

**REPORT OF THE
WORKING GROUP ON BEAM TRAWL SURVEYS**

By Correspondence

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International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

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1 INTRODUCTION

Fisheries independent beam trawl surveys using research vessels were established in the 1980s by countries bordering the North Sea to monitor stocks of plaice and sole. Collation and analysis of some of the data derived from these surveys was undertaken by the Beam Trawl Study Group, which in 1998 was re-established as the Working Group on Beam Trawl Surveys. Although the initial focus of its efforts was in the North Sea and Eastern Channel, the Working Group now evaluates all major surveys in Sub-area IV and VII (ICES 1991).

The Working Group comprises regular participants from Belgium, Germany, Netherlands and the UK. An annual report describing the surveys and summarising the distribution and catch rate of fish species has been produced every year since 1990. Recent reports have described the distribution of selected species of benthic invertebrates.

1.1 Terms of Reference

At the 1998 Annual Science Conference it was resolved that the Working Group on Beam Trawl Surveys (Chairman: Dr S I Rogers, UK) should work by correspondence to:

- a) Prepare a progress report summarising the results of the 1998 Beam Trawl Surveys;
- b) Continue work of developing an international database of beam trawl survey data;
- c) Calculate population abundance indices by age-group for sole and plaice in the North Sea, Division VIIa and Divisions VIId-g;
- d) Present summary results from other International Demersal Young Fish Surveys, including the pre-recruit indices for commercially important species;
- e) Collate information describing epibenthic invertebrate by-catch during beam trawl surveys;
- f) Obtain peer review of the Working Group report from the appropriate assessment Working Group prior to the 1999 Annual Science Conference;
- g) Comment on the draft objectives and activities in the Living Resources Committee component of the ICES Five-Year Strategic Plan, and specify how the purpose of the Working Group contributes to it.

The Working Group will report to the Living Resources and Marine Habitats Committees at the 1999 Annual Science Conference and to ACFM before its October 1999 meeting.

1.2 Participants by correspondence

Ulrich Damm	Germany
Siegfried Ehrich	Germany
Henk Heesen	Netherlands
Olivier Le Pape	France
Gerjan Piet	Netherlands
Brian Rackham	England
Stuart Rogers	England
Willy Vanhee	Belgium

2 PROGRESS DURING 1998 AND SUMMARY RESULTS

2.1 Survey details

Beam trawl surveys described in this report cover an area comprising the southern North Sea (IVb, IVc), the English Channel (VIIId, VIIe), the Celtic Sea (VIIf, VIIfg) and the Irish Sea (VIIa). The gears deployed by research vessels in these areas are different because of differences in substrate type and the ability of vessels to deploy the trawls. Despite these differences, the survey and data analysis procedures are standardised, and have been described in detail elsewhere (ICES 1993; ICES 1994; Rogers *et al.* 1997). A summary description of the beam trawl survey characteristics of each

country is given in Table 2.1, and the duration of each survey is shown in Table 2.2. The total number of beam trawl hauls by these surveys is shown by rectangle in Figure 2.1, both for 1998, and for all years from 1990.

Sampling stations are stratified according to ICES rectangle and depth zone. In the UK surveys of the Channel and western UK waters, the station grid comprises fixed station positions, identified as Prime Station Numbers. In the Netherlands survey the stations are distributed pseudo-randomly over the rectangle, taking untrawlable areas into account.

Length stratified otolith samples of sole, plaice and dab are taken by sub-area. In the UK surveys the position of all otolithed fish is recorded but in North Sea surveys pooled samples are taken from hauls within otolith sampling areas. These sampling areas are shown in Figure 2.2.

2.2 Sampling procedures.

All surveys sample fish and selected species of macro-benthic invertebrates. A detailed description of sampling procedures has been produced in earlier reports of the Study Group (ICES 1990; ICES 1991; ICES 1993; ICES 1995), and also in journal papers published by members of the Group (Rogers *et al.* 1997; Rogers *et al.* 1998; Rogers *et al.*, 1999). In summary, all fish are sorted from the catch, identified and the number of fish by one cm size class is recorded. Large catches are subsampled. Catch rates were converted to the standard 8 m beam trawl by multiplying the observed catch rates by the ratio of the beam trawl widths, and raising to a one hour tow duration. A list of all demersal fish species caught since 1990, and all macro-benthic invertebrates caught in UK and RV Tridens surveys since 1997, is shown in Table 2.2.1 with Latin name and 3 letter NODC code. These NODC codes are used in the database as the SPECIES variable.

2.3 Fish distribution and abundance in 1998 (TOR a)

The catch rates of fish from the 1998 beam trawl surveys (numbers/8 m beam/hour) were averaged by rectangle, and these averages were averaged for the sub-areas shown in Figure 2.3. The data for selected fish species are presented by management area and year since 1990, and by ICES rectangle (Tables 2.3.1 to 2.3.9; Figures 2.3.1 to 2.3.26). A thorough process of checking and validation for earlier years' data has enabled some countries to provide improved datasets for the period 1990–1998. New time-series data have therefore been produced for the relevant management areas, but these improvements do not significantly change previously published data.

2.4 Survey indices of sole and plaice (TOR c)

Year class strength indices of sole and plaice (0-group to 10+-group), for the period 1985 to 1998, are provided for the Netherlands and UK surveys by management area (Table 2.4.1 and 2.4.2). The geographic coverage of each management area is shown in Figure 2.3. Each survey index is calculated as the arithmetic mean abundance over a standard grid of rectangles, and data are presented here for:

North Sea	(IVa)
Eastern Channel	(VIIId)
Western Channel	(VIIe)
Bristol Channel	(VIIIf&g)

2.5 Other International Demersal Young Fish Surveys (TOR d)

A number of other beam trawl surveys regularly report abundance indices of sole and plaice to ICES, but these are not part of the Working Group database, and are not used for calculating abundance indices described in section 2.3 above. The Demersal Young Fish Survey (DYFS) is a group of national surveys carried out by the Netherlands, Belgium and Germany in the continental nursery areas of the North Sea to record abundance of 0- and 1-group plaice and sole. A comparable survey is carried out by the UK on the flatfish nursery grounds of the North Sea (UKYFS). The Sole Net Survey (SNS) is a survey undertaken by the Netherlands to obtain pre-recruit indices for 1- and 2-group plaice and sole in coastal waters between the Scheldt estuary and Denmark. These surveys are described in further detail elsewhere (Beek 1997; Riley *et al.* 1981). Abundance indices for 0- group to 3-group sole and plaice produced by these surveys are shown in Table 2.5.1 a) to c).

It is appropriate to consider whether these survey data, and those from other European beam trawl surveys, should now be included in the routine output of WGBEAM. While this would be an important step forward, the time involved in collating and checking the data should not be underestimated.

2.6 International Beam Trawl Survey Database (TOR b)

The main purpose of the Group in the past 12 months has been to provide the wider scientific community with access to data from the beam trawl surveys. Although annual summary reports have been provided by the Group since 1990, and selected data published in scientific journals, it was felt that the major national survey datasets should be combined centrally by the Chairman of the Working Group, as a first step to preparing a formal database.

After some discussion it was decided that the basic format of using a separate trawl data file and fish length frequency file was to be adopted, following the principles of the International Bottom Trawl Survey database. The specification of these files has already been described (ICES 1996), but some modifications have taken place during the past 12 months. The agreed basic procedures and responsibilities are as follows:

- a) Data for each country is provided by the chief scientist of the relevant cruise.
- b) The responsibility for checking accuracy of entries and completeness of datasets remains entirely with the source country.
- c) The role of the Working Group Chairman is only to combine annual datasets and make the resulting compilation available.

During the past 12 months the Working Group has compiled a standardised dataset for the period up to and including 1998, and this is described in the following section.

2.6.1 Format of the International Beam Trawl Survey Database

Data are available for six countries for a maximum period of 9 years (Table 2.2).

In the database, data for each country is saved in a separate directory. For each country, data is saved separately for each year. For each survey year, data is separated into two files, one containing fish length frequency data (Table 2.6.1), and one for trawl details (Table 2.6.2). These two files can be combined using three variables common to both datasets, STATION, COUNTRY, and YEAR. Fish species length frequency data is presented by 1 cm length categories, raised to the catch / 8 m beam trawl / hour (Table 2.6.1). The SPECIES variable uses the three letter NODC codes common to ICES countries, and shown in Table 2.2.1 for all demersal fish species caught since 1990, and all macro-benthic invertebrates caught in UK and RV Tridens surveys since 1997. The beam trawl station position file (Table 2.6.2) includes important variables that are relevant to the position of the tow, and the prevailing sea conditions during the survey.

The Database consists of data stored in the format described in Tables 2.6.1 and 2.6.2. This format has been kept as simple as possible, and without restriction on the length of each variable. Data are submitted to WGBEAM as plain data or comma separated files (*.csv), and are subsequently held in the database both a SAS (version 6.12 MS DOS) format and as comma separated files, to allow easy export to different software. All files, including the text, tables and figures of this report, are stored on CD ROM. These data are held by all contributing countries, and are available to other scientists depending on their region of interest.

It is recommended that this format is adopted as standard when submitting data to the WGBEAM Chairman.

Additional information on fish age, and maturity at length, is also available for some species from the surveys but has not yet been included in the database. This will be considered as a possible subject of future investigation by the Working Group.

2.7 Analysis of benthic species distribution (TOR e)

Many invertebrates are caught as bycatch on beam trawl surveys. The level of sampling varies depending on the gear and type of vessel used, but the larger, epibenthic invertebrates are generally all identified and their abundances recorded. The less frequently observed, and smaller, epibenthic species do not form part of the database, but standardised sampling methods for this part of the biota are now becoming established by the UK and The Netherlands. There is still much that needs to be done by the Working Group to set quality standards for species identification, and to

describe the main species that need to be recorded. The main invertebrate species routinely sampled are given in (ICES 1994), and all epibenthic invertebrates identified since 1997 by the UK and The Netherlands are shown in Table 2.2.1.

The distributions of nine selected epibenthic invertebrates, which include species with predominantly either northern and southern distributions, are shown in Figures 2.7.1 to 2.7.9. The shaded region in these figures represents all rectangles comprehensively sampled for epibenthic invertebrates. It is clear that several species are widespread throughout the shelf seas of Northwest Europe, and that sampling the beam trawl bycatch for these species appears to be an effective way of collecting data on their relative abundance. Future studies will need to investigate the catchability and gear efficiency of beam trawls before conclusions can be drawn from the regional differences in invertebrate species distributions. These preliminary results suggest, however, that the groundfish surveys can provide valuable information for some macro-invertebrates.

3 COMMENT ON THE DRAFT OBJECTIVES AND ACTIVITIES IN THE LIVING RESOURCES COMMITTEE COMPONENT OF THE ICES 5-YEAR STRATEGIC PLAN.

The ICES scientific objectives, which incorporate the activities of the Living Resources Committee, include broad topics which are of relevance to the purpose and objectives of WGBEAM. Specifically, two of these scientific objectives refer to the need to understand the functioning of the natural ecosystem, and also to describe and quantify the effects of human impacts on these natural resources. Initially, the groundfish surveys which comprise the database of WGBEAM were established only with the purpose of monitoring the flatfish stocks of the coastal waters of north-west Europe. It has become clear, however, that all ICES member countries must justify the relatively high cost of sea time, and so the use and interpretation of additional information collected during these surveys has become an increasingly important output. Although the surveys were not designed to sample macro-epibenthic bycatch, for example, the data collected has real value and importance, and with careful interpretation can lead to real progress with the understanding of natural processes in the marine environment. The productivity of this working group, in terms of both annual WG reports and published scientific papers, shows how valuable a resource these groundfish surveys are.

The ICES 5-year plan makes it clear that understanding natural processes, and the effect of human impact on these processes, will be a fundamental part of its research. The broad scale fisheries sampling programmes of member countries are a valuable resource, and can make a real contribution to this research. For this to happen within the next five years, it will be necessary for this potential to be fully realised.

4 REFERENCES

- Beek, F. A., Van. 1997 Recruitment surveys on juvenile plaice and sole in continental nurseries in the North Sea by the Netherlands. ICES C.M. 1997/Y:30, 1–25.
- ICES. 1990 Report of the Study Group on Beam Trawl Surveys in the North Sea and Eastern Channel. ICES C.M. 1990/G:59, 58.
- ICES. 1991 Report of the Study Group on Beam Trawl Surveys in 1990. ICES C.M. 1991/G:81, 57.
- ICES. 1993 Report of the Study Group on Beam Trawl Surveys. ICES C.M. 1991/G:5, 92.
- ICES. 1994 Report of the Study Group on beam trawl surveys in the North Sea and Eastern Channel. ICES C.M. 1990/G:59.
- ICES. 1995 Report of the Study Group on Beam Trawl Surveys in 1994. ICES C.M. 1995/G:5, 32.
- ICES. 1996 Report of the Study Group on beam trawl surveys. ICES C.M. 1996/G:2.
- Riley, J. D., Symonds, D. J. & Woolner, L. E. 1981 On the factors influencing the distribution of 0-group demersal fish in coastal waters. Rapp. P.v. Reun. Cons. int. Explor. Mer. 178, 223–228.
- Rogers, S. I., Damm, U., Rijnsdorp, A. D. & Vanhee, W. 1997 Description and evaluation of the international beam trawl surveys of the European continental shelf. ICES C.M. 1997/Y:23, 20.

- Rogers, S. I., Rijnsdorp, A. D., Damm, U. & Vanhee, W. 1998 Demersal fish populations in the coastal waters of the UK and continental N.W. Europe from beam trawl survey data collected from 1990 to 1995. *Journal of Sea Research* **37**, 79–102.
- Rogers, S. I., Maxwell, D., Rijnsdorp, A. D., Damm, U. & Vanhee, W. (1999) Fishing effects in northeast Atlantic Shelf Seas: patterns in fishing effort, diversity and community structure. IV. Can comparisons of species diversity be used to assess human impacts on coastal demersal fish faunas? *Fisheries Research* **40**, 135–152.

Table 2.1 Details of the beam trawl surveys currently undertaken by each country.

	Belgium	Germany	Netherlands	Netherlands	UK	UK	UK
Survey area:	IVb&c west	IVb east	IVb&c east	Central N Sea	VIIId	VIIe	VIIa, f&g
Year survey started:	1992	1991	1985	1985	1988	1988	1988
Dates:	August	early September	end August	end August	early August	late September	late August
Ship:	RV Belgica	RV Solea	RV Isis	RV Tridens	RV Corystes	MFV Carhelmar	RV Corystes
Ship length:	50 m	35 m	28 m	73.5	53 m	22 m	53 m
Beam trawl length:	4 m	7 m	8 m	8 m	4 m	4 m	4 m
Number of beams fished:	1	2	2	2	1	2	1
Trawl duration (min):	30	30	30	30	30	30	30
Tow speed (knots):	4	4	4	4	4	4	4
Cod end liner stretched mesh (mm):	40	44	40	40	40	40	40
Number of ticklers:	0	5	8	8	0	0	0
Gear code:	BT4M	BT7	BT8	BT8	BT4FM	BT4FM	BT4FM
Attachment:	*	(none)	(none)	(none)	*	*	*
Station positions:	fixed	pseudo-random	pseudo-random	pseudo-random	fixed	fixed	fixed
Benthos sampling since:	1992	1992	1985	1985	1991	1992	1992

* chain mat & flip-up rope

Table 2.2 Years for which data is available for each research vessel.

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Belgica			*	*	*	*	*	*	*
Carhelmar	*	*	*	*	*	*	*	*	*
Corystes	*	*	*	*	*	*	*	*	*
Isis	*	*	*	*	*	*	*	*	*
Solea								*	*
Tridens							*	*	*

Table 2.2.1 A complete list of demersal fish and invertebrates, collected during beam trawl surveys.
NODC codes in brackets are used for species without a code, or those identified to a higher taxonomic level.

Higher taxa	pecies	ODC Code
Porifera	<i>Pachymatisma johnstonia</i> (Bowerbank in Johnston) <i>Suberites domuncula</i> (Olivi) <i>Cliona celata</i> (Grant) <i>Tethya aurantium</i> (Pallas) <i>Stelligera stuposa</i> (Montagu) <i>Halichondria panicea</i> (Pallas) <i>Haliclona oculata</i> (Pallas)	(PFZ) SUD (PFZ) TAA STE BCS HAO
Cnidaria: Hydrozoa	<i>Tubularia indivisa</i> L. <i>Hydrallmania falcata</i> (L.) <i>Abietinaria abietina</i> (L.) <i>Diphasia</i> sp. <i>Thuiaria</i> sp. <i>Nemertesia antennina</i> (L.) <i>Nemertesia ramosa</i> (Lamouroux)	TBI (HYD) (HYD) (HYD) (HYD) NEM NEM
Cnidaria:Anthozoa	<i>Alcyonium digitatum</i> L. <i>Alcyonium glomeratum</i> (Hassall) <i>Pennatula phosphorea</i> L. <i>Virgularia mirabilis</i> (Müller) <i>Caryophyllia smithii</i> Stokes & Broderip <i>Epizoanthus incrustatus</i> (Düben & Koren) <i>Actinia equina</i> (L.) <i>Bolocera tuediae</i> (Johnston) <i>Urticina eques</i> (Gosse) <i>Urticina felina</i> (L.) <i>Metridium senile</i> (L.) <i>Adamsia carciniopados</i> (Otto) <i>Hormathia</i> sp.	DMF AYG PNP VAM DCC EPS AEQ BCT (AMU) DHA PMA (HIA) HOD
Nemertea	<i>Lineus longissimus</i> (Gunnerus)	(NEA)
Polychaeta	<i>Aphrodita aculeata</i> (L.) <i>Hermione hystrix</i> (Savigny) <i>Malmgrenia castanea</i> McIntosh <i>Chaetopterus variopedatus</i> (Renier) (tubes) <i>Hyalinoecia tubicola</i> (O.F.Müller) <i>Pectinaria</i> spp. <i>Lanice conchilega</i> (Pallas) <i>Sabellaria alveolata</i> (L.) <i>Sabellaria spinulosa</i> Leuckhart <i>Filograna implexa</i> Berkeley <i>Protula tubularia</i> (Monatgu)	AAC HMH (BWV) CVT HYT PEY LCE RCL RCL FII PRT

Hirudinea	<i>Pontobdella muricata</i> (L.)	PON
Echiura	<i>Maxmuelleria lankesteri</i> (Herdman)	MLI
Cirripedia	<i>Scalpellum scalpellum</i> (L.) <i>Balanus balanus</i> (L.)	(CIZ) BAB
Isopoda	<i>Idotea linearis</i> (L.)	IAL
Stomatopoda	<i>Squilla mantis</i> Fabricius	MTS
Amphipoda	Gammaridea indet. Caprellidea indet.	GMZ CXZ
Natantia	<i>Palaemon serratus</i> (Pennant) <i>Alpheus glaber</i> <i>Alpheus macrocheles</i> (Hailstone) <i>Spirontocaris</i> sp. <i>Pandalus monatgui</i> <i>Crangon allmanni</i> <i>Crangon crangon</i> <i>Pontophilus spinosus</i>	CPR ALP ALM SSZ PRM CGA CSH PPS
Astacidea	<i>Nephrops norvegicus</i> (L.) <i>Homarus gammarus</i> (L.)	NEP LBE
Anomura	<i>Upogebia deltaura</i> (Leach) <i>Diogenes pugilator</i> (Roux) <i>Pagurus bernhardus</i> (L.) <i>Pagurus cuanensis</i> Thompson <i>Pagurus prideauxi</i> Leach <i>Lithodes maja</i> L. <i>Galathea</i> spp. <i>Munida rugosa</i> (Fabricius) <i>Pisidia longicornis</i> (L.) <i>Porcellana</i> spp.	UPD (PAY) HIW (PAY) HIA LDM GAL MNR PIS PCL
Brachyura	<i>Dromia personata</i> (L.) <i>Ebalia cranchii</i> Leach <i>Ebalia tuberosa</i> (Pennant) <i>Hyas araneus</i> (L.) <i>Hyas coarctatus</i> Leach <i>Inachus doresttensis</i> (Pennant) <i>Macropodia rostrata</i> (L.) <i>Eurynome aspera</i> (Pennant) <i>Eurynome spinosa</i> Hailstone <i>Pisa armata</i> (Latreille) <i>Pisa tetradon</i> (Pennant) <i>Maia squinado</i> (Herbst) <i>Corystes cassivelaunus</i> (Pennant) <i>Atelecyclus rotundatus</i> (Olivi) <i>Cancer pagurus</i> L.	DRP EBC EBT HYA HYC IND MCR EUA EUS PAA PIT SCR CCV ALR CRE

Brachyura (continued)	<i>Carcinus maenas</i> (L.)	CRG
	<i>Liocarcinus corrugatus</i> (Pennant)	LIC
	<i>Liocarcinus depurator</i> (L.)	LMD
	<i>Liocarcinus holsatus</i> (Fabricius)	LMH
	<i>Liocarcinus marmoreus</i> (Leach)	LMM
	<i>Liocarcinus pusillus</i> (Leach)	LPU
	<i>Necora puber</i> (L.)	MLP
	<i>Portumnus latipes</i> (Pennant)	PLL
	<i>Pilumnus hirtellus</i> (L.)	PNH
	<i>Monodaeus couchi</i> (Couch)	(CBX)
	<i>Xantho</i> spp.	XAN
	<i>Geryon tridens</i> Krøyer	GET
	<i>Goneplax rhomboides</i> (L.)	GOR
	<i>Pinnotheres pisum</i> (L.)	PEA
Pycnogonida	<i>Pycnogonum littorale</i> (Strøm)	PGL
Scaphopoda	<i>Antalis entalis</i> L.	DEE
Gastropoda	<i>Diodora graeca</i> (L.)	KYL
	<i>Calliostoma ziziphinum</i> (L.)	PTS
	<i>Turritella communis</i> Risso	TUC
	<i>Crepidula fornicata</i> (L.)	ASL
	<i>Lunatia alderi</i> (Forbes)	NKS
	<i>Natica catena</i> (da Costa)	PNC
	<i>Trophonopsis</i> spp.	SIS
	<i>Beringus turtoni</i> (Bean)	(WHZ)
	<i>Buccinum undatum</i> L.	WHE
	<i>Colus gracilis</i> (da Costa)	CSG
	<i>Colus islandicus</i> (Mohr)	CSI
	<i>Colus jeffreysianus</i> (Fischer)	(WHZ)
	<i>Liomesus ovum</i> (Turton)	(WHZ)
	<i>Neptunea antiqua</i> (L.)	RWK
	<i>Troschelia berniciensis</i> (King)	(WHZ)
	<i>Volutopsis norvegicus</i> (Gmelin)	(WHZ)
	<i>Hinia reticulata</i> (L.)	NSR
	<i>Scaphander lignarius</i> (L.)	SDL
	<i>Philine aperta</i> (L.)	PHP
	<i>Pleurobranchus membranaceus</i> (Cuvier)	PBM
	<i>Tritonia hombergi</i> (Cuvier)	TNH
	<i>Dendronotus frondosus</i> (Alder & Hancock)	DDF
	<i>Acanthodoris pilosa</i> (Abildgaard in Müller)	ACP
	<i>Onchidoris bilamellata</i> (L.)	ONB
	<i>Doris</i> sp	(NBX)
	<i>Archidoris pseudoargus</i> (Rapp)	ADP
	<i>Coryphella</i> spp.	CYX

Bivalvia	<i>Nucula nitidosa</i> Winckworth <i>Nucula nucleus</i> (L.) <i>Glycymeris glycymeris</i> (L.) <i>Mytilus edulis</i> L. <i>Modiolarca tumida</i> (Hanley) <i>Modiolus barbatus</i> (L.) <i>Modiolus modiolus</i> (L.) <i>Ostrea edulis</i> L. <i>Pecten maximus</i> (L.) <i>Aequipecten opercularis</i> (L.) <i>Chlamys varia</i> (L.) <i>Pseudamussium septemradiatum</i> (Müller) <i>Astarte sulcata</i> (da Costa) <i>Arctica islandica</i> (L.) <i>Acanthocardia echinata</i> (L.) <i>Laevicardium crassum</i> (Gmelin) <i>Dosinia lupinus</i> (L.) <i>Venus verrucosa</i> L. <i>Paphia (Venerupis) rhomboides</i> (Pennant) <i>Clausinella fasciata</i> (da Costa) <i>Mactra stultorum</i> (L.) <i>Spisula solida</i> (L.) <i>Spisula subtruncata</i> (da Costa) <i>Lutraria lutraria</i> (L.) <i>Ensis arcuatus</i> (Jeffreys) <i>Ensis siliqua</i> (L.) <i>Ensis</i> spp. <i>Mya truncata</i> L. <i>Mya</i> spp. <i>Hiatella</i> spp.	(NSP) NNU GLG MUS (MSX) BML HML OYF SCE QSC CHV CSE AES CLQ ACY LCC DSL VVR TVR VFR MAZ TTS CTH LUL ESA ESS ESY MYT MYA HIT
Cephalopoda	<i>Sepia officinalis</i> L. <i>Sepioloatlantica</i> d'Orbigny <i>Rossia macrosoma</i> (Delle Chiaje) <i>Alloteuthis subulata</i> (Lamarck) <i>Loligo forbesi</i> Steenstrup <i>Loligo vulgaris</i> Lamarck <i>Todaropsis eblanae</i> (Ball) <i>Eledone cirrhosa</i> (Lamarck)	CTL SPA ROM ATS NSQ LLV OME EDC
Bryozoa	<i>Flustra foliacea</i> (L.) <i>Securiflustra securifrons</i> (Pallas) <i>Cellaria sinuosa</i> (Hassall) <i>Bugula turbinata</i> Alder <i>Bugula flabellata</i> (Thompson in Gray) <i>Sertella beaniana</i> (King) <i>Pentapora foliacea</i> (Ellis & Solander) <i>Alcyonidium diaphanum</i> Lamouroux	FAF FAS CEL BUG BUG SBN PET ALG

