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MRV *Alba na Mara*

## **Survey 1722A**

### **REPORT**

1-5 November 2022

**Loading:** 28 October 2022, Troon

**Sailing:** 1 November 2022

**Unloading:** 15 November 2022, Fraserburgh

**Fishing Gear:** Scallop dredges

**Project:** 15 days, SCALOP

### **Personnel**

J Turriff (SIC)

S Kinnear

P Gibson

### **Objectives**

1. To carry out a survey of scallop stocks in the Clyde.
2. To age, measure and assess shell damage on all scallops caught.
3. To identify, quantify and damage assess by-catch.
4. To collect whole scallops for heavy metal and organic contaminants testing.
5. To collect scallops for genetic and shell isotope analysis to assess connectivity among scallop grounds in the Clyde.
6. To collect data on scallop ring measurements.
7. To collect scallop meat weight and biological data.
8. To record and retain marine litter obtained during the dredging process for UK Marine Strategy.

### **Introduction**

Scallops are bivalve molluscs that live in the coastal waters around Scotland and the wider north-east Atlantic. They can be found on the seabed anywhere from just below the low water mark to depths exceeding 100 m, preferring sediments comprising sand, gravel and mud, sometimes interspersed with stones, rocks or boulders. The king scallop is the second most valuable shellfish species in Scotland with landings by Scottish vessels in 2021 over 17,000 tonnes and worth almost £30 million (Sea Fisheries Statistics, 2021 [Scottish Sea Fisheries Statistics 2021 - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/scottish-sea-fisheries-statistics-2021/pages/1-introduction.aspx)).

Dredge surveys of the scallop grounds around Scotland have been carried out by Marine Scotland Science (MSS) since the mid-1990's (partial surveys of the west coast began in the late 1980's). There are currently four surveys each year which

collectively cover the major scallop fishing grounds to the west of Scotland (including Clyde), the North Sea (Scottish coast) and around Shetland.

MSS has carried out two previous surveys in the Clyde with the first one being carried out in 2019 and the second in 2021. There was no survey in 2020 due to the Covid19 pandemic.

The main aim of the survey is to collect standardised catch rate data for king scallops for use in stock assessment.

## Method

The surveys have a fixed station design. The station locations were originally determined with reference to British Geological Survey charts to locate sediments suitable for scallops and also using knowledge of the fishing grounds contributed by skippers fishing at the time when the surveys first took place. There are around 58 fixed stations which have been previously fished in the Clyde located in 15 statistical rectangles, however, these are not all carried out every year as the survey can be affected by time constraints, bad weather, aquaculture activity and closed areas. A survey of this duration with favourable weather conditions would aim to fish 50 to 60 of the stations.

Two dredge arrays are fished (one either side of the vessel). One array consists of standard commercial spring-loaded Newhaven type dredges (2.5' wide, 9 tooth bar, with 80 mm internal diameter belly rings, Type A, referred to as S9 fished from the starboard side). The second array consists of smaller configuration sampling dredges with 11 teeth and smaller diameter belly rings (Type B), more similar to commercial gear for queen scallops (*Aequipecten opercularis*) (2.5' wide, 11 tooth bar, with 60 mm internal diameter belly rings, referred as P11 fished from the port side). This side of gear is configured to catch smaller scallops compared to the commercial dredges.

At each station the dredges are towed at a speed of about 2.5 knots for approximately 30 minutes with both sides of dredges on the seabed. All king scallops caught are aged and measured (length to the 0.5 cm below) in accordance with the MSS Scallop aging standard operating procedure and damage assessed in accordance with the damage index **Error! Bookmark not defined.** The total width of dredges used in the survey has changed over the survey time series. Catch rate data are, therefore, further standardised and expressed as numbers caught per hour per metre dredge width (N hr<sup>-1</sup> m<sup>-1</sup>).

