 (5/6) and in addition to fish and invertebrates yielded about two boxes of clinker and associated artefacts such as bottles, cans, china and a brass key. Station 15 (4500 m) was fished between 0315 and 1350 (6/6) but when tension was released from the deep wire serious turns developed on the winch drum which necessitated the removal of about 70 m of badly kinked wire. These turns were probably generated by hauling in

large amounts of wire under tension through the spooling gear and in an effort to remove them 2000 m of wire was streamed on passage to station 16 (4800 m). The net was shot at 1853 but when 2433 m of wire had been paid out the winch driver reported stranding on the deep wire. On investigation this was found to be at a point where the wire had been joined by a long splice. The trawl was recovered and since it would take several hours to resplice the wire it was decided to abandon this station and steam to the Goban Spur to begin the next transect.

Challenger was on station at 0830 (7/6) at a proposed depth of 2000 metres but by the time the net was shot the depth had decreased to 1750 m. Payout continued and station 17 was worked between 0854 and 1509 with the IOS semi-balloon trawl. A new position was found for a 2000 m trawl and station 18 was fished between 1612 and 2235. The bottom temperature during this tow varied from 4.2 to 5.0°C and was higher than that recorded during the 1750 m tow which was constant at 3.8°C. Station 19 (1500 m) was worked between 0130 and 0554 (8/6) and during passage to station 20 (1250 m) the Granton trawl was rigged. This net was fished between 0957 and 1402 and again at station 21 (1000 m) between 1531 and 1934. The semi-balloon trawl was then rigged and fished consecutively during the night at stations 22, 23 and 24 (1000, 500 and 750 m respectively). Before shooting the Granton trawl again it was considered necessary to stream both the port and starboard trawl warps and this was done on passage to station 25.

The Granton trawl was then fished at stations 25 and 26 (500 and 750 m) between 1233 and 1910 (9/6). This completed the work on the Goban Spur and before steaming for Barry it was decided to use the remaining hours of scientific time in searching for a suitable trawling ground further north (approx. 50°39'N 11°13'W). This area was known to have coral at depths between 700 and 1200 m and on a previous Discovery cruise some interesting results were obtained from this type of ground. However after searching for a suitable trawling area for two hours the station had to be abandoned and Challenger set course for Barry and secured alongside at about 1900 (11/6).

Results:

Since 1975 a total of 37 hauls have been made with the SMBA Granton trawl on the Hebridean Terrace to the west of Barra in depths from 500 to 1250 m. Comparisons of the catches of this net with those from the SMBA box trawl, which is fished on a single warp showed quite clearly that the former was more efficient at catching larger species such as sharks, chimaerids, scabbard fish and alepocephalids. This was also true of the comparative trawls carried out on this cruise between the Granton trawl and the IOS semi-balloon trawl. The Granton trawl caught a higher proportion of squaloid sharks but the biomass and number of species was considerably less than might have been expected from the Hebridean Terrace. Similarly the biomass of chimaerids, especially Chimaera monstrosa, was considerably reduced. The

numbers of scabbard fish, Aphanopus carbo, were also low but this may have been a seasonal effect since its distribution on the Hebridean Terrace is variable and may be related to the abundance of blue whiting. Alepocephalids (at least two species) tended to be more widely distributed and perhaps more abundant than on the Hebridean Terrace, which agrees with the results of the MAFF surveys of the continental slope during the years 1973 and 1974.

The catch rates of the macrourid Coryphaenoides rupestris, were considerably lower than on the Hebridean Terrace and it appears to have a slightly deeper depth distribution, its place at the 750 m stations being taken by Trachyrhynchus trachyrhynchus, a species which does not occur further north. The abundance and distribution of the other macrourid and morid fish which are common to both areas appeared to be similar.

The samples taken with the semi-balloon otter trawl along the two transects (8 in the western part of the Sea Bight and 6 on the Goban Spur) yielded 660 kg of fish from 472 - 4510 m soundings. In addition, large quantities of echinoderms were collected from almost all stations, with holothurians dominating all the deeper ones. The fish were represented by about 60 species from almost 30 families. Peak diversity and biomass were encountered on the slope in soundings shallower than 2000 m. The most abundant species was the eel, Synaphobranchus kaupi, while the dominant family was the Macrouridae. This contrasts with the situation reflected by the catches of the

Granton trawl on the upper slope. This sampled a high proportion of alepocephalids and squaloid sharks, which were almost unrepresented in the semi-balloon trawl catches.

Notable among the fish collection was an unusual species of Myxine, some rare rays (including Bathyraja bigelowi), lycodids and brotulids. A female of the deep-water family Aphyonidae, tentatively identified as Sciadonus sp., was caught and found to be carrying embryos, visible through the translucent body wall. During the course of the cruise blood samples were collected from Chimaeras for Salford University.

Samples of fish muscle for ^{137}Caesium analysis were collected from depths ranging from 500 - 1250 m by the Ministry of Agriculture, Fisheries and Food, Radiobiological Laboratory at Lowestoft. In addition to these, samples were taken of muscle, liver, gonad and bone for the analysis of natural occurring alpha radiation.