Crinoidea	<i>Antedon bifida</i> (Pennant)	ADB
Asteroidea	<i>Astropecten irregularis</i> (Pennant) <i>Luidia ciliaris</i> (Philippi) <i>Luidia sarsi</i> (Düben & Koren) <i>Hippasteria phrygiana</i> (Parelius) <i>Porania pulvillus</i> (O.F.Müller) <i>Anseropoda placenta</i> (Pennant) <i>Crossaster papposus</i> (L.) <i>Solaster endeca</i> (L.) <i>Henricia oculata</i> (Pennant) <i>Henricia sanguinolenta</i> (O.F.Müller) <i>Stichastrella rosea</i> (O.F.Müller) <i>Asterias rubens</i> L. <i>Leptasterias muelleri</i> (M. Sars) <i>Marthasterias glacialis</i> (L.)	API LDC LUS HPP PPV CMP CTP SLE HEO HNS SLR STH LSM MAG
Ophiuroidea	<i>Ophiura ophiura</i> (L.) <i>Ophiura albida</i> Forbes <i>Ophiura robusta</i> (Ayres) <i>Ophiocomina nigra</i> (Abildgaard) <i>Ophiothrix fragilis</i> (Abildgaard) <i>Amphiura</i> spp.	OHT OHA (BTZ) OPN OPF AMY
Echinoidea	<i>Psammechinus miliaris</i> (Gmelin) <i>Echinis acutus</i> Lamarck <i>Echinus esculentus</i> L. <i>Echinus elegans</i> Düben & Koren <i>Spatangus purpureus</i> O.F.Müller <i>Brissopsis lyrifer</i> (Forbes) <i>Echinocardium cordatum</i> (Pennant)	PMM URA URS EEG SPG BRL ECC
Holothuroidea	<i>Thyone fusus</i> (O.F.Müller) <i>Thyone raphanus</i> Düben & Koren <i>Trachythyone elongata</i> (Düben & Koren) Cucumariidae (indet.) <i>Psolus phantapus</i> (L.)	THH (CMX) CUE CMX PSX
Ascidacea	<i>Aplidium punctum</i> (Giard) <i>Polyclinum aurantium</i> Milne Edwards <i>Synoicum pulmonaria</i> (Ellis & Solander) <i>Ascidia conchilega</i> Müller <i>Ascidia mentula</i> Müller <i>Ascidia prunum</i> Müller <i>Asidiella aspersa</i> (Müller) <i>Asidiella scabra</i> (Müller) <i>Phallusia mammillata</i> (Cuvier) <i>Styela clava</i> Herdman <i>Distomus variolosus</i> Gaertner <i>Botrylloides leachi</i> (Savigny) <i>Botryllus schlosseri</i> (Pallas) <i>Molgula</i> spp.	AUM PCA SYQ ASD ASM ASU ASB ASS PAM SAA DSV BOT BIS MOA

Scyliorhinidae	<i>Scyliorhinus canicula</i> (L.) <i>Scyliorhinus stellaris</i> (L.)	LSD DGN
Triakidae	<i>Galeorhinus galeus</i> (L.) <i>Mustelus mustelus</i> (L.) <i>Mustelus asterias</i> Cloquet	GAG SMH SDS
Squalidae	<i>Squalus acanthias</i> L.	DGS
Torpedinidae	<i>Torpedo marmorata</i> Risso <i>Torpedo nobiliana</i> Bonaparte	MER ECR
Rajidae	<i>Raja brachyura</i> Lafont <i>Raja clavata</i> L. <i>Raja microocellata</i> Montagu <i>Raja montagui</i> Fowler <i>Raja radiata</i> Donovan <i>Raja naevus</i> Müller & Henle <i>Raja undulata</i> Lacepède	BLR THR PTR SDR SYR CUR UNR
Anguillidae	<i>Anguilla anguilla</i> (L.)	ELE
Congridae	<i>Conger conger</i> (L.)	COE
Gobiesocidae	<i>Diplecogaster bimaculata</i> (Bonnaterre) Gobiesocidae indet.	TSC CFX
Lophiidae	<i>Lophius piscatorius</i> L.	MON
Gadidae	<i>Gadus morhua</i> L. <i>Melanogrammus aeglefinus</i> (L.) <i>Merlangius merlangus</i> (L.) <i>Trisopterus esmarki</i> (Nilsson) <i>Trisopterus minutus</i> (L.) <i>Trisopterus luscus</i> (L.) <i>Pollachius pollachius</i> (L.) <i>Ciliata mustela</i> (L.) <i>Ciliata septentrionalis</i> (Collett) <i>Enchelyopus cimbrius</i> (L.) <i>Gaidropsarus mediterraneus</i> (L.) <i>Gaidropsarus vulgaris</i> (Cloquet) <i>Molva molva</i> (L.)	COD HAD WHG NOP POD BIB POL FVR NNR FRR SRR TBR LIN
Ranicipiteridae	<i>Raniceps raninus</i> (L.)	LFB
Merlucciidae	<i>Merluccius merluccius</i> (L.)	HKE
Macrouridae	<i>Coryphaenoides rupestris</i>	RNG
Zeidae	<i>Zeus faber</i> L.	JOD
Caproidae	<i>Capros aper</i> (L.)	BOF
Gasterosteidae	<i>Gasterosteus aculeatus</i> L.	TSS
Syngnathidae	<i>Syngnathus acus</i> L. <i>Syngnathus rostellatus</i> Nilsson <i>Entelurus aequoreus</i> (L.) <i>Hippocampus ramulosus</i> Leach <i>Hippocampus hippocampus</i> (L.)	GPF NPF SKP SNH SHE
Triglidae	<i>Trigla lucerna</i> L. <i>Aspitrigla cuculus</i> (L.) <i>Eutrigla gurnardus</i> (L.) <i>Trigloporus lastoviza</i> (Brünnich)	TUB GUR GUG GUS
Cottidae	<i>Myoxocephalus scorpius</i> (L.) <i>Taurulus bubalis</i> (Euphrasen)	BRT SSN
Agonidae	<i>Agonus cataphractus</i> (L.)	POG

Cyclopteridae	<i>Cyclopterus lumpus</i> L. <i>Liparis liparis</i> (L.) <i>Liparis</i> spp.	LUM SSL LPS
Percichthyidae	<i>Dicentrarchus labrax</i> (L.)	ESB
Sparidae	<i>Spondyllosoma cantharus</i> (L.)	BKS
Mullidae	<i>Mullus surmuletus</i> L.	MUR
Cepolidae	<i>Cepola rubescens</i> L.	RPF
Mugilidae	<i>Chelon labrosus</i> (Risso)	MTL
Labridae	<i>Labrus mixtus</i> L. <i>Labrus bergylta</i> Ascanius <i>Centrolabrus exoletus</i> (L.) <i>Ctenolabrus rupestris</i> (L.) <i>Crenilabrus melops</i> (L.)	CUW BNW SMW GDY CWG
Zoarcidae	<i>Zoarces viviparus</i> (L.)	ELP
Stichaeidae	<i>Chirolophis ascanii</i> (Walbaum) <i>Lumpenus lampretaeformis</i> (Walbaum)	YBY SBY
Pholidae	<i>Pholis gunellus</i> (L.)	BTF
Trachinidae	<i>Trachinus draco</i> L. <i>Echiichthys vipera</i> (Cuvier)	WEG WEL
Blenniidae	<i>Blennius ocellaris</i> L. <i>Blennius gattorugine</i> (L.)	BBY TBY
Callionymiidae	<i>Callionymus lyra</i> L. <i>Callionymus maculatus</i> Rafinesque <i>Callionymus reticulatus</i> Valenciennes	CDT SDT RDT
Gobiidae	<i>Gobius paganellus</i> L. <i>Gobius niger</i> L. <i>Gobius gasteveni</i> Miller <i>Lesuerigobius friesii</i> (Malm) <i>Pomatoschistus minutus</i> (Pallas) <i>Pomatoschistus pictus</i> (Malm) Gobiidae indet.	RKG BLG GSV FSG SDG PTG GPA
Scophthalmidae	<i>Scophthalmus rhombus</i> (L.) <i>Scophthalmus maximus</i> (L.) <i>Lepidorhombus whiffiagonis</i> (Walbaum) <i>Phrynorhombus regius</i> (Bonnaterre) <i>Phrynorhombus norvegicus</i> (Günther) <i>Zeugopterus punctatus</i> (Bloch)	BLL TUR MEG EKT NKT TKT
Bothidae	<i>Arnoglossus laterna</i> (Walbaum) <i>Arnoglossus imperialis</i> (Rafinesque)	SDF ISF
Pleuronectidae	<i>Pleuronectes platessa</i> L. <i>Platichthys flesus</i> (L.) <i>Limanda limanda</i> (L.) <i>Microstomus kitt</i> (Walbaum) <i>Glyptocephalus cynoglossus</i> (L.) <i>Hippoglossoides platessoides</i> (Fabricius) <i>Hippoglossus hippoglossus</i> (L.)	PLE FLE DAB LEM WIT PLA HAL
Soleidae	<i>Buglossidium luteum</i> (Risso) <i>Solea lascaris</i> (Risso) <i>Solea solea</i> (L.) <i>Microchirus variegatus</i> (Donovan)	SOT SOS SOL TBS
Molidae	<i>Mola mola</i> (L.)	SUN

Table 2.3.1

Abundance of fish species in subarea VIIa

		1990	1991	1992	1993	1994	1995	1996	1997	1998
AMERICAN PLAICE (LR DAB)	PLA	15	46	11	2	4	9	4	14	4
ANGLERFISH (MONK)	MON	1	2	3	4	3	3	3	2	2
BRILL	BLL	2	3	2	2	1	1	2	1	1
COD	COD	36	14	6	23	15	9	8	6	1
COMMON DRAGONET	CDT	189	158	209	197	175	136	133	141	125
DAB	DAB	574	383	232	381	549	487	430	586	524
EUROPEAN PLAICE	PLE	317	154	193	298	273	276	257	358	346
FLOUNDER (EUROPEAN)	FLE	4	1	2	1	1	1	1	2	2
GREY GURNARD	GUG	66	52	118	90	81	44	47	56	51
HADDOCK	HAD	2	51	2	1	12	2	8	4	4
JOHN DORY	JOD	1	1	1	1	1	1	1	1	1
LEMON SOLE	LEM	5	2	4	13	11	13	9	12	10
LESSER SPOTTED DOGFISH	LSD	21	21	32	23	19	19	21	40	34
LESSER WEEVER FISH	WEL	14	25	44	45	55	53	20	33	29
POGGE (ARMED BULLHEAD)	POG	81	38	47	65	57	52	48	39	39
POOR COD	POD	246	103	135	219	124	153	109	139	95
RED GURNARD	GUR	1	6	4	4	6	3	6	9	10
RED MULLET	MUR	.	1	1	1	.	1	.	1	1
SCALD FISH	SDF	24	38	35	40	47	34	48	40	50
SOLE (DOVER SOLE)	SOL	185	179	159	76	66	60	81	128	114
SOLENETTE	SOT	138	257	129	210	196	252	174	240	234
THICKBACK SOLE	TBS	12	22	50	30	24	22	27	24	28
TUB GURNARD	TUB	8	7	15	8	7	8	9	9	14
TURBOT	TUR	1	1	1	1	1	1	1	1	1
WHITING	WHG	73	446	224	98	83	173	85	124	103
WHITING POUT (BIB)	BIB	39	28	28	7	2	11	4	16	29

Table 2.3.2

Abundance of fish species in subarea VIIId

		1990	1991	1992	1993	1994	1995	1996	1997	1998
ANGLERFISH (MONK)	MON	1	.	.	1	1	.	1	1	1
BRILL	BLL	2	1	1	1	1	2	1	1	1
COD	COD	.	.	1	1	1	1	1	1	1
COMMON DRAGONET	CDT	118	214	300	245	305	126	227	258	489
DAB	DAB	49	84	97	35	132	70	53	69	33
EUROPEAN PLAICE	PLE	51	60	61	42	36	32	63	85	111
FLOUNDER (EUROPEAN)	FLE	1	5	2	2	2	2	17	3	3
GREY GURNARD	GUG	1	1	1	1	1	1	1	1	1
JOHN DORY	JOD	.	1	1	1	1	1	1	1	1
LEMON SOLE	LEM	8	3	3	7	11	13	9	8	2
LESSER SPOTTED DOGFISH	LSD	3	5	9	12	7	7	6	11	5
LESSER WEEVER FISH	WEL	9	5	6	8	11	5	11	5	8
POGGE (ARMED BULLHEAD)	POG	14	25	25	30	44	36	29	55	20
POOR COD	POD	173	82	70	59	99	100	77	61	50
RED GURNARD	GUR	8	8	8	8	12	10	14	7	11
RED MULLET	MUR	1	.	1	1	.	1	1	1	1
SCALD FISH	SDF	7	18	15	17	10	6	9	10	8
SOLE (DOVER SOLE)	SOL	28	48	32	42	32	28	30	40	32
SOLENETTE	SOT	105	190	138	181	180	79	162	140	92
THICKBACK SOLE	TBS	2	4	5	7	7	6	9	9	10
TUB GURNARD	TUB	4	2	5	6	4	3	2	3	3
TURBOT	TUR	1	1	1	1	1	1	1	1	1
WHITING	WHG	1	1	2	1	2	4	1	1	1
WHITING POUT (BIB)	BIB	230	39	59	39	62	47	71	92	136

Table 2.3.3

Abundance of fish species in subarea VIIe

		1990	1991	1992	1993	1994	1995	1996	1997	1998
ANGLERFISH (MONK)	MON	1	1	1	3	1	2	1	1	1
BRILL	BLL	1	1	1	1	1	1	1	1	1
COD	COD	.	.	1	.	1	.	.	1	1
COMMON DRAGONET	CDT	38	8	74	36	87	60	123	40	72
DAB	DAB	17	13	13	13	32	21	20	20	16
EUROPEAN PLAICE	PLE	19	12	15	10	9	9	16	35	20
FLOUNDER (EUROPEAN)	FLE	.	.	.	1	.	1	1	.	1
GREY GURNARD	GUG	6	4	4	5	9	3	7	3	6
HADDOCK	HAD	.	.	.	.	.	1	.	.	.
JOHN DORY	JOD	1	1	1	2	1	1	1	1	1
LEMON SOLE	LEM	2	2	1	1	1	1	1	1	1
LESSER SPOTTED DOGFISH	LSD	10	9	14	18	11	15	14	28	22
LESSER WEEVER FISH	WEL	1	.	1	1	5	2	5	2	3
POGGE (ARMED BULLHEAD)	POG	13	1	4	3	10	4	6	5	9
POOR COD	POD	70	13	116	44	105	46	106	38	92
RED GURNARD	GUR	35	10	30	34	51	31	26	22	22
RED MULLET	MUR	1	1	1	2	1	2	2	2	1
SCALD FISH	SDF	6	2	13	9	24	15	26	10	20
SOLE (DOVER SOLE)	SOL	10	18	22	13	10	9	12	19	16
SOLENETTE	SOT	12	1	46	44	113	74	92	39	137
THICKBACK SOLE	TBS	31	6	58	23	45	26	60	31	99
TUB GURNARD	TUB	1	1	2	1	1	1	1	1	1
TURBOT	TUR	1	1	1	1	1	1	1	1	1
WHITING	WHG	1	13	5	13	2	4	4	7	4
WHITING POUT (BIB)	BIB	13	9	11	8	4	2	6	14	8

Table 2.3.4

Abundance of fish species in subarea VIIIf

		1990	1991	1992	1993	1994	1995	1996	1997	1998
ANGLERFISH (MONK)	MON	1	3	11	6	5	3	2	1	1
BRILL	BLL	2	3	2	2	2	3	2	2	1
COD	COD	1	1	1	1	1	1	1	1	1
COMMON DRAGONET	CDT	20	40	76	52	119	51	89	50	40
DAB	DAB	67	78	153	118	167	85	108	88	123
EUROPEAN PLAICE	PLE	100	122	101	34	37	43	74	52	60
FLOUNDER (EUROPEAN)	FLE	1	1	1	1	2	2	1	1	1
GREY GURNARD	GUG	15	52	85	63	45	26	24	26	33
HADDOCK	HAD	.	.	.	.	1	.	1	1	.
JOHN DORY	JOD	1	2	1	3	1	1	1	2	1
LEMON SOLE	LEM	2	2	3	5	9	6	12	6	4
LESSER SPOTTED DOGFISH	LSD	72	86	101	49	40	33	35	51	51
LESSER WEEVER FISH	WEL	1	3	1	3	3	3	3	2	2
POGGE (ARMED BULLHEAD)	POG	1	2	3	8	3	4	5	3	16
POOR COD	POD	322	294	335	298	113	116	125	181	381
RED GURNARD	GUR	1	5	1	7	10	7	10	7	1
RED MULLET	MUR	2	1	.	1	1	1	1	1	.
SCALD FISH	SDF	1	2	1	1	3	3	4	4	1
SOLE (DOVER SOLE)	SOL	119	137	130	81	110	55	61	96	189
SOLENETTE	SOT	113	280	153	138	247	120	114	74	141
THICKBACK SOLE	TBS	8	27	31	27	24	23	23	17	10
TUB GURNARD	TUB	10	7	13	3	9	7	6	6	11
TURBOT	TUR	1	2	1	1	2	2	1	1	1
WHITING	WHG	85	87	123	164	53	56	94	153	73
WHITING POUT (BIB)	BIB	255	100	29	14	5	8	16	171	114

Table 2.3.5

Abundance of fish species in subarea VIIg

		1990	1991	1992	1993	1994	1995	1996	1997	1998
AMERICAN PLAICE (LR DAB)	PLA	.	.	.	34	87	60	42	22	.
ANGLERFISH (MONK)	MON	.	.	.	20	26	20	9	5	7
BRILL	BLL	8	.	4	1	1	.	.	.	4
COD	COD	.	.	.	2	1	1	1	1	.
COMMON DRAGONET	CDT	.	4	4	76	97	65	42	40	33
DAB	DAB	.	4	.	113	65	54	43	98	183
EUROPEAN PLAICE	PLE	.	12	4	10	7	9	11	18	52
GREY GURNARD	GUG	.	32	4	93	99	52	38	25	128
HADDOCK	HAD	.	.	.	27	44	17	20	17	1
JOHN DORY	JOD	.	.	.	1	1	.	1	.	3
LEMON SOLE	LEM	.	.	.	20	19	17	13	6	16
LESSER SPOTTED DOGFISH	LSD	.	.	8	16	14	19	15	46	4
LESSER WEEVER FISH	WEL	.	4	.	.	1	.	1	.	.
POGGE (ARMED BULLHEAD)	POG	.	.	.	29	10	13	5	16	29
POOR COD	POD	12	468	180	189	68	56	52	162	139
RED GURNARD	GUR	.	.	.	4	2	1	1	2	3
SCALD FISH	SDF	.	.	.	80	44	44	44	21	87
SOLE (DOVER SOLE)	SOL	12	60	16	20	13	12	8	23	11
SOLENETTE	SOT	.	.	4	74	44	41	9	21	125
THICKBACK SOLE	TBS	.	8	.	78	68	70	47	36	61
TUB GURNARD	TUB	.	4	.	.	.	.	1	1	1
TURBOT	TUR	4	.	4	1	.	1	.	.	3
WHITING	WHG	20	108	40	64	19	36	29	124	95
WHITING POUT (BIB)	BIB	.	12	4	.	1	.	.	7	1

Table 2.3.6

Abundance of fish species in RFA 4

		1990	1991	1992	1993	1994	1995	1996	1997	1998
AMERICAN PLAICE (LR DAB)	PLA	.	.	.	.	.	.	85	66	82
ANGLERFISH (MONK)	MON	.	.	2	.	.	.	3	1	2
BRILL	BLL	.	.	3	8	1	2	2	1	1
COD	COD	.	.	1	16	7	10	13	100	10
COMMON DRAGONET	CDT	.	.	1	2	.	4	67	14	29
DAB	DAB	.	.	510	462	128	291	886	398	245
EUROPEAN PLAICE	PLE	.	.	108	116	25	259	70	54	39
GREY GURNARD	GUG	.	.	97	.	7	24	300	37	45
HADDOCK	HAD	.	.	.	6	58	34	32	.	.
LEMON SOLE	LEM	.	.	7	34	64	87	77	87	37
LESSER WEEVER FISH	WEL	.	.	.	10	165	4	7	.	.
POGGE (ARMED BULLHEAD)	POG	.	.	5	136	21	33	61	9	3
POOR COD	POD	.	.	.	.	.	.	.	2	1
RED GURNARD	GUR	.	.	.	.	.	17	.	.	.
RED MULLET	MUR	.	.	.	.	.	.	.	.	1
SCALD FISH	SDF	.	.	46	.	.	15	146	7	2
SOLE (DOVER SOLE)	SOL	.	.	21	48	69	130	14	29	34
SOLENETTE	SOT	.	.	11	.	.	39	121	52	10
TUB GURNARD	TUB	.	.	1	10	.	3	.	.	.
TURBOT	TUR	.	.	2	.	.	1	.	1	.
WHITING	WHG	.	.	5	30	24	126	68	64	185
WHITING POUT (BIB)	BIB	.	.	.	22	3	8	4	18	2

Table 2.3.7

Abundance of fish species in RFA 5

		1990	1991	1992	1993	1994	1995	1996	1997	1998
ANGLERFISH (MONK)	MON	.	.	1	.	.	.	.	.	.
BRILL	BLL	1	2	1	1	1	1	2	1	1
COD	COD	2	5	3	1	4	2	3	17	3
COMMON DRAGONET	CDT	21	33	7	110	80	125	90	7	62
DAB	DAB	70	83	236	65	100	192	318	233	122
EUROPEAN PLAICE	PLE	21	26	37	26	46	59	60	51	53
FLOUNDER (EUROPEAN)	FLE	.	12	1	1	2	11	6	9	1
GREY GURNARD	GUG	17	35	31	10	20	13	26	23	16
HADDOCK	HAD	.	.	.	.	.	.	.	.	1
LEMON SOLE	LEM	7	31	8	27	43	38	54	24	17
LESSER SPOTTED DOGFISH	LSD	10	3	2	8	3	3	4	8	4
LESSER WEEVER FISH	WEL	109	105	50	87	59	116	207	38	48
POGGE (ARMED BULLHEAD)	POG	1	11	7	60	159	117	96	33	23
POOR COD	POD	141	100	10	15	29	21	9	6	12
RED GURNARD	GUR	1	3	1	1	1	8	2	1	1
RED MULLET	MUR	.	.	1	.	1	1	1	1	1
SCALD FISH	SDF	27	13	50	35	18	69	43	21	20
SOLE (DOVER SOLE)	SOL	68	35	87	167	199	128	105	138	105
SOLENETTE	SOT	14	8	78	24	10	77	134	63	49
THICKBACK SOLE	TBS	.	.	.	.	.	.	.	1	1
TUB GURNARD	TUB	1	1	2	6	1	1	1	1	1
TURBOT	TUR	.	.	1	1	1	1	1	1	.
WHITING	WHG	12	19	44	49	40	50	43	48	126
WHITING POUT (BIB)	BIB	18	50	25	26	134	125	33	46	113

Table 2.3.8

Abundance of fish species in RFA 6

		1990	1991	1992	1993	1994	1995	1996	1997	1998
AMERICAN PLAICE (LR DAB)	PLA	3	2	1	1	2	2	7	8	33
ANGLERFISH (MONK)	MON	.	.	1	1	1	1	1	.	.
BRILL	BLL	2	1	3	2	2	1	1	2	1
COD	COD	5	11	3	1	10	9	64	23	4
COMMON DRAGONET	CDT	156	61	142	131	147	155	50	111	132
DAB	DAB	1958	1169	1122	1123	1062	763	1433	1573	1549
EUROPEAN PLAICE	PLE	525	680	593	645	590	523	768	1404	1229
FLOUNDER (EUROPEAN)	FLE	10	15	5	9	5	7	13	12	5
GREY GURNARD	GUG	25	24	34	34	61	36	60	36	68
HADDOCK	HAD	.	.	.	1	.	1	.	.	1
JOHN DORY	JOD	.	.	.	.	1	.	1	.	.
LEMON SOLE	LEM	2	2	1	3	13	9	16	81	6
LESSER SPOTTED DOGFISH	LSD	1	1	1	.	1	.	.	1	.
LESSER WEEVER FISH	WEL	28	25	34	60	66	79	250	58	132
POGGE (ARMED BULLHEAD)	POG	46	62	59	43	156	135	75	188	166
POOR COD	POD	3	1	1	1	1	5	5	1	6
RED GURNARD	GUR	.	1	1	1	1	1	6	1	1
RED MULLET	MUR	1	1	1	1	4	2	1	1	1
SCALD FISH	SDF	94	71	75	187	90	82	63	43	93
SOLE (DOVER SOLE)	SOL	90	53	138	78	48	59	49	170	92
SOLENETTE	SOT	80	78	125	176	165	140	192	95	70
THICKBACK SOLE	TBS	1	.	.	.	.	1	.	.	1
TUB GURNARD	TUB	8	6	13	13	10	6	7	4	7
TURBOT	TUR	5	4	3	3	5	3	2	2	3
WHITING	WHG	374	73	77	79	119	110	109	54	208
WHITING POUT (BIB)	BIB	27	2	12	3	6	30	11	32	42

Table 2.3.9

Abundance of fish species in RFA 7

		1990	1991	1992	1993	1994	1995	1996	1997	1998
AMERICAN PLAICE (LR DAB)	PLA	27	28	.	73	.	.	628	75	186
ANGLERFISH (MONK)	MON	.	1	.	.	.	.	9	1	2
BRILL	BLL	.	.	.	1	.	.	1	1	1
COD	COD	1	5	.	2	.	.	338	14	16
COMMON DRAGONET	CDT	62	53	.	70	.	.	7	1	10
DAB	DAB	2799	1531	.	3382	.	.	926	812	2829
EUROPEAN PLAICE	PLE	871	692	.	286	.	.	101	527	1147
FLOUNDER (EUROPEAN)	FLE	7	3	.	1	.	.	1	2	1
GREY GURNARD	GUG	110	86	.	91	.	.	82	32	92
HADDOCK	HAD	.	.	.	.	.	.	10	5	2
LEMON SOLE	LEM	8	3	.	1	.	.	13	8	7
LESSER WEEVER FISH	WEL	.	.	.	5	.	.	.	.	.
POGGE (ARMED BULLHEAD)	POG	35	52	.	84	.	.	13	9	23
POOR COD	POD	.	.	.	.	.	.	.	1	.
SCALD FISH	SDF	5	18	.	21	.	.	.	.	1
SOLE (DOVER SOLE)	SOL	16	11	.	9	.	.	4	1	10
SOLENETTE	SOT	5	3	.	24	.	.	2	1	1
TUB GURNARD	TUB	3	.	.	2	.	.	1	5	3
TURBOT	TUR	2	1	.	1	.	.	1	1	1
WHITING	WHG	659	152	.	89	.	.	28	2	14
WHITING POUT (BIB)	BIB	1	.	.	.	.	.	.	.	.

