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MRV *Scotia*

Survey 0819S

## PROGRAMME

2-24 June 2019

**Loading:** Aberdeen, 30 May 2019

**Sailing:** Aberdeen, 02 June 2019

**Half landing:** Campbeltown, 13 June 2019

**Unloading:** Aberdeen, 24 June 2019

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 cruise ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

<b>Estimated days by project:</b>	9 days RV1910	20535 (North Sea)
	12 days RV1911	20536 (West Coast)
	2 days RV1911	20397 (COMPASS)

## Gear

2 x Scotia BT175 60mm prawn trawls

2 x Day grabs and 1 x sieving table

2 x towed UWTV sledges

3 x 600m umbilical towing cables and associated TV equipment (including back up)

COMPASS work: VEMCO deck box, transponder and charging unit for acoustic release,

100kg clump weight, two sensors, mooring line, shackles (one for each of six mooring sites).

## Objectives

1. To obtain estimates of abundance and distribution of *Nephrops* burrow complexes at Fladen, in the North Minch, the South Minch, the Firth of Clyde, in the Sound of Jura and at Devil's Hole. If time and weather permits, stations at the Noup may also be surveyed.
2. To use the TV footage to record the occurrence of other benthic fauna as well as evidence of commercial trawl activity.
3. To collect sediment samples at each station.
4. To carry out trawling for *Nephrops* in order to obtain samples of *Nephrops* for size composition analysis.

5. To collect samples of *Nephrops* from the trawls for comparison of reproductive condition and morphometrics in each of the different survey areas (Functional Units).
6. To record and retain marine litter obtained from trawling as part of the MSFD.
7. To recover COMPASS moorings at six sites on the west coast, and to deploy replacement devices at each site.

## Procedures

**TV objectives** - The main areas in which the underwater television (UWTV) survey will take place (see Figure 1 below) have been surveyed on regular basis for a number of years, and the data used in annual fisheries management advice. A combination of two approaches will be used to derive the survey positions: a stratified random approach and fixed stations. The majority of stations will be generated by employing the traditional stratified random technique based on sediment distribution in all areas except the North Minch, where stations will be randomly generated within the boundaries of commercial *Nephrops* fishing effort, obtained from Vessel Monitoring System (VMS) data. Alternatively, at the Devils Hole, as well as within some of the other survey areas, deployments will be carried out at a number of fixed sites. The location of all TV stations will be provided ahead of the survey.

Weather permitting, *en route* to the Fladen ground approximately 450 m of the TV cable will be paid, out with a large buoy attached to the end of the cable which will be lowered into the water. This will add back tension to the cable on recovery, creating tighter turns on the winch and reduce the potential for damaging the cable. The sledge will then be attached to the umbilical to allow a training session to be carried out, where the sledge will be shot, and then approximately 100 m of cable paid out and finally, recovered. During this procedure a calibration grid will be attached to the skids on the sledge. This will be undertaken in the vicinity of the first TV station. Once this procedure is completed to the satisfaction of all involved, the grid will be removed and the vessel will then begin surveying *Nephrops* burrow TV stations as scheduled. Once the work at Fladen has been completed, the vessel will then steam west and survey the Noup before continuing on to the stations in the North and South Minches.

It is anticipated that the vessel will work south along the western side of the Minches and then on towards the Clyde, surveying TV sites and carrying out trawls as required. The timing of the half landing will depend on how well the work has progressed and berth availability at Campbeltown, but it is anticipated that the Clyde will be surveyed before the half landing; although this can be reviewed nearer the time and adjustments made accordingly.

If the Clyde leg of the survey has already been completed prior to the half landing, the survey will resume in the Sound of Jura, followed by the remaining South and North Minch stations whilst working north. If the Noup was not surveyed in the first leg of the survey for whatever reason, if time and weather permits, a small number of stations at the Noup may be attempted before returning to Fladen to complete any additional stations (if required), or those not covered on the first half. The survey will conclude once the stations and any trawling at the Devils Hole have been completed, before returning to Aberdeen prior to unloading on 24 June.