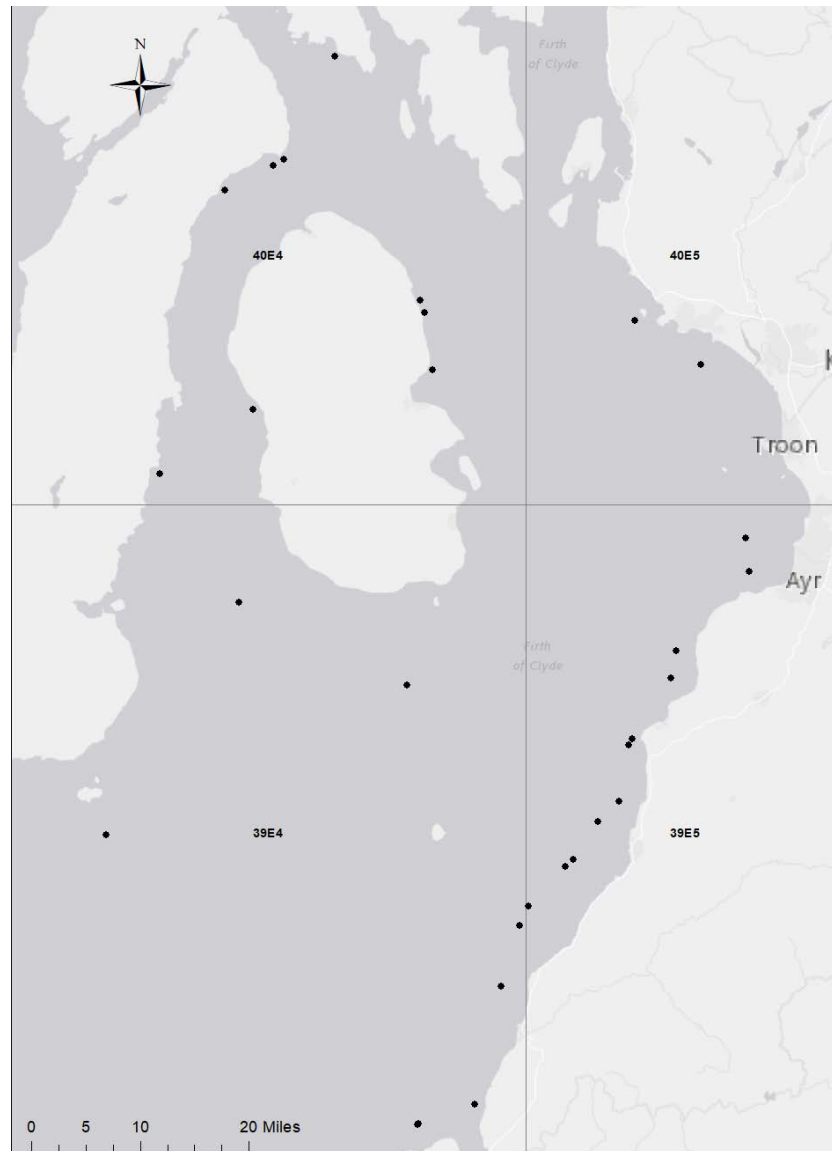
Bycatch, including starfish, are collected, identified, measured, sexed and damage assessed, with the same damage index referenced for the scallops, where appropriate.

Any additional requests are also carried out if there is scope to do so.

## Results

A total of 30 stations were fished, covering four ICES statistical rectangles in the Clyde (Figure 1). One day was lost to bad weather and the presence of creels in the Clyde

area shortened the possible fishing time each day due to the requirement for daylight for visibility. A bad forecast forced the vessel to depart the Clyde survey area and return to Fraserburgh after fishing on the 9 November. Four additional tows were carried out in the Moray firth to conduct dredge maintenance training prior to unloading. A total of 3057 scallops were caught (1695 port side and 1362 starboard) which were all measured, aged and assessed for shell damage. This compares to 2780 scallops caught in 31 hauls on the 2021 survey (Table 1).



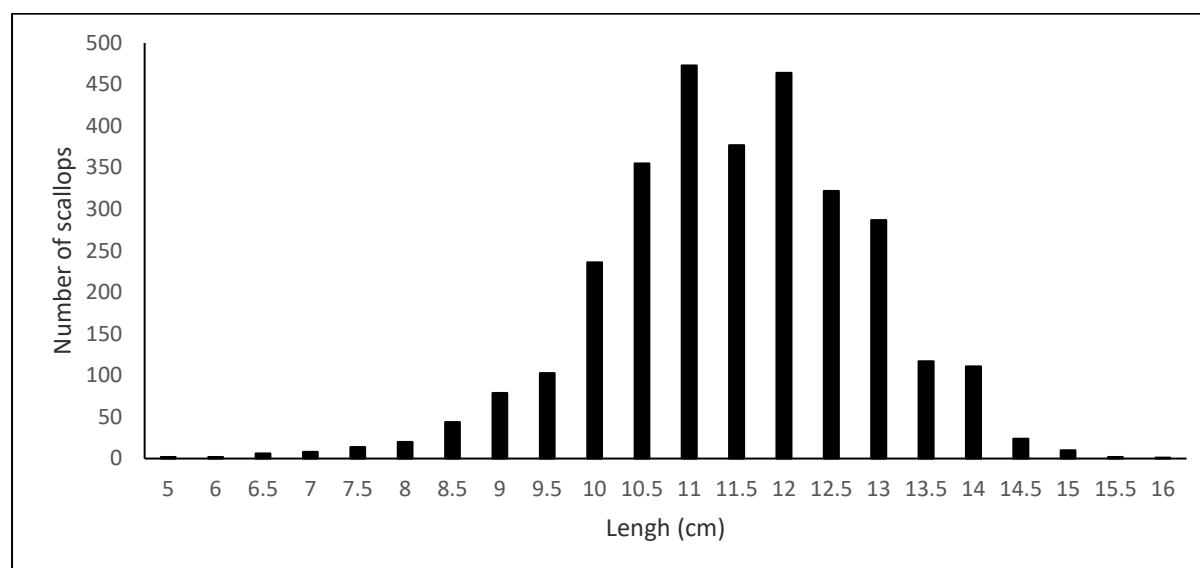
**Figure 1:** Station start positions for 2022 MSS Clyde scallop dredge survey.