Acknowledgements

This was a particularly arduous cruise with only six scientists, the minimum of steaming time between stations and no loss of time due to weather or breakdown. The co-operation of Captain Maw and the entire ship's company was magnificant and the amount of work achieved was beyond our wildest expectations. A special word of thanks must go to the fishing skipper and the chief officer for their expertise and long hours spent on deck assisting with the trawls. Finally it is a pleasure to acknowledge the assistance of Research Vessel Services in the planning of this cruise.

J.D.M. Gordon.

21/4/75

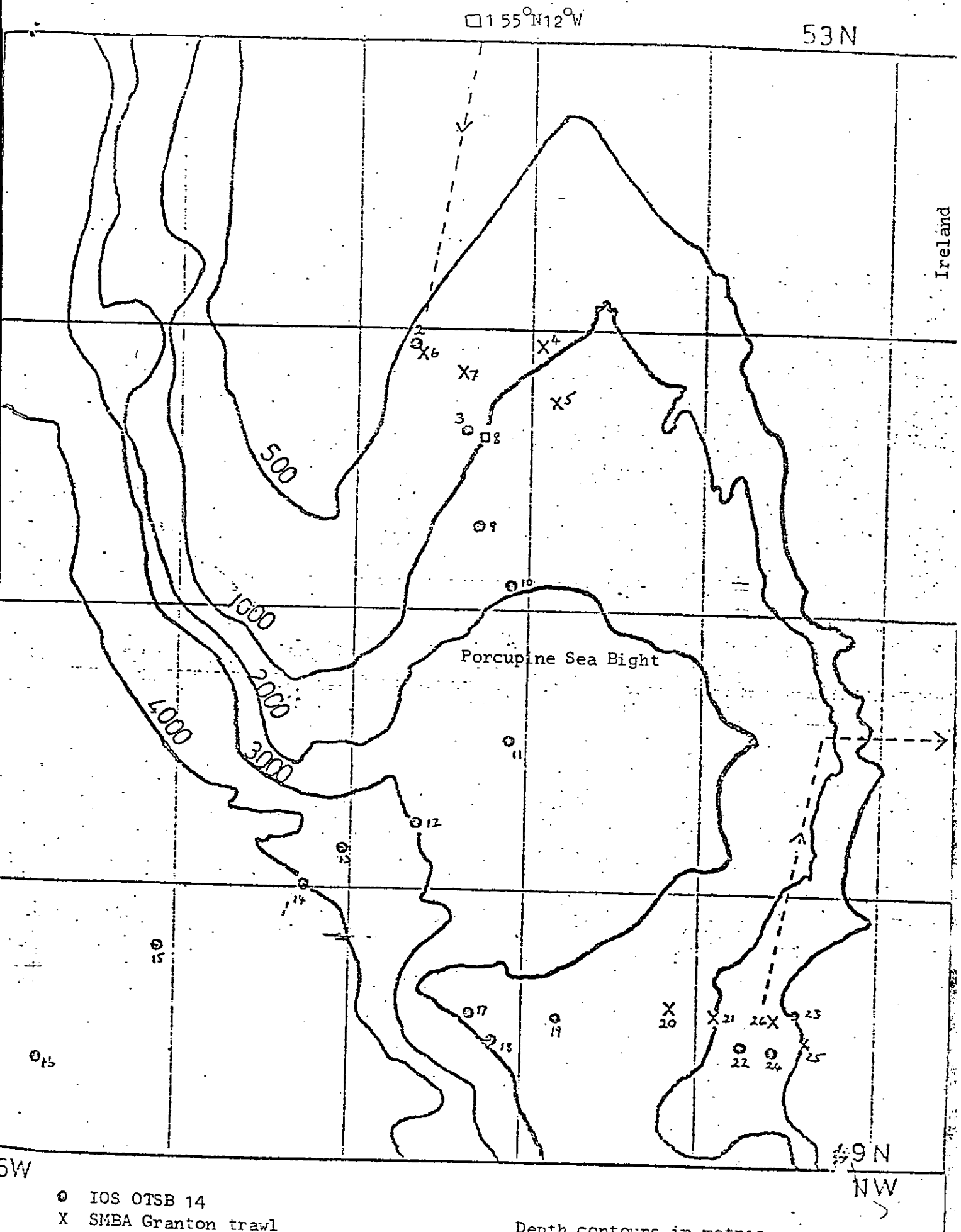
CHALLENGER 8/79 STATION LIST

Station No.	SMBA Ref.No.	Gear	Date	Time (bottom) BST	Position	Depth (m)	Temp	Dist Run n. miles
1	SWT34	SMBA single warp trawl	31/5	0122 - 0252	54°54.6'N 12°11.7'W to 54°52.2'N 12°17.8'W	2880	2.7°C	-
2	-	IOS OTSB14	1/6	0204 - 0311	51°56.2'N 13°34.8'W to 51°54.3'N 13°35.2'W	500	9.4	2.0
3	-	IOS OTSB14	1/6	0729 - 0838	51°37.1'N 13°14.6'W to 51°35.0'N 13°15.4'W	992 - 1042	8.6	2.3
4	40	Granton trawl	1/6	1716 - 1801	51°54.4'N 12°53.9'W to 51°56.7'N 12°50.1'W	970 - 975	-	3.2
5	41	Granton trawl	1/6	2257 - 2342	51°44.1'N 12°46.3'W to 51°43.2'N 12°50.6'W	1270 - 1300	-	2.5
6	42	Granton trawl	2/6	1135 - 1220	51°55.8'N 13°36.3'W to 51°58.8'N 13°34.2'W	490	-	1.5??
7	43	Granton trawl	2/6	1800 - 1845	51°50.6'N 13°18.2'W to 51°53.8'N 13°16.4'W	770 - 795	-	3.4
8	SWT35	SMBA single warp trawl	3/6	0741 - 0924	51°34.0'N 13°18.1'W to 51°32.3'N [illegible]	980 -	-	3.8

9	-	IOS OTSB14	2/6	1418 -1523	51°14.7'N 13°16.3'W to 51°13.5'N 13°19.2'W	1490 - 1523	-	-
10	-	IOS OTSB14	3/6	1925 - 1940	51°05.3'N 13°04.5'W to 51°06.5'N 12°59.5'W	1925 - 1960	3.3	3.5
11	-	IOS OTSB14	4/6	1240 - 1412	50°32.4'N 13°01.4'W to 50°31.4'N 12°55.6'W	2435 - 2405	3.0	3.7
