

R1/10

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FRV *Goldseeker*

7 and 8GR89

Cruises 7/89 and 8/89

Report

29 May - 16 June 1989, and 26 June - 14 July 1989

| | | | |
|-------------------|--------------|-------------|---------------------------------|
| Personnel: | Cruise 7/89: | J Mason | PSO (in charge 5-16 June) |
| | | D I Fraser | HSO (in charge 29 May - 4 June) |
| | Cruise 8/89: | D I Fraser | HSO (in charge) |
| | | A R Weetman | ASO |

Objectives

1. To investigate the settlement of scallops, queens and crabs in the Clyde Sea area, the Sound of Jura, off the Islay coast, the Sound of Mull, Loch Nevis, Loch Hourne, Loch Carron, Camustiel and Loch Toscaig, Gairloch and Poolewe.
2. To study the size and age composition of scallop and queen stocks in the same areas.
3. To examine the gonads of scallops and queens to determine their maturing stage.
4. To record surface and subsurface water temperature.
5. To preserve gill sections of scallops from selected west coast stations for future pathological examination.

Narrative

Cruise 7/89

D Fraser joined *Goldseeker* at Kyle of Lochalsh on 29 May and dredging commenced in the Sound of Sleat next day. The boat then made passage to the Clyde Sea area, passing through the Crinan Canal on 1 June. Repairs were made to the vessel's steering on 31 May, 1 and 2 June when hydraulic piping and electrical connections failed. These repairs resulted in the loss of part of each of those working days. *Goldseeker* then spent six days in the Clyde setting spat collector strings and dredging for scallops and queens before returning through the Crinan Canal on 9 June, J Mason having joined the boat in Ayr on the evening of 5 June prior to the half landing there on 6 June.

Six days were spent setting collector strings and dredging west of Kintyre and north to the Sound of Mull, two working days being lost owing to strong south-easterly winds. Due to the breakdowns and delays, work had not been completed when the vessel berthed at Corpach on 16 June at the end of the cruise.

Cruise 8/89

The crew and scientific staff joined *Goldseeker* on 26 June. Next day, spat collector strings were set and dredge hauls were made in the Sound of Mull, completing work from Cruise 7/89. The following five days were spent setting spat collectors in the northwest area, between Loch Nevis and Eddrachillis Bay before dredging recommenced on 3 July. The half landing was spent at Ullapool on 4 July then the next nine days spent dredging for scallops. Work was successfully completed on 13 July when *Goldseeker* berthed at Kyle of Lochalsh. The crew and scientific staff left the vessel on the morning of 14 July.

Results

1. A total of 101 spat collector strings were set and 124 dredge hauls made during cruises 7/89 and 8/89. The spat collectors were left in the sea until autumn when they were retrieved and their contents examined.
2. Dredging was undertaken using an array of three, 85 cm dredges (one, nine toothed standard dredge in starboard and port positions and an 11 toothed sampling dredge in between). The hauls were mainly of 30 minutes duration, and the results are shown in Table 1a-c.

From a total of 450 queens caught at North Arran in 7 x $\frac{1}{2}$ hr hauls, 1, 340, 37, 71 and 1 respectively were aged 1, 2, 3, 4 and 5 years. Few queens were caught elsewhere.

3. From a study of scallop gonads it was observed that spawning had commenced in the south west during cruise 7/89 and by cruise 8/89 spawning had progressed to the stages where most animals were either partially or fully spent (Table 2).
4. Water temperatures were taken at all stations and the results are shown in Table 3.
5. Gill sections were taken from 30 scallops, from each main area fished, preserved in "Carson" fixative then sent to microbiologist Stein Mortensen, Institute of Marine Research, Norway, who is studying the prevalence of *Rickettsiae* bacteria infections in scallop gill tissue.

