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MRV *Scotia*

Survey 1321S

PROGRAMME

1-6 October 2021

Ports
Loading: 30 September 2021, Aberdeen
Departure: 01 October 2021, Aberdeen
Half Landing: NA
Arrival and Unloading: 06 October 2021, Aberdeen

In setting the survey programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the survey report, to I Gibb and the survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the survey Summary Report a nil return is required, if appropriate.

Project: 6 days - C80320 (20491)

Fishing Gear: Trawl BT237, Scallop dredges.

Rationale

This survey will conduct further data collection for development of high-tech (AI) systems for the EU fishing sector developed under the SMARTFISH H2020 (2018-2022) international research project. The goal is to improve automatic data collection for fish stock assessment and provide evidence of compliance with fishery regulations.

Objectives

1. To catch representative samples of northern North Sea fish and shellfish communities from bottom trawl and scallop dredge gears. From these catches:

    a. To collect CCTV footage of unsorted catch from the conveyor belt (at different simulated belt densities).
    b. To collect quantitative information on catch composition and length frequencies of species.
    c. To measure, weigh and photograph 300 individuals of all commercial species using the CatchSnap photography boards.
    d. Go pro footage of simulated creel fish (mixed species) bycatch being collected in a fish box will also be recorded along with the lengths of the fish.
    e. 3D camera footage of fish baskets of single species will be collected to develop AI algorithms to estimate bycatch weight in baskets.

2. To measure, age and photograph all scallops caught and return the shells to the lab, where they will be aged by experts onshore (measures and age determination may be

carried out on-board or onshore depending on survey staffing).

a. To collect CCTV footage of unsorted scallops and by-catch from the conveyor belt (at different simulated belt densities).

3. To investigate possible causes of recent recordings of dead auks around UK coast by collecting abundance information on small pelagic species as well as biological samples of potential prey species.

Procedure

The fishing gear and scientific equipment for 1321S will be loaded on 30 September. *Scotia* will sail on 1 October and, after all safety drills, a shakedown trawl (<30 minutes) will be conducted with the cod end tied off to secure a catch to carry out a run through of the catch processing procedure in the fish house. The vessel will then steam North heading to fishing grounds around Shetland (48E8), weather conditions, and input from the Captain and Fishing Master will determine the exact start area. The survey schedule and operations will be decided by the SIC after daily consultation with the Fishing Master and Captain. Fishing operations will take place in daylight hours between 07:00 and 18:00 using known IBTS tows. The last two days will be spent in the Moray Firth firstly repeating 2021 IBTS Q3 tows for Objective 3 and for the second day fishing with scallop dredges before returning to port. There will be no staff transfers or a scheduled half landing. The survey will finish in Aberdeen on 6 October with all staff and equipment/fishing gear returning to the Marine Laboratory.

Trawling

No specific survey design will be employed, the objective is merely to obtain representative commercial catch compositions. Figure 1 shows the geographical extent of potential fishing activities and reflects the 2020 survey. All fishing activity will be undertaken within the UK EEZ. The intention is for ~3 tows to be undertaken per day on suitable ground within important commercial fishing grounds (i.e. Scalloway deeps, Balta sound) for demersal whitefish species with a particular focus on targeting saithe. Figure 2 shows the average IBTS CPUE (2018-2021) for small saithe (<55 cm). The SIC will take direction from the fishing master regarding suitable fishing grounds taking any weather considerations into account. Haul durations will be 30-60 minutes. There will be minimal performance monitoring of the trawl gear (door sensors and trawl eye). The kite will not be deployed although additional floats may be added to the topline if required.

Fish sampling

Catches will be passed along the conveyor belt (in view of overhead cameras) multiple times with different degrees of spread to replicate different levels of fish density observed in CCTV footage of commercial catch processing. Fish will then be sorted by species, weighed and measured using the EDC systems in accordance with IBTS manuals and MSS SOPs. The count and length data of catches as recorded on the EDC systems will be compared to machine vision technology applied to the catch conveyor footage to demonstrate its ability to accurately identify and record fish. Up to 300 individuals of each commercial species (over the survey not by haul) will be photographed, measured (mm) and weighed (g).

Dredging

Scallop hauls will be made at a selection of stations within the Moray Firth (Figure 3 and Table 1) used on previous scallop surveys with a variety of ground types being considered. Hauls will be ~30 minutes duration with the gear rigged with 2/3 dredges on a single beam deployed

from the methot winch. Dredges will be recovered and emptied into a trough on deck. Catches will be transferred in baskets from the trough to the fish house for sampling.

All of the scallops will be measured to the half centimeter below and aged. The catches will be processed as described in fish sampling above. Following processing, the scallops will be stored for transportation to the laboratory on unloading. The scallops will be aged from the shells and images by staff onshore, increasing the dataset for the image based scallop age reading project.

Normal contacts will be maintained with the laboratory.

The vessel will return to Aberdeen for unloading on 06th October.