12	-	IOS OTSB14	4/6	2357 - 0135	50°13.6'N 13°14.5'W to 50°10.8'N 13°36.8'W	3022 - 3110	2.7	4.1
13	-	IOS OTSB14	5/6	0908 -1040	50°07.6'N 13°58.3'W to 50°04.2'N 14°02.0'W	3400 - 3600	2.7	4.2
14	-	IOS OTSB14	5/6	1755 - 1945	49°43.9'N 14°02.2'W to 49°38.8'N 14°00.4'W	4017 - 4095	2.4	5.1
15	-	IOS OTSB14	6/6	0815 - 1000	49°43.9'N 15°04.6'W to 49°46.9'N 15°08.2'W	4505 - 4515		4.3
16	-	IOS OTSB14	6/6	-	(49°25.6'N 15°42.1'W)	4800	-	-
17	-	IOS OTSB14	7/6	1130 - 1215	49°30.1'N 13°19.9'W to 49°27.7'N 13°17.2'W	1794 - 1785	3.8	2.7
18	-	IOS OTSB14	7/6	1813 - 2014	49°27.3'N 13°21.1'W to 49°30.1'N 13°26.8'W	2045 - 2110	4.2 - 5.8	4.1

19	-	IOS OTSB14	8/6	0325 - 0430	$49^{\circ}29.5'N$ $12^{\circ}48.9'W$	1465	6.2	
					to	-	-	3.1
					$49^{\circ}29.9'N$ $12^{\circ}43.6'W$	1431	6.4	
20	44	Granton Trawl	8/6	1131 - 1225	$49^{\circ}33.6'N$ $12^{\circ}08.1'W$	1245		
					to	-	-	3.1
					$49^{\circ}36.5'N$ $12^{\circ}06.4'W$	1230		
21	45	Granton Trawl	8/6	1655 - 1740	$49^{\circ}30.2'N$ $11^{\circ}48.8'W$	965		
					to	-	-	3.2
					$49^{\circ}30.4'N$ $11^{\circ}50.2'W$	970		
22	-	IOS OTSB14	8/6	2215 - 2315	$49^{\circ}24.0'N$ $11^{\circ}45.4'W$	1000	7.9	
					to	-	-	2.4
					$49^{\circ}26.1'N$ $11^{\circ}45.1'W$	965	8.1	
23	-	IOS OTSB14	9/6	0307 - 0418	$49^{\circ}31.6'N$ $11^{\circ}23.9'W$	455	8.2	
					to	-	-	2.1
					$49^{\circ}29.0'N$ $11^{\circ}25.9'W$	490	8.8	
24	-	IOS OTSB14	9/6	0707 - 0838	$49^{\circ}33.9'N$ $11^{\circ}36.1'W$	736	7.6	
					to	-	-	3.8
					$49^{\circ}37.9'N$ $11^{\circ}35.6'W$	790	7.9	
25	46	Granton Trawl	9/6	1324 - 1410	$49^{\circ}35.2'N$ $11^{\circ}23.8'W$	490		
					to	-	-	2.8
					$49^{\circ}32.7'N$ $11^{\circ}24.4'W$	515		
26	47	Granton Trawl	9/6	1708 - 1758	$49^{\circ}28.5'N$ $11^{\circ}35.4'W$	745		
					to		-	2.7
					$49^{\circ}25.8'N$ $11^{\circ}34.5'W$			

CHALLENGER CRUISE 8/79



⊙ IOS OTSB 14
X SMBA Granton trawl
□ SMBA Box trawl

Depth contours in metres