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Commercial Vessel "Cluaran II"

# CHARTER CRUISE REPORT

22 August - 16 September 1988

## Personnel

N Bailey	HSO	22 August - 16 September
T Howell	HSO	5-10 September
J Main	SSO	5-10 September
G Sangster	HSO	5-10 September

## Objectives

1. To compare the catch rates of scallops using traditional (4') dredges with the catch rates obtained using more recent designs (2' and 2'6"). The information to be used in calibrating catch per unit effort information provided by fishermen.
2. To obtain information on scallop population structure on various grounds around Islay.
3. To observe, by the use of divers and underwater television, the action and efficiency of scallop dredges on various types of bottom.

## Narrative

N Bailey arrived in Islay at 1645 on 21 August in readiness to join "Aspire" BF234 but this vessel was no longer available owing to engine trouble. The charter was transferred to "Cluaran II" which sailed at 0900 on 22 August for gear trials off Port Ellen, using 2' and 4' scallop dredges. In the afternoon adjustments were made to the 4' dredges and a welder made modifications to one of the towing bars. On the following two days "Cluaran" sailed at 0800 making repeat hauls at sites off of Port Ellen (11 hauls) and Ardmore Point (4 hauls). Docking was at 1800.

Gale force winds prevented scallop fishing operations on 25 August. "Cluaran" returned to the Ardmore Point site on 26 August to make a further 5 hauls fishing with the long and short warps on opposite sides. One bag of scallops was retained for meat weight analysis. "Cluaran" arrived in Port Ellen at 1820 and tied up for the weekend.

Persistent S and SW gales between 29 August and 1 September again interrupted fishing operations but a slight moderation on 2 September permitted two hauls to be made off Port Ellen before the weather deteriorated again.

Messers Howell, Main and Sangster joined the vessel in Port Ellen at 0830 on 5 September and following the loading and setting up of diving equipment and vehicle, "Cluaran" sailed at 1400 for the divers to have a trial run observing dredges fishing. On 6 September an effort to find shelter at Machrihanish Bay, Kintyre was curtailed owing to freshening winds and "Cluaran" was forced to return to port. The vessel was moved to Port Askaig and on 7 and 8 September further diving observations were successfully made west of Jura and off McArthur's Head, Islay; docking was at 1800. On 9 September the vessel steamed to Claggain Bay, Islay where observations were made of dredges fished with their covers removed. The dredge tracks made by the passage of dredges over the bottom were also examined. Docking was at 1600 and all diving gear and TV equipment was offloaded and stored. The diving team departed at 1100 on 10 September.

For the remaining period of the charter (12-16 September) "Cluaran" sailed daily at 0800 to fish grounds off Ardtalla (6 hauls), off Port Ellen (8 hauls), in Lochindaal (6 hauls) and at the Otter Rock (4 hauls). At the last three sites, 2' dredges were compared with 2'6" dredges; docking was at 1800. All gear was loaded onto the Laboratory lorry at 1700 on 16 September and N Bailey returned to Aberdeen on 17 September.

## Results

### Dredging

A total of 58 dredge hauls were made on the various grounds around Islay (see Table 1) and 10184 scallops were caught. Thirty-three hauls compared traditional 4' dredges with more recent 2' dredges by fishing simultaneously three of the former on the starboard side and six of the latter on the port side. To permit turning, one set of gear was always fished on a shorter warp; the effect of altering the gear around was investigated. Seven hauls were made with divers observing the gear (only one set was fished at a time in these hauls). Eighteen hauls compared the catch rate of the 2'6" dredges with the 2' dredges.

### Comparison of gear

In Table 1 mean catch rates (scallop numbers per 12' or 3.6 m dredge width  $\text{hr}^{-1}$  fishing) are shown for 2' and 4' dredges. Preliminary analysis suggested that on most types of hard ground, catch rates with the 2' dredges exceeded those of the 4' gear; the ratio 2'/4' varied from 1.33 to 2.33. This outcome was similar regardless of which gear was fished on the shorter warp. Results were slightly different on the smoother ground where the 4' dredges fished slightly better. However, only three hauls were made.

On hard, stoney ground the 2' dredges also appeared to outfish the 2'6" ones (Table 2), although the differences were not so marked (ratio 2'/2'6" varied between 1.27 and 1.77). On the smooth ground (Otter Rock) there was again some evidence that the catch rate of the larger dredges was improved relative to the smaller ones.

### Population structure

The size and age compositions of scallops from 34 of the dredge hauls were determined. A total of 4688 scallops were aged and measured during the course of the charter. Details of the age and size compositions of scallops obtained from the various grounds using the 2' dredges are shown in Tables 3 and 4. These results, expressed as catch rate (scallops per 6 x 2' dredges  $\text{hr}^{-1}$ ), are based on 2787 scallops from 32 hauls. Marked variations in both age and size compositions were evident from ground to ground. In some cases where age compositions were similar (eg Gander and Ardmore Islands), size composition was markedly different suggesting variations in growth rate.

### Diving observations

Using the underwater vehicle diving observations were made of the 2' dredges (5 hauls) and 4' dredges (2 hauls) fished over a variety of types of bottom ranging from sand to rock. Underwater television and video tapes (4) were used to record the observations. Information was collected on the localised heterogeneity of the scallops grounds, the action of the dredges on the different grounds, the movement of the tooth bar and the fate of scallops in the path of the dredges; the removal of the net covers facilitated some of these observations. Of particular interest was

the way in which the different dredges dealt with stones and boulders. Preliminary analysis of the videos suggested that whereas stones were trundled in front of the tooth bar of the 2' dredge for relatively short distances before the dredge bounced over them, the large dredges trundled stones for some distance and clearance was slower. This may be one of the reasons for the reduced catch rates of the larger dredge compared to the smaller one on hard grounds.

