THE CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE, LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK, NR33 OHT

2003 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 13/03

STAFF:

Part A	Part B
I Holmes (SIC)	M Boon (SIC)
S Milligan (2IC)	B Harley (2IC)
J Ellis	J Ellis
R Scott	G Burt
J Keable	J Keable
M Parker-Humphreys	M Parker-Humphreys
R Humphreys	R Humphreys
J Smith	J Smith
J Kennedy (Liverpool Univ.) (12th-20th September)	J Araujo (U.C.Leicester)

DURATION:

4 September – 4 October 2003
All times are BST

LOCATION:

Part 13a - Irish Sea (VIIa); Bristol Channel & Celtic Sea (VIIf&g)
Part 13b - Western English Channel (VIIe)

AIMS:

1. To carry out a 4m beam-trawl survey of groundfish and in support of the EU data regulation, to i) obtain fisheries independent data on the distribution and abundance of commercial flatfish species, and ii) derive age compositions of sole and plaice for use in the assessment of stock size.
2. To collect biological data including maturity and weight at age of sole, plaice, lemon sole and other commercially important finfish species.
3. To determine the distribution and relative abundance of juvenile and adult sole and plaice.
4. To quantify the epibenthos using 4m beam trawl by-catch.
5. To collect surface seawater samples for processing on return to Lowestoft for the analysis of tritium and caesium. (AE001) (B Smith EG 1).
6. To collect live-fish and fecundity samples in support of plaice recruitment project (MO423).
7. To collect fish samples in support of other CEFAS projects and training courses.

NARRATIVE:

Part 13a – Irish Sea & Bristol Channel beam trawl survey

CORYSTES sailed from Lowestoft at 1730h, Thursday 4 September. After a reasonable passage through the Channel, CORYSTES proceeded to a position due south of Plymouth to recover a toroidal buoy (no 4) that had drifted out of position. A successful recovery was made at 0030h, 6 September. CORYSTES then proceeded to the eastern Celtic Sea to start the beam trawl survey grid. Fishing commenced at 1209h in the Outer Bristol Channel (BCO) and continued until 2000h when CORYSTES commenced water sampling in the Bristol Channel and Severn Estuary for Tritium H-3 analysis. These 26 water collection stations were completed at 0927h, 7 September. Fishing recommenced at 1017h the same day in the Inner Bristol Channel (BCI) and continued until 1451h, 10 September when all 32 stations in BCI were completed. CORYSTES then proceeded to Cardigan Bay to commence the St George's Channel (SGC) and Irish Sea West (ISW) beam trawl stations on 11 September. On the evening of 12 September, CORYSTES paused off Port St Mary (IOM) in order to pick up J Kennedy to carry out fecundity sample and live fish collection. On 13 September, CORYSTES began the Irish Sea South (ISS) and Irish Sea North (ISN) fishing stations. Additional fishing stations were fished on the evening of 13 September in order to collect live plaice samples. The planned landing of these live fish to the quayside in Douglas IOM was cancelled on the evening of 15 September as the IOM authorities did not give the necessary permission to land these fish 'live'.

All ISS and ISN stations were completed by 1609h on 17 September and CORYSTES steamed to the Western Irish Sea to complete the fishing stations in the Irish Sea West (ISW) sector, picking up a water sample en-route. The remaining ISW stations were completed by 1016h, 19 September and CORYSTES steamed to Dublin Ireland, docking in the late afternoon for a change of staff and an additional Micro CTD unit.

CORYSTES left Dublin at 0603h on 21 September to continue fishing the SGC stations, which were completed on 22 September. Fishing in BCO then recommenced, and all BCO stations were completed on 23 September. CORYSTES then steamed to the western English Channel to commence the VIIe beam trawl survey.