**Table 1:** MSS Clyde scallop dredge survey stations, 2019-2023, with number of stations sampled and total number of king scallops caught. Note that the number of stations includes foul hauls in brackets.

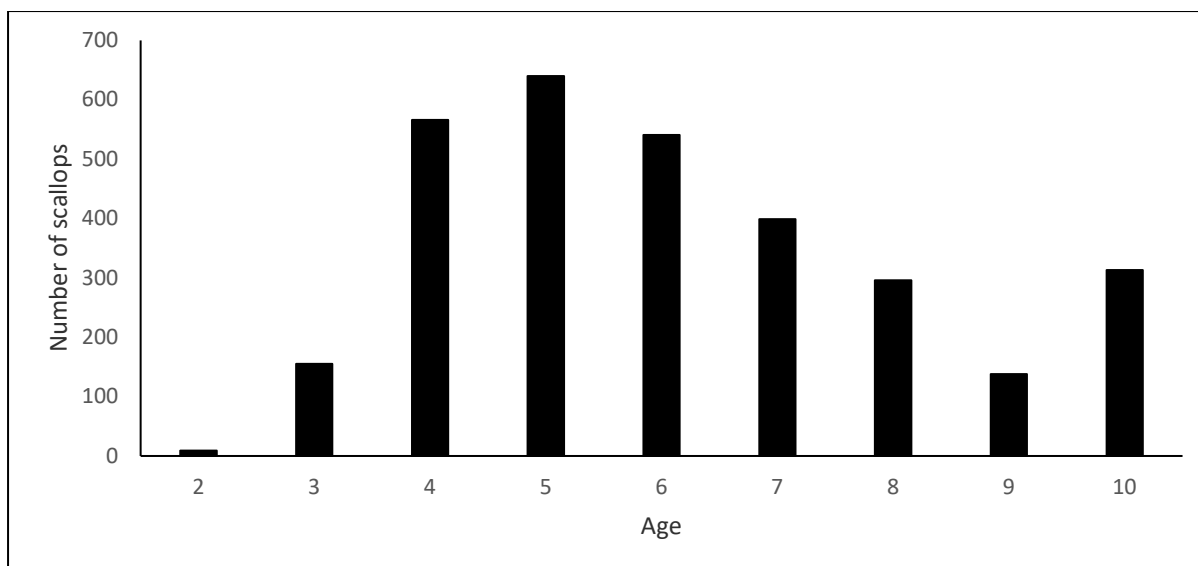
Cruise	Vessel	Year	Start date	End date	No. stations	No. scallops
0222A	Alba na Mara	2022	1-Nov-22	15-Nov-22	30	3057
0221A	Alba na Mara	2021	14-Oct-21	26-Oct-21	31	2709
0219A	Alba na Mara	2019	04-Oct-19	18-Oct-19	58(1)	5291

King scallop lengths ranged from five to 16 cm with the highest number of scallops recorded between 11 and 12 cm (Figure 2). King scallops were aged between two and ten years old (note that age ten is a plus group (meaning >10) as it is difficult to identify annual age rings in scallops older than age ten) with the highest number of scallops aged five (Figure 3). Two year olds were reported at seven stations and three year olds were reported at 24 stations. Standardised indices will be worked up as part of the next stock assessment.

All scallops were assessed for damage. Approximately 93% of the scallops caught had a damage index of two; meaning that the edge of the shell was chipped but that the scallop is highly likely to survive. The remainder were assessed as damage level three or four, meaning that the hinge was broken, or the scallop was crushed or dead.