Table 2.4.1: Catch rate of sole from Netherlands and UK surveys
in the North Sea and VII d,a,e,f&g

Netherlands (N.hr ⁻¹ /8m trawl) North Sea											
Age	0	1	2	3	4	5	6	7	8	9	10+
1985	0.0	2.4	6.0	4.0	1.6	0.6	0.2	0.0	0.0	0.0	0.0
1986	0.0	5.9	4.9	1.6	1.0	0.5	0.2	0.1	0.0	0.0	0.1
1987	0.1	6.1	9.8	2.5	0.8	0.6	0.2	0.1	0.1	0.0	0.0
1988	0.0	70.6	11.1	3.1	0.8	0.2	0.2	0.1	0.1	0.0	0.0
1989	0.9	8.0	60.5	3.2	4.1	0.5	0.2	0.1	0.0	0.0	0.0
1990	0.1	19.0	19.4	19.5	1.0	0.7	0.2	0.1	0.1	0.0	0.0
1991	0.9	3.3	17.4	4.6	9.1	0.3	0.5	0.1	0.0	0.0	0.0
1992	0.2	67.8	24.4	9.1	2.5	3.4	0.1	0.2	0.0	0.0	0.1
1993	0.0	5.0	24.5	2.7	3.9	1.7	3.3	0.0	0.1	0.0	0.0
1994	0.8	6.5	5.1	14.9	0.5	1.9	0.1	0.7	0.0	0.0	0.0
1995	0.7	25.8	6.3	8.3	7.4	0.4	0.9	0.2	0.9	0.0	0.1
1996	0.2	3.0	5.1	1.2	1.4	2.2	0.3	0.4	0.1	0.2	0.0
1997	1.3	173.2	5.4	3.2	0.8	0.8	0.4	0.1	0.0	0.0	0.1
1998	0.3	14.8	28.0	1.0	1.1	0.1	0.1	0.3	0.0	0.0	0.0

United Kingdom (N.hr ⁻¹ /8m trawl) Eastern Channel (VII d)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	0.0	8.2	14.2	9.9	0.8	1.3	0.6	0.1	0.1	0.2	0.2
1989	0.0	2.6	15.4	3.4	1.7	0.6	0.2	0.2	0.0	0.0	0.7
1990	0.0	12.1	3.7	3.7	0.7	0.8	0.2	0.1	0.2	0.0	0.1
1991	0.0	8.9	22.8	2.2	2.3	0.3	0.5	0.1	0.2	0.1	0.1
1992	0.0	1.4	12.0	10.0	0.7	1.1	0.3	0.5	0.1	0.2	0.6
1993	0.0	0.5	17.5	8.4	7.0	0.8	1.0	0.3	0.2	0.0	0.4
1994	0.0	4.8	3.2	8.3	3.3	3.3	0.2	0.6	0.1	0.3	0.3
1995	0.0	5.2	16.9	2.1	3.8	2.2	2.4	0.2	0.3	0.2	0.2
1996	0	3.5	7.3	3.8	0.7	1.3	0.9	1.1	0.1	0.5	0.4
1997	0	19	7.3	3.2	1.3	0.2	0.5	0.4	0.9	0	0.7
1998	0.1	2.1	20.9	2.3	0.9	0.9	0.1	0.3	0.0	0.1	0.3

United Kingdom (N.hr ⁻¹ /8m trawl) Western Channel (VII e)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0.0	0.2	2.5	4.9	4.3	1.5	1.6	0.7	0.3	0.3	0.4
1990	0.0	0.6	1.7	3.1	1.3	1.0	0.3	0.6	0.1	0.2	0.5
1991	0.0	0.3	7.9	2.9	2.1	1.0	0.8	0.3	0.7	0.2	0.7
1992	0.0	0.2	5.8	11.6	1.5	1.3	0.5	0.3	0.2	0.4	0.5
1993	0.0	0.3	2.7	5.4	5.4	1.0	0.5	0.3	0.2	0.1	0.7
1994	0.0	0.1	1.7	3.3	2.4	1.4	0.2	0.3	0.0	0.1	0.3
1995	0.1	1.1	1.5	1.9	1.7	1.0	1.3	0.2	0.2	0.2	0.5
1996	0.0	1.9	4.7	2.4	1.0	1.3	0.7	0.6	0.1	0.0	0.4
1997	0.2	3.0	5.5	5.1	1.7	0.5	0.6	0.5	0.4	0.2	0.6
1998	0.0	0.9	6.0	4.4	2.6	0.9	0.3	0.4	0.2	0.3	0.4

United Kingdom (N.hr ⁻¹ /8m trawl) Bristol Channel (VII f&g)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	2.2	6.7	26.6	3.7	1.8	0.9	0.0	0.0	0.0	0.0	0.4
1989	18.6	19.7	27.0	18.7	2.2	2.4	1.2	0.4	0.1	0.1	0.0
1990	6.9	30.8	18.2	6.2	1.9	1.0	3.4	0.5	0.0	0.0	0.5
1991	4.0	16.9	40.6	8.8	2.9	4.3	0.4	0.0	0.1	0.3	0.3
1992	0.3	30.7	18.9	12.1	3.0	2.1	1.5	0.1	0.5	0.2	1.0
1993	0.0	7.4	13.0	4.5	6.4	2.6	0.7	0.1	0.1	0.2	0.2
1994	0.1	9.7	4.7	5.9	3.8	2.5	1.0	0.1	0.1	0.7	0.1
1995	2.0	3.4	11.7	5.0	1.8	0.6	2.3	0.5	0.0	0.4	0.3
1996	0.3	7.9	11.0	3.4	2.4	0.8	0.4	0.2	0.3	0.2	0.6
1997	1.6	22.1	13.5	1.7	0.9	1.4	0.5	0.1	1.1	0.0	0.6
1998	2.7	24.4	13.1	1.8	0.3	0.3	0.2	0.1	0.0	0.2	0.2

United Kingdom (N.hr ⁻¹ /8m trawl) Irish Sea (VII a)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	0.2	8.8	24.3	23.3	43.8	8.6	4.6	0.1	0.0	0.0	0.0
1989	2.0	15.8	25.9	22.1	9.9	25.0	4.9	1.8	0.0	0.0	0.2
1990	0.9	122.7	53.8	12.1	4.0	9.5	15.2	2.6	1.4	0.6	0.1
1991	0.3	13.2	105.2	17.0	2.8	1.1	2.1	8.4	2.3	0.2	0.3
1992	0.1	14.9	26.2	53.9	14.3	6.2	1.2	0.5	7.9	1.7	0.8
1993	0.0	3.6	13.3	7.0	11.3	2.7	1.0	0.4	0.7	1.9	0.9
1994	0.0	1.7	17.9	10.0	4.3	6.5	2.4	0.7	0.5	0.2	1.6
1995	1.8	13.2	8.8	11.2	4.8	2.2	2.9	0.6	0.3	0.1	1.2
1996	0.2	46.2	8.3	2.5	5.8	3.3	1.7	2.1	0.6	0.2	0.7
1997	0.5	65.7	39.8	4.9	1.8	3.9	1.9	1.1	2.3	0.6	0.8
1998	0.5	35.9	44.2	21.9	2.5	0.6	2.2	1.8	0.3	1.5	0.9

Table 2.4.2: Catch rate of plaice from Netherlands and UK surveys
in the North Sea and VII d,a,e,f&g

Netherlands (N.hr ⁻¹ /8m trawl) North Sea											
Age	0	1	2	3	4	5	6	7	8	9	10+
1985	44.8	105.7	185.9	39.5	13.3	1.5	1.0	0.5	0.2	0.2	0.5
1986	14.6	634.3	125.8	50.4	10.2	4.7	0.9	0.5	0.3	0.1	0.2
1987	39.0	207.7	707.4	32.1	9.5	2.7	1.5	0.3	0.2	0.1	0.3
1988	86.7	541.2	151.1	208.0	6.8	3.1	0.7	0.6	0.1	0.1	0.3
1989	73.2	398.0	337.9	56.1	51.1	7.9	1.1	0.4	0.2	0.1	0.3
1990	15.4	123.2	122.1	67.4	22.3	10.2	1.1	0.3	0.2	0.1	0.1
1991	6.1	187.2	125.5	30.1	21.6	5.4	4.6	0.6	0.2	0.1	0.2
1992	15.3	179.6	117.2	20.6	6.1	5.0	2.9	1.4	0.4	0.0	0.1
1993	49.7	124.9	164.1	36.9	7.3	1.8	1.5	0.5	0.5	0.2	0.1
1994	154.8	152.7	65.2	32.2	10.3	2.1	0.6	0.7	1.3	0.3	0.1
1995	97.4	238.2	48.2	14.3	6.2	2.3	0.9	0.4	1.1	0.3	0.2
1996	194.0	213.5	193.1	23.9	5.7	3.3	0.8	0.1	0.2	0.2	0.3
1997	40.7	431.6	742.0	20.3	2.8	0.2	0.4	0.2	0.1	0.0	0.0
1998	242.8	347.6	421.2	53.9	7.5	1.1	0.4	0.2	0.3	0.1	0.0

United Kingdom (N.hr ⁻¹ /8m trawl) Eastern Channel (VIId)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	0.0	26.5	31.3	43.8	7.0	4.6	1.5	0.8	0.7	0.6	1.2
1989	0.0	2.3	12.1	16.6	19.9	3.3	1.5	1.3	0.5	0.3	1.7
1990	0.6	5.2	4.9	5.8	6.7	7.5	1.8	0.7	1.0	0.8	0.4
1991	0.0	11.7	9.1	7.0	5.3	5.4	3.2	1.2	1.0	0.1	1.2
1992	0.0	16.5	12.5	4.2	4.2	5.6	4.9	3.4	0.7	0.5	0.7
1993	0.1	3.2	13.4	5.0	1.7	1.9	1.6	2.0	2.8	0.4	0.6
1994	1.2	8.3	7.5	9.2	5.6	2.0	0.8	0.9	1.8	1.2	0.8
1995	0.0	11.3	4.1	3.0	3.7	1.5	0.6	0.6	1.3	0.8	0.8
1996	13.6	13.2	11.9	1.3	0.7	1.3	0.9	0.4	0.3	0.4	2.8
1997	0.7	33.2	13.5	4.2	0.7	0.3	0.3	0.2	0.2	0.2	1.9
1998	0.3	11.4	27.3	7.0	3.1	0.3	0.2	0.2	0.1	0.0	1.0

United Kingdom (N.hr ⁻¹ /8m trawl) Western Channel (VIIf)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1989	0.0	0.8	2.2	10.6	7.5	1.4	0.2	0.3	0.2	0.1	0.3
1990	0.0	0.8	1.1	7.0	3.4	2.4	0.0	0.2	0.1	0.1	0.3
1991	0.0	0.6	0.8	1.4	2.7	2.1	1.6	0.7	0.1	0.0	0.3
1992	0.0	4.3	1.0	1.4	0.5	1.3	0.7	0.5	0.1	0.2	0.2
1993	0.0	0.7	2.4	3.3	1.1	0.5	1.2	0.7	0.6	0.0	0.1
1994	0.0	0.8	0.8	3.6	1.2	0.4	0.2	0.5	0.6	0.3	0.0
1995	0.3	2.1	1.7	1.9	2.1	0.5	0.2	0.3	0.2	0.1	0.2
1996	5.4	2.3	3.9	1.3	0.8	0.9	0.2	0.0	0.1	0.3	0.4
1997	10.4	8.1	4.8	8.1	0.9	0.3	0.6	0.3	0.1	0.0	0.4
1998	0.1	5.7	5.2	4.7	3.2	0.4	0.2	0.2	0.1	0.0	6.0

United Kingdom (N.hr ⁻¹ /8m trawl) Bristol Channel (VIIf&g)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	0.4	10.9	26.2	7.5	0.0	0.7	0.7	0.0	0.0	0.2	0.0
1989	0.5	15.1	26.5	7.4	2.1	0.8	0.0	0.1	0.0	0.0	0.0
1990	0.9	11.4	15.8	6.4	2.5	0.4	0.0	0.0	0.3	0.0	0.3
1991	0.1	43.2	1.8	3.6	1.4	0.5	0.3	0.0	0.3	0.0	0.0
1992	0.2	28.4	18.5	0.8	0.4	1.2	0.3	0.3	0.0	0.0	0.1
1993	0.1	3.9	13.1	2.9	0.7	0.3	0.8	0.2	0.0	0.0	0.0
1994	3.3	5.1	4.3	3.4	1.0	0.0	0.0	0.2	0.1	0.0	0.4
1995	0.1	7.5	7.0	3.0	0.4	0.5	0.3	0.0	0.0	0.1	0.2
1996	0.4	12.0	21.8	5.3	1.6	0.8	0.0	0.1	0.0	0.0	0.1
1997	0.3	11.6	12.3	9.6	6.7	0.2	2.0	0.0	0.1	0.0	0.6
1998	0.6	29.9	17.2	7.7	2.0	0.9	0.2	0.0	0.0	0.0	0.4

United Kingdom (N.hr ⁻¹ /8m trawl) Irish Sea (VIIa)											
Age	0	1	2	3	4	5	6	7	8	9	10+
1988	2.9	72.6	145.3	30.8	1.2	6.8	1.2	0.5	0.0	0.1	0.8
1989	5.9	41.3	67.6	64.8	11.3	1.4	3.4	0.3	0.0	0.0	0.1
1990	63.4	146.9	36.7	19.9	9.1	4.8	4.1	0.2	0.1	0.9	0.3
1991	6.7	60.4	59.8	8.1	4.4	0.1	0.9	1.8	0.1	0.0	0.4
1992	4.8	50.7	96.1	38.0	2.0	2.1	1.5	1.6	0.1	0.0	2.0
1993	9.3	168.5	155.4	38.7	13.0	2.0	1.9	1.0	0.4	0.4	0.6
1994	14.6	207.0	124.6	81.4	17.5	5.6	1.4	1.4	0.6	0.2	0.6
1995	17.8	249.7	101.0	38.8	32.2	2.9	1.5	0.6	0.4	0.4	0.3
1996	6.3	144.0	69.3	20.4	9.1	7.1	2.3	1.0	0.1	0.4	0.5
1997	33.3	169.2	98.1	41.4	13.5	7.4	6.1	2.7	0.9	0.5	0.9
1998	23.8	124.4	112.1	41.9	1.6	10.4	4.9	4.3	1.1	0.5	1.2

Table 2.5.1 Indices of juvenile sole and plaice abundance from other coastal beam trawl surveys. Abundance indices for sole and plaice are given as numbers per 1000 m2 sampled during the UKYFS (b) and as numbers per 100 fishing hours of the SNS (c), (see section 4 for details).

a)					b)					c)				
Year class	Sole		Plaice		Year class	Sole		Plaice		Year class	Sole			
	0-group	1-group	0-group	1-group		0-group	1-group	0-group	1-group		0-group	1-group	2-group	3-group
69			0.66		69					67				204
70	12.18		0.04	6.7	70					68			745	99
71	7.93	0.07	4.59	2.63	71					69		4938	1961	161
72	0.29	0.21	2.46	6.79	72					70	669	613	341	73
73	4.54	0.33	2.58	1.96	73	27.48		43.48		71	6327	1410	905	69
74	0.83	0.03	2.29	3.03	74		2.69	56.91	14.36	72	24	4686	397	174
75	8.08	0.19	2.17	4.03	75	42.79	7.08	21.06	4.76	73	847	1924	887	187
76	3.38	0.22	7.03	6.59	76	65.3	8.5	59.87	9.08	74	140	597	79	77
77	1.07	0.03	3.7	3	77	24.81	0.92	59.02	11.82	75	565	1413	762	267
78	4.36	0.11	8.18	7.91	78	33.58	0.79	31.14	9.75	76	475	3724	1379	325
79	20.65	2.05	17.07	10.53	79	46.97	8.61	17.67	6.6	77	1620	1552	388	99
80	19.83	0.51	5.02	6.92	80	117.89	8.12	21.35	5.89	78	10529	104	80	51
81	15.15	0.67	28.87	13.83	81	50.57	6.92	53.19	12.64	79	3908	4483	1411	231
82	17.61	1.11	24.01	7.82	82	62.73	4.78	16.74	7.08	80	5518	3739	1124	107
83	4.93	0.41	18	5.74	83	64	10.82	62.39	9.76	81	3194	5098	1137	307
84	9.17	0.1	10.72	4.65	84	86.91	4.23	70.63	19.14	82	2528	2640	1081	159
85	15.8	0.58	36.98	13.41	85	46.58	3.12	52.61	16.68	83	769	2359	709	67
86	3.5	0.24	17.69	9.98	86	27.03	2.29	39.96	7.22	84	3473	2151	456	59
87	28.55	0.76	23.38	4.97	87	38.22	9.4	33.9	7.98	85	4268	3791	955	284
88	2.07	0.28	15.5	6.31	88	60.72	4.05	48.67	13.88	86	901	1890	594	248
89	2.62	0.22	22.35	6.25	89	116.4	13.51	31.71	7.9	87	13690	11227	5369	907
90	2.6	0.03	22.02	6.88	90	49.7	30.46	34.37	12.04	88	523	3052	1078	527
91	19.37	0.54	24.47	5.88	91	53.55	5.93	17.8	7.47	89	2171	2900	2515	319
92	0.82	0.03	18.09	3.41	92	58.08	28	35.55	7.3	90	53	1265	114	46
93	0.76	0.03	12.31	0.87	93	50.8	8.97	49.5	9.19	91	3640	11081	3489	943
94	3.62	0.11	22.92	0.96	94	34.19	10.59	40.65	11.95	92	303	1351	475	126
95	0.47	0.07	6.94	6.17	95	31.37	5.77	49.84	4.98	93	231	559	234	27
96	2.32	0.47	24.68	8.11	96	58.46	17.24	62.84	10.62	94	5114	1501	473	231
97	2.69	0.42	8.17	1.67	97	23.10	2.95	16.57	1.49	95	1365	691	143	131
98	1.53		4.3		98	37.97		42.84		96	2197	10132	1993	
										97	972	2875		
										98	235			

Table 2.6.1

Variables in fish length frequency file

variable	type	label	format
STATION	Char	Station number	
COUNTRY	Char	Country	
YEAR	Num	Year	19**
SPECIES	Char	3 letter NODC code	see Table 2.2.1
SEX	Char	sex	M, F, U,
CTCHNOHR	Num	Catch number / hour / 8m beam	
CTCHWTHR	Num	Catch weight / hour / 8m beam	kg
LENGRP	Num	Length group	cm
LENNOHR	Num	Number at length / hour / 8m beam	
SHIP	Char	Ship	
RECTAN	Char	ICES square	
PRIMSTN	Char	Primary station	English data only

Table 2.6.2 Variables in trawl station details file

variable	type	label	format
STATION	Char	Station number	
COUNTRY	Char	Country	
YEAR	Num	Year	19**
QUARTER	Num	Quarter	
MONTH	Num	Month	
DAY	Num	Day	
TIME	Num	Shot time	for example "1035"
SHIP	Char	Ship	
GEAR	Char	Gear type	see Table 2.1
PRIMSTN	Char	Primary station	English data only
HALDUR	Num	Haul duration	in minutes
HALLAT	Num	Haul Latitude	Decimal
HALLON	Num	Haul Longitude	Decimal
SHTLAT	Num	Shot Latitude	Decimal
SHTLON	Num	Shot Longitude	Decimal
DISTANCE	Num	length of haul	metres
DAYNIGHT	Char	Day / night	D, N
DIVISION	Char	ICES Division	
RECTAN	Char	ICES square	
SHTDEP	Num	Shot depth	metres
SFSALN	Num	Surface salinity	ppt
SFTEMP	Num	Surface temperature	deg C
WIND	Char	Wind direction & speed (Beaufort scale)	for example "SW10"
VHAULS	Char	valid haul	V, P, I

Figure 2.1 Total number of beam trawl hauls per rectangle.
Total hauls in 1998 (above) and total for 1990–98 (below).

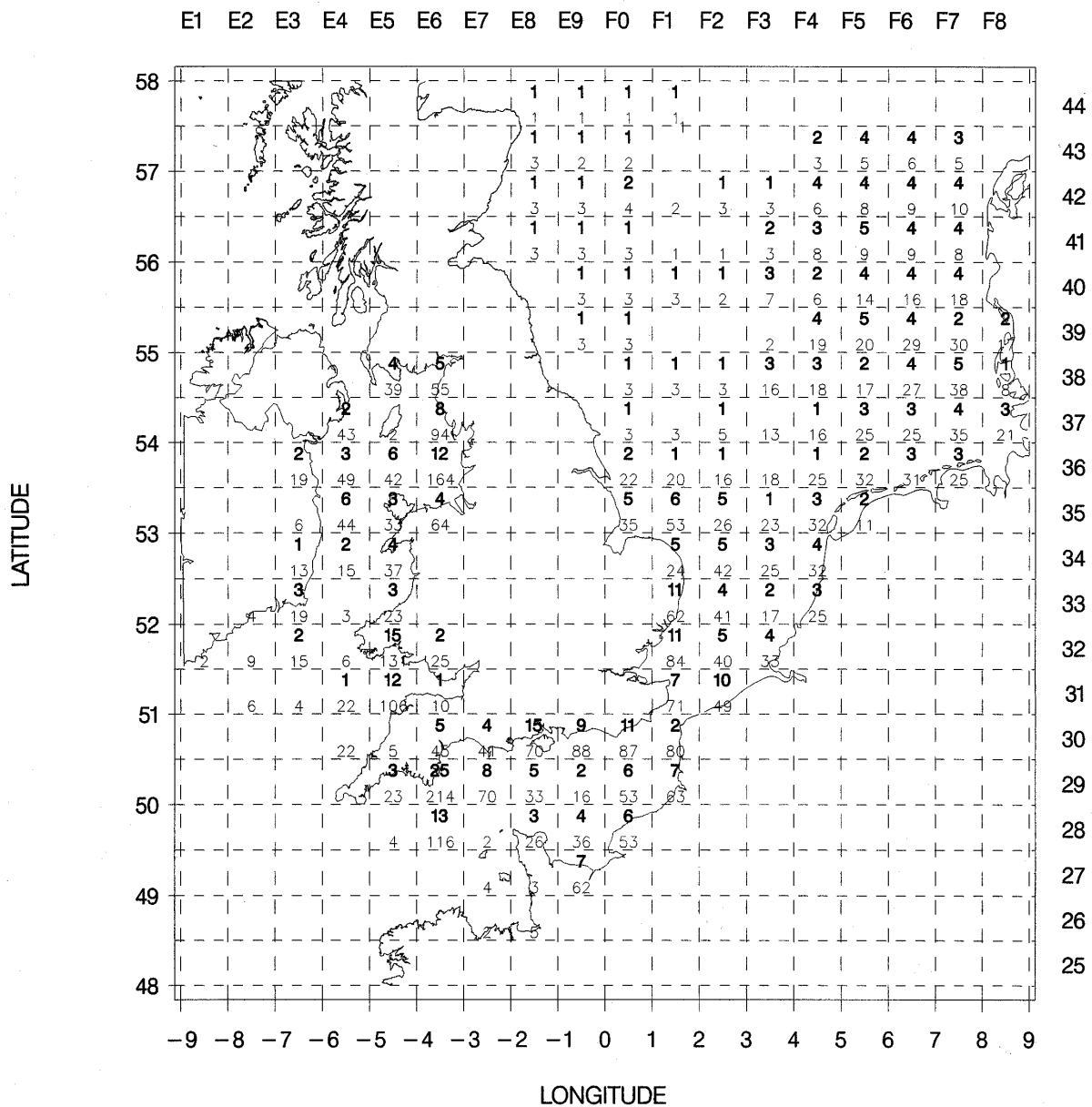
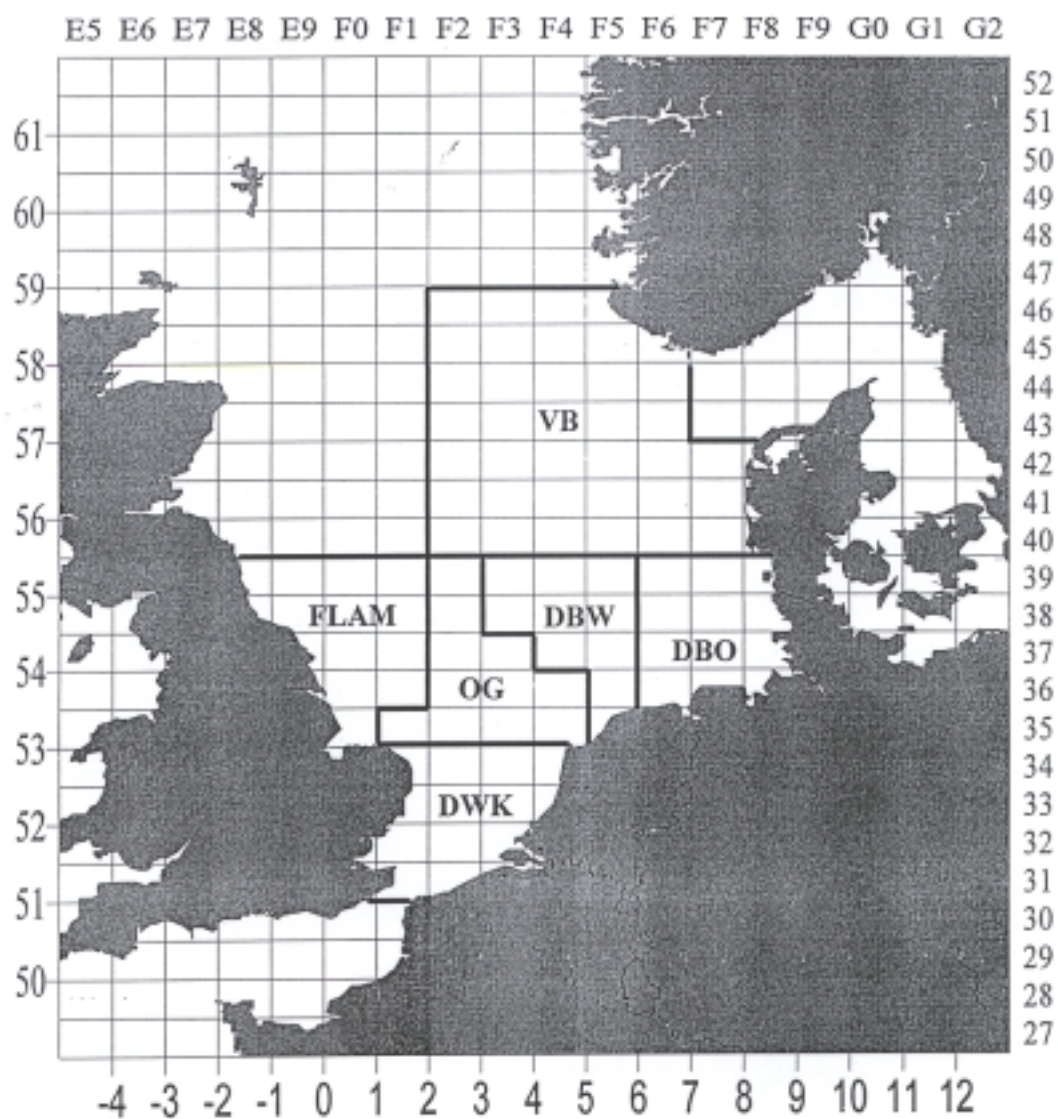


Fig. 2.2: Otolith sampling areas



Sub-area codes

Beam trawl survey sub-areas: 1995

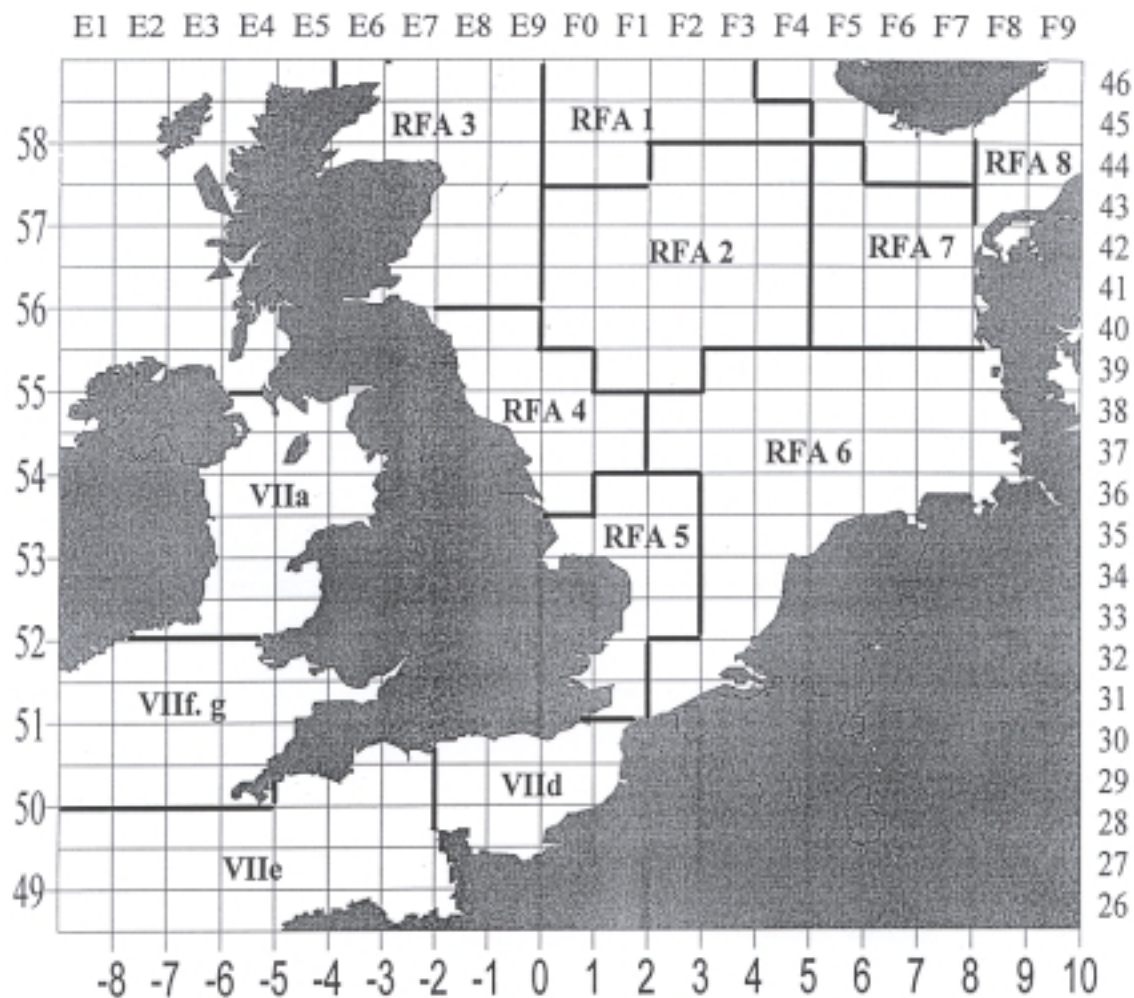


Fig. 2.3: Sub-areas for beam trawl surveys. Area classification is according to Roundfish areas for North Sea and Management areas (ICES Divisions) for other areas.