Throughout the survey, sledge deployments and TV observations will be carried out 24 hours a day, weather permitting. Whilst on the West coast, there maybe some occasions during the hours of darkness and in areas of high creel densities where TV operations are suspended for a short time to avoid any potential gear conflict. Alternatively TV operations maybe suspended whilst the vessel surveys the planned route ahead for creels during the hours of daylight, and, therefore, allowing TV operations to continue throughout the hours of darkness. There will be two teams with two staff, and one team of three staff, each working an eight hour shift and all

will be involved in deploying and recovering the TV equipment, recording data and liaising with the ship's compliment. There will be a requirement for staff to work outwith their shift period, which will include tasks such as reviewing video footage, assisting in working up trawl catches and data entry. These additional tasks will not involve working on the deck. All work will be carried out in accordance with WTR regulations. The names of staff on each shift, watch leaders and the shift patterns will be provided to the ship prior to sailing.

At each TV station a video camera mounted on to the sledge will be towed along the seabed for approximately 10 minutes at approximately 0.7 knot and in to the tide – the ship's dynamic positioning will be required for this. *Nephrops* burrows observed, individual *Nephrops* and other benthic fauna will be recorded onto DVD for later analysis. The depth and distance travelled by the sledge, as well as camera height from the seabed will be recorded automatically. Where practical, sediment samples will be taken using the mini van Veen grab mounted on the sledge. However, if the mini van Veen fails it may be necessary to use the Day Grab. All sediment samples will be frozen.

Trawl caught samples of *Nephrops* will be collected and information on size composition, maturity and morphometrics will be recorded. Up to five trawls may be made in Fladen with a maximum of three tows in each of the other survey areas. Where possible trawls will be carried out on different sediment types in each area, as defined by British Geological Survey data. Trawls will be no longer than one hour and carried out at either dawn or dusk. Any litter collected in the trawl will be recorded as set out in the SOP and placed in bags to be disposed of on return to port. There will be a requirement for the trawl to be cleaned by 'streaming' it behind the vessel for 15 minutes between the main fishing areas, as well as a final, more prolonged clean at the end of the survey.