Part 13b – Western English Channel beam trawl survey

Fishing commenced at 0709h on Wednesday 24 September and five tows were fished that day on the outer westerly prefixed 'X' stations while en-route to the station grid previously sampled by MFV CARHELMAR. Fishing commenced on the 58 'CARHELMAR' tows the next day and these were completed by 30 September, except for tow P6 which was moved to avoid the French zone then deemed to be invalid due to the massive weight of broken shell in the net and a torn liner. A few of the 'CARHELMAR' stations were moved slightly due to new cables, or reduced to 15 minutes to avoid dhans or in known areas of large quantities of weed or excessive abundance of small fish. On completion of the 'CARHELMAR' grid, CORYSTES began a survey of eight new exploratory inshore tows between Start Point and Lands End. These tows were completed on 1 October. CORYSTES then proceeded to fish the

remaining X-prefixed stations. These were completed by the evening of Thursday 2 October, and 'CARHELMAR' station P6 was repeated in its correct position on the morning of 3 October. Having completed all the aims of the cruise, CORYSTES set course for Lowestoft, docking at 1500h on 4 October.

RESULTS

Aims 1, 2 & 3

The survey gear was the standard 4m beam trawl with chain mat, flip-up ropes and the net was fitted with a 40mm cod-end liner. All fish and selected commercial shellfish were identified to species, weighed and measured (large catches of an individual species were sub-sampled beforehand). A water sample was taken at the first and last station every day for salinity calibration purposes, and surface temperature and salinity readings were logged at every station using the continuous recorder. In addition, a SAIV Micro CTD unit was attached to the 4m-beam trawl in order to record the temperature and salinity depth profile at each station fished. All station details, fish catch, length distributions and biological data were entered into the Fishing Survey database. The number of otoliths taken in each ICES Division is shown in Table 1 below.

Table 1. Numbers of fish otolithed by ICES division

	VIIa	VIIe	VIIf	VIIg	Total
Anglerfish *(L.piscatorious)*	30	38	23	12	103
Anglerfish *(L.budegassa)*	0	2	0	0	2
Bass	0	0	17	0	17
Brill	22	4	14	0	40
Cod	21	2	1	1	25
Dab	275	201	254	1	731
Haddock	29	3	7	0	39
Hake	6	2	9	6	23
Lemon sole	91	46	91	5	233
Megrim	2	22	14	4	42
Plaice	1506	255	302	6	2069
Sole	532	353	478	28	1391
Turbot	6	3	12	2	23
Whiting	156	36	25	19	236
Total	2676	967	1247	84	4974

Part 13a – Irish Sea & Bristol Channel (ISBC) beam trawl survey

The trawl survey covering the Irish Sea and Bristol Channel is divided up into six sectors consisting of 108 beam trawl tows. All 66 stations used for tuning data (ISN, ISS, BCI) in the Northern and Southern Shelf assessment Working Groups were fished successfully, and 108 stations in total were completed successfully (Figure 1a). A total of 8 Prime stations – numbers 27 (Morecambe Bay), 40 (Red Wharf Bay), 313 (Tremadoc Bay), 203 (Dundrum Bay), 214 and 220 (north of Dublin), 233 (south of Wicklow) and 501 (southwest of Milford Haven) were reduced from the standard 30 minutes to 15 minute tows because of expected large catches of weed, shell or small

flatfish. Prime station number 27 (Morecambe Bay) was moved again this year due to a cable being laid over the revised tow used last year. The new position was due north of the original position within the same depth contour, but cable positions reduced this new tow to just 15 minutes.

Prime stations 1 (Luce Bay), 106 (Swansea Bay) and 305 (Caernarfon Bay) were not fished due to potential unexploded ordnance, potential gear loss/damage, and static gear (no clear tow) respectively. A few other stations were moved short distances to avoid snagging undersea cables (an increasing problem in this busy sea area).

Abundances of juvenile (pre-recruit) plaice and sole in the Irish Sea and Bristol Channel are shown in Figures 2 and 3. Pre-recruit plaice were most abundant off the east coast of Ireland, in inshore waters off north Wales and northwest England, and in Liverpool Bay. Pre-recruit sole were most abundant in the Bristol Channel and in inshore waters off north Wales, northwest England and Liverpool Bay.

Total catches of plaice per half-hour tow increased by 13% from last year in ISN, by 18% in ISS and by 47% in ISW. However, they decreased by 13% in SGC, by 17% in BCI and by 53% in BCO. Total catches of sole per half-hour tow increased by 35% in ISN, by 11% in ISS, by 47% in ISW and by 54% in BCO. However they decreased by 11% in SGC and by 4% in BCI.