D I Fraser
17 November 1989

Seen in Draft: A Mair

Table 1a

Number of scallops caught at each age, June-July 1989

Cruise 7/89

| Area | Growth rings | | | | | | | | | | | Total |
|----------------|--------------|----------|-----------|-----------|------------|------------|------------|-----------|-----------|-----------|-----------|------------|
| | Hours fished | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| East Clyde | 3.00 | 0 | 1 | 3 | 9 | 9 | 3 | 1 | 3 | 2 | 10 | 41 |
| Arren | 5.00 | 0 | 14 | 7 | 28 | 75 | 34 | 5 | 12 | 3 | 9 | 187 |
| Loch Fyne | 1.00 | 0 | 0 | 0 | 1 | 4 | 5 | 2 | 2 | 7 | 11 | 32 |
| East Kintyre | 4.50 | 0 | 0 | 7 | 4 | 9 | 16 | 10 | 10 | 4 | 16 | 76 |
| Gigha | 3.00 | 0 | 11 | 13 | 24 | 31 | 8 | 14 | 3 | 2 | 7 | 113 |
| Islay shore | 1.50 | 0 | 9 | 13 | 21 | 15 | 18 | 6 | 9 | 7 | 14 | 112 |
| Jura shore | 2.50 | 1 | 1 | 14 | 20 | 35 | 32 | 27 | 19 | 10 | 12 | 171 |
| Sound of Mull | 0.75 | 0 | 2 | 11 | 19 | 13 | 14 | 6 | 6 | 4 | 6 | 81 |
| Sound of Sleat | 1.00 | 0 | 7 | 7 | 20 | 19 | 10 | 4 | 3 | 2 | 5 | 77 |
| Total | 22.25 | 1 | 45 | 75 | 146 | 210 | 140 | 75 | 67 | 41 | 90 | 890 |

Cruise 8/89

| Area | Growth rings | | | | | | | | | | | Total |
|----------------------|--------------|----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| | Hours fished | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Eddrachillis Bay | 1.4 | 0 | 0 | 5 | 12 | 11 | 16 | 14 | 17 | 9 | 38 | 122 |
| Summer Isles | 2.7 | 0 | 0 | 1 | 6 | 4 | 8 | 5 | 11 | 11 | 15 | 61 |
| Rubha Reidh | 2.5 | 0 | 0 | 2 | 4 | 2 | 25 | 15 | 13 | 22 | 49 | 132 |
| Loch Ewe | 1.3 | 0 | 0 | 0 | 2 | 4 | 11 | 13 | 16 | 12 | 50 | 108 |
| Loch Galrloch | 2.2 | 0 | 4 | 1 | 8 | 7 | 35 | 17 | 23 | 10 | 44 | 149 |
| Applecross | 2.6 | 0 | 0 | 0 | 2 | 1 | 8 | 10 | 6 | 10 | 28 | 65 |
| Loch Carron & Peabay | 3.9 | 0 | 0 | 1 | 1 | 4 | 24 | 24 | 17 | 12 | 48 | 131 |
| Sandaig Isle | 1.5 | 0 | 3 | 15 | 38 | 21 | 19 | 8 | 13 | 6 | 11 | 134 |
| Armadale & Knock Bay | 4.0 | 0 | 6 | 20 | 6 | 3 | 18 | 16 | 18 | 12 | 42 | 141 |
| Loch Mourne | 1.9 | 1 | 1 | 3 | 3 | 13 | 18 | 12 | 7 | 5 | 11 | 74 |
| Tarskavaig | 1.3 | 0 | 1 | 16 | 45 | 19 | 24 | 11 | 8 | 10 | 29 | 163 |
| Loch Nevis | 1.9 | 0 | 6 | 10 | 12 | 11 | 25 | 11 | 10 | 4 | 43 | 132 |
| Arisaig | 0.9 | 0 | 12 | 21 | 30 | 14 | 23 | 19 | 11 | 7 | 25 | 162 |
| Sound of Mull | 2.0 | 0 | 3 | 9 | 18 | 13 | 7 | 3 | 4 | 5 | 8 | 70 |
| Total | 30.1 | 1 | 36 | 104 | 187 | 127 | 261 | 178 | 174 | 135 | 441 | 1644 |

Table 1b

Age composition (percentage) of scallop catches

Cruise 7/89

| Area | Growth rings | | | | | | | | | |
|----------------|--------------|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| East Clyde | | 2 | 7 | 22 | 22 | 7 | 2 | 7 | 5 | 24 |
| Arran | | 7 | 4 | 15 | 40 | 18 | 3 | 6 | 2 | 5 |
| Loch Fyne | | | | 3 | 12 | 16 | 6 | 6 | 22 | 34 |
| East Kintyre | | | 9 | 5 | 12 | 21 | 13 | 13 | 5 | 21 |
| Gigha | | 10 | 11 | 21 | 27 | 7 | 12 | 3 | 2 | 6 |
| Islay shore | | 8 | 12 | 19 | 13 | 16 | 5 | 8 | 6 | 12 |
| Jura shore | 1 | 1 | 8 | 12 | 20 | 19 | 16 | 11 | 6 | 7 |
| Sound of Mull | | 2 | 14 | 23 | 16 | 17 | 7 | 7 | 5 | 7 |
| Sound of Sleat | | 9 | 9 | 26 | 23 | 13 | 5 | 4 | 3 | 6 |
| Overall % | | 5 | 8 | 16 | 24 | 16 | 8 | 8 | 5 | 10 |