N Bailey  
21 December 1988

Table 1. Areas fished during "Cluaran" charter giving general details and mean catch rates of scallops (No per 3.6 m dredge width hr<sup>-1</sup>) in each area using 4' and 2' dredges.

Area	Position (centre of area)	Depth (ftms)	Bottom type	No hauls	Relative warp length 2' dredges	Catch rates			
						4'		2'	
						mean	sd	mean	sd
Gander	(55°36.5'N 6°12.9'W)	10	hard, v rough, rocky	11	short	151.0	73.5	288.0	96.9
West Jura	(56°02.0'N 5°56.5'W)	10-12	hard, rough, rocky	3	short	43.3	26.3	89.0	35.5
Ardmore Islands	(55°39.3'N 6°01.5'W)	15	hard, rock with peaks	a2	short	116.0	-	271.0	-
				b2	long	121.0	-	216.0	-
Ardmore Point	(55°41.2'N 6°00.5'W)	20-35	hard, stoney	a4	short	76.7	27.8	126.0	46.3
				b7	long	50.4	20.8	67.3	7.9
Claggain Bay	(55°43.3'N 6°01.2'W)	10-14	hard, smooth, boulders	4	short	86.5	44.5	115.3	51.3
McArthurs Head	(55°44.5'N 6°02.0'W)	12-14	hard, smooth, boulders	2	short	44.0	-	66.0	-
South Gander	(55°36.0'N 6°13.6'W)	10	soft, smooth gravel (some stones)	3	short	30.5	7.8	25.7	5.5

Table 2. Areas fished during "Cluaran" charter giving general details and mean catch rates of scallops (No per 3.6 m dredge width  $\text{hr}^{-1}$ ) in each area using 2'6" and 2' dredges.

Area	Position (centre of area)	Depth (ftms)	Bottom type	No hauls	Relative warp length 2' dredges	Catch rates			
						2'6"		2'	
						mean	sd	mean	sd
Gander	(55°36.5'N 6°12.9'W)	10	hard, v rough, rocky	8	short	71.3	33.2	126.5	75.7
Lochindaal	(55°40.8'N 6°22.2'W)	12-20	hard, stoney	6	short	74.4	8.1	94.5	13.3
Otter Rock	(55°33.8'N 6°07.0'W)	25-30	soft, smooth gravel	4	short	89.0	47.1	90.5	42.1

Table 3. Age composition in various areas around Islay expressed as catch rate  
(No of scallops per 3.6 m 2' dredge hr<sup>-1</sup>)

Area	Age									
	1	2	3	4	5	6	7	8	9	10+
Gander	0.9	16.9	57.8	59.6	29.6	23.3	16.4	10.5	5.3	8.2
South Gander		1.1	10.5	3.7	1.1	1.9	0.75	2.2	1.1	4.5
McArthur's Head		5.3	6.7	14.7	17.3	2.9	5.3	9.3	8.0	10.7
Claggain Bay	0.4	9.3	20.0	27.5	23.1	6.7	8.9	7.1	4.0	4.4
Ardmore Point		1.6	12.6	13.2	11.5	5.3	3.3	5.4	5.1	16.7
Ardmore Islands	2.2	14.2	72.5	78.0	47.4	24.0	21.8	5.4	4.4	6.5
Lochindaal		0.4	7.5	10.8	13.5	15.7	17.2	9.7	8.2	9.4
Otter Rock			14.2	13.9	6.7	3.7	3.0	6.4	9.7	22.1
West Jura		2.6	14.2	20.6	13.1	7.9	7.1	4.1	1.5	1.5

Table 4. Size composition in various areas around Islay expressed as catch rate (No of scallops per 3.6 m 2' dredge hr<sup>-1</sup>)

Area	Size group (cm)														
	<9	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5+
Gander	4.7	14.0	17.4	18.5	14.7	36.5	20.9	20.9	16.7	23.4	16.7	13.3	7.4	4.5	1.3
South Gander	1.1	2.6	2.6	3.3	1.9	1.5	1.5	1.5	0.4	1.1	0.7	3.7	2.2	1.5	1.1
McArthur's Head	5.3	1.3	2.6	2.6	6.7	9.3	4.0	8.0	13.3	8.0	13.3	4.0	1.3		
Claggain Bay	2.2	5.3	9.8	12.4	7.1	13.8	12.4	16.0	9.3	8.4	7.5	7.5	1.3	2.2	
Ardmore Point	2.6	3.4	5.4	7.8	5.0	10.1	7.8	8.9	10.7	7.7	3.0	1.7	0.1	0.1	
Ardmore Islands	27.3	24.0	37.6	40.9	24.5	12.5	35.4	15.3	26.3	18.5	6.5	6.5	4.4		
Lochindaal	1.1	4.1	4.1	7.1	7.1	11.2	16.5	21.7	13.9	6.7	2.2	0.4			
Otter Rock	0.7	1.5	7.5	7.1	6.7	3.7	7.1	7.1	7.5	12.4	10.9	6.0	1.5		
West Jura	2.2	2.2	4.9	11.2	6.0	11.2	10.1	6.4	4.1	6.4	3.0	3.7	0.4	0.4	0.4