Of particular note, was the dramatic increase in the numbers of dabs caught in ISN, ISS, ISW and SGC, by 64%, 47%, 163% and 186% respectively. Lemon sole numbers were also up throughout the Irish Sea and Bristol Channel, while whiting numbers were up in ISN, ISS and BCO but down elsewhere.

Part 13b – Western English Channel beam trawl survey

A total of 58 'CARHELMAR' tows were fished as last year (Figure 1b). Overall catches of plaice were slightly down on last year, while catches of sole more than doubled from last year. Catches of lemon sole, whiting, lesser spotted dogfish (LSD) and thornback ray all increased (by 50%, 33%, 84% and 100%), while dab numbers fell by 32%.

21 exploratory tows were fished between Start Point and Lands End, including the 12 'X' stations fished last year, plus one station off the Scilly Isles and 8 new inshore stations off Plymouth. Catches of plaice and sole were low but were up on last year. Catches of note in ICES Division VIIe are LSD (average 9.8 per hour over the 12 'X' stations), lemon sole (3 per hour) and anglerfish (3 per hour).

Aim 4 - Epibenthos

The by-catch of epi-benthic invertebrates was quantified at each station during the survey, thus providing data on the invertebrate fauna of the entire survey area.

Catches in the outer Bristol Channel were generally small and dominated by echinoderms (e.g. *Astropecten irregularis, Luidia sarsi, Asterias rubens* and *Marthasterias glacialis*) and crustaceans (e.g. *Pagurus prideaux, Inachus* spp., *Macropodia tenuirostris* and *Liocarcinus* spp.). The invertebrate fauna of the inshore waters of the Bristol Channel and Irish Sea were comprised primarily of *A. rubens,*

Buccinim undatum, Pagurus bernhardus and *Liocarcinus* spp. The coarser offshore grounds in the Irish Sea were more diverse, with spider crabs (*Inachus* spp. and *Macropodia* spp.) and echinoderms abundant. Clumps of *Cellaria* in these areas were often inhabited by small (2-5mm) queen scallop *Aequipecten opercularis*. The muddy substrates in the Irish Sea were the least diverse sites, and catches were comprised of starfishes, *Alpheus glaber*, thalassinoid shrimps, *Brissopsis* and *Nucula*.

Catches in the Start Bay area comprised typical inshore fauna, and *Liocarcinus* spp., *Pagurus bernhardus*, *Alcyonidium diaphanum*, *Asterias rubens* and *Ophiura* spp. were abundant. Catches further offshore were dominated by large echinoderms, including *Astropecten irregularis, Luidia ciliaris, L. sarsi, Porania pulvillus, Anseropoda placenta, Marthasterias glacialis, Echinus acutus, Echinus esculentus* and *Spatangus purpureus*.

Exploratory tows further west were generally similar, although several colonies of sea fan *Eunicella* were recorded off Plymouth. One specimen of fan mussel *Atrina fragilis* was caught in the Start Bay area, the first time this species has been recorded since CEFAS started quantifying the epibenthic by-catch in beam trawl surveys.

Aim 5

1 litre surface seawater samples were collected from 35 stations in the Bristol Channel and Severn Estuary for Tritium H-3 analysis. In addition, 51 litre surface seawater samples were collected in the Irish Sea (35 samples) and the Western English Channel (14 samples) for Tritium H-3 and Caesium Cs-137 analysis. These were taken for Bryan Smith (CEFAS, Lowestoft).

Aim 6

James Kennedy joined CORYSTES in order to collect live fish and fecundity samples from mature female plaice in support of a plaice recruitment project (MO423). A total of 49 live mature female plaice were collected from two dedicated evening tows of 15 minutes duration each. These were fished on survey prime station reference number 37 in the south Liverpool Bay area. Unfortunately, the necessary permission to land these fish live into the Douglas IOM was not forthcoming from the IOM authorities and these fish had to be discarded. Fecundity samples and muscle tissue samples were collected from Irish Sea fishing stations (51 from ISS, 55 from ISN and 25 from ISW).