Figure 2.3.1 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)
 DAB

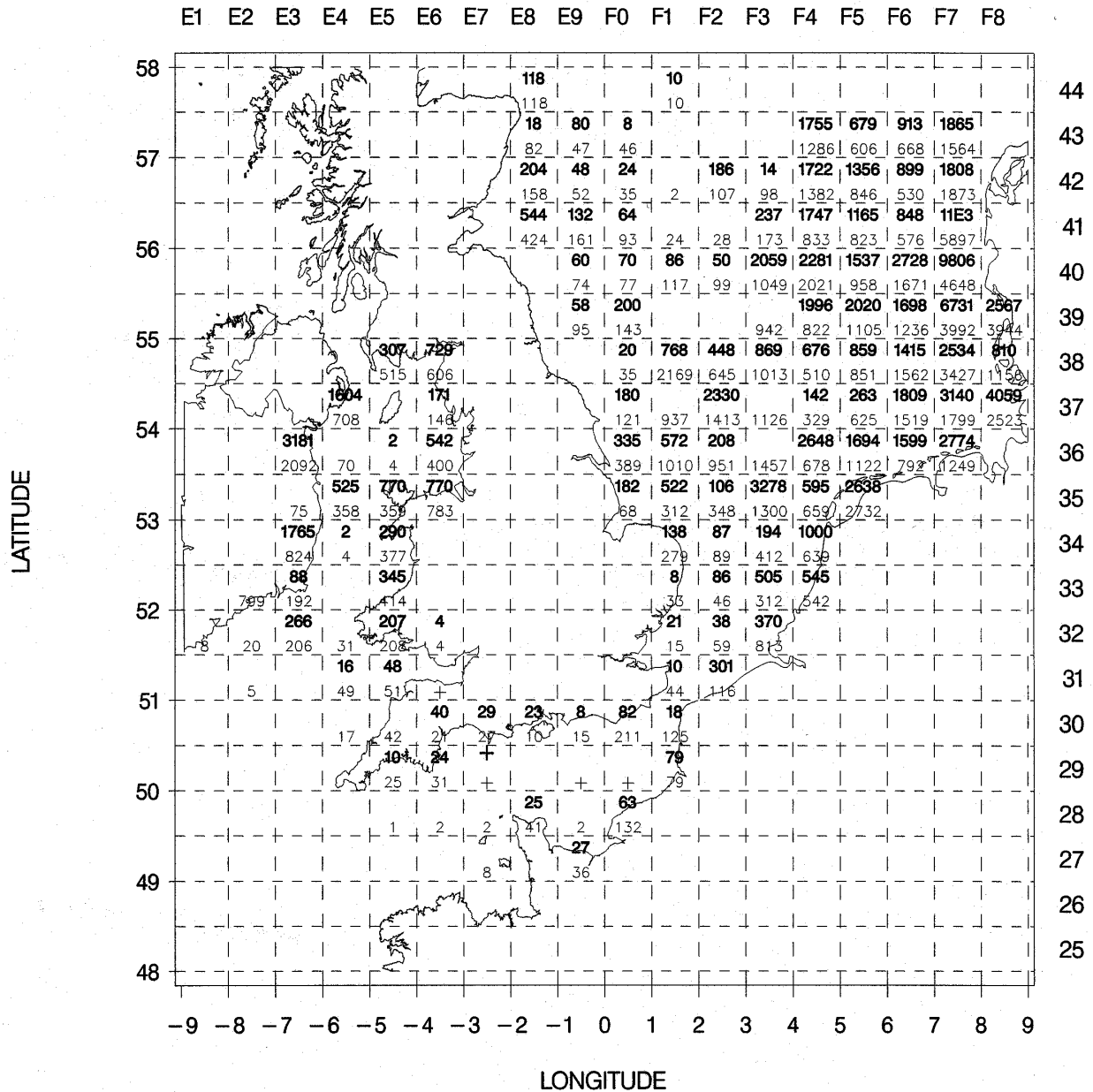


Figure 2.3.2 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)

SOLE

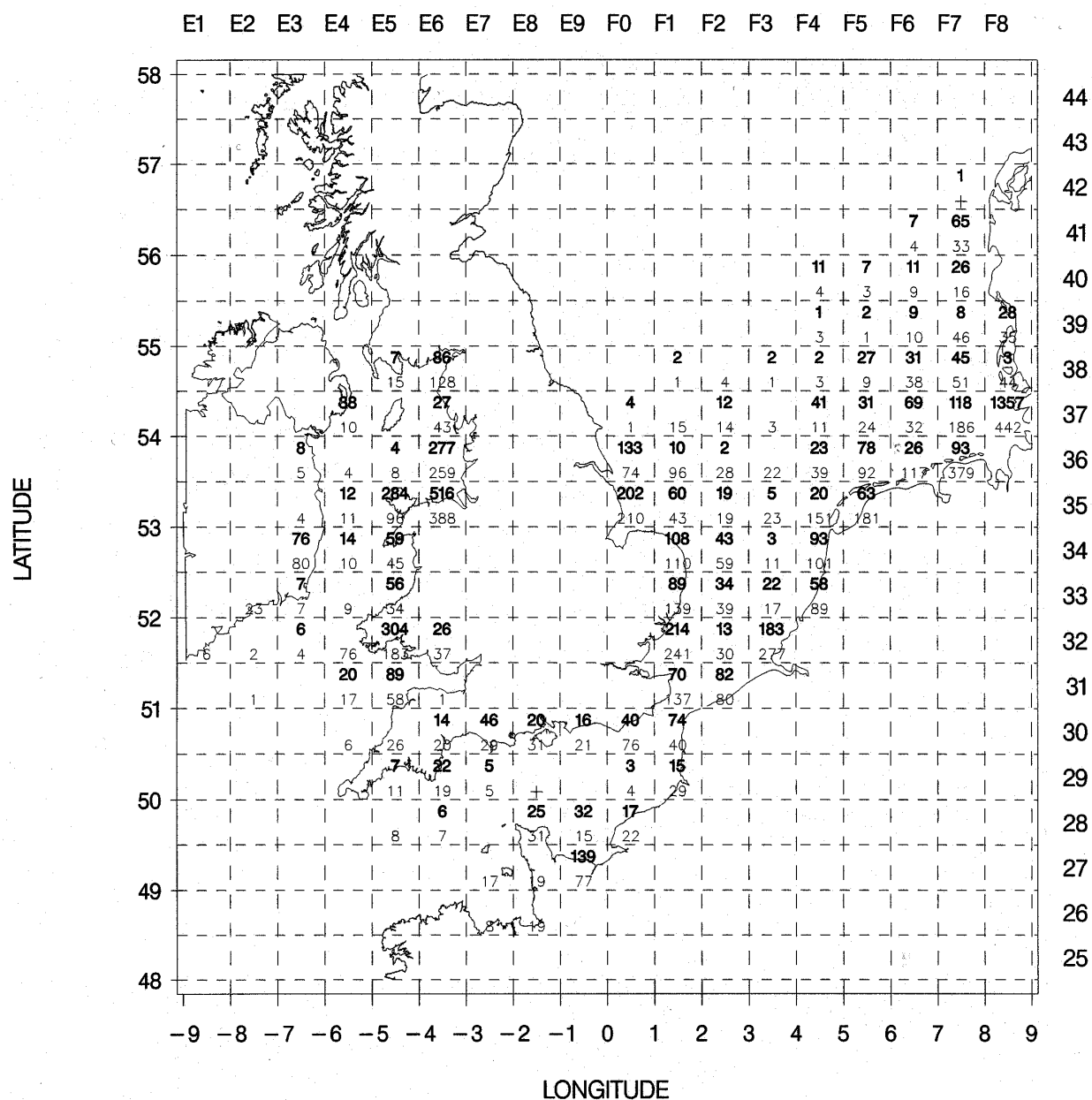


Figure 2.3.3 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)

PLAICE

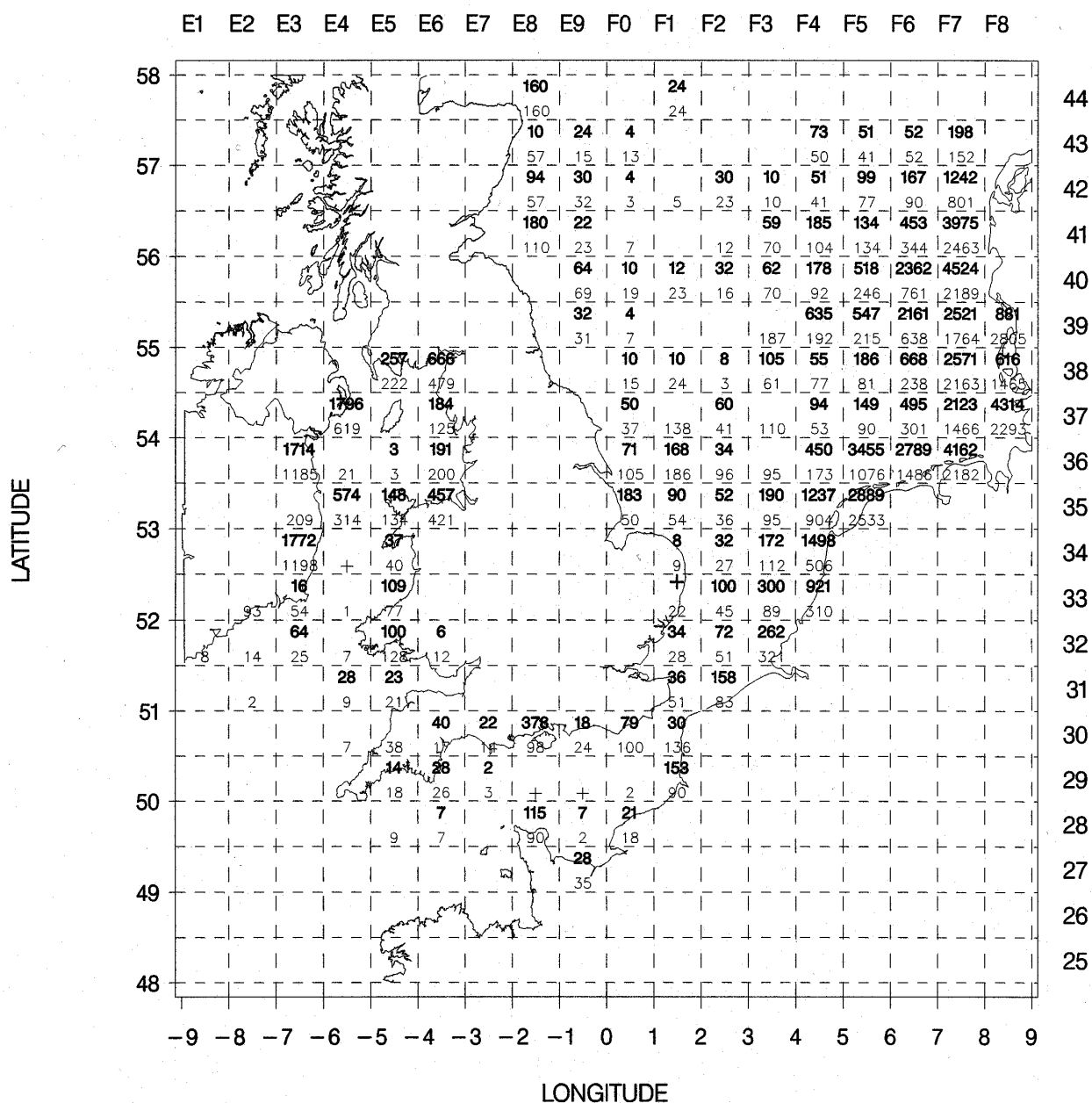


Figure 2.3.4 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)
TURBOT

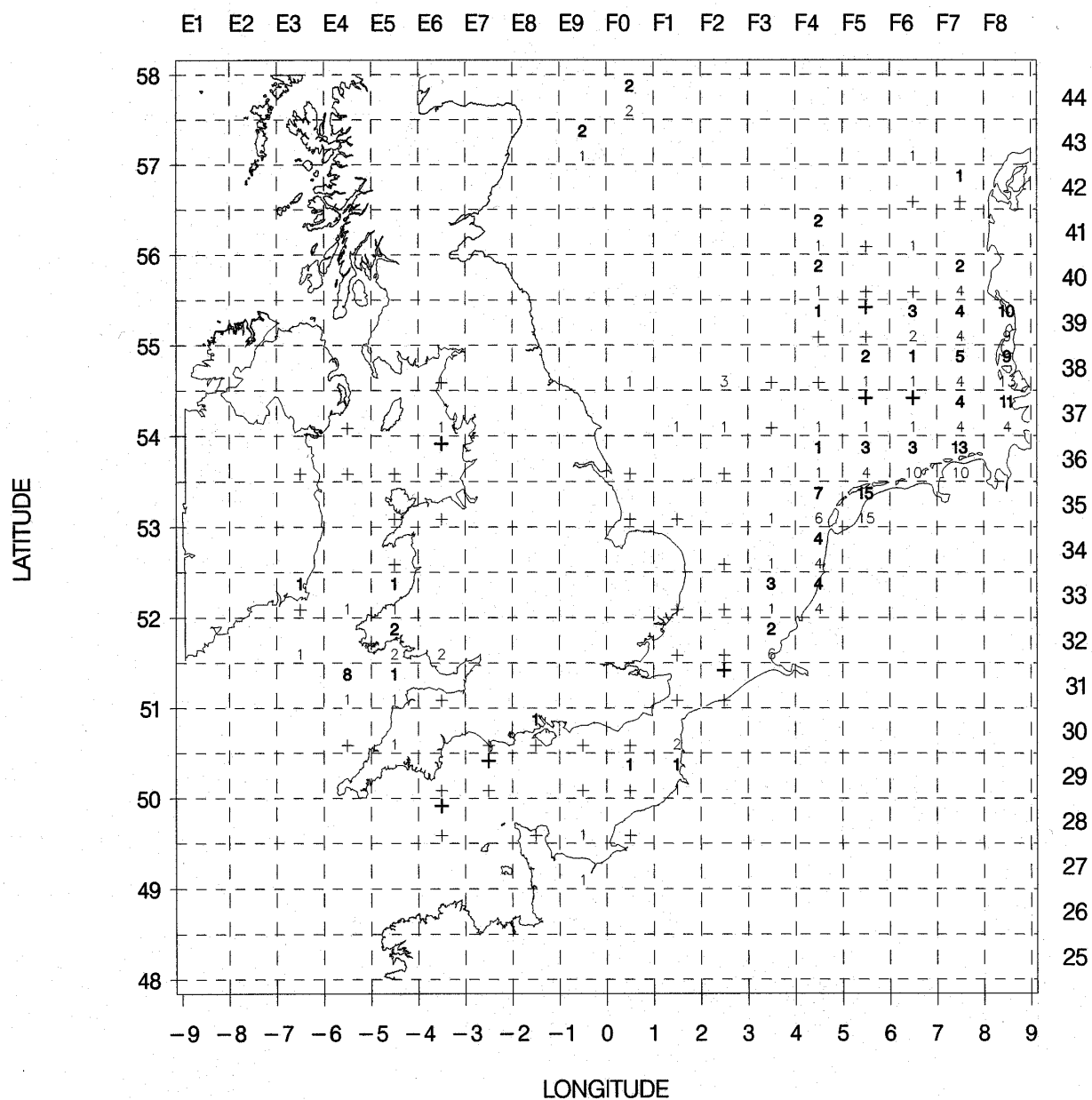


Figure 2.3.5 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)

BRILL

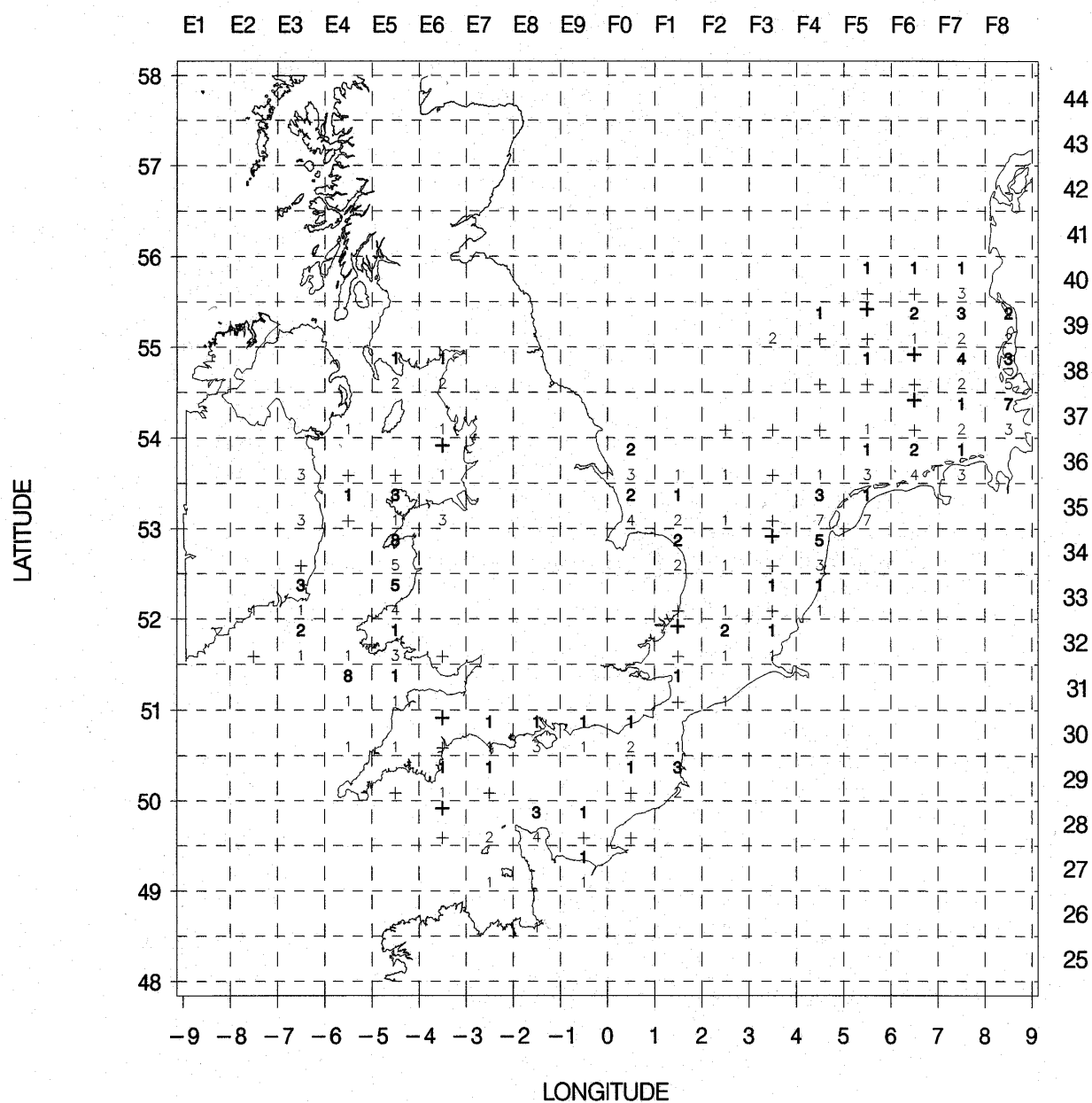
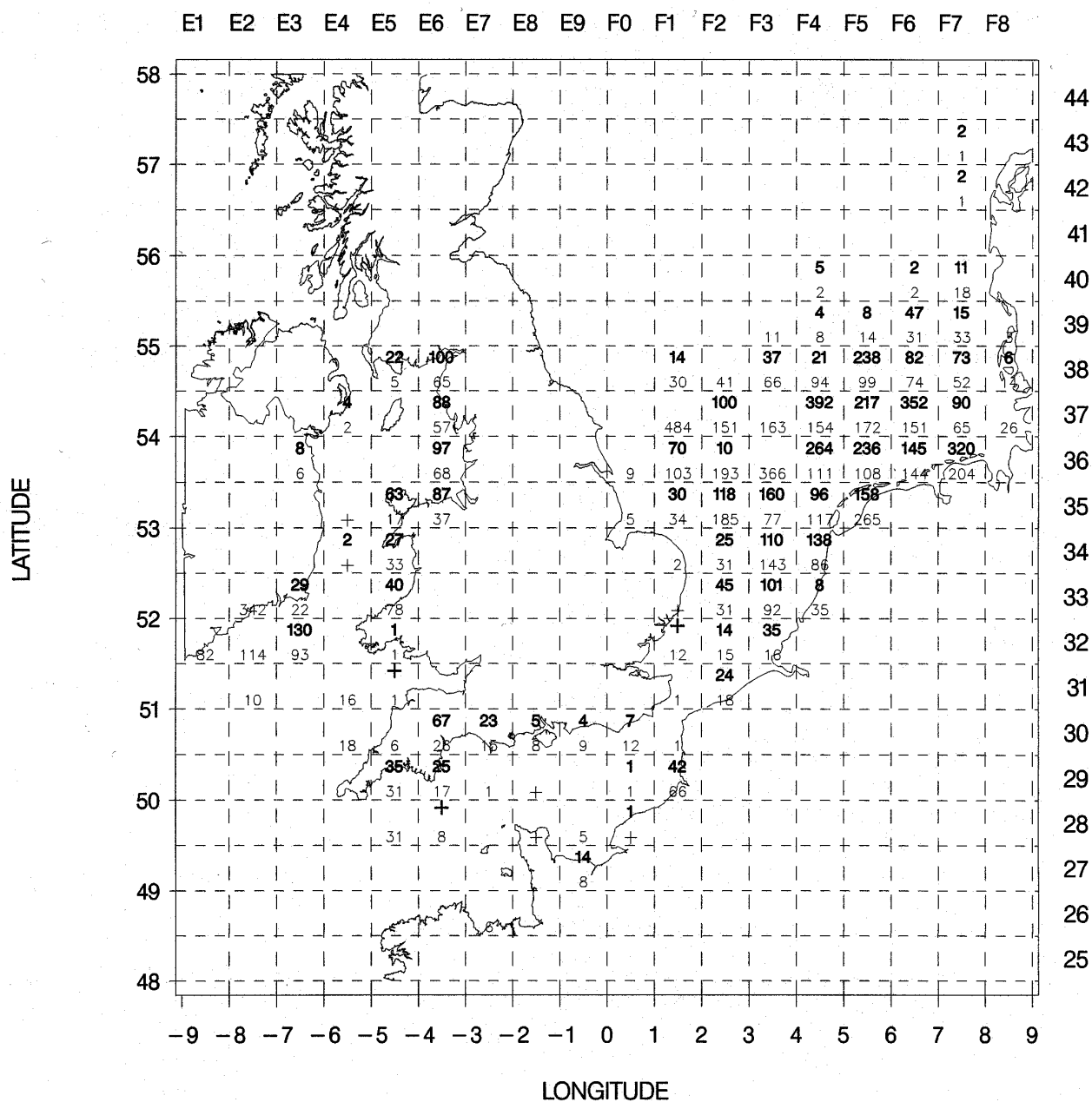


