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

MRV *Alba na Mara*

Survey 0323A

REPORT

25 February – 16 March 2023

Loading: 23 February 2023, Fraserburgh
Sailing: 25 February 2023
Unloading: 16 March 2023, Fraserburgh
Fishing Gear: Scallop dredges
Project: 20 days, SU02NS

Personnel

P Gibson (SIC)
J Turriff
S Kinnear

Objectives

1. To carry out a survey of scallop stocks on the West coast of Scotland.
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 on West coast.
6. 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)).

Dredge surveys of the major scallops grounds around Scotland have been carried out annually by Marine Scotland Science (MSS) since the mid-1990's. These surveys typically cover Shetland, the East coast and West coast of Scotland with the Clyde being added to the survey programme in 2019. The primary survey objective is to

collect data for the provision of a catch at age index for use in the scallop regional stock assessments carried out by MSS.

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 117 fixed stations which have been historically fished on the West Coast, 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. An average West coast survey of this duration with favourable weather conditions would aim to survey between 80 to 90 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-1 m-1).

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 64 stations were fished covering fourteen ICES statistical rectangles along the West coast of Scotland, from up near Lochinver down to Gigha.(Figure 1). A total of 11398 scallops were caught (6586 port side and 4812 starboard) in 64 hauls which were all measured, aged and assessed for shell damage. This compares to 7783 scallops caught in 63 hauls on the 2022 survey (Table 1).

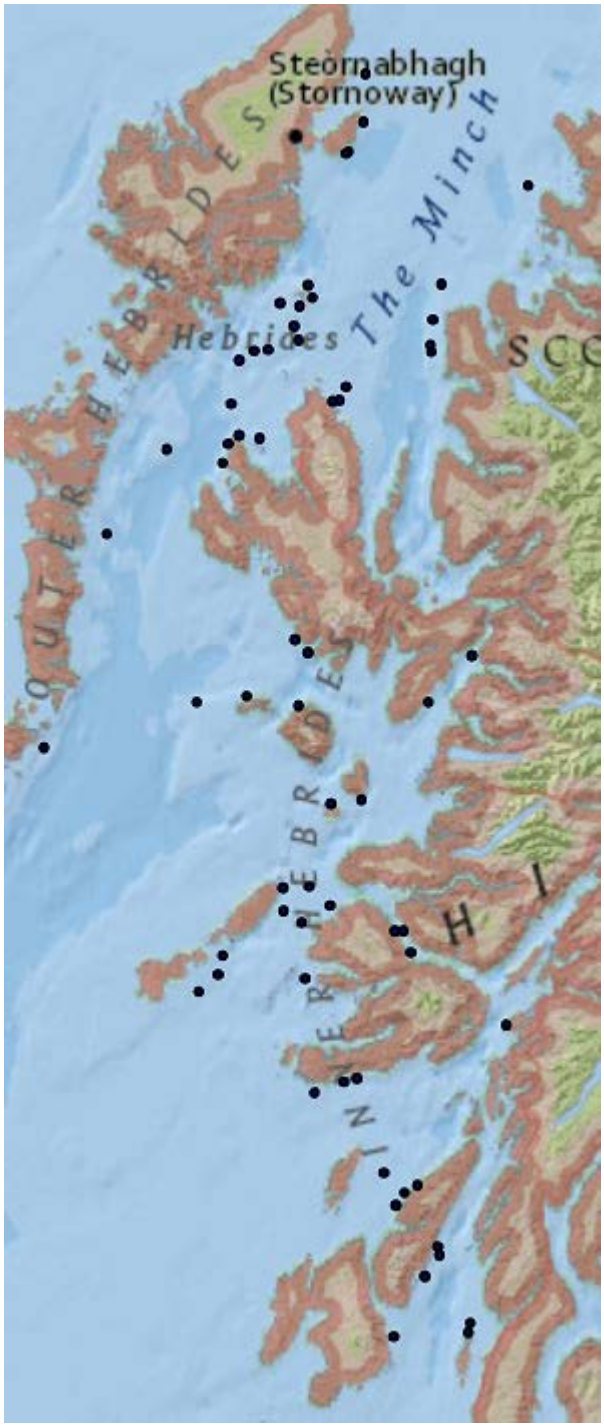

Figure 1: Station start positions for 2023 MSS West coast scallop dredge survey.