Aim 7

Additional fish samples were taken in support of other CEFAS projects and training courses:

Samples of whiting otoliths were collected from each ICES Division fished, for an otolith-staining project. J Keable (CEFAS, Lowestoft)

Specimens of nine selected flatfish species caught in ICES Division VIIe were frozen individually for fish identification purposes. S Kupschus (CEFAS, Lowestoft)

Length/weight relationship information was collected for various fish species: Bib *(Trisopterus luscus*), black sea-bream (*Spondyliosoma cantharus*), horse mackerel, (*Trachurus trachurus*), long-rough dab (*Hippoglossoides platessoides*), poor cod (*Trisopterus minutus*), thick-back sole (*Microchirus variegatus*), tub gurnard (*Trigla lucerna*) and lesser weever (*Echiichthys vipera*) from each ICES Division fished during the survey. Richard Ayers (CEFAS, Lowestoft)

Collection of tissue samples from all thornback ray (*Raja clavata*) and selected samples of other ray species caught were taken for genetic studies. J Ellis (CEFAS, Lowestoft)

All lesser weevers caught in ICES Division VIIa were frozen. Dr. R. Nash (Port Erin Marine Lab, University of Liverpool)

Specimens of forty-six selected species of fish caught were frozen individually for use on future RN/SFI fish identification courses. Dr. C. Fox (CEFAS, Lowestoft)

A request for jaw and muscle samples from mature Nursehounds (*scyliorhinus stellaris*) was unable to be fulfilled as no suitable specimens were caught. T Boon (CEFAS, Lowestoft)

Five whole mature female plaice were frozen for a fecundity sampling workshop. P Witthames (CEFAS, Lowestoft)

Micro CTD

SAIV Micro CTD unit number 427 was attached to the 4m-beam trawl in order to record the temperature and salinity depth profile at each station fished. In addition, on two fishing days (10 stations), the beam was also fitted an with AML Micro CTD unit (number 7035) as backup to the SAIV unit, and in order to carry out comparisons between the two units and to provide feedback to SIGs. These units were fitted to the headline, behind the beam itself, to afford some protection whilst the beam trawl was on the bottom.

Before the mid-cruise break in Dublin (stations 1-127), the SAIV Micro CTD was used each fishing day, and was successful in collecting data on all except one of these days. Data was collected from a total of 88 out of 94 fishing stations fished. On two days, both types of Micro CTD unit were fitted to the beam trawl and the results compared. It was found that both units had recorded similar values of temperature and salinity at all depths. At a depth of 4m, a comparison was made with the recordings taken from the ships continuous logged data, and it was found that these values differed from the data collected by both Micro CTD units. Further analysis of this data will be carried out on CORYSTES return to Lowestoft, when the surface water salinity samples will be analysed to help validate the continuous logged data.

After the mid-cruise break (stations 128-222), the SAIV Micro CTD (number 427) was successful in collecting data until the battery failed during the first station on 28 September and no data was recovered that day. Unit 427 was replaced with SAIV Micro CTD unit number 426 the next morning and this unit worked successfully for the rest of the survey. Data was collected from a total of 84 out of 95 fishing stations fished.

Our thanks go to all the officers and crew of RV CORYSTES for their help and support during this survey.

Finally, thanks go to all personnel on board who donated a total of over £100 for Jennie Keable to have her head shaved during the cruise in aid of the RNLI.

I D Holmes & M J Boon
4 October 2003

INITIALLED: Dr R. Millner

SEEN IN DRAFT: Master: Capt M. Jones
Senior Fishing Mate: B. Salter

DISTRIBUTION:

Basic List +
I Holmes
M Boon
S Milligan
B Harley
J Ellis
R Scott
M Parker-Humphreys
J Keable
G Burt
Richard Humphreys
J Smith
J Araujo (UC Leicester)
J Kennedy (Liverpool Univ.)
R S Millner
S Flatman
M J Armstrong (DARDNI, Belfast)
P Connolly (DOM, Dublin)
FCO (for Republic of Ireland & France)
Sea Fisheries Committees:
Cumbria
North Western and North Wales
South Wales
Devon
Cornwall

Figure 1a Corystes 13/03.