Figure 2.3.6 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)
 SCALDFISH



Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

LEMON SOLE

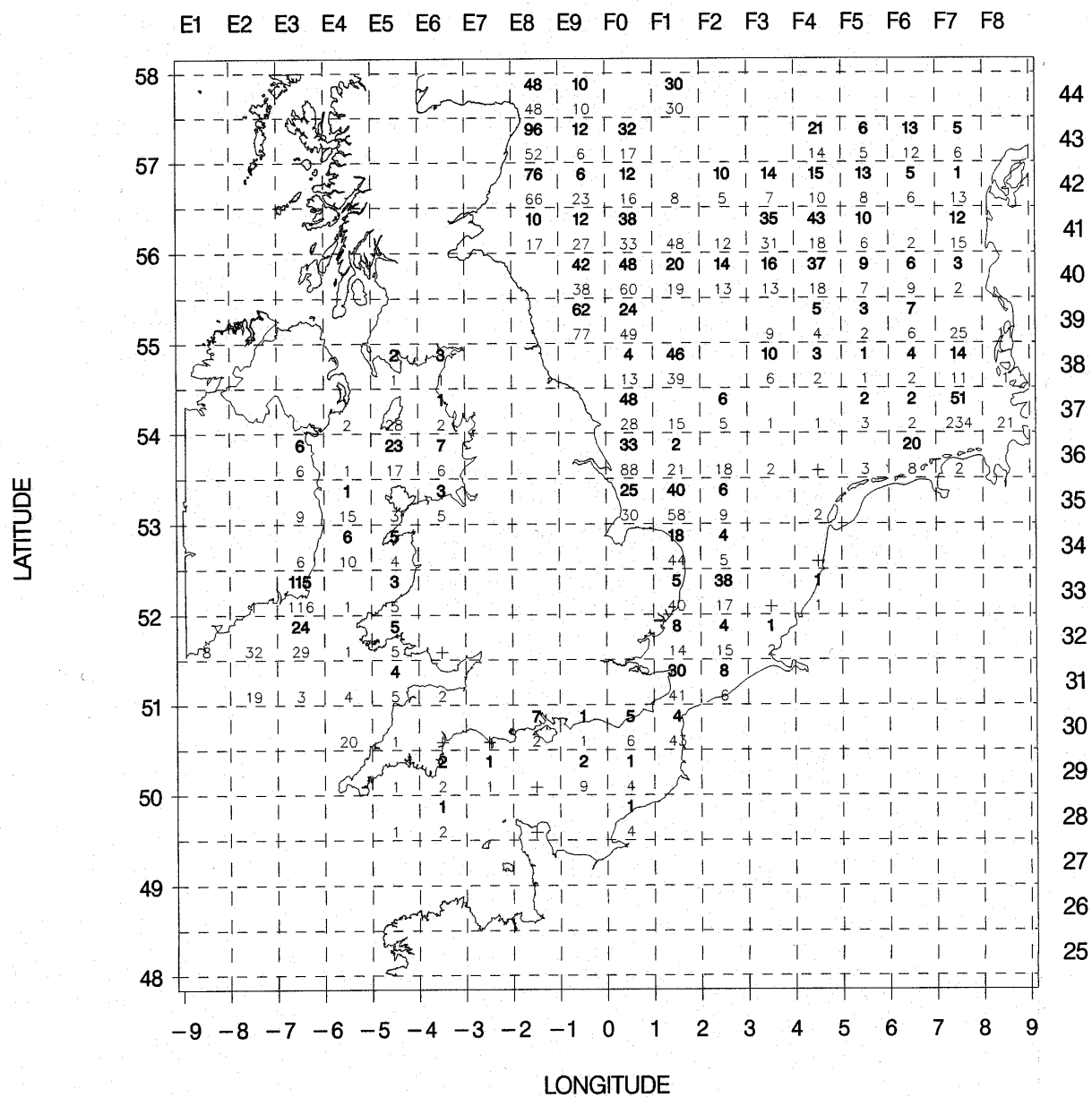


Figure 2.3.8 International Beam Trawl Surveys 1990–98
 Catches in number / 8m beam / hour / rectangle
 1998 data in bold, above the survey mean ('+' = < 0.5)
 AMERICAN PLAICE (LONG ROUGH DAB)

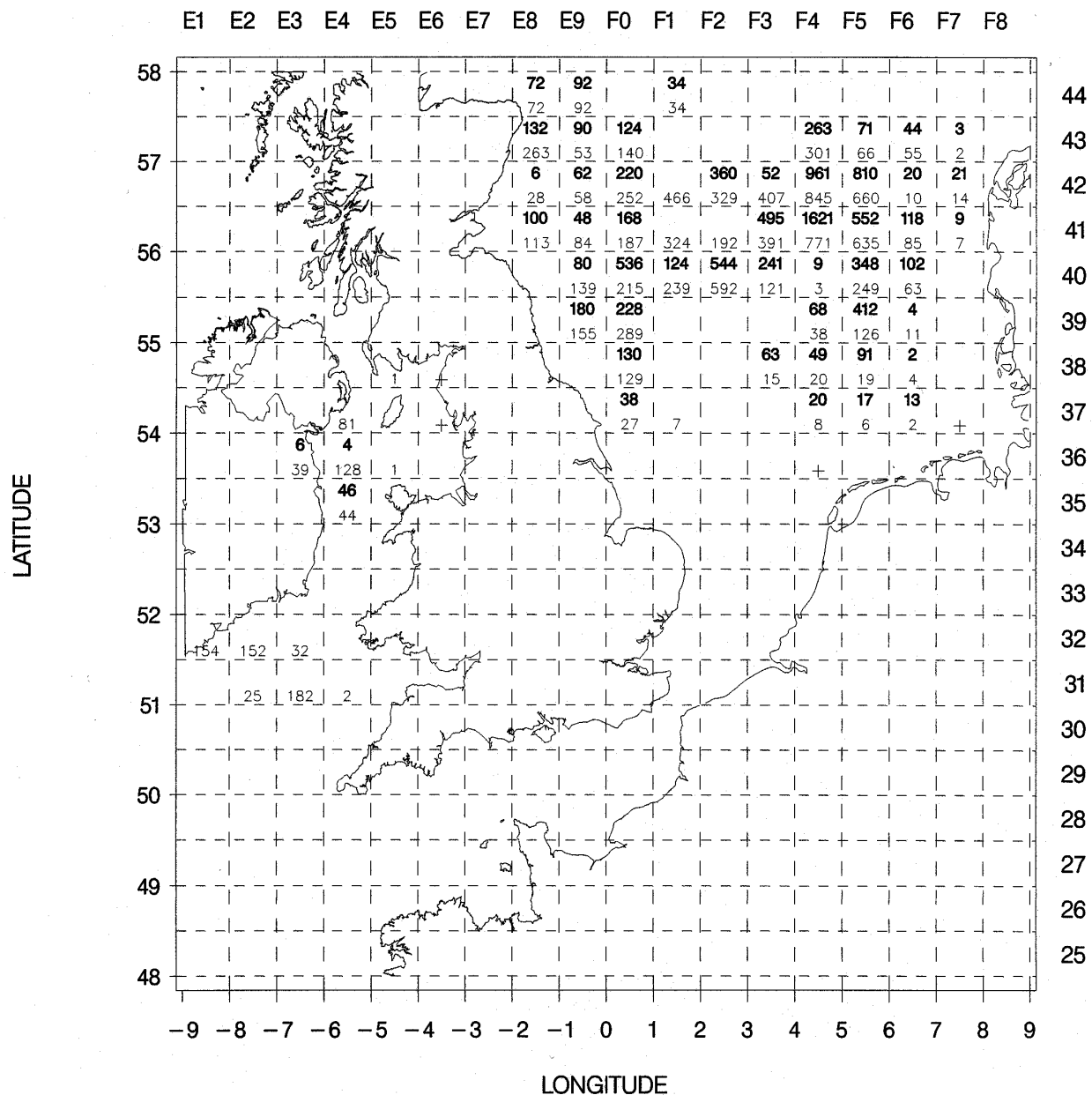
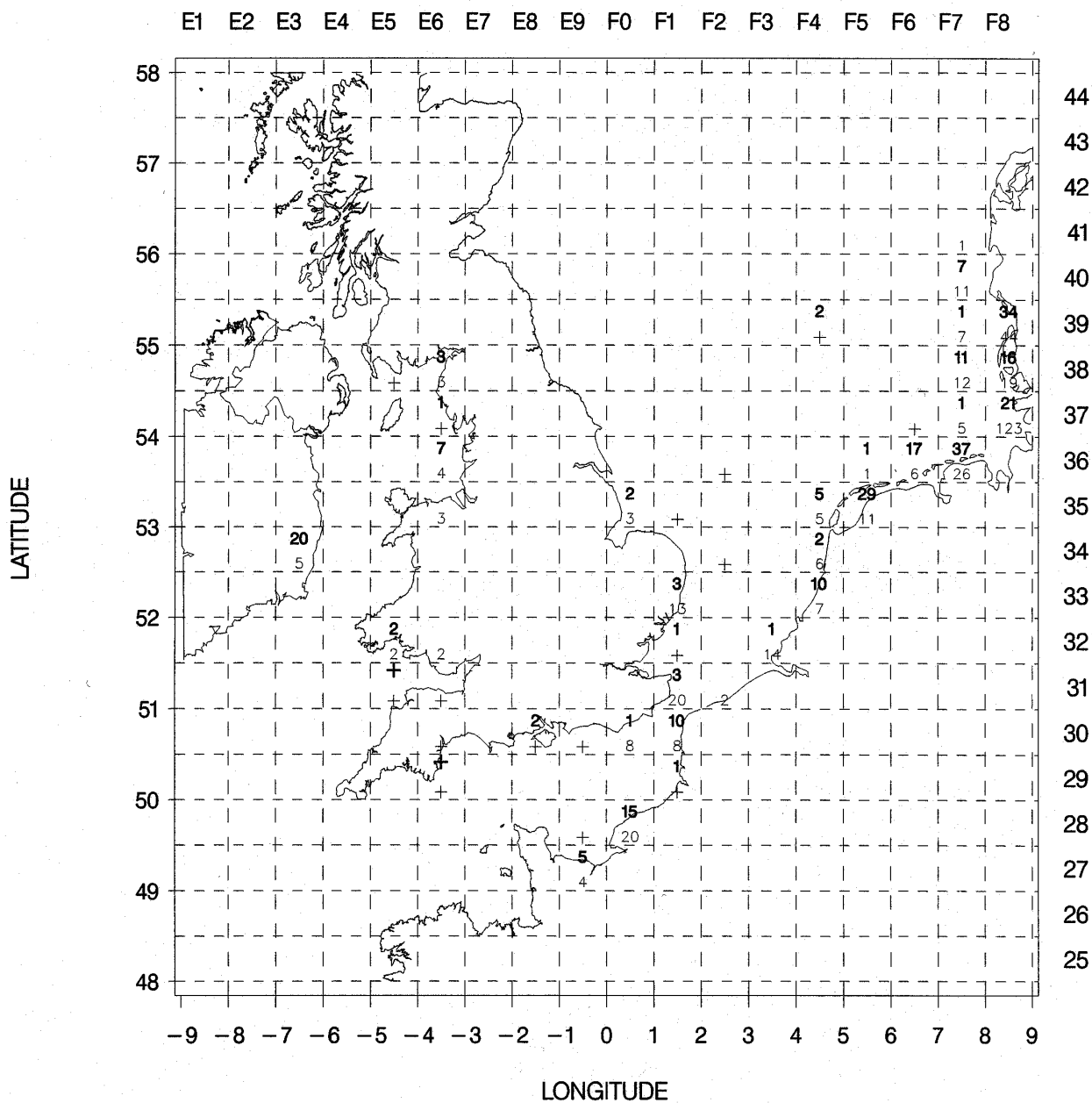


Figure 2.3.9 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

FLOUNDER



Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

LATITUDE

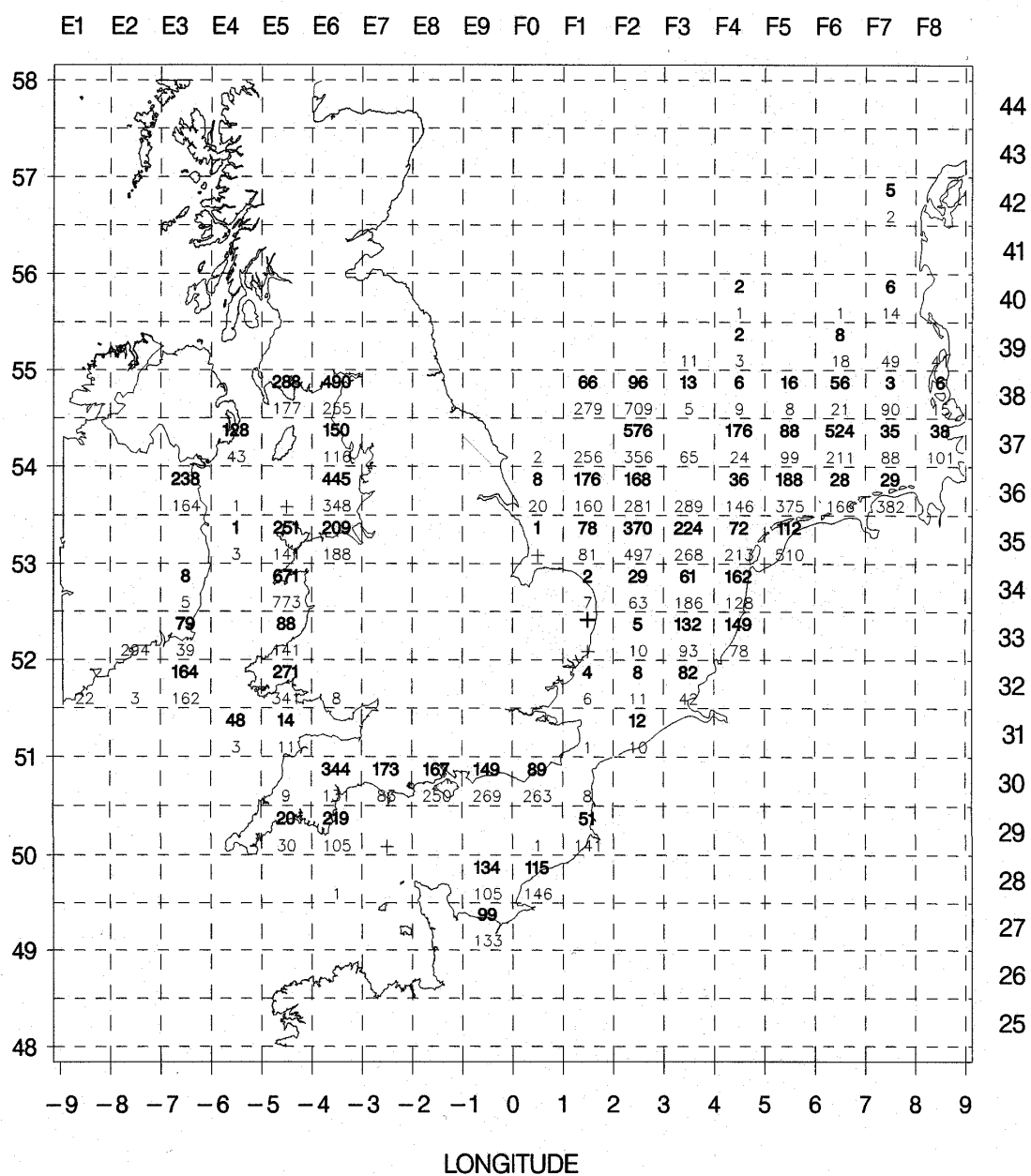


Figure 2.3.11 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

THICKBACK SOLE

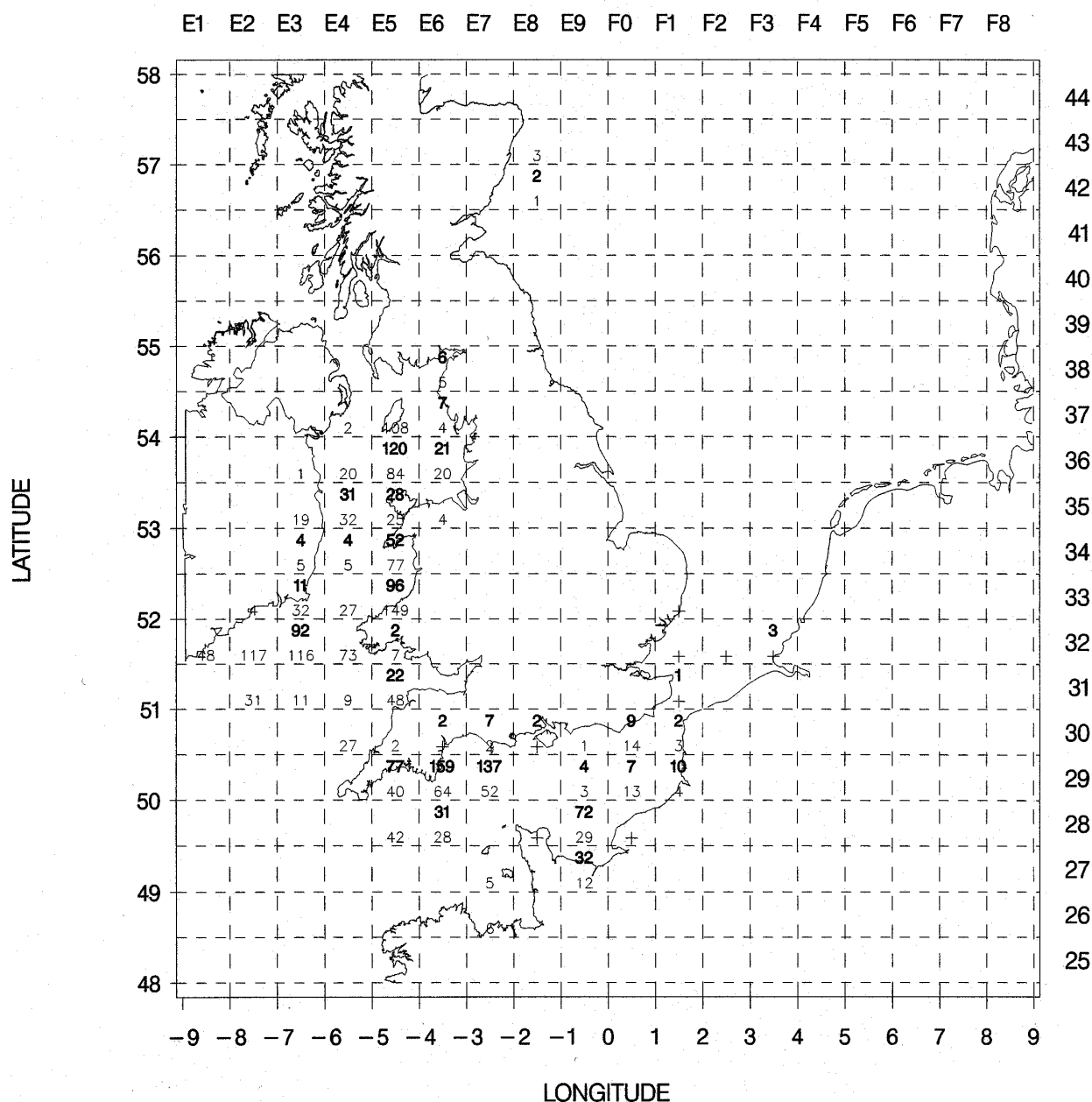


Figure 2.3.12 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

POGGE (ARMOURED BULLHEAD)