Table 1 MSS West coast scallop dredge survey stations, 2008-2023 (no survey took place in 2020 due to Covid restrictions), 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
0208A	Alba na Mara	2008	24/04/2008	24/04/2008	92	12608
0709A	Alba na Mara	2009	19/04/2009	08/05/2009	91	13817
0410A	Alba na Mara	2010	29/03/2010	20/04/2010	92	12608
0411A	Alba na Mara	2011	04/04/2011	23/04/2011	128 (1)	14944
0612A	Alba na Mara	2012	09/04/2012	23/04/2012	74	14905
0413A	Alba na Mara	2013	03/04/2013	22/04/2013	80(1)	14859
0514A	Alba na Mara	2014	04/01/2014	23/04/2014	68	10835
0415A	Alba na Mara	2015	29/03/2015	17/04/2015	74(2)	13703
0516A	Alba na Mara	2016	28/03/2016	15/04/2016	74(1)	13345
0517A	Alba na Mara	2017	06/04/2017	26/04/2019	72(2)	11093
0518A	Alba na Mara	2018	06/074/2018	05/05/2018	81	11972
1019A	Alba na Mara	2019	11/04/2019	30/04/2019	68 (1)	11547
0521A	Alba na Mara	2021	11/04/2021	30/04/2021	28	2583
0622A	Alba na Mara	2022	01/05/2022	19/05/22	63 (2)	7783
0323A	Alba na Mara	2023	25/02/2023	16/03/2023	64(2)	11398

The total number of king scallops at length caught on the 2023 survey on the West coast survey are shown in Figure 2 with sizes ranging from 3.5 to 16.5 cm. King scallops were aged between two (11 individuals) and ten years old (note that this is a plus group as scallops on MSS surveys are only aged to a maximum of ten years) with the highest number of scallops aged four (Figure 3). Standardised indices will be worked up as part of the next stock assessment.

All scallops were assessed for damage. Approximately 89 % 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 3 or 4, meaning that the hinge was broken or the scallop was crushed or dead.

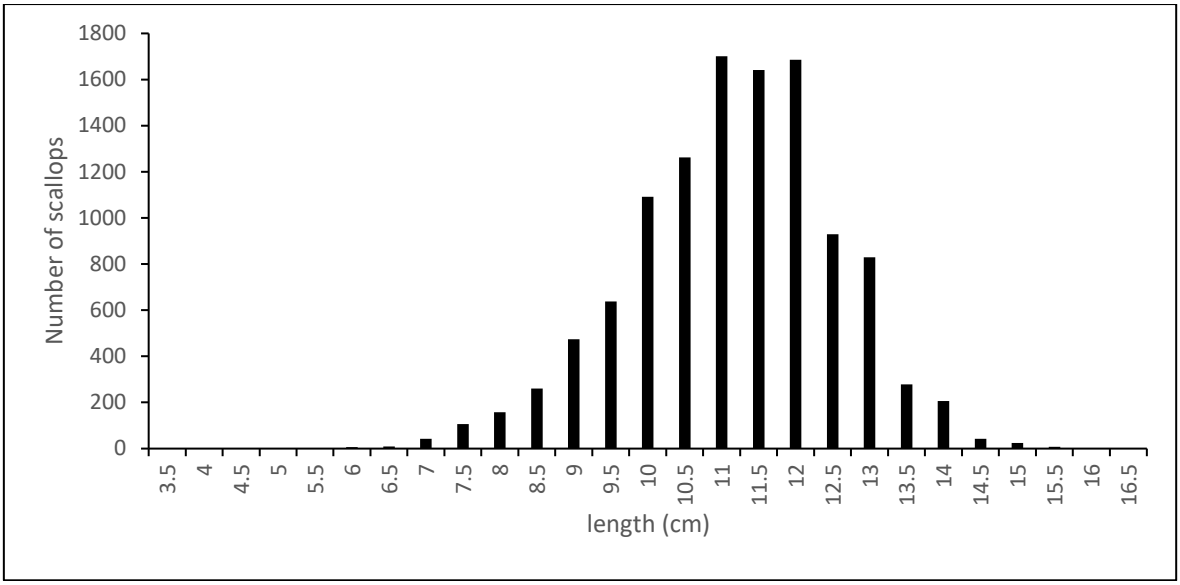

Figure 2: MSS West coast scallop survey. Total number of king scallops at length caught on the 2023 survey.