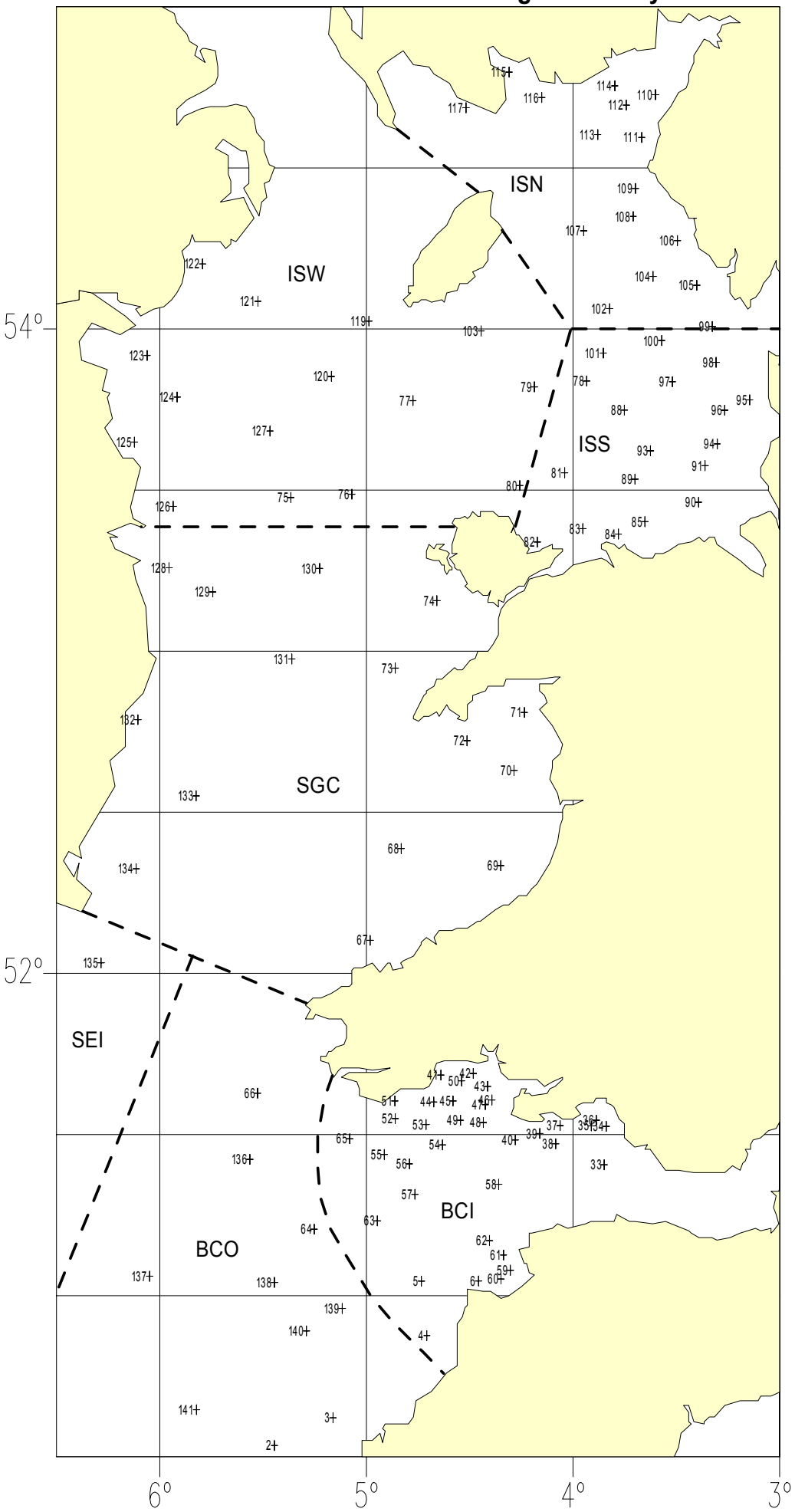


Figure 1b

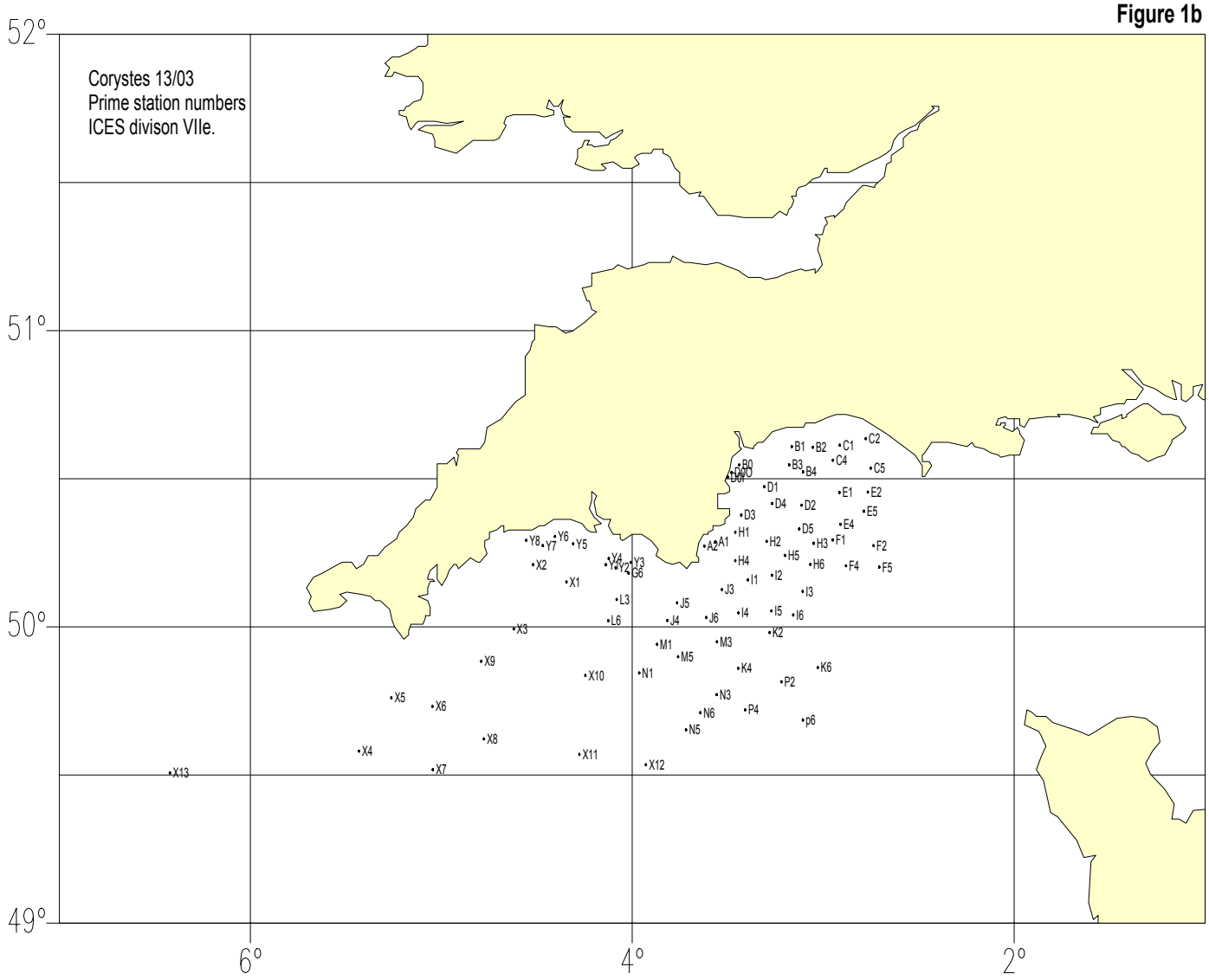

Corystes 13/03
Prime station numbers
ICES divison VIIe.
52°
51°
50°
49°
6°
4°
2°
B1
B2
C1
C2
B3
B4
C4
C5
D1
E1
E2
D4
D2
E5
D3
E4
D5
H1
H2
H3
F1
F2
A2
A1
H5
H4
H6
F4
F5
I2
I1
I3
J3
J5
J6
I4
I5
I6
K2
M1
M3
M5
K4
K6
P2
N3
N6
P4
p6
N5
N1
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
L3
L6
J4
Y8
Y7
Y6
Y5
Y4
Y3
Y2
G6