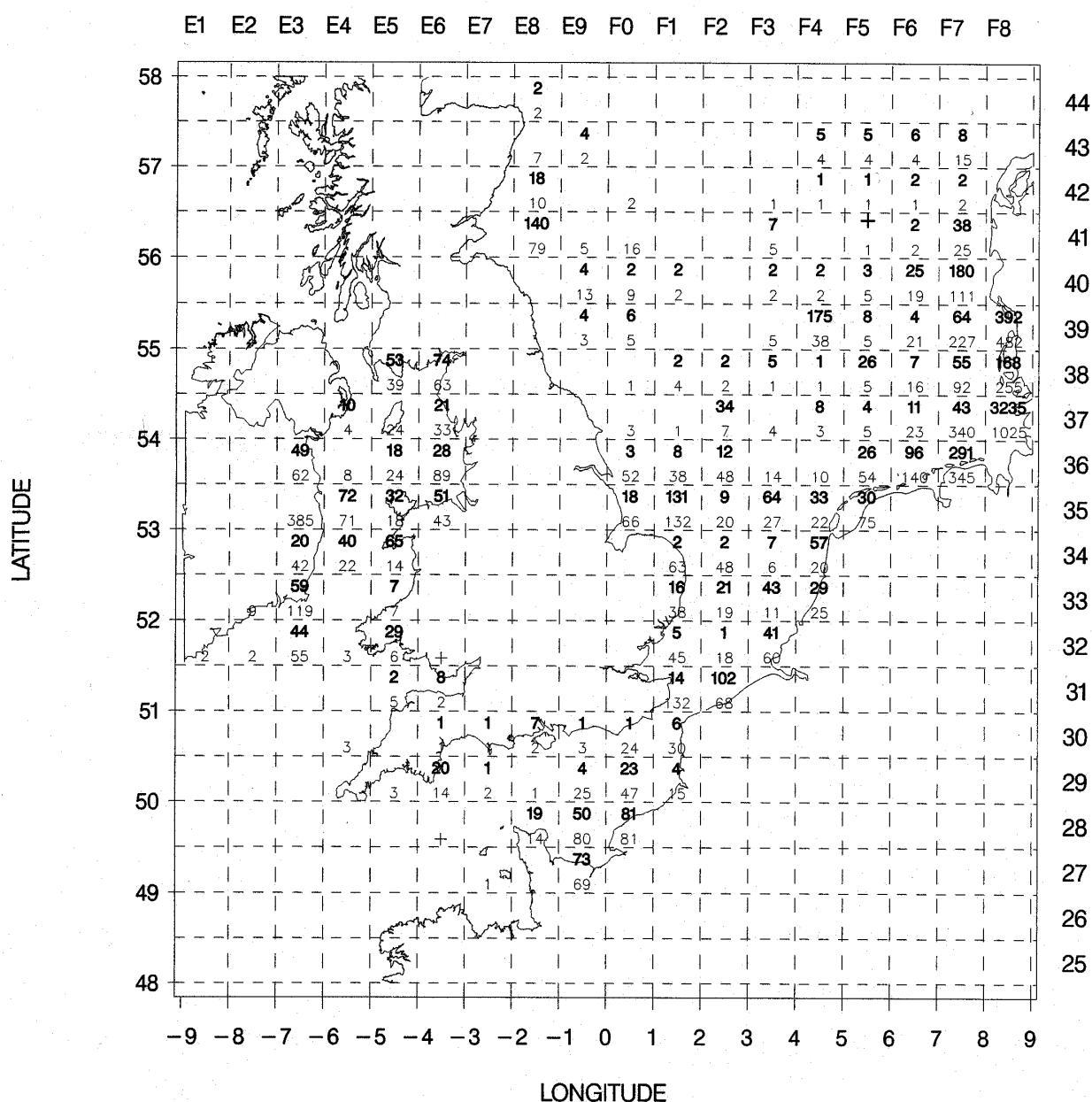


Figure 2.3.13 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

TUB GURNARD

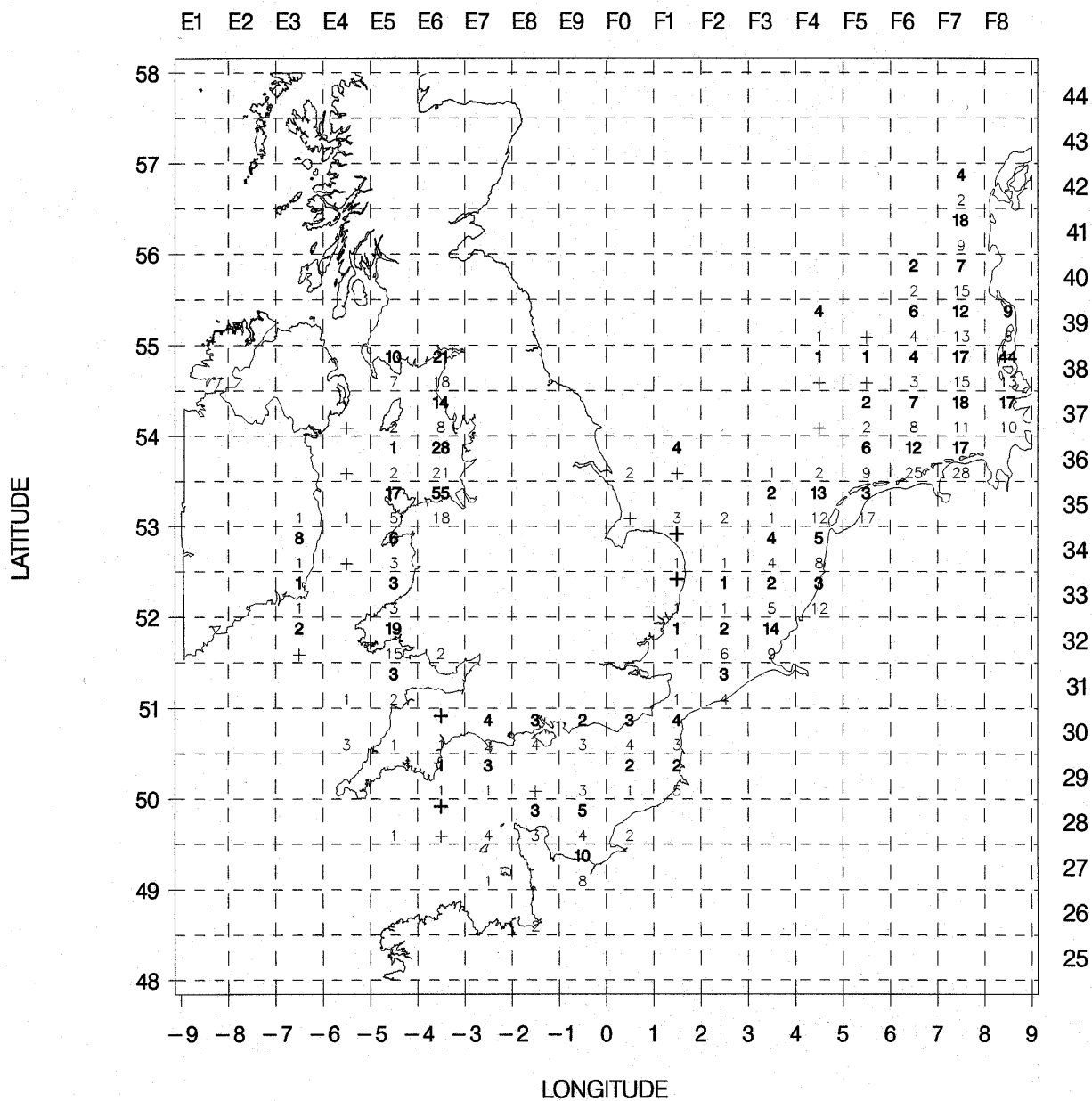


Figure 2.3.14 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

GREY GURNARD

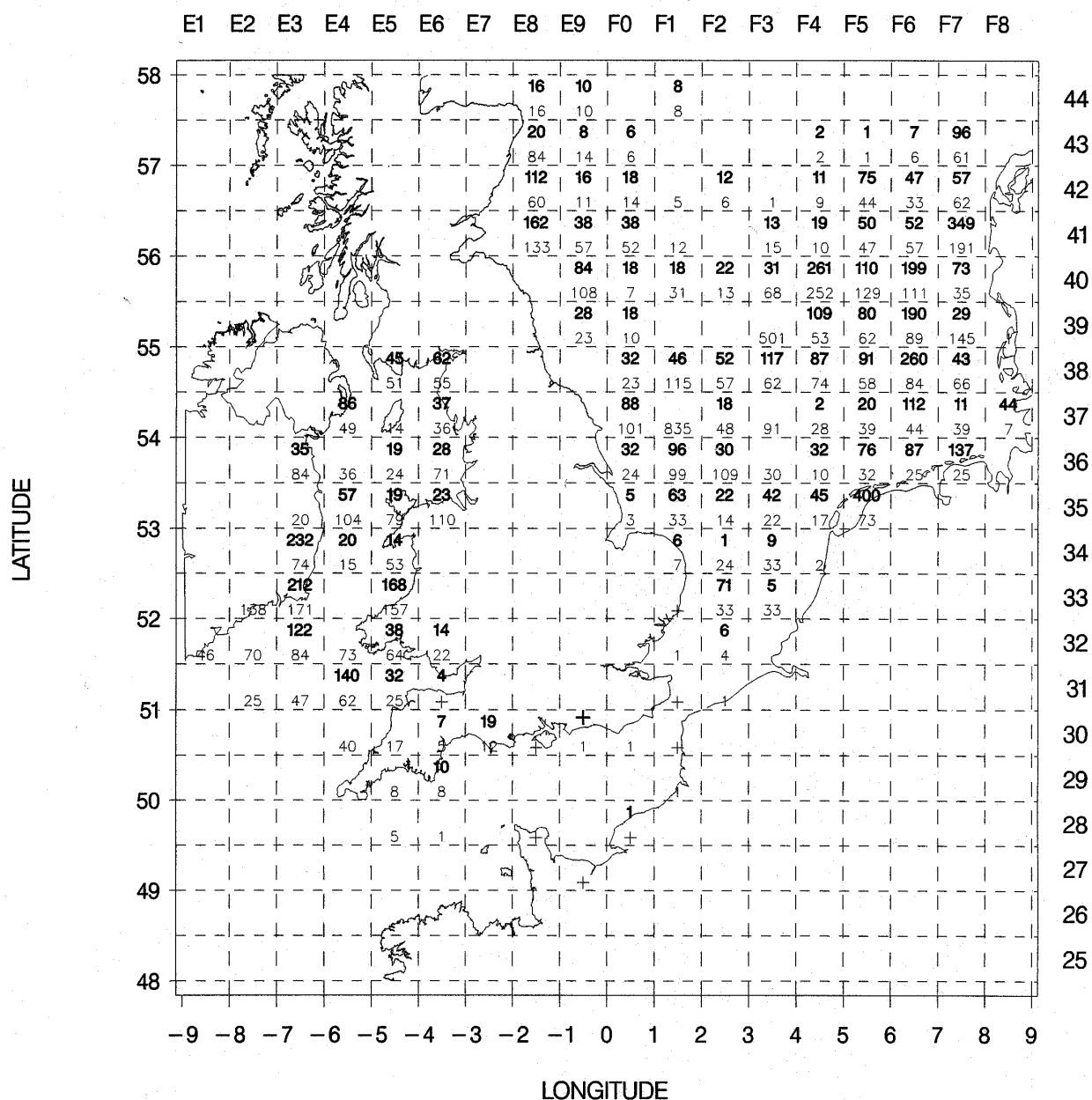


Figure 2.3.15 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

LESSER WEEVER

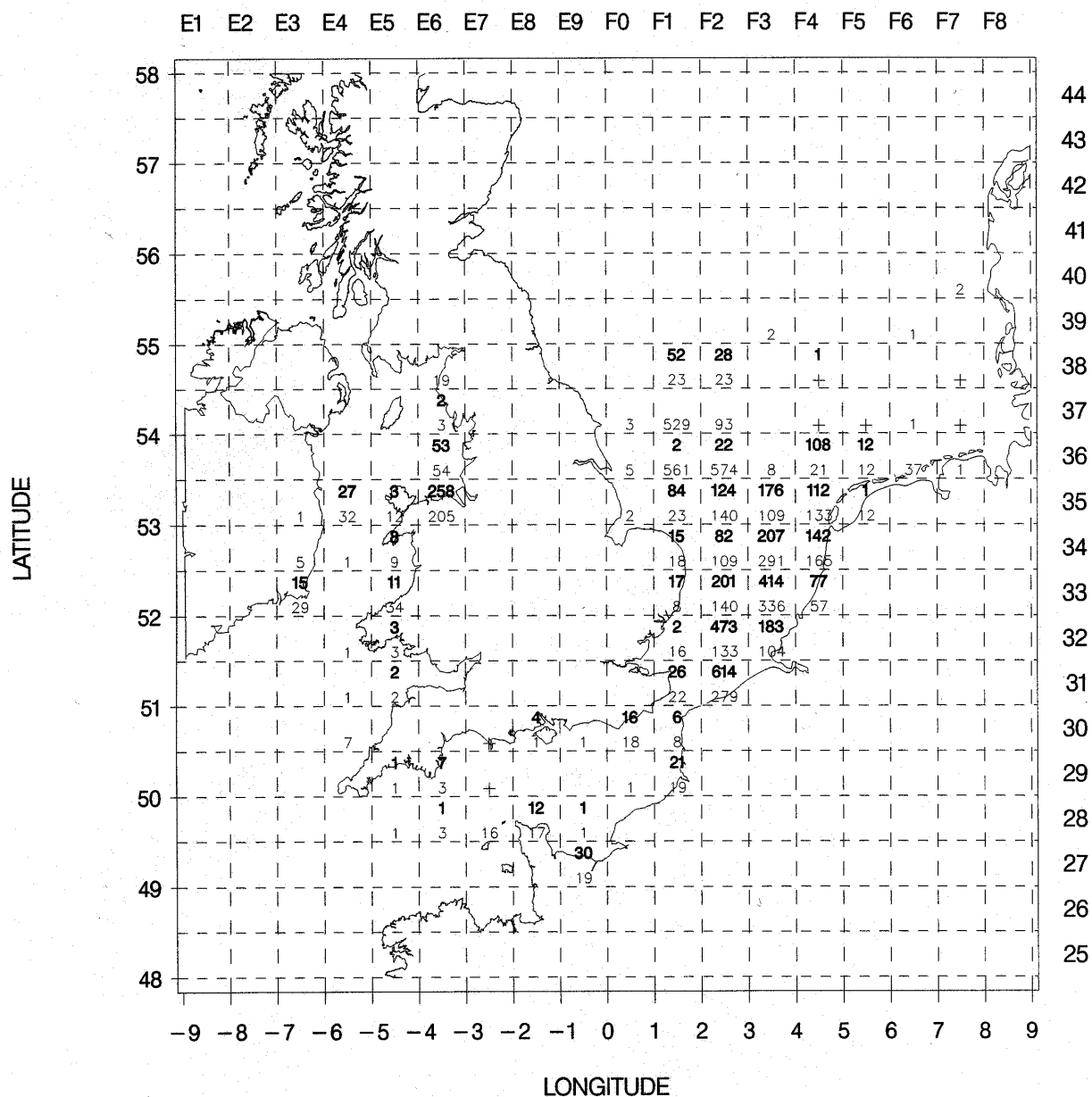


Figure 2.3.16 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

COMMON DRAGONET

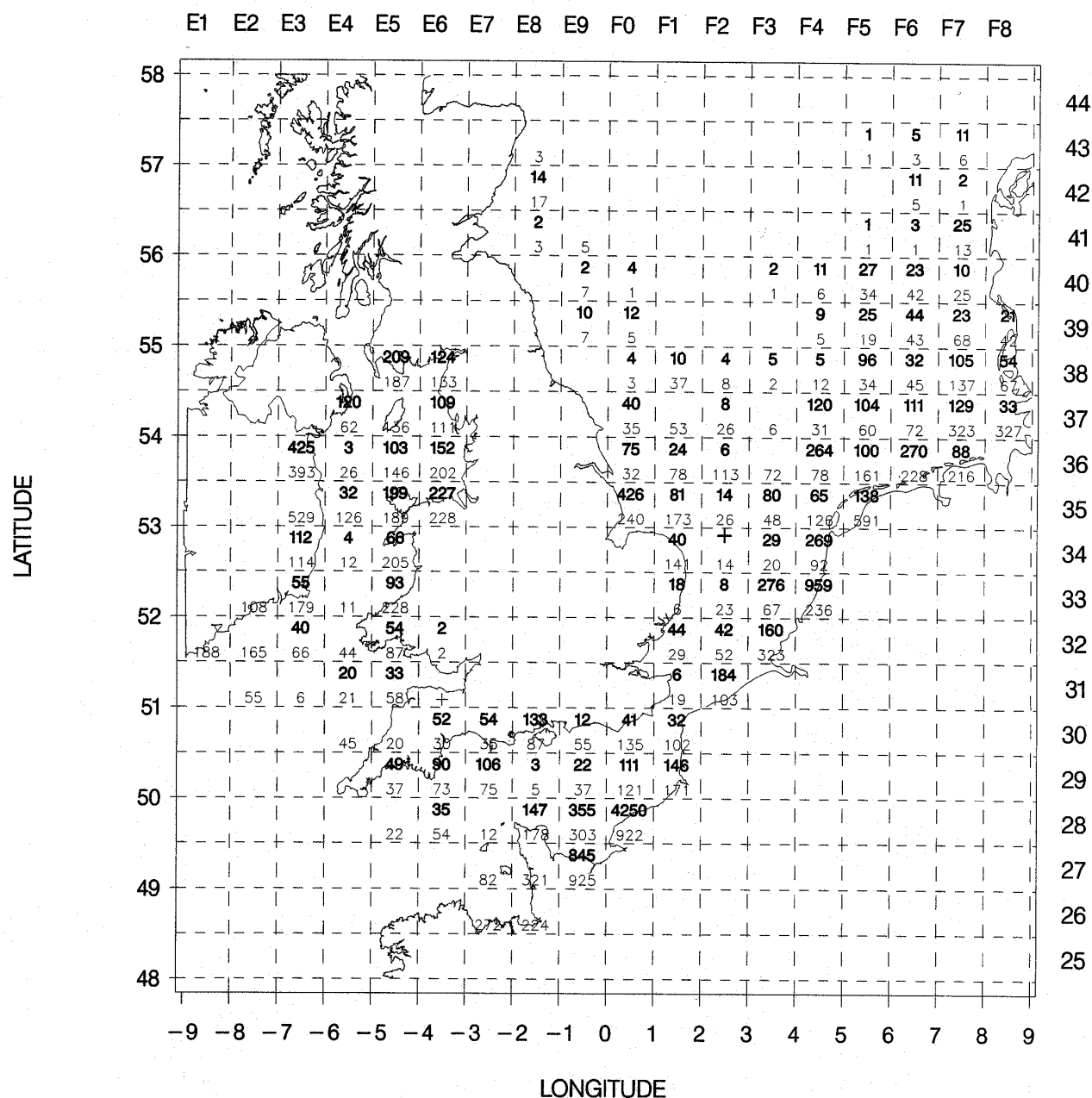


Figure 2.3.17 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

LESSER SPOTTED DOGFISH

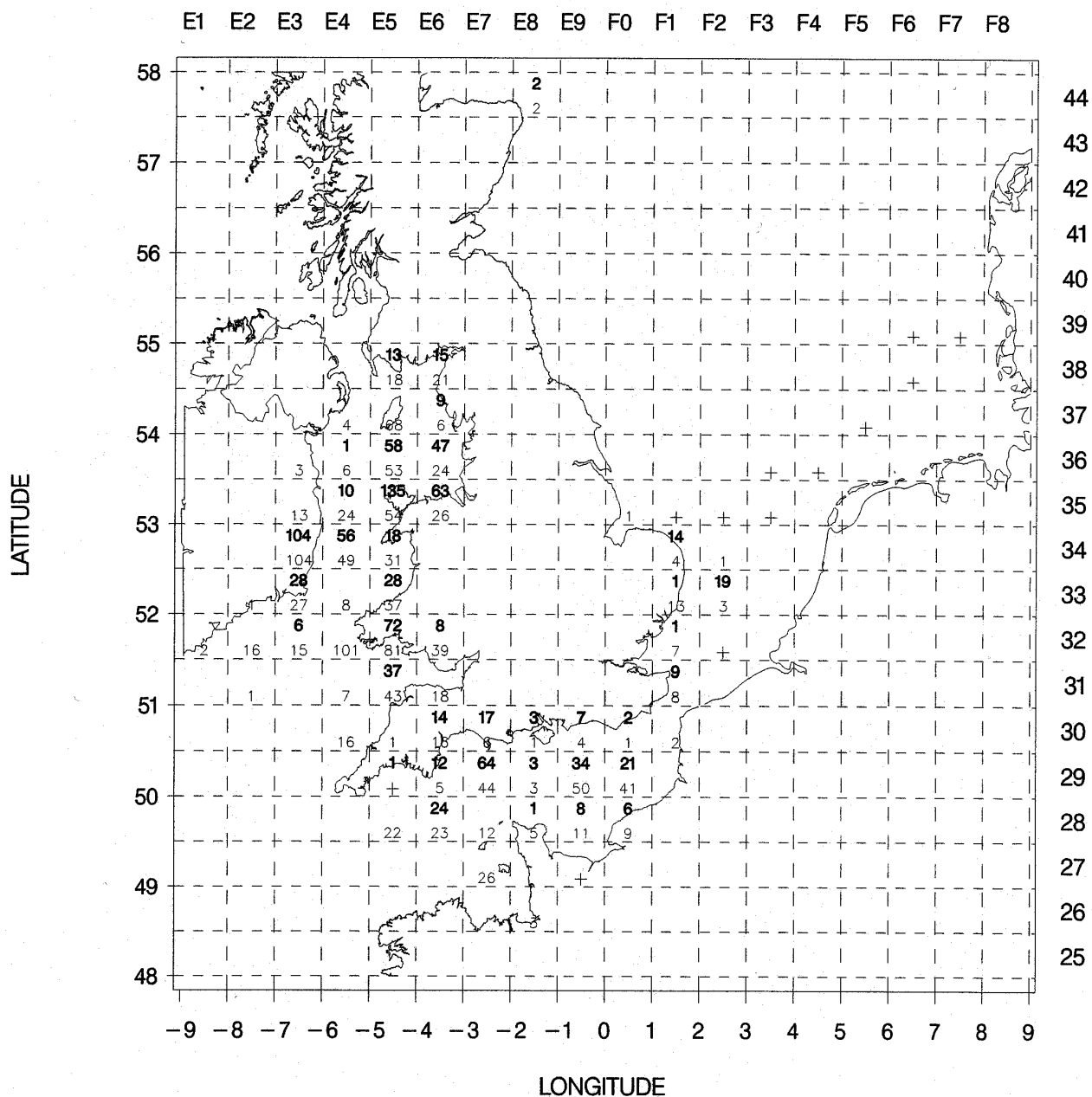


Figure 2.3.18 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

WAYS

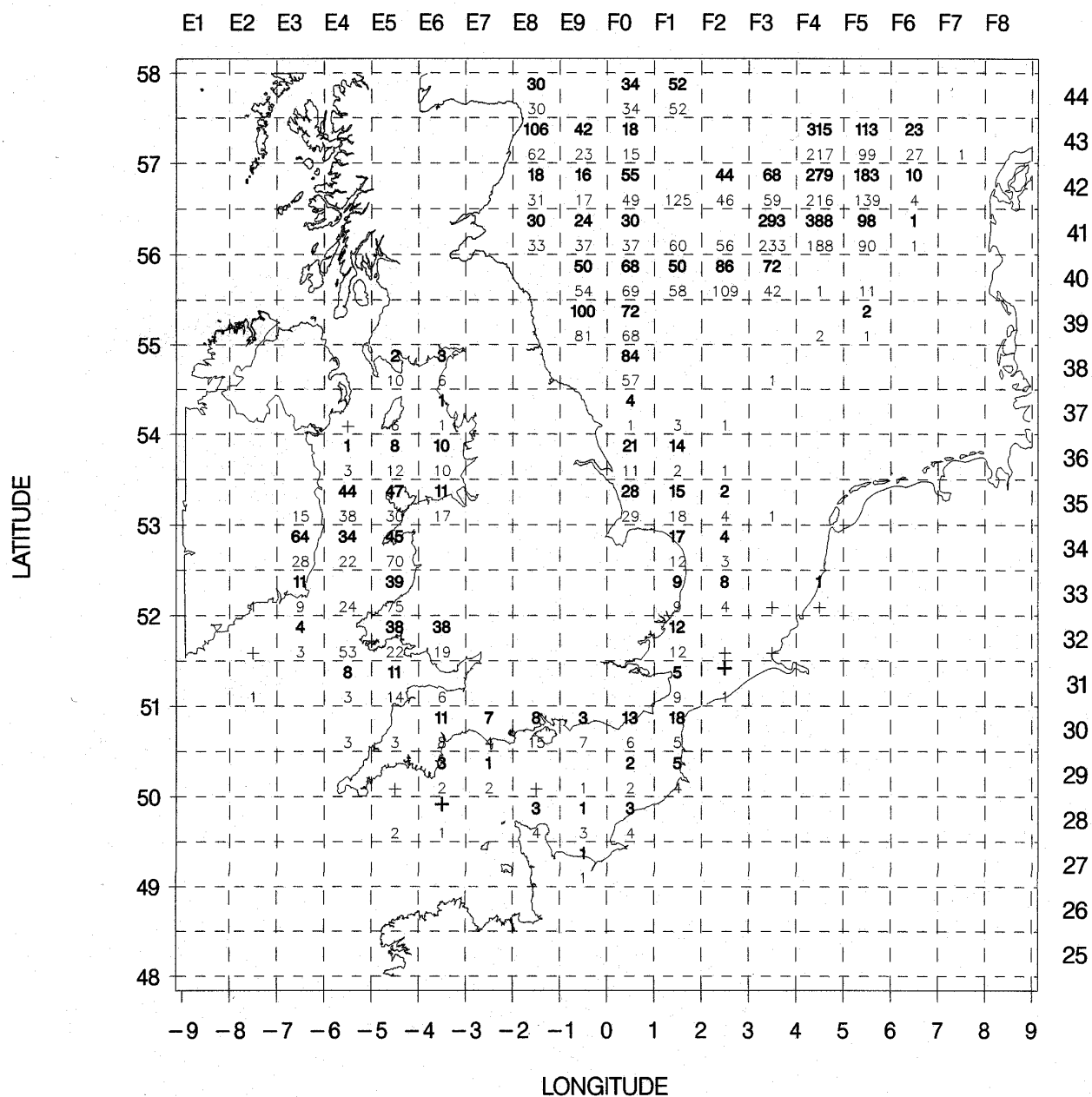


Figure 2.3.19 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

COD

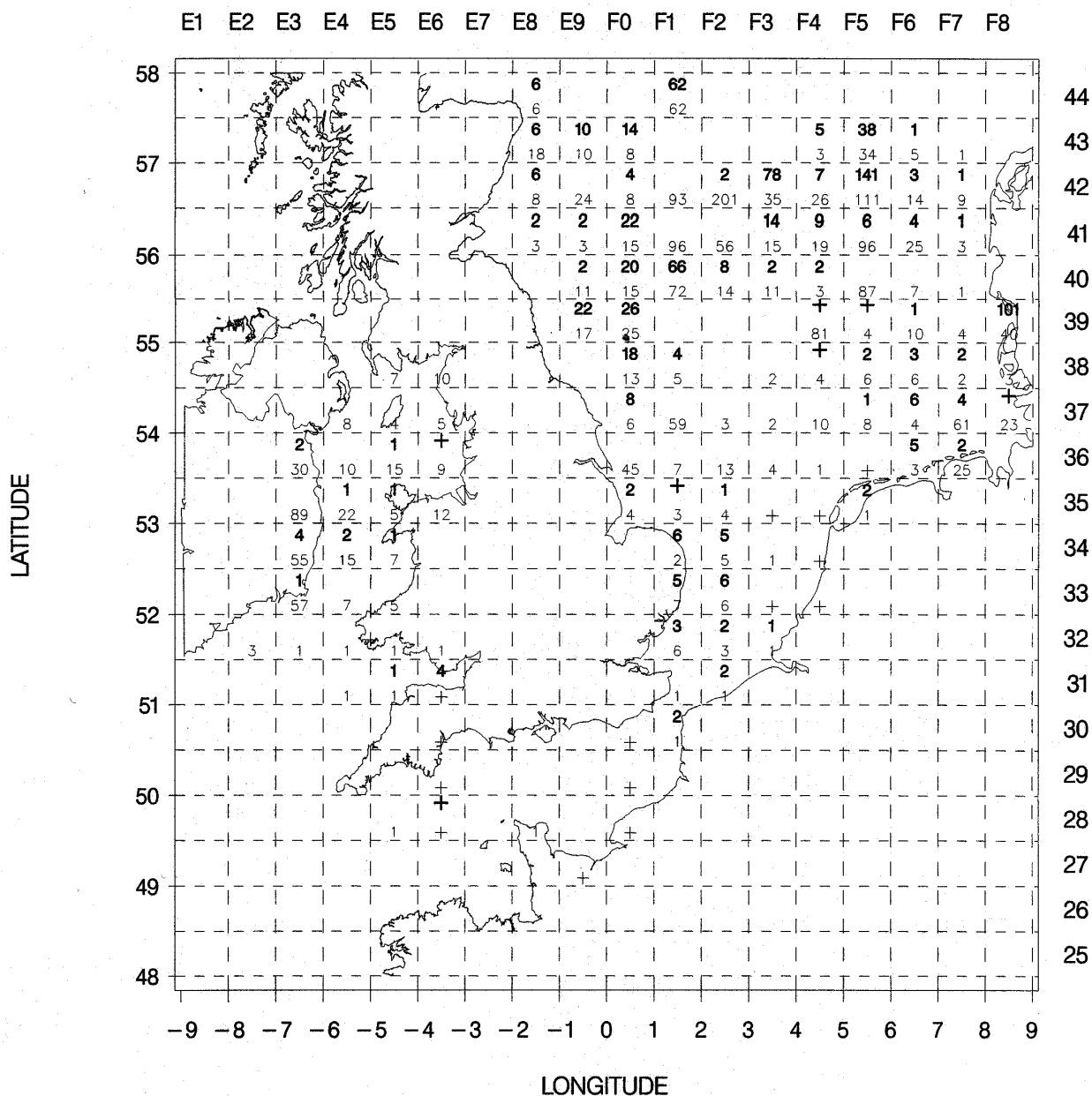


Figure 2.3.20 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

POOR COD

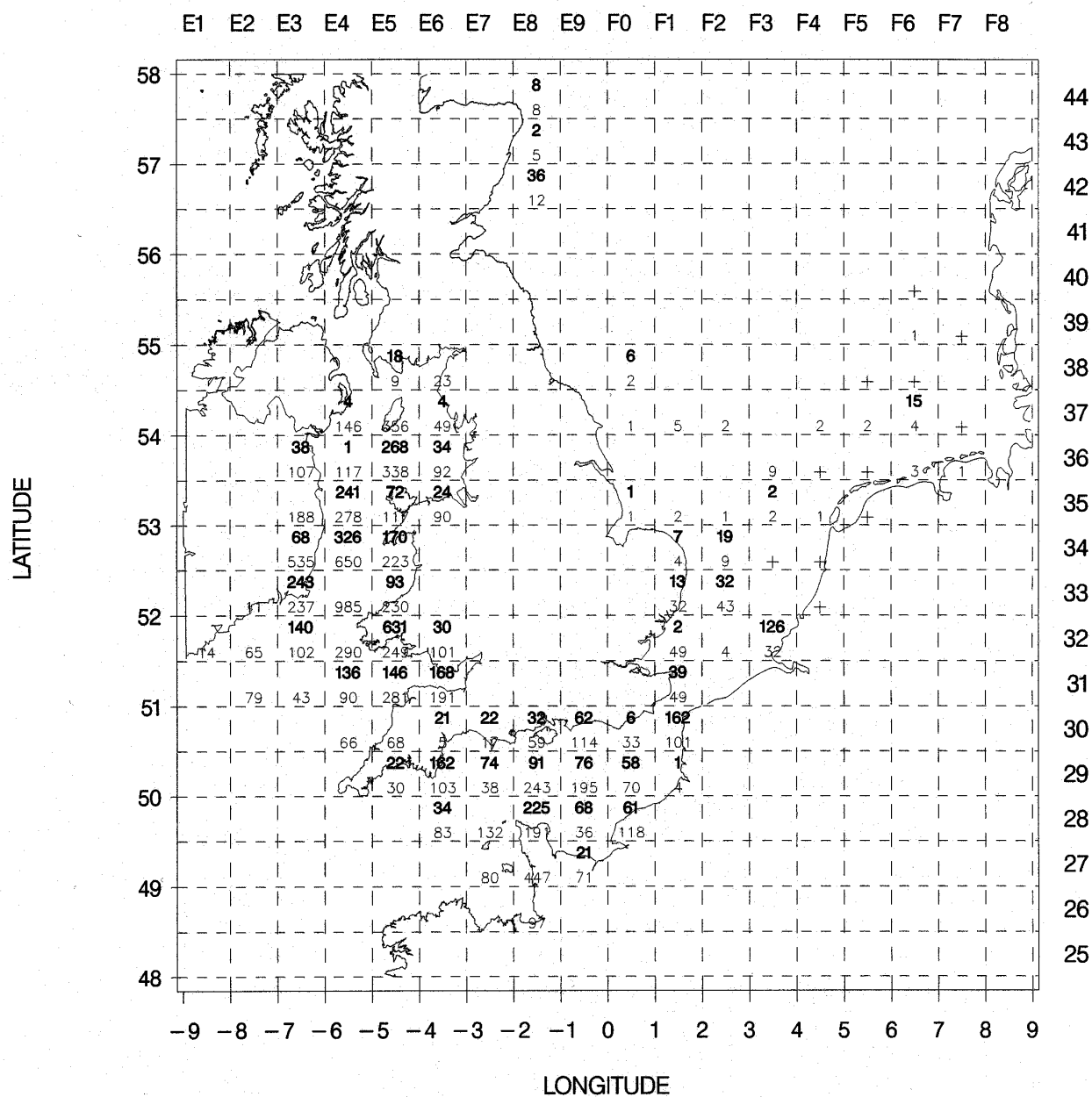


Figure 2.3.21 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

HADDOCK

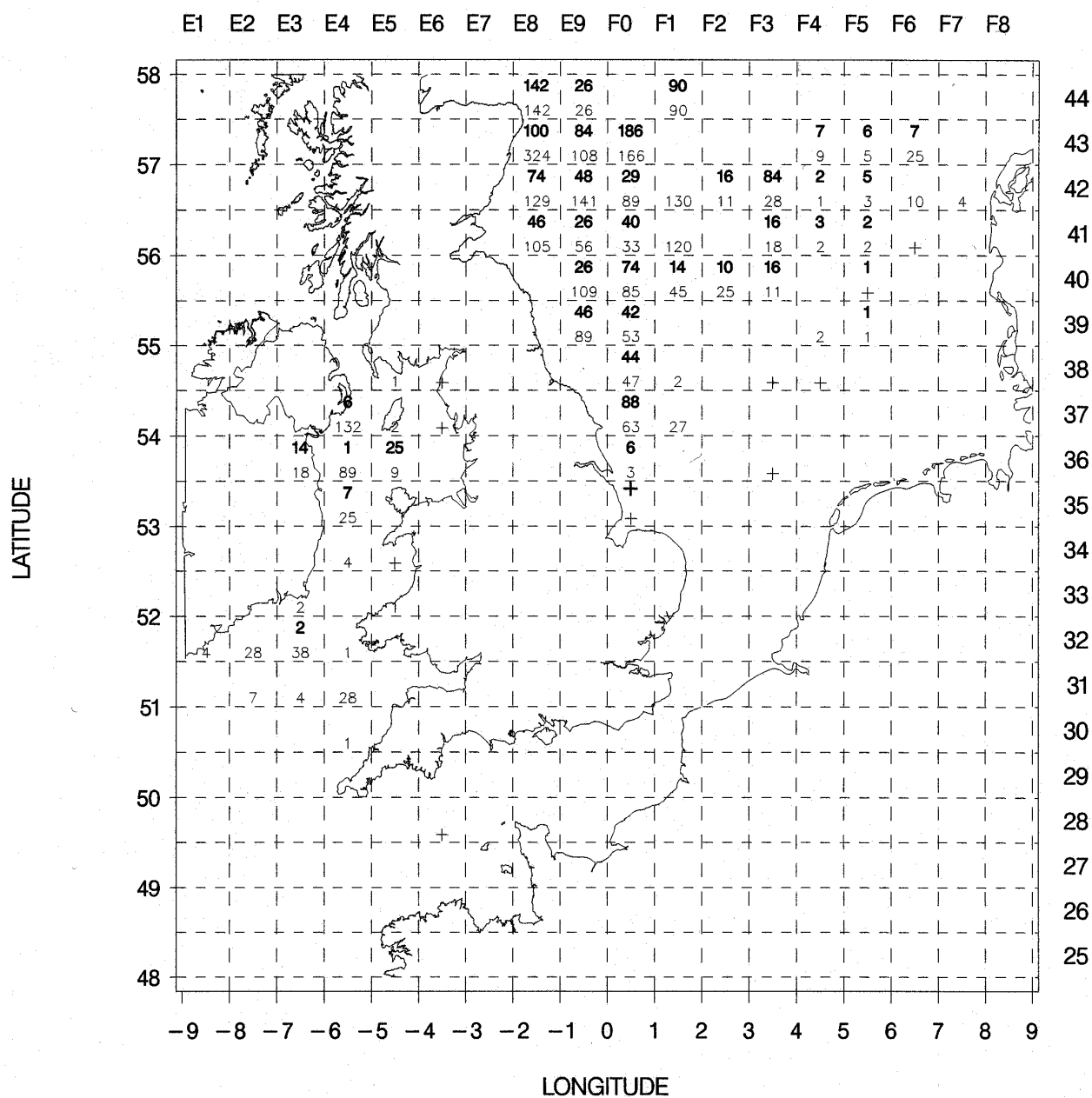


Figure 2.3.22 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

POUT WHITING (BIB)

