RESEARCH VESSEL PROGRAMME

RV CEFAS ENDEAVOUR
Survey: C END 16 - 2021

STAFF:

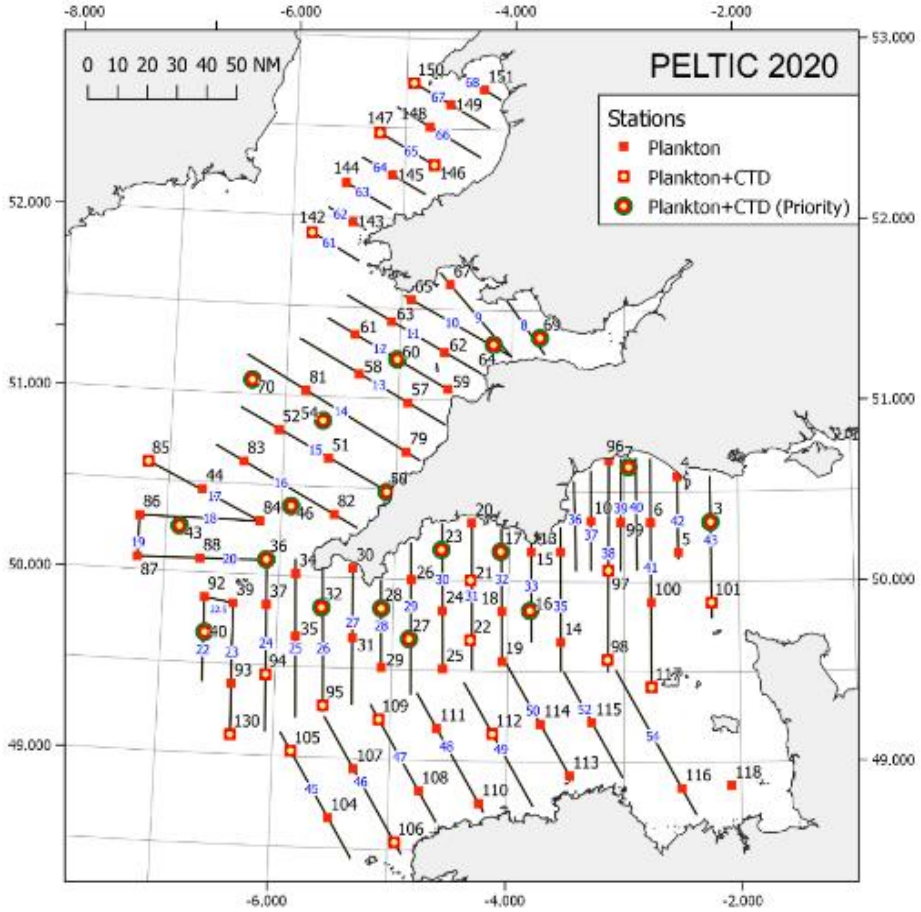
Name	Role
Jeroen van der Kooij	SIC/Acoustics
Joana Silva*/Elisa Capuzzo**	2IC/Fish/Oceanography
Fabio Campanella	2IC/Acoustics
Eleanor Haigh	Oceanography
Richard Humphreys	Lead Fishroom
Sílvia Rodríguez Climent	Acoustic/Fish
Samantha Barnett	Deckmaster/Fish
Allen (Spike) Searle	Fish
Matt Eade	Fish/Zooplankton
Nevena Almeida	Zooplankton
Amy Larter	Zooplankton
Izzy Lake	eDNA
James Scott*	PhD (PI)
Peter Howlett	ML Observer
Emma Neave-Webb	ML Observer

**** Disembarking on 21/10/21***
*****joining 21/10/21***

DURATION: **4th October – 7th November (35 days)**

LOCATION: Western English Channel, Celtic Sea, Cardigan Bay (ICES Divisions 7.e-f and parts of 7.a,g)

Pakefield Road, Lowestoft NR33 0HT | www.cefas.co.uk | +44 (0) 1502 562244



AIMS:

1. To carry out the tenth autumn PELTIC survey: pelagic ecosystem survey of the western English Channel, Celtic Sea, including (for the second time) Cardigan Bay (for Welsh Government), to estimate the biomass of-, and gain insight into the populations of the small pelagic fish community including sprat (*Sprattus sprattus)*, sardine (*Sardina pilchardus*), mackerel (*Scomber scombrus*), anchovy (*Engraulis encrasicolus*), horse mackerel (*Trachurus trachurus*). The PELTIC derived sardine biomass in area 7 will feed into its stock assessment (WGHANSA) and sprat biomass data from the western English Channel will feed into the stock assessment of sprat in area 7de (HAWG).

    a. To carry out a fisheries acoustic survey during daylight hours only using four operating frequencies (38, 120, 200 and 333 kHz) to map and quantify the small pelagic species community.

    b. To trawl for small pelagic species using a 20x40m VDK herring (mid-water) trawl in order to obtain information on:
        - Species and size composition of acoustic marks
        - Age-composition and distribution, for small pelagic species
        - Length weight and maturity information of pelagic species
        - Stomach contents of selected species

Pakefield Road, Lowestoft NR33 0HT | www.cefas.co.uk | +44 (0) 1502 562244

2. To collect biological data (size, weight, age and maturity) on range of data-limited fish species, including European seabass (*Dicentrarchus labrax*), black seabream (*Spondyliosoma cantharus*), striped red mullet (*Mullus surmuletus*), garfish (*Belone belone*), saury pike (*Scomberesox saurus*).