Cruise 8/89

| Area | Growth rings | | | | | | | | | |
|----------------------|--------------|---|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Eddrachillis Bay | 0 | 0 | 4 | 10 | 9 | 13 | 11 | 14 | 7 | 31 |
| Summer Isles | 0 | 0 | 2 | 10 | 6 | 13 | 8 | 18 | 18 | 25 |
| Rubha Reidh | 0 | 0 | 2 | 3 | 2 | 19 | 11 | 10 | 17 | 37 |
| Loch Ewe | 0 | 0 | 0 | 2 | 4 | 10 | 12 | 15 | 11 | 46 |
| Loch Galrloch | 0 | 3 | 1 | 5 | 5 | 23 | 11 | 15 | 7 | 30 |
| Applecross | 0 | 0 | 0 | 3 | 2 | 12 | 15 | 9 | 16 | 44 |
| Loch Carron & Pabay | 0 | 0 | 1 | 1 | 3 | 18 | 18 | 13 | 9 | 37 |
| Sandaig Isle | 0 | 2 | 11 | 28 | 16 | 14 | 6 | 10 | 4 | 8 |
| Armadale & Knock Bay | 0 | 4 | 14 | 4 | 2 | 13 | 11 | 13 | 9 | 30 |
| Loch Hourne | 1 | 1 | 4 | 4 | 18 | 24 | 16 | 9 | 7 | 15 |
| Tarskavaig | 0 | 1 | 10 | 27 | 11 | 15 | 7 | 5 | 6 | 18 |
| Loch Nevis | 0 | 5 | 8 | 9 | 8 | 19 | 8 | 8 | 3 | 33 |
| Arisaig | 0 | 7 | 13 | 19 | 9 | 14 | 12 | 7 | 4 | 15 |
| Sound of Mull | 0 | 4 | 13 | 26 | 18 | 10 | 4 | 6 | 7 | 11 |
| Overall % | | 2 | 6 | 11 | 8 | 16 | 11 | 11 | 8 | 27 |

Table 1c

Mean length of scallops caught at each age group (mm)

Cruise 7/89

| Area | Growth rings | | | | | | | | | | Overall mean length |
|----------------|--------------|----|----|-----|-----|-----|-----|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| East Clyde | | 95 | 98 | 107 | 119 | 123 | 120 | 125 | 132 | 129 | 116 |
| Arran | | 79 | 83 | 97 | 113 | 114 | 115 | 117 | 105 | 132 | 102 |
| Loch Fyne | | | | 80 | 99 | 100 | 117 | 111 | 115 | 122 | 112 |
| East Kintyre | | | 90 | 97 | 106 | 103 | 113 | 116 | 114 | 125 | 111 |
| Gigha | | 74 | 94 | 103 | 114 | 118 | 127 | 135 | 131 | 133 | 108 |
| Islay shore | | 78 | 99 | 103 | 107 | 124 | 133 | 134 | 133 | 132 | 115 |
| Jura shore | 46 | 58 | 84 | 94 | 96 | 111 | 116 | 118 | 126 | 131 | 107 |
| Sound of Mull | | 75 | 92 | 103 | 107 | 116 | 117 | 122 | 123 | 126 | 109 |
| Sound of Sleat | | 76 | 92 | 100 | 106 | 107 | 116 | 112 | 135 | 120 | 103 |