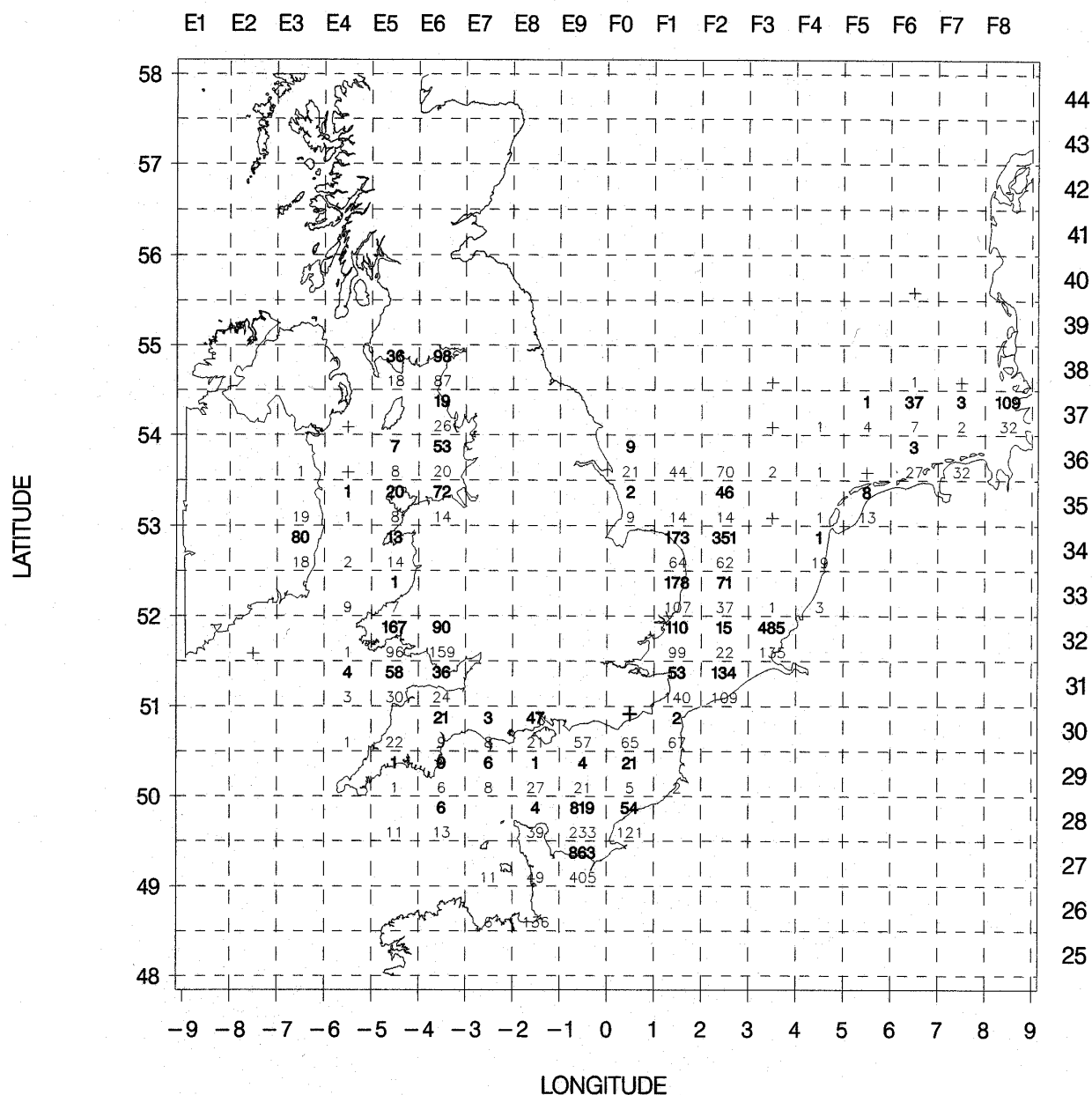


Figure 2.3.23 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

WHITING

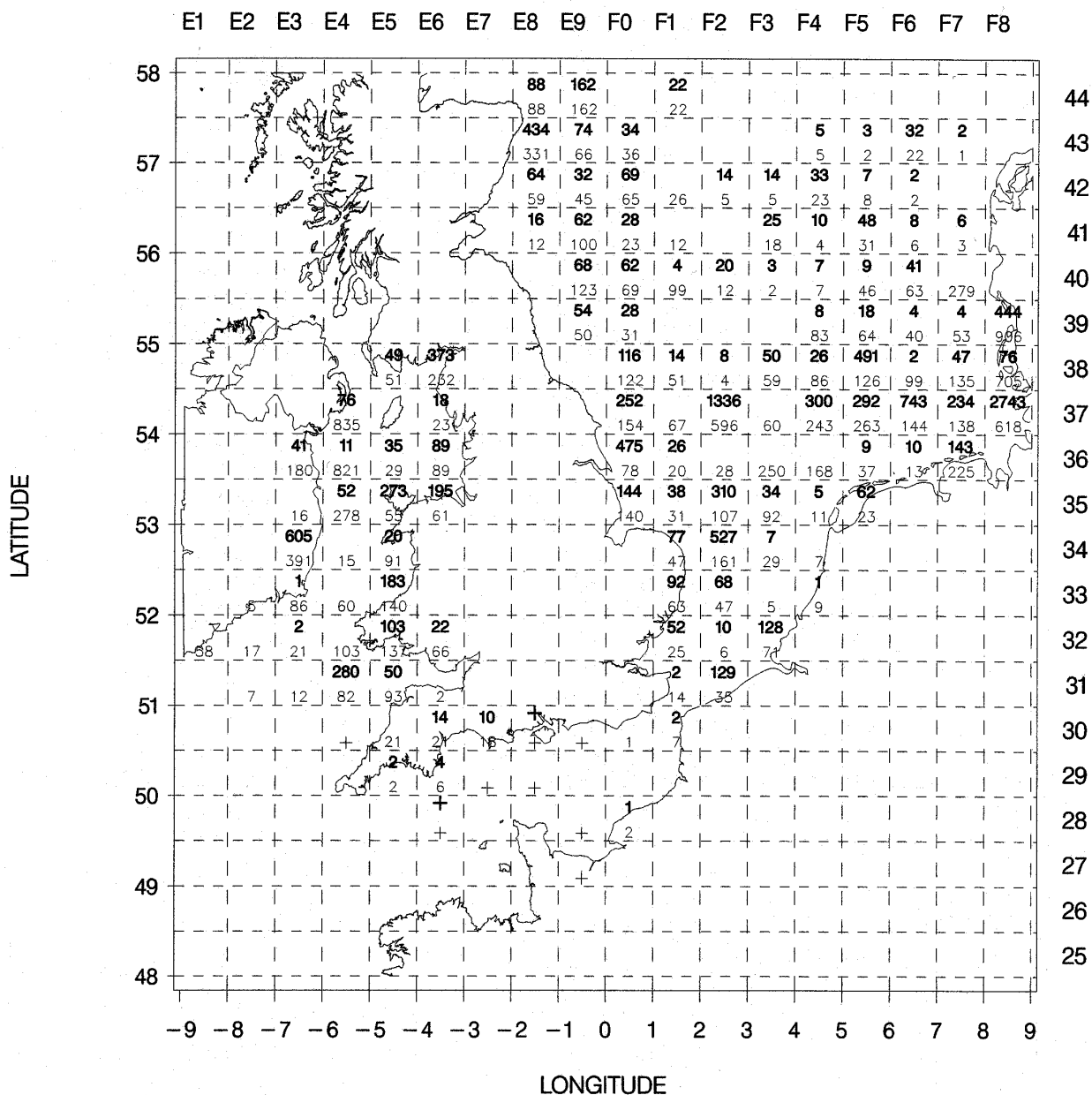


Figure 2.3.24 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

ANGLER FISH (MONK FISH)

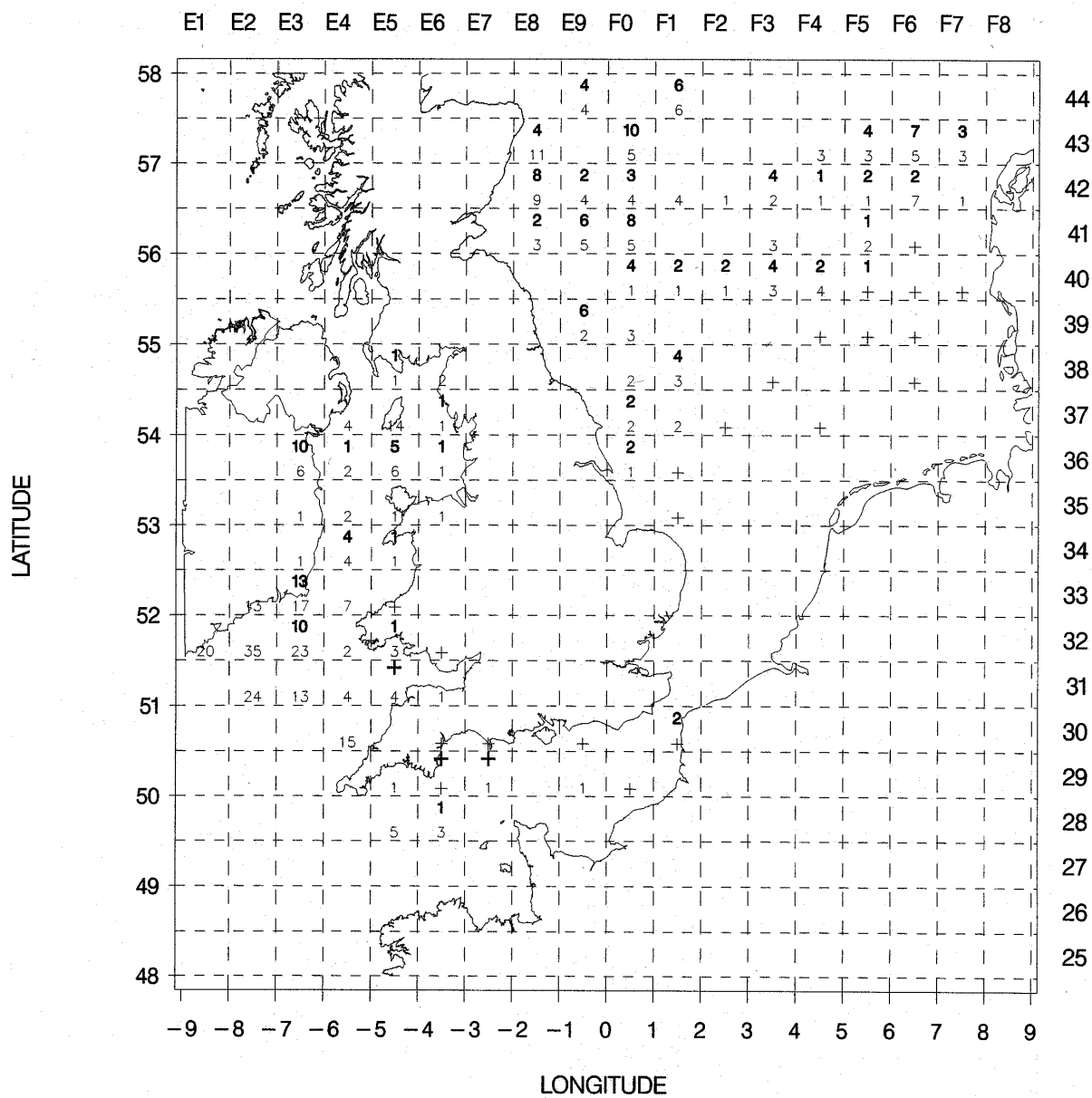


Figure 2.3.25 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle

1998 data in bold, above the survey mean ('+' = < 0.5)

JOHN DORY

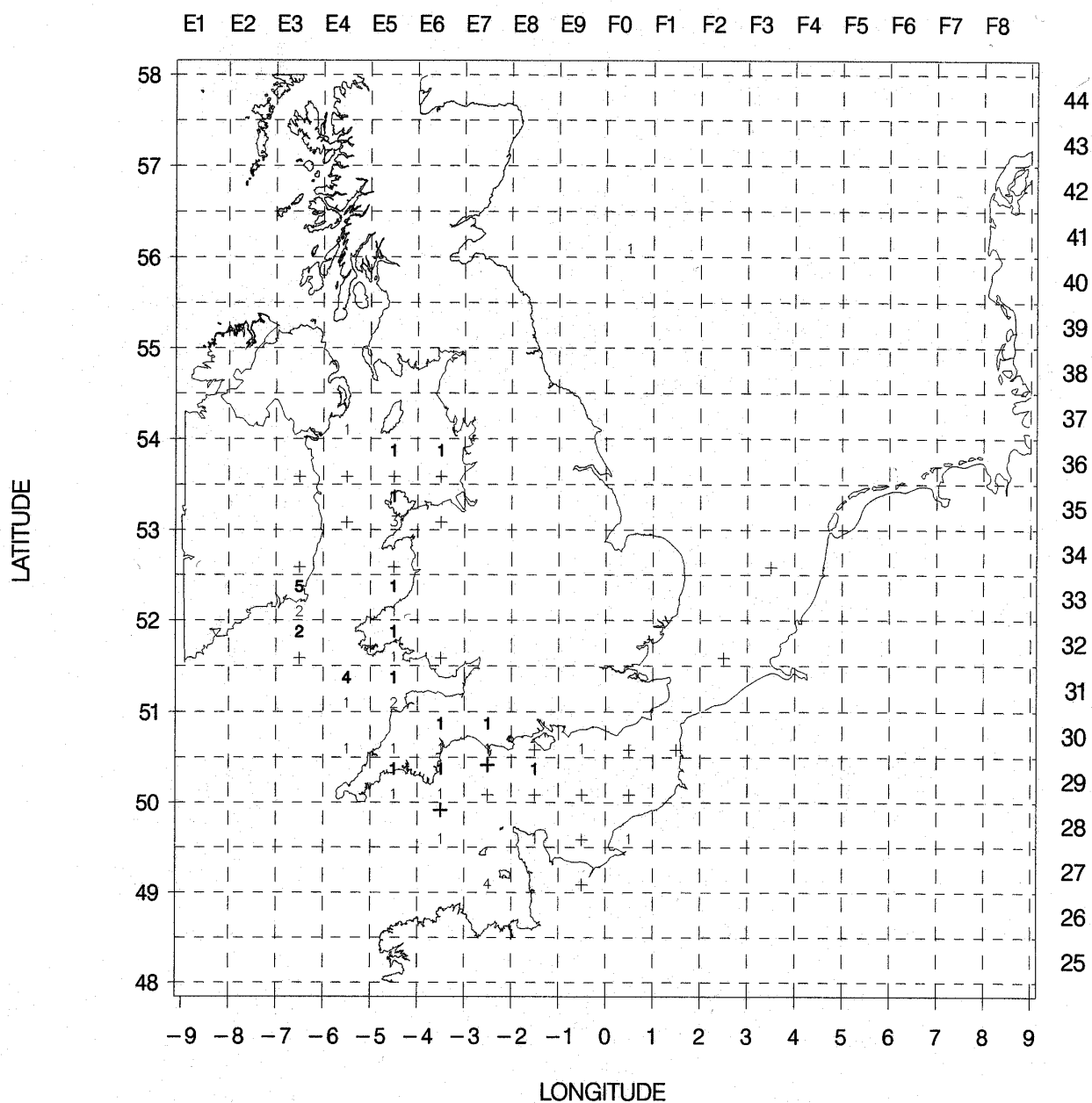


Figure 2.3.26 International Beam Trawl Surveys 1990–98

Catches in number / 8m beam / hour / rectangle
1998 data in bold, above the survey mean ('+' = < 0.5)

RED MULLET

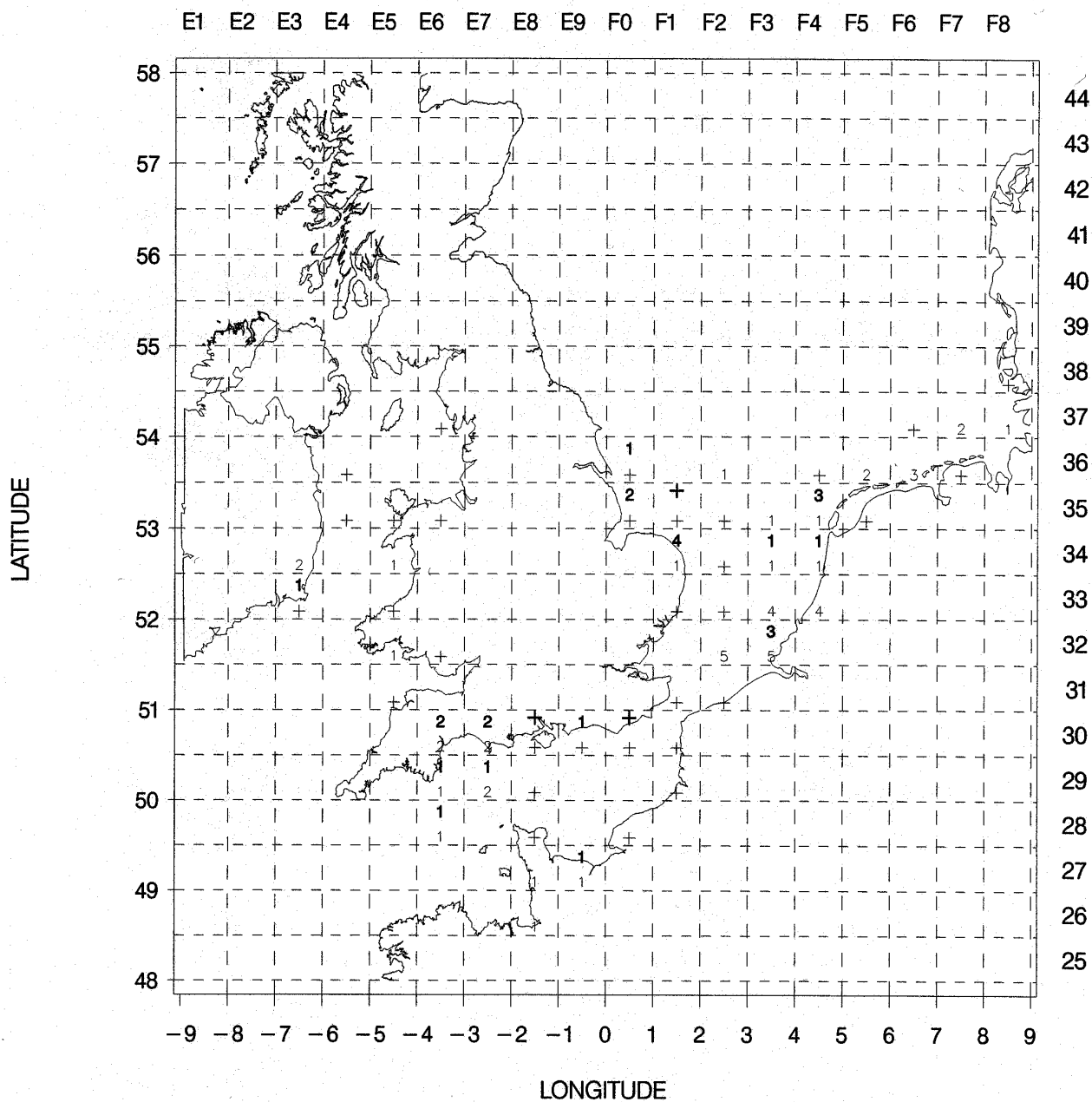


Figure 2.7.1 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
starfish – *Asterias rubens*

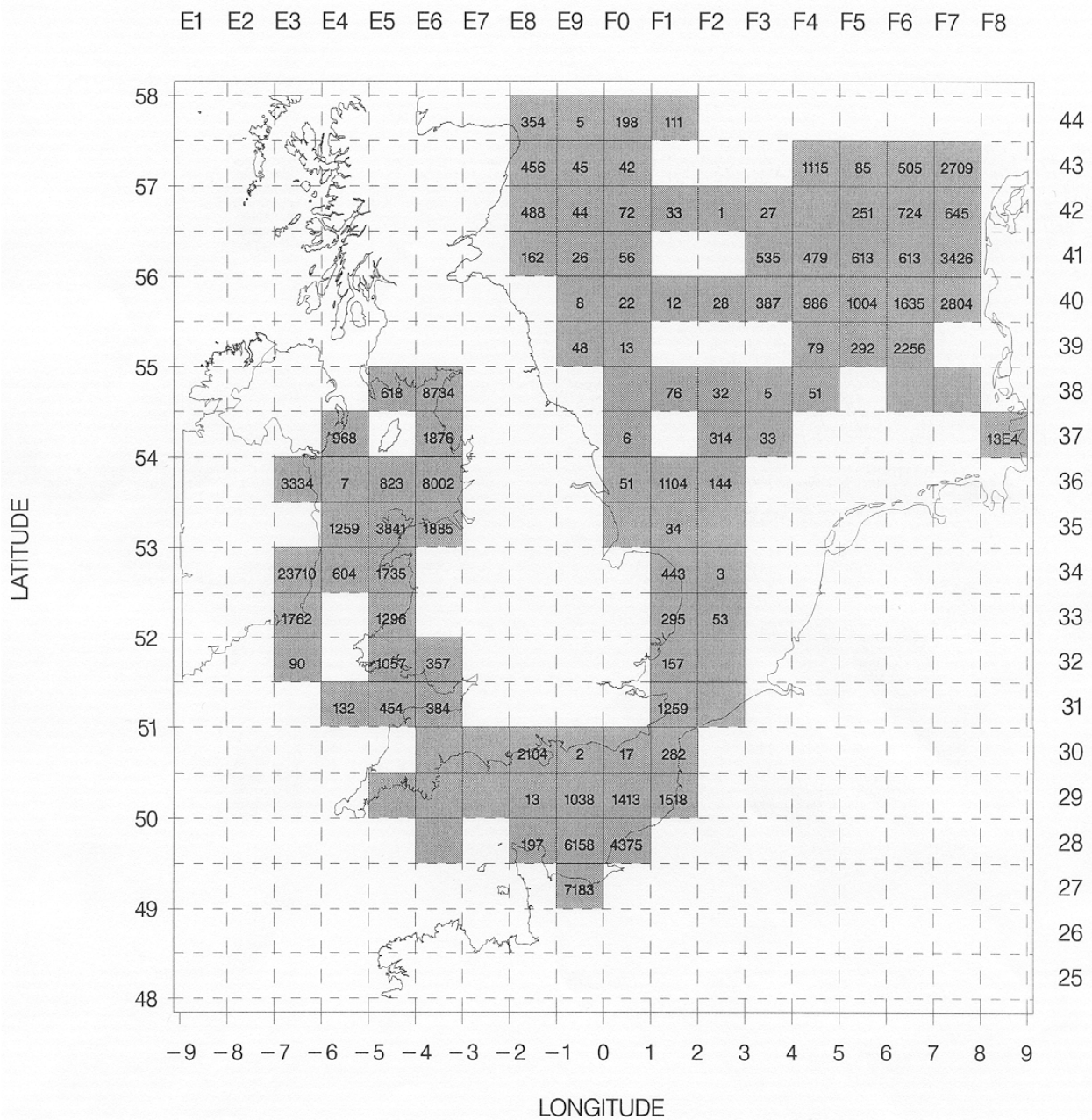


Figure 2.7.2 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
brown crab – *Cancer pagurus*

