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

MRV Scotia

Survey 0621S

PROGRAMME

15-26 May 2021

Loading: Aberdeen, 13 May 2021
Sailing: Aberdeen, 15 May 2021
Docking: Aberdeen, 25 May 2021
Unloading: Aberdeen, 26 May 2021

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.

Scientific gear:

1. Smolt trawl x 2 (new and old), Thyboron type 15vf pelagic trawl doors (6m2), Dyneema sweep rig and Fenders (300mm diameter with 215kg buoyancy) attached 4 per side of the trawl.

2. Video frame/box incorporating pit tag detector.

3. Self-contained underwater camera systems.

4. New fish-lift aquarium system incorporating grid box and aluminum live fish aquarium.

Objectives

1. To undertake smolt trawl surveys in and offshore from the Firths of Tay and Forth and in the north sea out to the Norwegian line but not over.

2. Gather water sample during the survey for eDNA work.

Estimated Days per Project: 12 days – 20332, RE0050

Procedure

All trawl gear, video-frame, fish-lift aquarium and scientific equipment will be transported to Aberdeen Harbour and rigged aboard *Scotia*. The vessel will sail on 15 May and make passage, depending on the weather, to either the offshore proposed new windfarm sites or Tay/Forth areas to commence the smolt survey. The survey will finish in Aberdeen during the

evening 25 May with all staff and fishing gear/scientific equipment returning to the Marine Laboratory on 26 May.

Trawl gear

The smolt trawl is designed to operate with its headline held at the surface and the footrope at approximately 12m deep. The headline and top sweeps (Guidance Note 3) of the net are supported using 50 x 200 mm floats (headline), 2 x 1400 mm long fender floats at net quarters and 1 x Polyform A6 fender buoy + 2 x 1400 mm long fender floats per side (top sweep). The trawl doors are designed to fish just below the surface (max depth 50-60 m) and buoyant Dyneema rope used throughout the sweep rig. The video frame is attached to the trawl using netting with supporting bridles and made neutrally buoyant using a combination of 27 5 mm and 200 mm floats. A rigging specification is given in Guidance Note 1. The new Fish-lift (Guidance Note 2) system will replace the video-frame system at the rear of the smolt trawl or be laced to the new net and used on second drum depending on final rigging chosen. It is a closed aluminum boat shaped aquarium and designed to produce the lowest possible turbulence inside and therefore, allows the fish caught inside to swim unharmed (see Guidance Note 2).

Trawling plan

The surveys will build on the successful 2017-2019 survey work in the Moray Firth and elsewhere off the Scottish east coast. The 2021 survey will further investigate the migration routes of salmon and sea trout smolts from Moray Firth rivers across the Moray Firth and carry out the second survey of smolts off the Firths of Tay and Forth (see Figure 1). There is also potential to investigate further offshore in prime smolt locations. The net requires a minimum depth of about 40 m for operation and is deployed in an arc, or arcs, so that the ship wash misses the net opening.

Tows of two hours or less will be carried out, four times per day, with a cod end/aquarium in place and smolts retained for genetic assignment to rivers and/or regions of origin. The by-catch will be recorded by species. The captured video and pit tag recordings will be used to identify where fish and pit tagged fish were caught on the tows. It is also possible that the net will also be deployed open ended at times, instead of using a cod end, potentially for longer tows, but not providing samples for genetic assignment. A combination of tows with and without the cod end in place may allow survey work to be carried out for up to 16 hours a day.

The fish-lift system will be deployed to retain smolts in better condition and allow any not required for subsequent sampling to be return alive to the sea.

All necessary licenses for the work will be in place and normal contacts, will be maintained with the laboratory.