3. To collect plankton samples using two ring-nets with 80 µm, and 270 µm mesh sizes at fixed stations (red squares on map below). Carried out at night by vertical haul and samples will be processed onboard:

    a. Ichthyoplankton (eggs and larvae, 270 µm) of pelagic species will be identified, counted and (in case of clupeids) staged and measured onboard to identify spawning areas.

    b. Zooplankton (80 µm) will be stored for zooscan analysis back in the lab.

4. Water column sampling (yellow stations on map below). At fixed stations along the acoustic transect, a CTD (either an ESM2 profiler or a Seabird mounted on a Rosette sampler) will be deployed to obtain measurements of environmental properties within the water column. Water column profile and water samples will provide information on chlorophyll concentration, dissolved oxygen, salinity, temperature, turbidity, and dissolved inorganic nutrients concentration as well as the relevant QA/QC samples for calibration of the equipment. Water samples will be collected and fixed on board for analysis post-survey. Samples for analysis of the phytoplankton and microzooplankton communities will also be collected at the subsurface at fixed sampling stations.

5. Seabirds and Marine Mammals. Locations, species, numbers and activities observed will be recorded continuously during daylight hours by two Marinelife observers located on the bridge.

6. Ferrybox Continuous CTD/Thermo-salinograph. Continuously collect oceanographic data at 4 m depth during steaming, including chlorophyll concentration (from calibrated fluorescence).

7. To carry out hourly measurements of the phytoplankton functional groups using an online flow-cytometer, connected to the Ferrybox; (V. Creach).

8. To collect water samples at 25 stations in the Bristol Channel and Cardigan Bay area to carry out an eDNA study on distribution and, where possible relative abundance, of bluefin tuna (*Thunnus thynnus*) and angel shark (*Squatina squatina*) as well as biodiversity monitoring in Welsh- and adjacent waters.

9. To further trial the continuous Plankton Imager (PI, James Scott, PhD).

10. To collect between 25-50 specimens per species (anchovy, boarfish, herring, horse mackerel, mackerel, sardine) and freeze for further analysis in the lab supporting a study on microplastics in fish stomachs (A. Bakir).

11. To collect a zooplankton sample using the 200 µm mesh ring-net at the West Gabbard2 SmartBuoy, for the Lifeform project (Defra) as part of the UK monitoring network of zooplankton.

12. To collect between 15-20 (similar sized) specimens per species (anchovy, boarfish, herring, horse mackerel, mackerel, sardine) and freeze (Stephen Smith, NMBAQC)

13. To collect 20 specimens each of anchovy and sardine at five different locations for a genetic study on both species (Naiara Rodriguez-Espeleta, AZTI, Spain).

14. To collect up to 24 specimens each of *Illex coindetii* and *Loligo forbesii* (V. Laptikhovsky)

15. Record macro-litter observations in the trawl (B. Silburn)

PLAN:

All staff will join RV Cefas Endeavour after mid-day of the 2nd of October in Lowestoft. COVID-19 swaps will be taken from all scientists after which staff will self-isolate in their cabins until test-results are returned. The RV will sail either at the late tide of the 3rd or morning tide of the 4th of October and make its way to Portland Bill, where fisheries acoustic equipment will be calibrated upon arrival during the 5th or 6th of October after which other gears will be tested. Following that, the Endeavour will start running the first acoustic transect, at some point conducting a shake-down tow with the 20x40 herring mid-water trawl.

The survey mission will involve steaming along transects (map above), continuously collecting fisheries acoustic data, surface oceanographic data and marine mammal and bird observations during daylight. Ad-hoc pelagic trawl operations will be conducted to identify and validate acoustic marks and to obtain biological information of the fish community. At night, plankton and oceanographic data will be collected using frame-mounted ring-nets and a Rosette sampler/ESM2 profiler respectively at fixed primary stations. Depending on time and conditions, pelagic fish eggs and larvae will be identified, staged (eggs), measured (larvae) and quantified from the ichthyoplankton samples collected on board; fish otoliths will be read onboard to determine the age of small pelagic species.

The vessel will continue in a westerly direction, working on both sides of the English Channel. Before first light on the 21st of October, on a single tide, the RV will dock briefly to drop two staff ashore in Fowey, and take a local staff member aboard, after which the RV will resume surveying the remaining transects and continue making its way around the Isles of Scilly into the Bristol Channel. For the second time, the survey is extended northwards to map and quantify the small pelagic fish community and collect ecosystem data in Cardigan Bay for the Welsh Government. At 25 stations, water samples collected at the rosette stations and from the surface, will be filtered for an eDNA study

After completing the survey grid, the RV will commence the return steam back to Lowestoft, where she will dock on the evening tide of the 7th November.

GEAR:

See Gear List

Jeroen van der Kooij
Scientist in Charge
24/09/2021

Pakefield Road, Lowestoft NR33 0HT | www.cefas.co.uk | +44 (0) 1502 562244

DISTRIBUTION:

BODC
AWSM
David Pettengell
Adil Bakir
Ian Holmes
Patsy Falconer
Clare Leech
Richard Nash
Rosana Ourens
Paul McIlwaine
Carl O'Brien
Sophie Pitois
Sonja Kirby
Lee Slater
Veronique Creach
James Pettigrew
Phil Lamb

Matthew Sayer (Matthew.Sayer@gov.wales)
Phil Wensley (Phil.Wensley@gov.wales)
Bekah Cioffi (Bekah.cioffi@gov.wales)
Leo Clarke (l.clarke@bangor.ac.uk)

Ciaran O'Donnell (Ciaran.O'Donnell@Marine.ie)