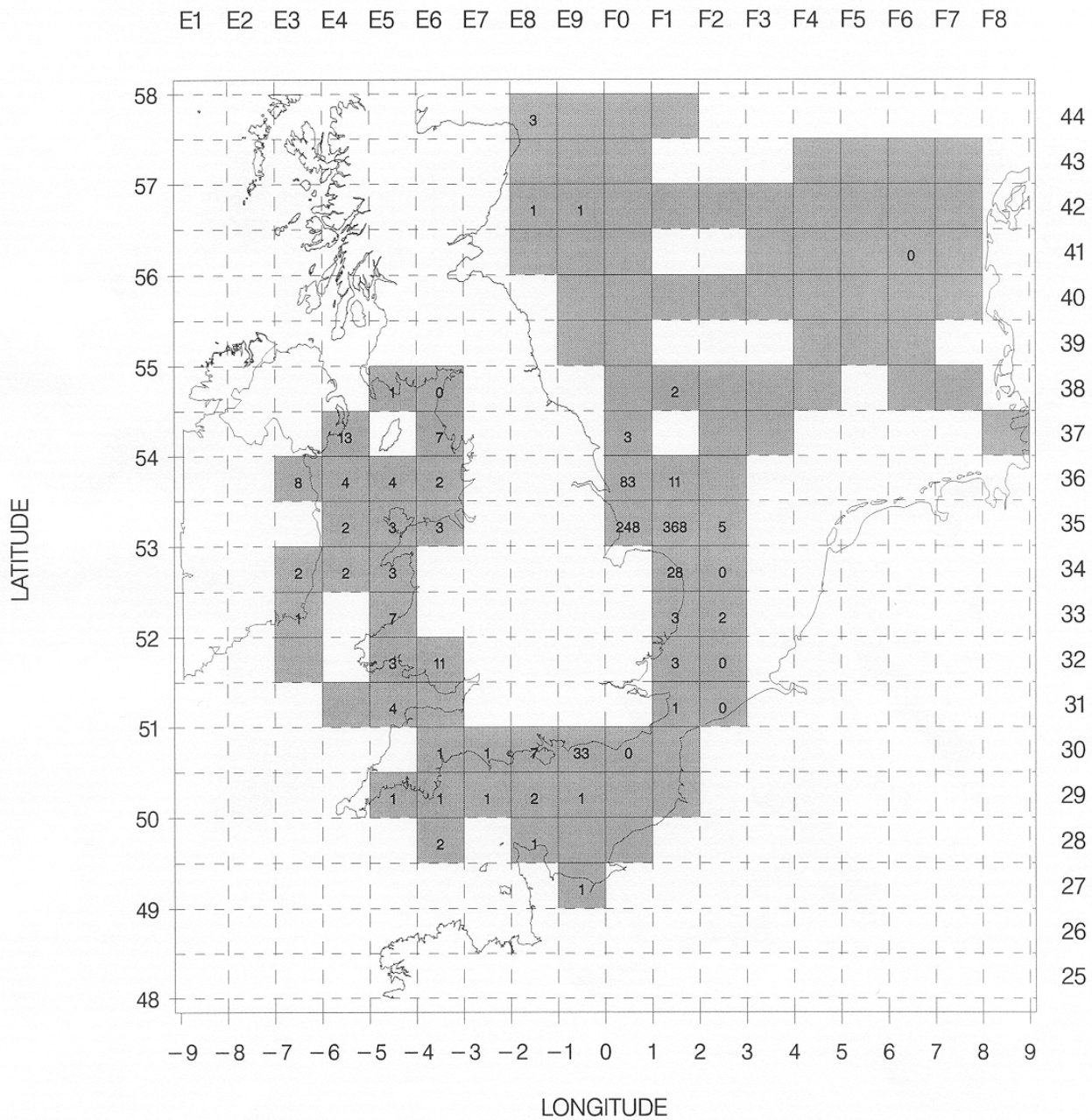


Figure 2.7.3 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
whelk – *Buccinum undatum*

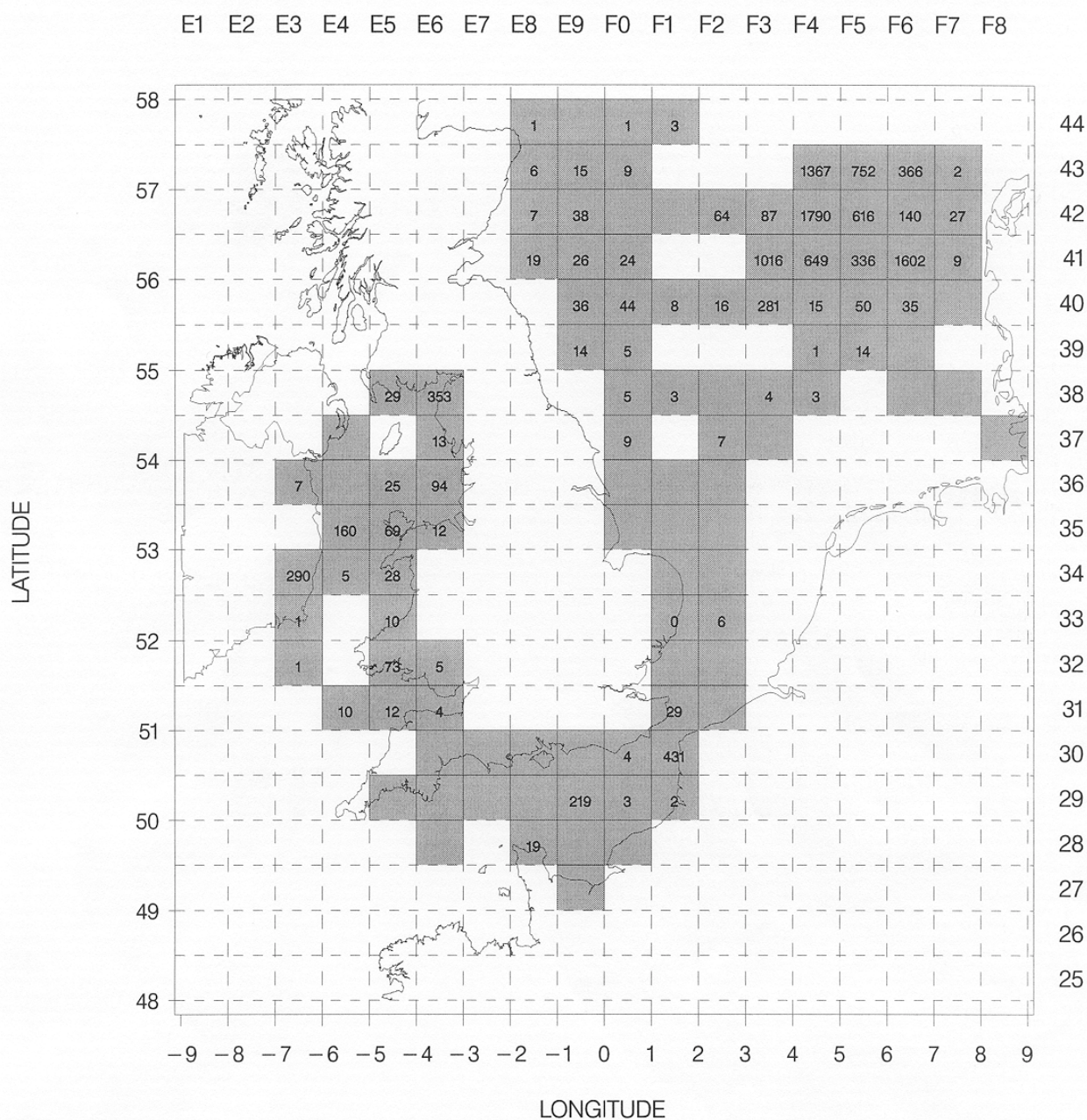


Figure 2.7.4 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
queen scallop – *Aequipecten opercularis*

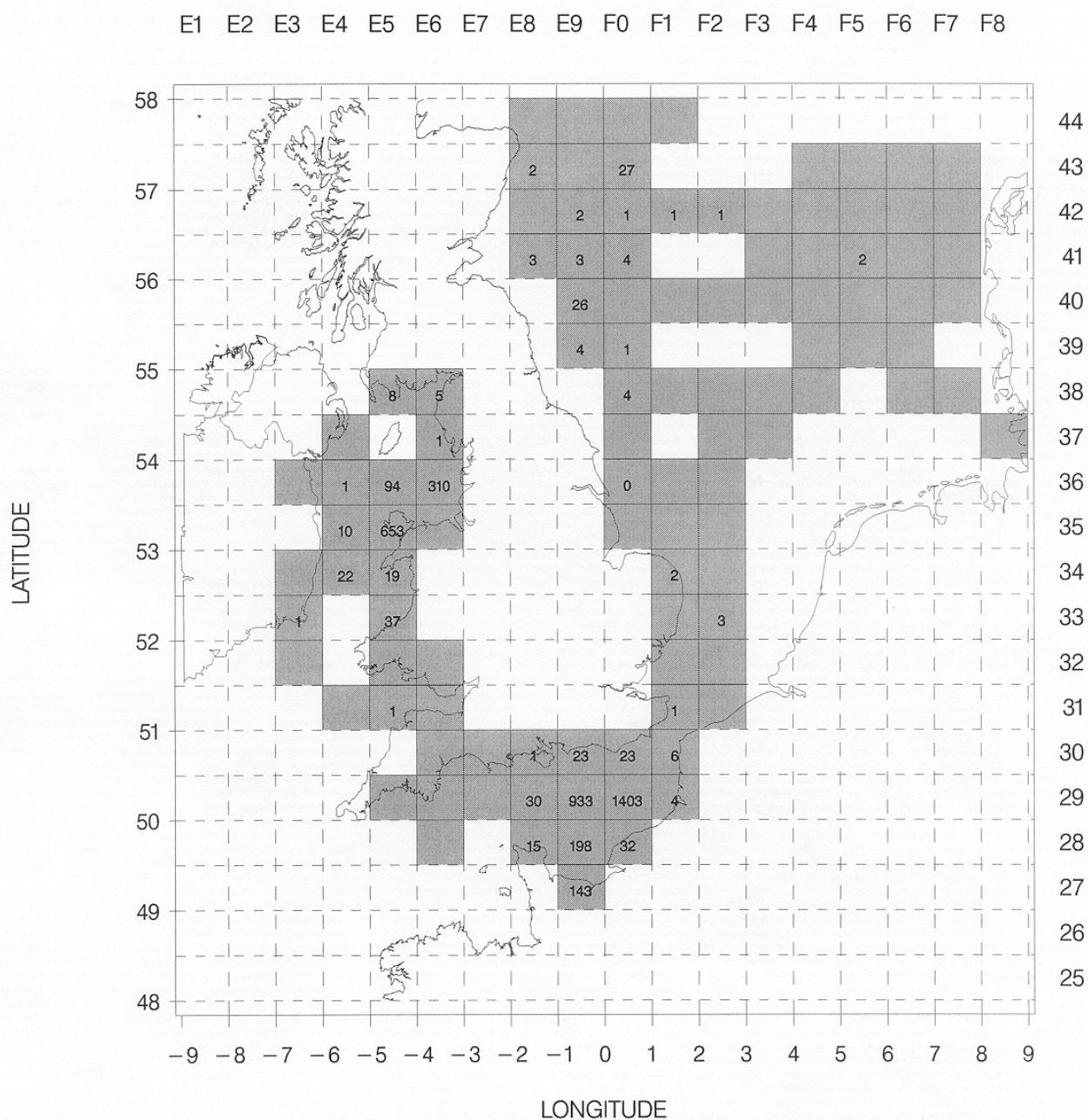


Figure 2.7.5 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
swimming crab – *Liocarcinus holsatis*

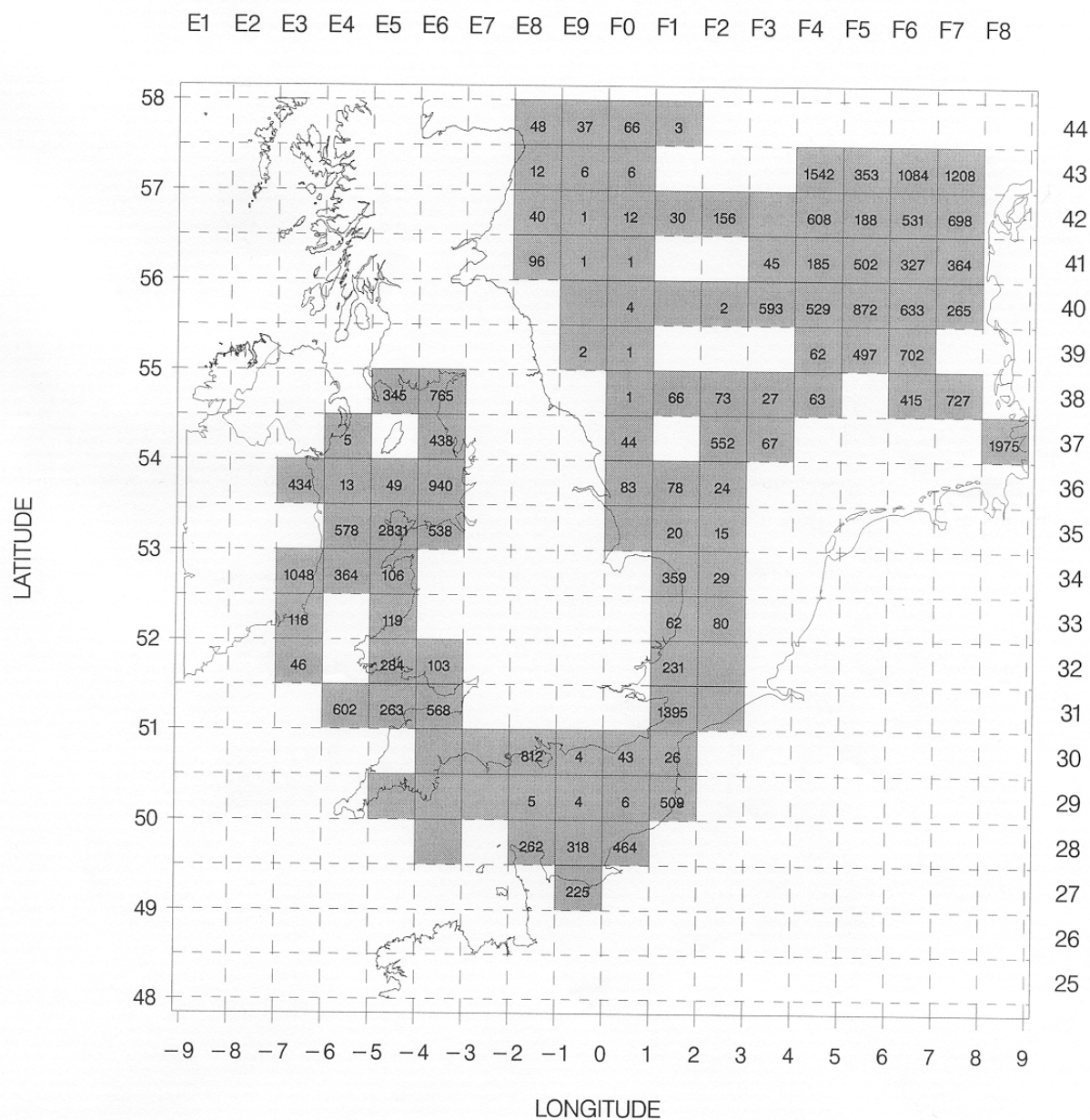


Figure 2.7.6 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
sea mouse – *Aphrodite aculeata*

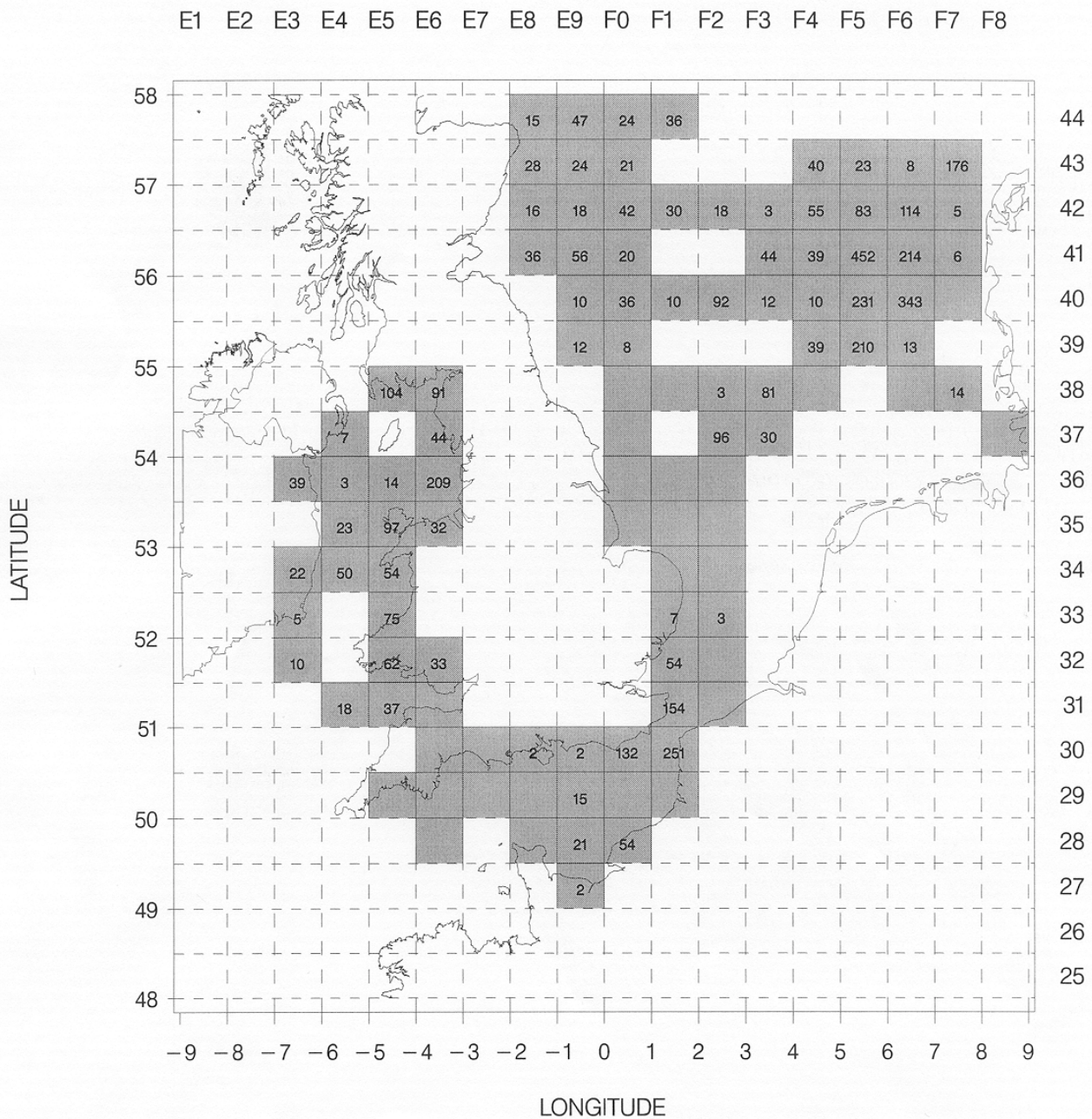


Figure 2.7.7 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
masked crab – *Corystes cassivelaunus*

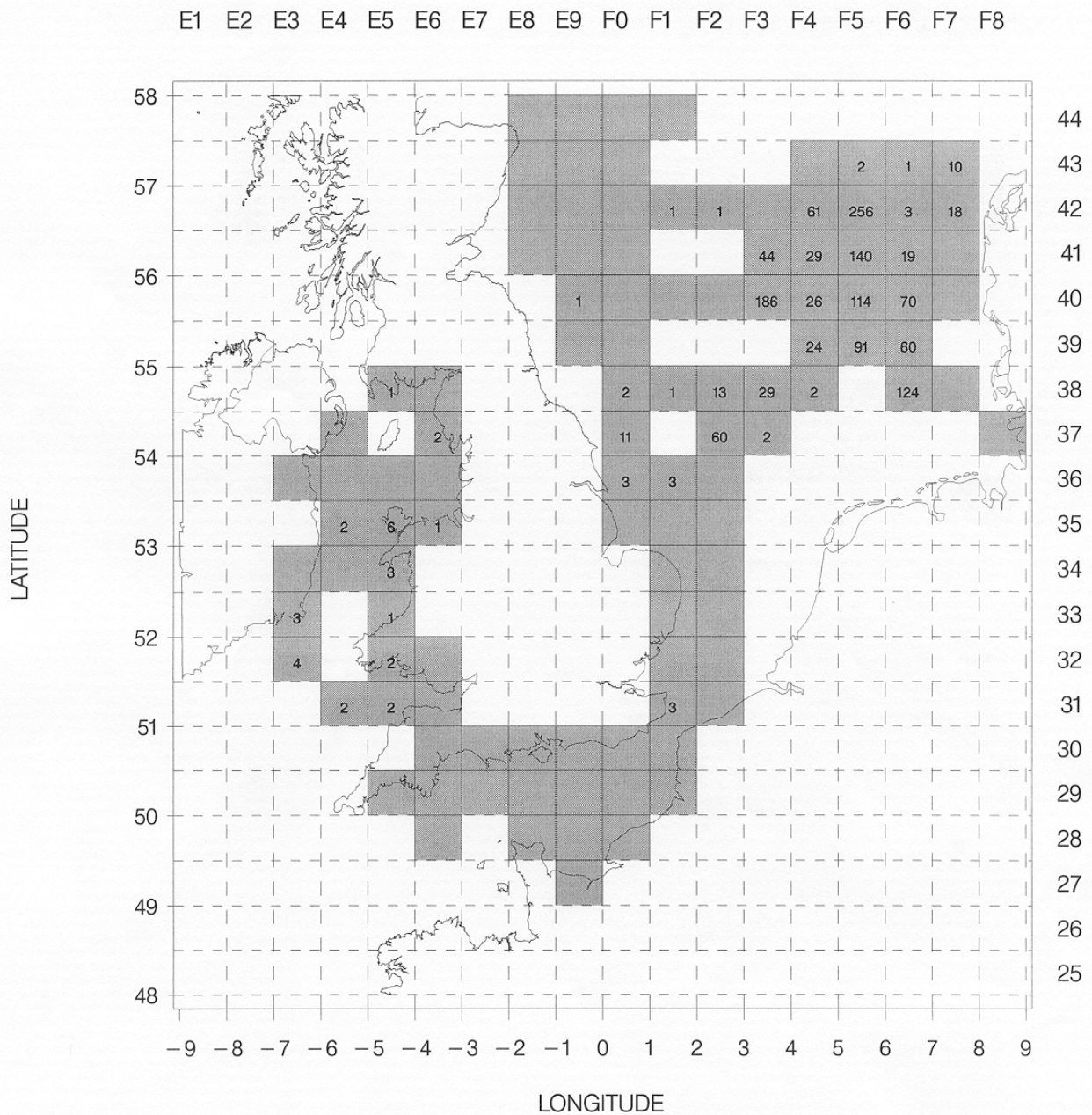


Figure 2.7.8 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
brittle star – *Ophiothrix fragilis*

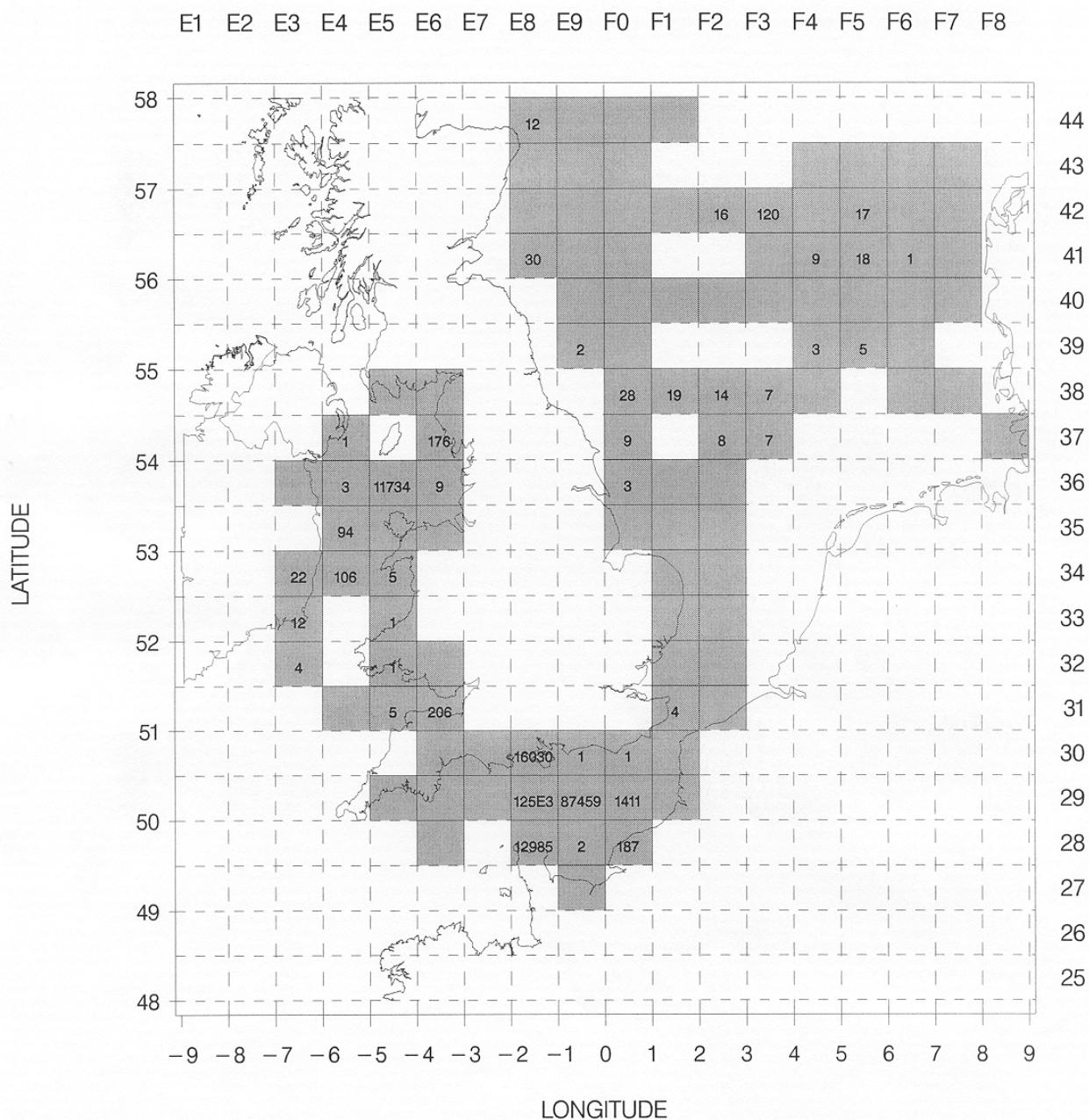


Figure 2.7.9 Catches of selected benthic invertebrates
(mean no./8m beam/30 min) from beam trawl surveys in 1998
dahlia anemone – *Urticina felina*