**Figure 2:** MSS Clyde scallop survey. Total number of king scallops at length caught on the 2022 survey.



**Figure 3:** MSS Clyde scallop survey. Total number of king scallops at age caught on the 2022 survey (note scallops aged ten include the 10+ category).

### Bycatch

In addition to king scallops, 934 other bycatch individuals (excluding starfish) were identified, measured and assessed for damage (Table 2). The most numerous bycatch species were Brown crab (396 individuals), Queen scallop (284 individuals) and Velvet crab (108 individuals). A total of 2101 starfish were also identified to species level and assessed for damage with the Spiny starfish (858 individuals), Common starfish (704 individuals) and Seven armed starfish (302 individuals) the most commonly caught (Table 3).

**Table 2:** MSS Clyde scallop survey 2022. Total number of bycatch individuals by species (excluding starfish) and average damage index

Common name	Scientific Name	Total	Average of Damage
Brown crab	<i>Cancer pagurus</i>	396	2
Queen scallop	<i>Aequipecten opercularis</i>	284	2
Velvet crab	<i>Necora puber</i>	108	2
Common whelk	<i>Buccinum undatum</i>	86	2
Arctica	<i>Arctica islandica</i>	24	3
Thornback ray	<i>Raja clavata</i>	9	3
Common dab	<i>Limanda limanda</i>	6	4
Common dragonet	<i>Callionymus lyra</i>	5	2
Plaice	<i>Pleuronectes platessa</i>	3	2
Red whelk	<i>Neptunea antiqua</i>	3	2
Dover sole	<i>Solea solea</i>	2	4
Topknot	<i>Zeugopterus punctatus</i>	2	4
Bullrout	<i>Myoxocephalus scorpius</i>	1	1
Cuckoo ray	<i>Raja naevus</i>	1	1
Grey gurnard	<i>Eutrigla gurnardus</i>	1	1

<b>Hake</b>	<i>Merluccius merluccius</i>	1	4
<b>Hooknose</b>	<i>Agonus cataphractus</i>	1	1
<b>Norway lobster</b>	<i>Nephrops norvegicus</i>	1	1
<b>Grand Total</b>		934	

**Table 3:** MSS Clyde scallop survey 2022. Total number of starfish species caught and average damage index **Error! Bookmark not defined..**

<b>Common name</b>	<b>Scientific Name</b>	<b>Total</b>	<b>Average of Damage</b>
<b>Spiny starfish</b>	<i>Marthasterias glacialis</i>	858	2
<b>Common starfish</b>	<i>Asterias rubens</i>	704	1
<b>Seven armed starfish</b>	<i>Luidia ciliaris</i>	302	3
<b>Common sun star</b>	<i>Crossaster papposus</i>	133	1
<b>Starlet cushion star</b>	<i>Asterina gibbosa</i>	70	1
<b>Sand star</b>	<i>Astropecten irregularis</i>	22	2
<b>Bloody henry starfish</b>	<i>Henricia sanguinolenta</i>	7	1
<b>Purple sun star</b>	<i>Solaster endeca</i>	5	1
<b>Grand Total</b>		2101	

### Scallop collection for chemical analysis

Forty scallops from four ICES statistical squares were collected and frozen for heavy metal and organic contaminants testing – results will be used to assess scallop tissues can potentially be used to improve the spatial coverage of regional status and trends of contaminants in biota as part of the UK annual monitoring programme.

### Scallop collection for genetic and shell isotope analysis

Scallops from seven stations were collected for genetic material to assess connectivity among scallop grounds in Scotland.

### Marine litter

Marine litter was recorded and retained during dredging process at every station. This is done routinely as part of monitoring for the UK Marine Strategy). On this survey 145 items of litter were recorded and retained from 13 stations on this survey, with ceramics and rubber items most common.

### Conclusion

The survey was impacted considerably by the weather conditions resulting in just 30 stations being fished. On return all data were checked and uploaded to the relevant databases.

The latest stock assessment report is available at:

<https://data.marine.gov.scot/dataset/scottish-scallop-stocks-results-2016-stock-assessments>

The survey data also support Scotland's National Marine Plan and latest marine assessments can be found:

[Scotland's Marine Assessment 2020 | Scotland's Marine Assessment 2020](#)

A big thank you to all staff involved in contributing to the survey.

John Turriff

Date submitted: 27 March 2023

Iain Gibb

Date:

**Error! Bookmark not defined.** Veale, L.O., Hill, A. S., Hawkins, S. J. and Brand, A. R. 2001. Distribution and damage to the by-catch assemblages of the northern Irish Sea scallop dredge fisheries. Journal of the Marine Biological Association of the United Kingdom, 81: 85-96.