Figure 2

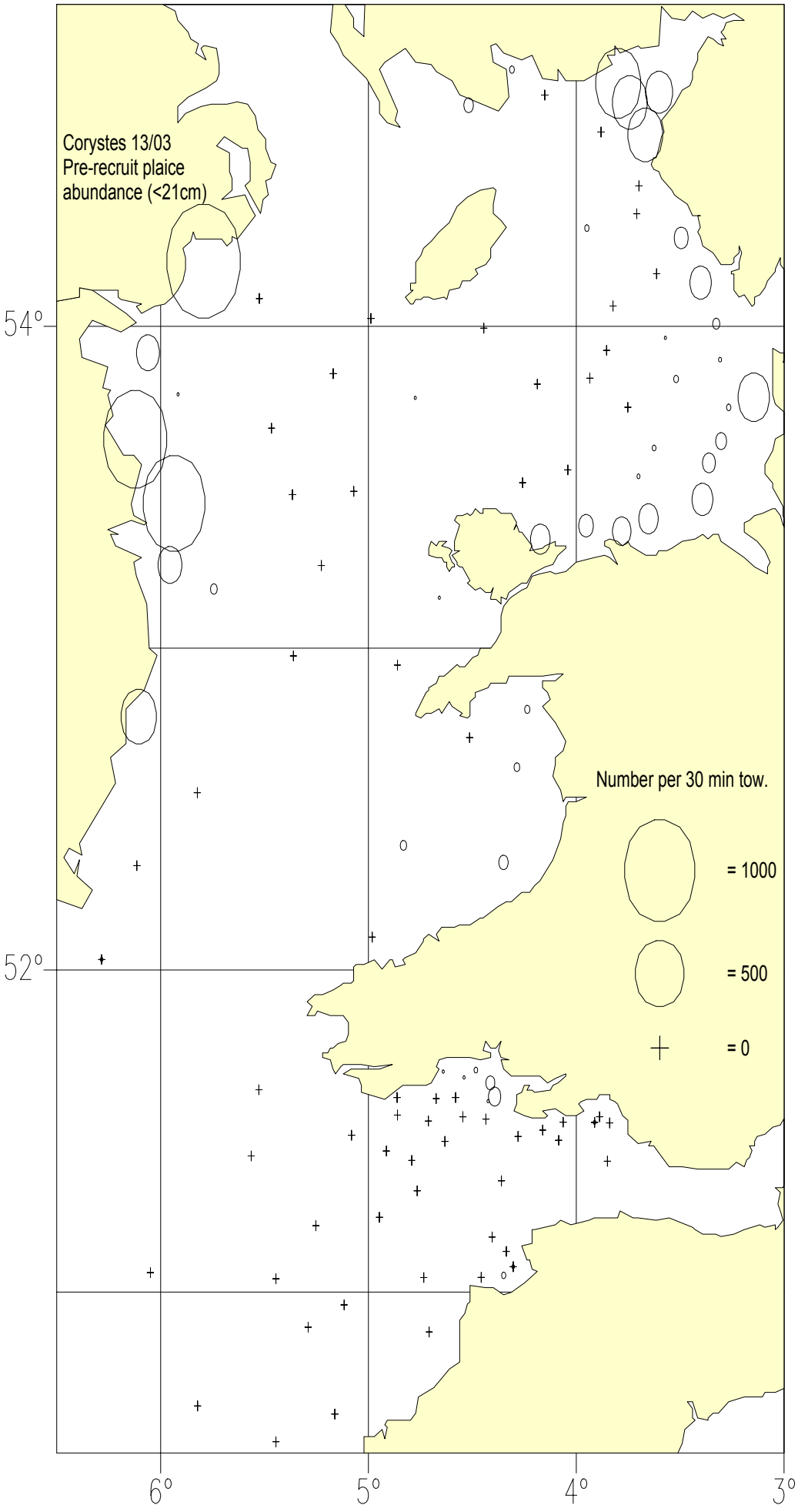
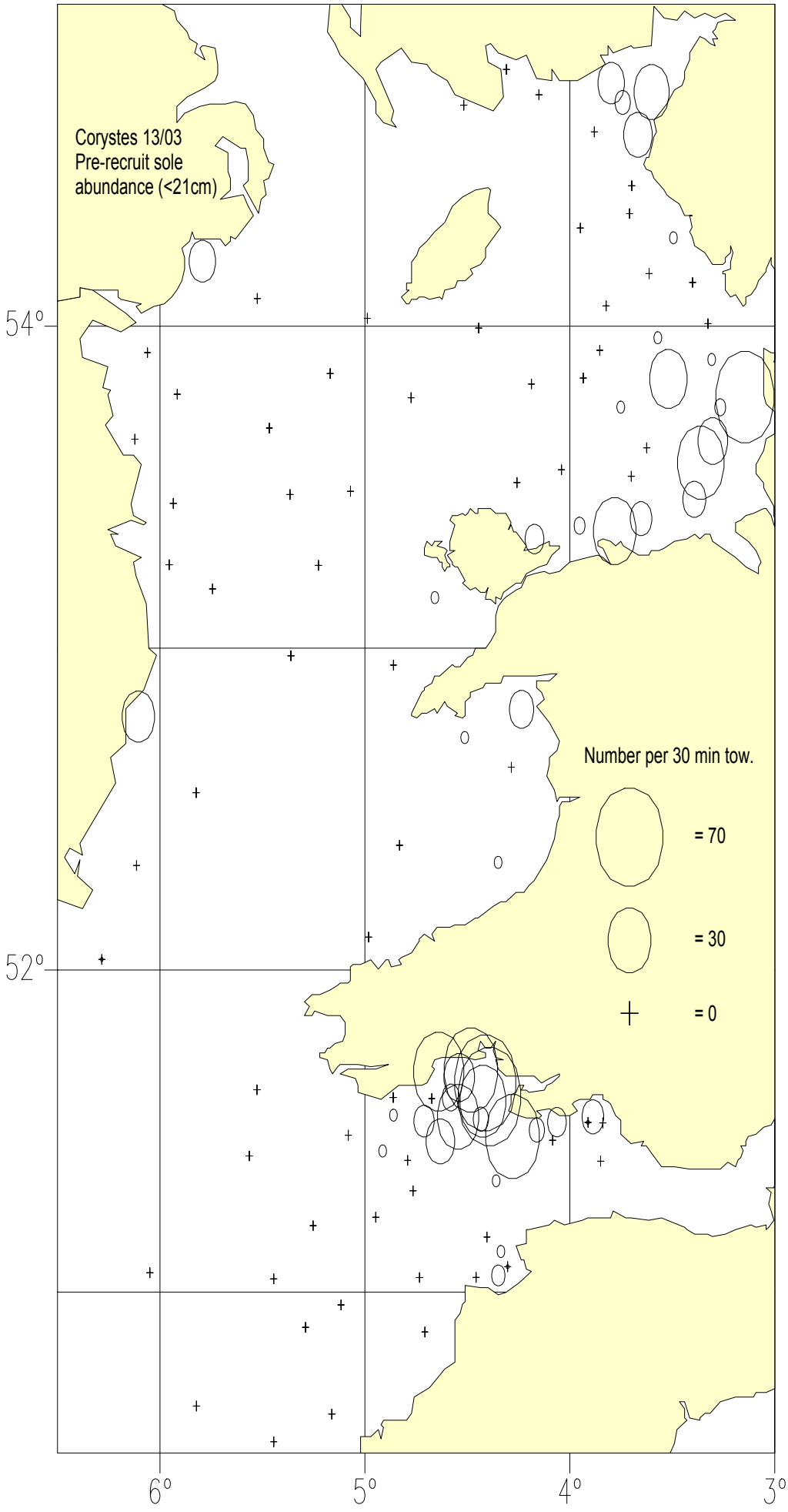

Corystes 13/03
Pre-recruit plaice
abundance (<21cm)
54°
52°
6°
5°
4°
3°
Number per 30 min tow.
= 1000
= 500
= 0

Figure 3


Corystes 13/03
Pre-recruit sole
abundance (<21cm)
54°
52°
6°
5°
4°
3°
Number per 30 min tow.
= 70
= 30
= 0