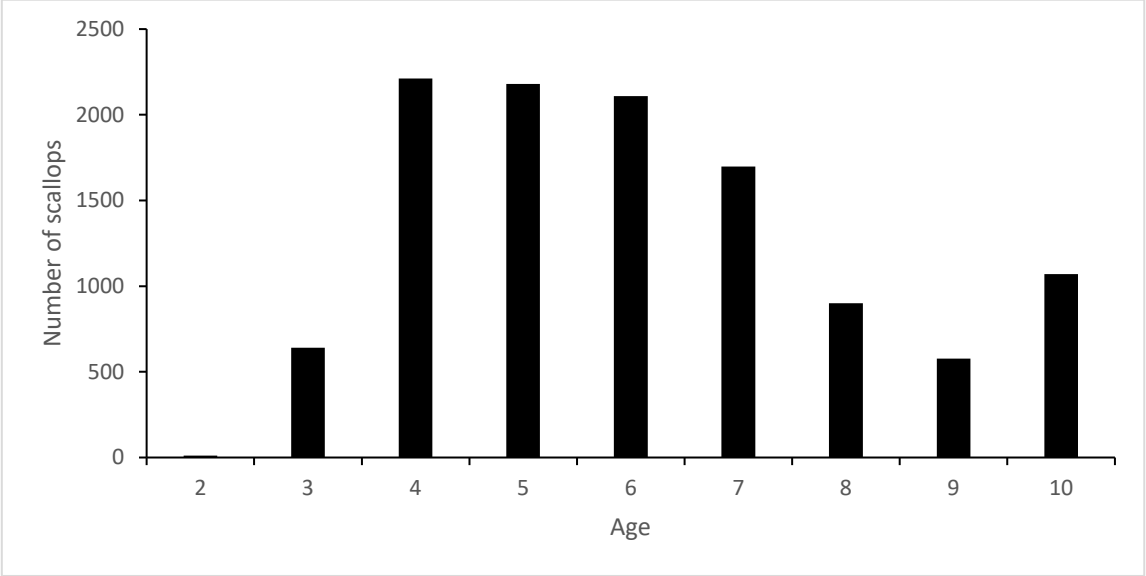

Figure 3: MSS West Coast scallop survey. Total number of king scallops at age caught on the 2023 survey.

Bycatch

In addition to king scallops, 382 other individual bycatch (excluding starfish) were identified, measured and assessed for damage (Table 2). The most numerous by-catch species was brown Crab (189 individuals), common whelk (57 individuals) queen scallop (30 individuals) and cuckoo ray (24 individuals). A total of 3541 starfish were also identified to species level identified and assessed for damage with the common starfish (1875 individuals), seven armed starfish (738 individuals) and spiny starfish (287 individuals) the most commonly caught (Table 3).

Table 2: MSS West coast scallop survey 2023. Total number of bycatch individuals by species (excluding starfish) and average damage index**Error! Bookmark not defined.**

Common name	Scientific Name	Total	Average of Damage
Arctica	*Arctica islandica*	15	2
Brown crab	*Cancer pagurus*	189	3
Bullrout	*Myoxocephalus scorpius*	2	1
Common Dragonet	*Callinoymus lyra*	1	4
Cuckoo ray	*Raja naevus*	24	2
Common Whelk	*Buccinum undatum*	57	2
Flapper skate	*Dipturus intermedius*	4	3
Haddock	*Melanogrammus aeglefin*	2	2
Lesser spotted dogfish	*Scyliorhinus canicula*	1	1
Monkfish	*Lophius piscatorius*	1	1
Northern stone carb	*Lithodes maja*	1	2
Plaice	*Pleuronectes platessa*	1	2
Queen scallop	*Aequipecten opercularis*	30	2
Red whelk	*Neptunea antiqua*	28	2
Spotted ray	*Raja montagui*	4	3
Thornback ray	*Raja clavata*	16	3
Topknot	*Zeugopterus punctatus*	1	4
Velvet crab	*Necora puber*	5	2
Total		382	

Table 3: MSS West Coast scallop survey 2023. Total number of starfish species caught and average damage index**Error! Bookmark not defined.**

Common name	Scientific Name	Total	Average of Damage
Bloody henry starfish	*Henricia sanguinolenta*	133	1
Common starfish	*Asterias rubens*	1875	1
Common sun star	*Crossaster papposus*	151	1
Goose foot starfish	*Anseropoda placenta*	46	2
Purple sun star	*Solaster endeca*	97	1
Sand star	*Astropecten irregularis*	155	2
Seven armed starfish	*Luidia ciliaris*	738	2
Spiny starfish	*Marthasterias glacialis*	287	2
Starlet cushion starfish	*Asterina gibbosa*	59	1
Total		3541	

.

Scallop collection for chemical analysis

Thirty scallops were collected and frozen from three ICES statistical squares 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 twelve stations were collected for genetic material to assess connectivity among scallop grounds on West coast.

Marine Litter

Marine litter was recorded and retained at every station. This is done routinely as part of monitoring for the UK Marine Strategy. On this survey 19 items of litter were recorded and retained from 14 stations on this survey, with plastics and fishing items being most common

Conclusion

The survey was completed successfully, as far as weather and time constraints allowed. On return all data were checked and uploaded to the relevant databases.

The latest report is available;

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

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

Scotland's Marine Assessment 2020 | Scotland's Marine Assessment 2020

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.