Cruise 8/89

| Area | Growth rings | | | | | | | | | | Overall mean length |
|----------------------|--------------|----|----|-----|-----|-----|-----|-----|-----|-----|---------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Sound of Mull | | 77 | 89 | 101 | 112 | 117 | 113 | 119 | 121 | 123 | 106 |
| Arisaig | | 72 | 87 | 99 | 104 | 109 | 114 | 117 | 116 | 119 | 104 |
| Loch Nevis | | 69 | 89 | 98 | 93 | 100 | 106 | 105 | 105 | 112 | 101 |
| Tarskavaig | | 70 | 87 | 96 | 102 | 110 | 110 | 113 | 118 | 123 | 104 |
| Loch Hourne | 50 | 65 | 82 | 90 | 101 | 102 | 106 | 109 | 111 | 118 | 104 |
| Armedale & Knock Bay | | 72 | 84 | 96 | 95 | 107 | 109 | 109 | 113 | 120 | 106 |
| Sandaig Isle | | 75 | 90 | 98 | 99 | 105 | 111 | 113 | 118 | 128 | 103 |
| Loch Carron & Pabey | | | 85 | 100 | 95 | 99 | 104 | 107 | 105 | 115 | 107 |
| Applecross | | | | 92 | 80 | 100 | 103 | 105 | 113 | 120 | 111 |
| Loch Gairloch | | 74 | 90 | 93 | 105 | 108 | 113 | 111 | 117 | 118 | 111 |
| Loch Ewe | | | | 85 | 101 | 104 | 106 | 109 | 111 | 117 | 111 |
| Rubha Reidh | | | 85 | 94 | 102 | 105 | 109 | 102 | 113 | 119 | 112 |
| Summer Isles | | | 80 | 91 | 101 | 102 | 110 | 112 | 114 | 115 | 108 |
| Eddrachillis Bay | | | 78 | 90 | 98 | 107 | 117 | 118 | 122 | 124 | 113 |

Table 2

Gonad stages of mature scallops

Cruise 7/89

| Gonad stage | III Recovering | | IV Filling | | V Half full | | VI Full | | VIIP Partially spent | | VII Spent | | Date sampled |
|----------------|-------------------|----|---------------|----|----------------|----|------------|----|-------------------------|----|--------------|----|-----------------|
| | No | % | No | % | No | % | No | % | No | % | No | % | |
| East Clyde | | | | | 8 | 23 | 27 | 77 | | | | | 5.6 |
| Arran | 12 | 7 | 75 | 45 | 11 | 7 | 1 | 1 | 44 | 27 | 22 | 13 | 7.6 |
| Loch Fyne | 7 | 24 | 6 | 21 | 1 | 3 | 2 | 7 | 8 | 28 | 5 | 17 | 5,7.6 |
| East Kintyre | | | | | 26 | 38 | 22 | 32 | 18 | 26 | 3 | 4 | 2-3.6 |
| Gigha | | | 7 | 8 | 2 | 2 | 1 | 1 | 76 | 86 | 2 | 2 | 10.6 |
| Ialay shore | | | 18 | 20 | 27 | 30 | 25 | 28 | 18 | 22 | 1 | 1 | 13.6 |
| Jura shore | | | 23 | 15 | 5 | 3 | 92 | 60 | 34 | 22 | | | 13-14.6 |
| Sound of Mull | | | 17 | 25 | 14 | 21 | 21 | 31 | 16 | 26 | | | 15.6 |
| Sound of Sleat | | | 2 | 4 | 15 | 33 | 21 | 47 | 5 | 11 | 2 | 4 | 30.5 |

Cruise 8/89

| Gonad stage | III Recovering | | IV Filling | | V Half full | | VI Full | | VIIP Partially spent | | VII Spent | | Date sampled |
|----------------------|-------------------|---|---------------|----|----------------|----|------------|----|-------------------------|----|--------------|----|-----------------|
| | No | % | No | % | No | % | No | % | No | % | No | % | |
| Sound of Mull | | | 5 | 10 | | | | | 43 | 87 | 1 | 2 | 30.6 |
| Arisaig | | | 3 | 3 | 3 | 3 | | | 43 | 38 | 63 | 56 | 9.7 |
| Loch Nevis | | | 10 | 11 | | | | | 27 | 30 | 52 | 58 | 12.7 |
| Tarskavaig | | | 12 | 11 | 3 | 3 | | | 73 | 66 | 22 | 20 | 9.7 |
| Loch Hourne | | | 7 | 12 | 1 | 2 | | | 21 | 34 | 32 | 52 | 8,13.7 |
| Armadale & Knock Bay | | | 15 | 14 | 3 | 3 | | | 67 | 64 | 20 | 19 | 8,13.7 |
| Sandaig Isle | | | 17 | 15 | 2 | 2 | 1 | 1 | 54 | 48 | 38 | 34 | 8,13.7 |
| Loch Carron & Pabay | | | 16 | 14 | 4 | 3 | 1 | 1 | 61 | 53 | 34 | 30 | 3,11.7 |
| Applecross | | | 4 | 7 | 8 | 14 | 3 | 5 | 31 | 55 | 10 | 18 | 6.7 |
| S Loch Gafrloch | | | 20 | 15 | 2 | 1 | | | 94 | 71 | 17 | 13 | 6.7 |
| Loch Ewe | | | 11 | 10 | 2 | 2 | 1 | 1 | 67 | 63 | 25 | 24 | 5.7 |
| Rubha Reidh | | | 3 | 2 | 4 | 3 | 2 | 2 | 101 | 81 | 14 | 11 | 5.7 |
| Summer Isles | | | 4 | 7 | | | 4 | 7 | 40 | 70 | 9 | 16 | 3.7 |
| Eddrachillife Bay | | | 3 | 3 | | | 30 | 31 | 64 | 65 | 1 | 1 | 2.7 |