Submitted:
H Holah
30 September 2021

Approved:
I Gibb
30 September 2021

Figure 1

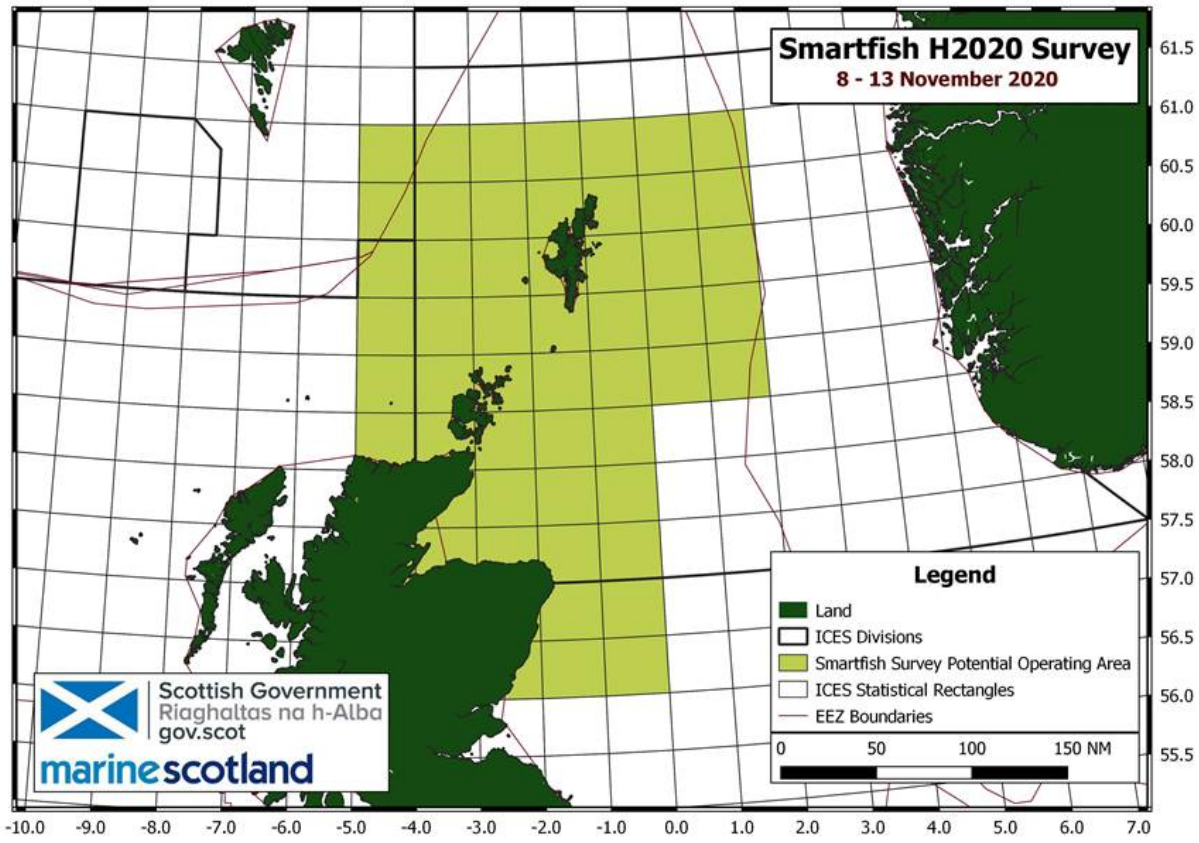


Figure 2

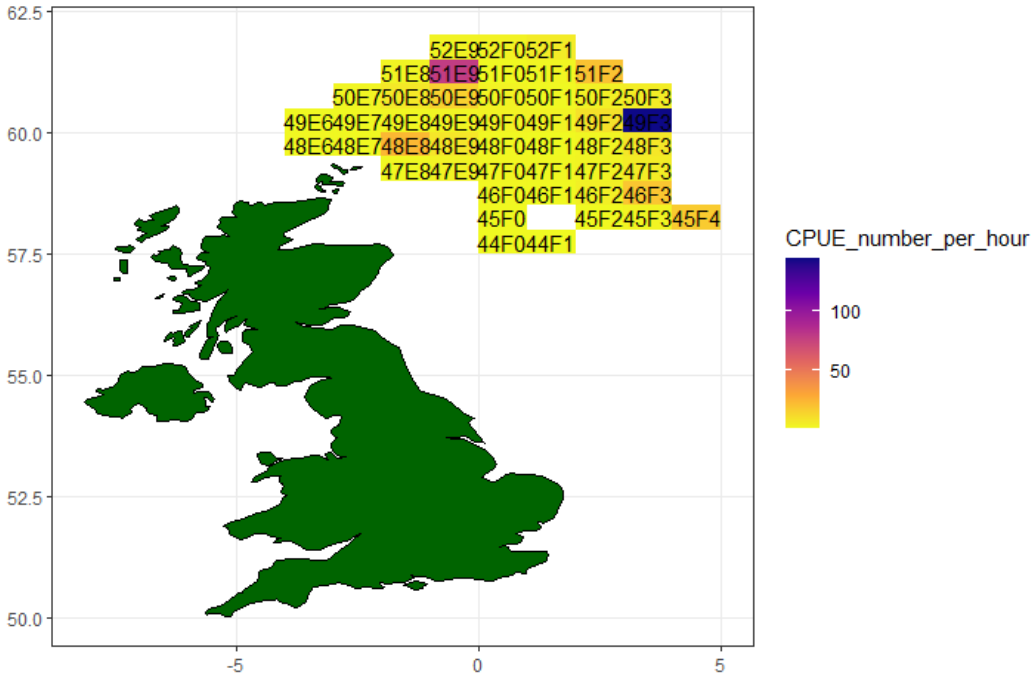
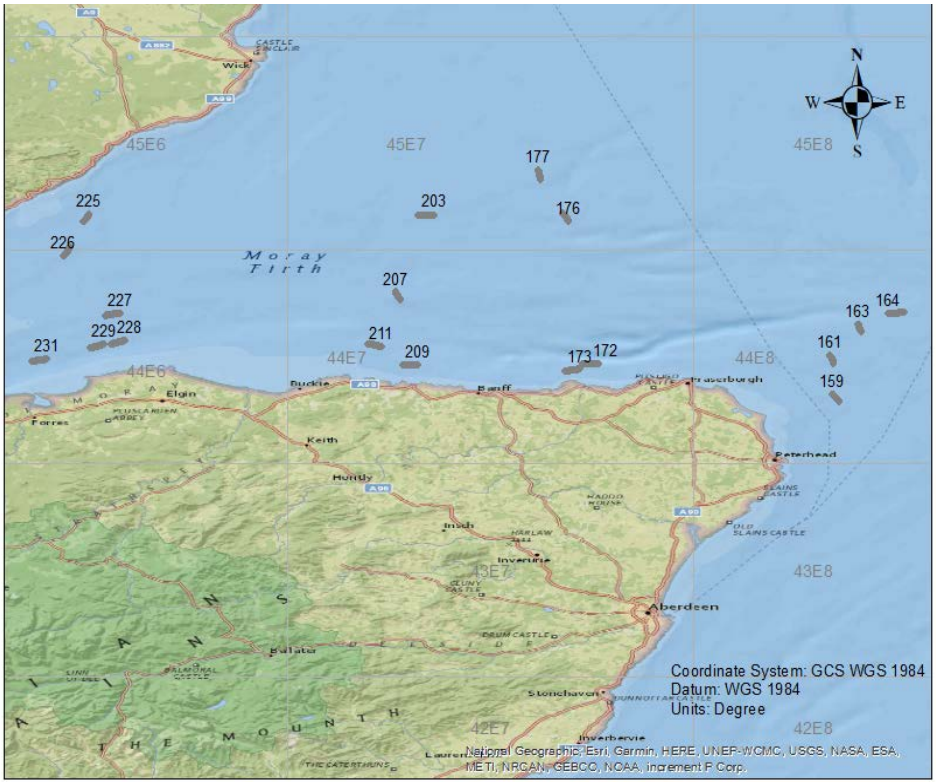


Figure 3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45E6
45E7
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Moray Firth
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161
44E6
44E7
44E8
159
Elgin
Forres
Keith
Huntly
Peterhead
Fraserburgh
Inverurie
43E7
43E8
Aberdeen
Ballater
Stonehaven
42E7
42E8
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Table 1: 1321S – Positions of potential scallop sampling stations.

Station	DecStartLat	DecStartLong	DecEndLat	DecEndLong	Region
159	57.6621	-1.659	57.6441	-1.641	Moray Firth
161	57.7541	-1.665	57.7341	-1.6501	Moray Firth
163	57.8271	-1.5953	57.8086	-1.5868	Moray Firth
164	57.8515	-1.5206	57.8555	-1.4811	Moray Firth
172	57.7348	-2.237	57.7345	-2.2751	Moray Firth
173	57.7218	-2.28015	57.7173	-2.3178	Moray Firth
176	58.067	-2.3076	58.087	-2.3236	Moray Firth
177	58.1878	-2.3845	58.1651	-2.3765	Moray Firth
203	58.084	-2.6398	58.0823	-2.6806	Moray Firth
207	57.9028	-2.735	57.883	-2.7223	Moray Firth
209	57.731	-2.6785	57.7313	-2.7161	Moray Firth
211	57.7745	-2.7678	57.7813	-2.8016	Moray Firth
225	58.084	-3.489	58.067	-3.5026	Moray Firth
226	57.987	-3.5516	58.0068	-3.5368	Moray Firth
227	57.8525	-3.413	57.8468	-3.4491	Moray Firth
228	57.7895	-3.401	57.7798	-3.4345	Moray Firth
229	57.7795	-3.4533	57.7713	-3.4871	Moray Firth
231	57.7455	-3.594	57.74	-3.6318	Moray Firth