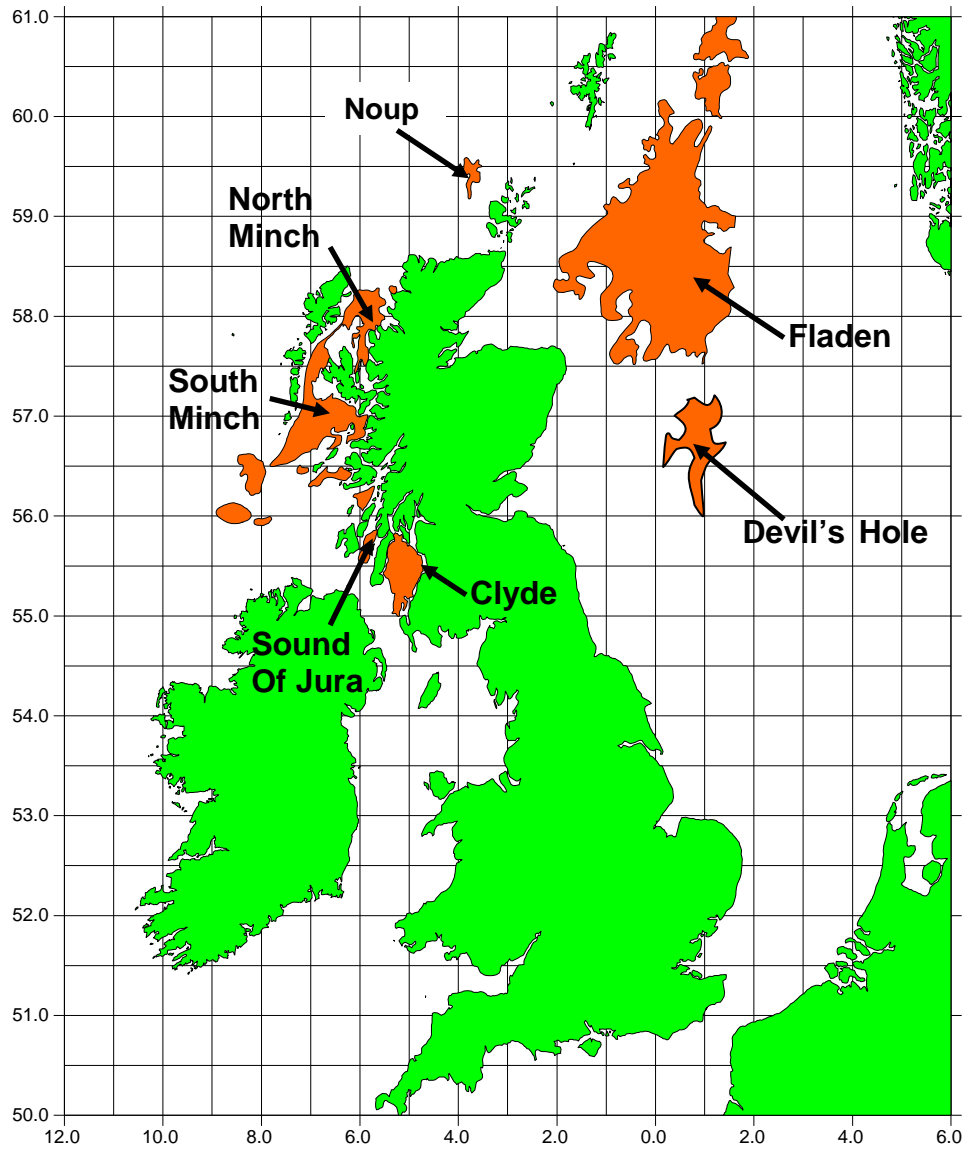
**COMPASS Objective** - In addition to the regular UWTV work, six moorings located on the West coast between Tolsta Head and Stanton Banks are required to be recovered and replacement devices redeployed at the same site (see Table 1 below). This operation replicates the work carried out on the Scotia *Nephrops* TV survey 0818S in 2018. The devices will be retrieved by acoustically releasing a buoy which will rise to the surface. The buoy will be attached to a length of Dyneema which in turn will be secured to the scientific equipment. Using a grappling hook to gather up the buoy, the Dyneema will be passed through the CTD winch which in turn will haul the equipment to the surface and eventually on to the hangar deck. Before moving off station, a replacement mooring will have been prepared and ready to launch from the hangar deck when instructed by the Bridge. No additional crew to that required for normal UWTV operations will be required. To ensure this work is as safe and efficient as possible, this work will only be carried out during daylight hours and undertaken when moorings are close to scheduled TV stations. Full risk assessments will be made available prior to sailing.

During the survey, normal contacts will be maintained with the Laboratory.

Submitted:  
A Weetman  
10 May 2019

Approved:  
I Gibb  
10 May 2019

## Survey areas for Scotia 0819S



**Figure 1:** Areas to be surveyed during the *Nephrops* burrow abundance underwater TV (UWTV) cruise 0819S.

Location name	Latitude1	Longitude1	Latitude2	Longitude2	Depth (m)
Stanton Bank	56.070833	-8.054	56 <sup>0</sup> 04.25' N	008 <sup>0</sup> 03.24' W	66
Garvellachs	56.234333	-5.757333	56 <sup>0</sup> 14.06' N	005 <sup>0</sup> 45.44' W	92
Shiant Isles	57.8695	-6.2695	57 <sup>0</sup> 52.17' N	006 <sup>0</sup> 16.17' W	85
Hyskeir	57.035333	-6.752833	57 <sup>0</sup> 02.12' N	006 <sup>0</sup> 45.17' W	50
Stoer Head	58.257333	-5.536833	58 <sup>0</sup> 15.44' N	005 <sup>0</sup> 32.21' W	100
Tolsta	58.392	-6.008666	58 <sup>0</sup> 23.52' N	006 <sup>0</sup> 00.52' W	100

**Table 1:** Location of the six COMPASS moorings to be recovered and replacement devices to be redeployed at.