Submitted:
R Main
01 April 2021

Approved:
I Gibb
10 May 2021

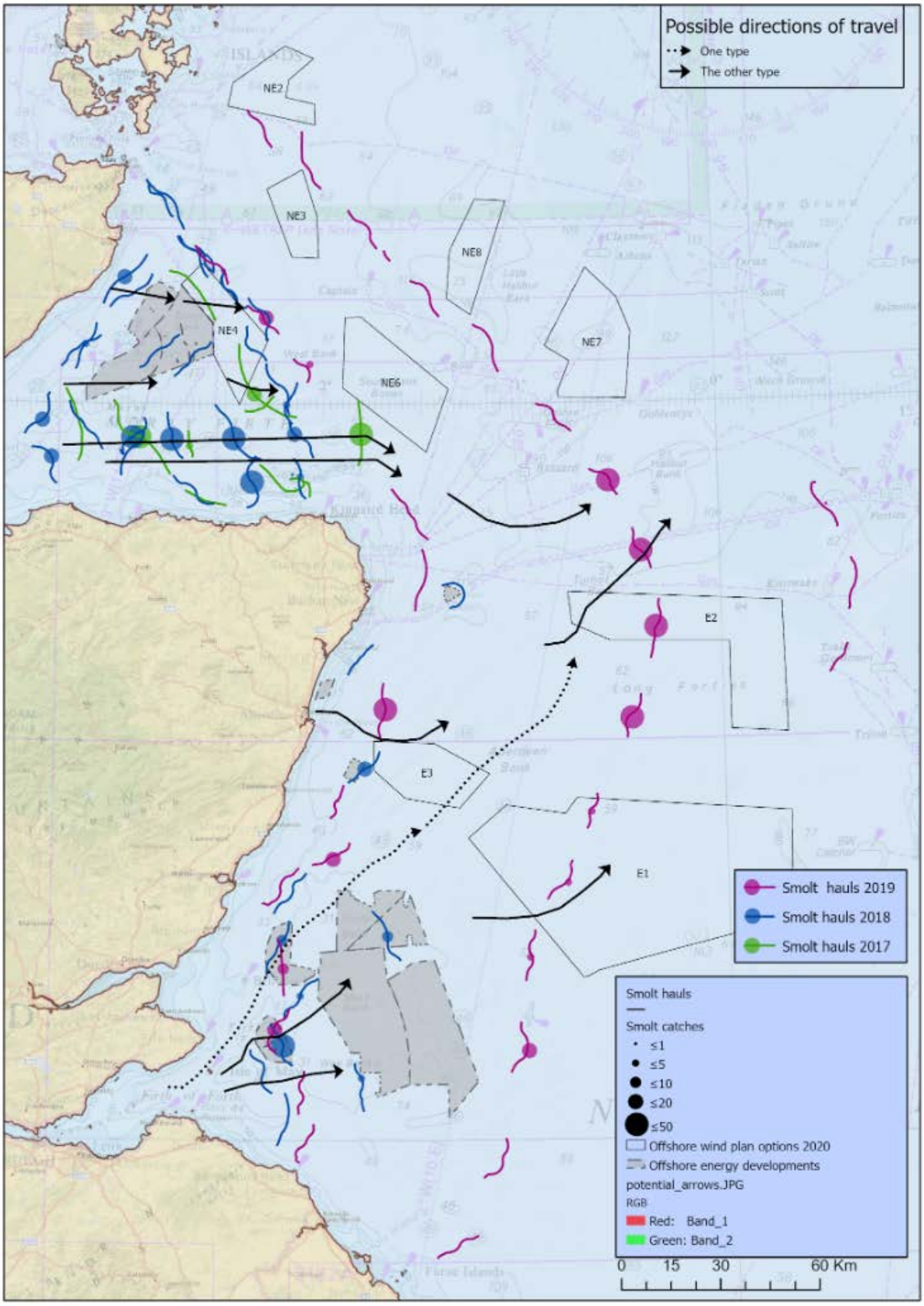


Figure 1: Previous survey hauls in relation to wind farm sites of interest.

Guidance Note 1. Smolt trawl rig details

Trawl (4 panel constructed from PA netting)

- Mesh size (Full mesh in mm):
    - Wings - 800
    - Front/side panel sections – 800
    - Lower cover/belly sections – 800
    - Reducing 400-200-120-80-60 and end taper 40
    - Straight extension – 40

- Frame lines and net opening
    - Headline length – 70.2m
    - Side line length – 15.9m
    - Footrope length – 59.8m
    - Wing stretch length (nominal) – 62m
    - Trawl tapered body stretched length (nominal) – 69.6m
    - Straight extension stretched length – 8m
    - Fishing circle – 224m
    - Nominal net mouth opening at fishing circle (assumes meshes roped (hung) at 50% of full mesh size) – 844.8m^2.

Sweep rig and otterboards

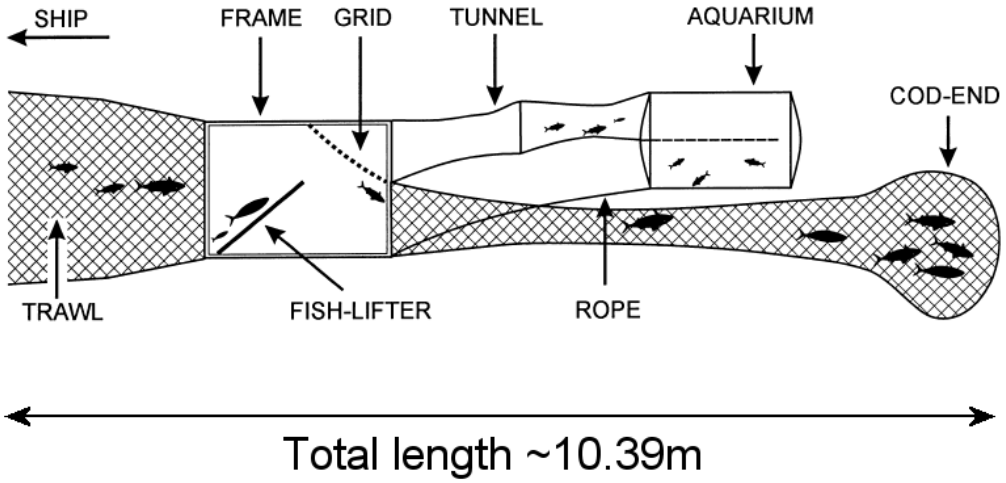
- Sweeps – 150m x 28mm dia. Dyneema
- Backstrops – 15m x 28mm dia Dyneema
- Headline/footrope extensions – 3m x 13mm long-link chain
- Otterboards – Thyborøn type 15vf pelagic otterboards:
    - Surface area – 6m2
    - Weight (each otterboard) – 1000kg + 200kg additional (8 x 25kg)

Flotation (headline)

- 50 x 200mm floats (each float 2.47kg buoyancy)
- 1 x Polyform (A2) H= 510mm Dia.= 300mm Buoyancy = 35kg
- Fenders (Blue Line JF2255):
    - 1 per side at quarters - L = 1400mm Ø = 300mm buoyancy = 215kg

2 per side at wingends (attached to chain extensions) - L = 1400mm Ø = 300mm buoyancy = 215kg + 1 per side Polyform A6 buoy fender L = 111.8cm x Ø = 86.4cm buoyancy = 359kg

Guidance Note 2 – Fish-lift aquarium schematic.



(Taken from J.C. Holst, A. McDonald/Fisheries Research 48 (2000) 87-91)

Guidance Note 3 – Smolt net sweepline rig