Table 3

1989 water temperatures at each spat collector station

Cruise 7/89

| Station and number | Date | Depth (m) | Sea bed | Mid-water | Surface |
|------------------------|------|-----------|---------|-----------|---------|
| East Clyde | | | | | |
| Bennane Head (43) | 5.6 | 15 | 9.00 | 8.50 | 9.00 |
| Ardwell Bay (43) | 5.6 | 15 | 10.00 | 10.00 | 10.00 |
| West Clyde | | | | | |
| Loch Fyne (20) | 2.6 | 15 | 9.00 | 9.00 | 9.25 |
| (21) | 2.6 | 15 | 9.25 | 9.25 | 9.25 |
| (18) | 2.6 | 16 | 9.25 | 9.25 | 9.50 |
| Kilbrannan Sound (28a) | 3.6 | 15 | 9.00 | 9.50 | 9.50 |
| (28b) | 3.6 | 15 | 9.00 | 9.00 | 9.00 |
| (32) | 3.6 | 15 | 9.00 | 9.00 | 9.00 |
| Arran (31b) | 7.6 | 15 | 9.75 | 10.00 | 10.75 |
| (31a) | 7.6 | 15 | 9.00 | 9.00 | 10.00 |
| (31) | 7.6 | 17 | 9.25 | 9.25 | 9.50 |
| West of Kintyre (18) | 10.6 | 15 | 10.25 | 10.25 | 10.25 |
| (14a) | 10.6 | 13 | 10.50 | 10.50 | 10.50 |
| (14b) | 10.6 | 14 | 10.00 | 10.25 | 10.25 |
| Islay shore (11, 112) | 13.6 | 15 | 10.00 | 10.00 | 10.50 |
| (10) | 13.6 | 20 | 10.00 | 10.00 | 10.25 |
| (9) | 14.6 | 15 | 10.00 | 10.00 | 10.00 |
| (6) | 14.6 | 18 | 9.25 | 9.25 | 9.50 |
| (4) | 14.6 | 14 | 9.75 | 10.00 | 9.75 |
| (3) | 14.6 | 20 | 9.50 | 9.50 | 9.50 |
| Sound of Mull (44) | 15.6 | 25 | 9.75 | 10.00 | 10.00 |

Cruise 8/89

| Station and number | Date | Depth (m) | Sea bed | Mid-water | Surface |
|--------------------|------|-----------|---------|-----------|---------|
| Sound of Mull (45) | 27.6 | 12 | 10.50 | 10.50 | 10.50 |
| (46) | 28.6 | 12 | 9.75 | 9.75 | 10.50 |
| Loch Nevis A | 28.6 | 14 | 11.00 | 11.00 | 11.00 |
| B | 28.6 | 15 | 11.00 | 11.00 | 11.00 |
| C | 28.6 | 15 | 11.00 | 11.00 | 11.00 |
| Loch Hourne A | 29.6 | 15 | 10.25 | 10.75 | 11.00 |
| B | 29.6 | 15 | 10.00 | 10.50 | 10.75 |
| Loch Carron A | 29.6 | 15 | 10.75 | 10.75 | 10.75 |
| B | 29.6 | 15 | 11.50 | 11.50 | 11.50 |
| C | 29.6 | 15 | 11.25 | 11.25 | 11.25 |
| Crowlin Isles | 30.6 | 18 | 9.75 | 9.75 | 10.00 |
| Camustiel | 30.6 | 19 | 10.00 | 10.00 | 10.50 |
| Torrison | 30.6 | 15 | 9.25 | 9.50 | 10.00 |
| Gairloch | 30.6 | 20 | 8.75 | 9.25 | 10.00 |
| Loch Ewe | 1.7 | 15 | 10.50 | 10.50 | 11.00 |
| Eddrachillis Bay | 1.7 | 17 | 9.50 | 9.50 | 10.00 |